Rhode Island Energy™

Rhode Island
Technical Reference Manual

For Estimating Savings from Energy Efficiency Measures

2025 Program Year

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APPENDICES

Introduction

This *Rhode Island Technical Reference Manual* ("TRM") documents for regulatory agencies, customers, and other stakeholders the methodologies and assumptions used by Rhode Island Energy to estimate the savings, including reductions in energy and demand consumption and other resource and non-energy impacts, attributable to its electric and gas energy efficiency programs. This reference manual provides methods, formulas, and default assumptions for estimating energy, peak demand and other resource and non-energy impacts from efficiency measures.

Within this TRM, efficiency measures are organized by the sector for which the measure is eligible and by the primary energy source associated with the measure. The three sectors are Residential, Income Eligible and Commercial & Industrial ("C&I"). The primary energy sources addressed in this TRM are electricity and natural gas.

Each measure is presented as a "measure characterization." The measure characterizations provide mathematical equations for determining savings (algorithms), as well as default assumptions and sources, where applicable. In addition, any descriptions of calculation methods or baselines are provided as appropriate. The parameters for calculating savings are listed in the same order for each measure.

Algorithms are provided for estimating annual energy and peak demand impacts for primary and secondary energy sources if appropriate. In addition, algorithms or calculated results may be provided for other non-energy impacts (such as water savings or operation and maintenance cost savings). Assumptions are based on Rhode Island data where available. Where Rhode Island-specific data is not available, assumptions may be based on: 1) manufacturer and industry data, 2) a combination of the best available data from jurisdictions in the same region, or 3) engineering judgment to develop credible and realistic factors.

The TRM is reviewed and updated annually to reflect changes in technology, baselines, and evaluation results.

The TRM in the Context of Energy Efficiency Programs

Overview

The purpose of this section is to show how the TRM fits into the process of administering energy efficiency programs in Rhode Island. This section explains how the TRM is connected to the following efforts:

- Planning,
- Annual reporting,
- Updates to Rhode Island Energy tracking systems,
- Evolution of program and measure cost effectiveness analysis tools,
- Evaluation, Measurement and Verification ("EM&V"),
- Quality control.

Planning and Reporting

Rhode Island Energy is submitting this version of the RI TRM (the 2025 TRM) to the stakeholders along with its Energy Efficiency Program Plan ("EE Program Plan") for 2025.

The RI TRM provides regulators and stakeholders with documentation of the assumptions and algorithms that Rhode Island Energy will use in planning and reporting its energy savings for 2025. It can also be used to support qualification in ISO-New England Forward Capacity Market Auctions. However, due to the nature of planning, not all planning assumptions – such as those for Commercial and Industrial programs – are documented in this TRM. For these areas, the algorithms used to calculate planned savings are presented.

Updates to Program Administrator Tracking Systems

Rhode Island Energy maintains a tracking system that contains the energy efficiency data that it uses to meet its annual reporting to the RI PUC. The current design of the tracking system influences the types of assumptions and algorithms that appear in this TRM. The current algorithms leverage inputs that Rhode Island Energy collects.

Evolution of Program and Measure Cost Effectiveness Analysis Tools

The program and measure cost effectiveness analysis tools are Microsoft® Excel® workbooks used by Rhode Island Energy to ensure that the measures and programs that they implement meet the cost effectiveness requirements defined by the filed three year plans, standards, and annual plans. Rhode Island Energy also uses the output from the cost effectiveness analysis tools to develop the input (data, tables, and graphs) for its EE Program Plans and Year-End Reports.

Evaluation, Measurement and Verification

Evaluation, Measurement and Verification ("EM&V") ensures that the programs are evaluated, measured, and verified in a way that provides confidence to the public at large that the savings are real and in a way that enables Rhode Island Energy to report those savings to the EERMC and RI PUC with full confidence.

A secondary goal of creating a TRM is to identify areas where savings calculations can be improved. The TRM will inform future EM&V planning as a means to make these improvements.

For its Rhode Island programs, Rhode Island Energy may use evaluation results from other jurisdictions. For some of these, Rhode Island contributed sites and/or budgets. For others, the application of results from other jurisdictions is considered based on how similar the programs, delivery, and markets are to those in Rhode Island.

Quality Control

Regulators and stakeholders can use the TRM to confirm that savings inputs and calculations are reasonable and reliable. However, the TRM cannot be used by regulators and stakeholders to replicate the Company's reported savings. The TRM does not provide regulators and stakeholders with data inputs at a level that is detailed enough to enable replication of the savings reported by Rhode Island Energy. These calculations occur within tracking systems, within separate Excel workbooks, and within cost effectiveness analysis tools. However, in the event that regulators and stakeholders request that Rhode Island Energy provide tracking system details, the reproduction of reported data will be possible using the TRM.

TRM Update Process

Overview

This section describes the process for updating the TRM. The update process is synchronized with the filing of EE Program Plans.

Updates to the TRM can include:

- additions of new measures,
- updates to existing TRM measures due to:
  - changes in baseline equipment or practices, affecting measure savings
  - changes in efficient equipment or practices, affecting measure savings
  - changes to deemed savings due the revised assumptions for algorithm parameter values (e.g., due to new market research or evaluation studies)
  - other similar types of changes,
- updates to impact factors (e.g., due to new impact evaluation studies),
- discontinuance of existing TRM measures, and
- updates to the glossary and other background material included in the TRM.

Each TRM is associated with a specific program year, which corresponds to the calendar year. The TRM for each program year is updated over time as needed to both plan for future program savings and to report actual savings. Please see Appendix D for the TRM updates that occurred for the upcoming program year.

Key Stakeholders and Responsibilities

Key stakeholders and their responsibilities for the TRM updates are detailed in the following table.

Stakeholder	Responsibilities
Rhode Island Energy	• Identify and perform needed updates to the TRM • Provide TRM to interested stakeholders
Rhode Island EEC and Division of Public Utilities and Carriers	• Review; suggest modifications; and accept TRM • Assure coordination with Rhode Island Energy submissions of program plans and reported savings

Jointly	• Administrative coordination of TRM activities, including:
	  • Assure collaboration and consensus regarding TRM updates
	  • Assure updates are compiled and incorporated into the TRM
	  • Coordinate with related program activities (e.g., evaluation and program reporting processes)

TRM Update Cycle

The description below indicates the main milestones of the TRM update cycle over a period of two years. The identifier "program year" or "PY" is used to show that this cycle will be repeated every year. For example, for the 2025 Program Year, compilation of updates continues up through September 2025 for submission in the TRM in October 2025.

September PY-2 to September PY-1: The PY TRM will be updated as needed based on evaluation studies and any other updates.

After the PY-1 TRM has been filed, there may be updates to the TRM. The most common updates to the TRM will result from new evaluation studies. Results of evaluation studies will be integrated into the next version of the TRM as the studies are completed. Other updates may include the results of group discussions to adopt latest research or the addition or removal of energy efficiency measures.

October/November (PY-1) prior to program year: The PY TRM is filed with Rhode Island Energy's PY EE program plan.

The PY TRM is submitted to the PUC jointly with Rhode Island Energy's EE program plan. With regard to the program plans, the TRM is considered a "planning document" in that it provides the documentation for how the Company *plan* to count savings for that program year. The TRM is not intended to fully document how the Company develop their plan estimates for savings.

January PY: Rhode Island Energy begins to track savings based on the PY TRM.

Beginning in January PY, Rhode Island Energy will track savings for the PY based on the PY TRM.

Measure Characterization Structure

This section describes the common entries or inputs that make up each measure characterization. A formatted template follows the descriptions of each section of the measure characterization.

Applicability: All Measures shown within the 2025 TRM are active for the 2025 Program Year: from 1/1/2025 to 12/31/2025.

Source citations: The source of each assumption or default parameter value should be properly referenced in a footnote.

Measure Description Overview

This section will include a plain text description of the efficient and baseline technology and the benefit(s) of its installation, as well as subfields of supporting information including:

Fuel: The fuel against which savings are being claimed, and the program from which EE incentives are being drawn. Indicates whether a measure is part of the electric or gas portfolio.

Sector: Indicates whether measure is Residential, Income Eligible or Commercial and Industrial.

Program Type: Indicates if the measure is prescriptive or custom.

Measure Category: Indicates the measure category, for example: Lighting, HVAC, Hot Water, Products, Food Service, Compressed Air, Motors/Drives, Refrigeration, Behavior, Custom, etc.

Measure Type and Sub-type: Further measure classification for purposes of sorting measures

Program Name: The current program name under which the measure is being delivered.

Group Name: A group consists of one measure or multiple measures. Measures in one group consist of the same measure description, baseline description, savings principle, savings calculation method and savings unit. Measures in the same group may vary by deemed savings value, measure life, and loadshapes.

Measure Name: A single device or behavior may be analyzed as a range of measures depending on a variety of factors which largely translate to where it is and who is using it. Such factors include hours of use, location, and baseline (equipment replaced or behavior modified). For example, the same screw-in LED lamp will produce different savings if installed in an emergency room waiting area than if installed in a bedside lamp.

Measure Description: Description of the energy efficiency measure, its benefits, and applications.

Baseline Description: Description of the assumed equipment/operation efficiency in the absence of program intervention. Multiple baselines will be provided as needed, e.g., for different markets.

Baselines may refer to reference tables or may be presented as a table for more complex measures.

Savings Principle: The means by which the measure saves energy relative to the baseline. Description of the assumed or calculated equipment/operation efficiency from which the energy and demand savings are determined. The high efficiency case may be based on specific details of the measure installation, minimum requirements for inclusion in the program, or an energy efficiency case based on historical participation. It may refer to tables within the measure characterization or in the appendices or efficiency standards set by organizations such as ENERGY STAR or the Consortium for Energy Efficiency.

Savings Calculation method: How the savings values are determined; in most cases, values are either deemed or calculated.

Savings unit: Required minimum unit / characteristic for claiming listed savings values.

Savings

This section includes various information on the measure savings and how they are determined.

- **Summary Average Gross Savings per Unit by Program:** This table summarizes the resource savings (kWh, kW, MMBtu) of all efficiency offerings within a measure category via a weighted average of their savings. This is only for illustrating savings and does not correspond to how savings are tracked
    - **Program:** This describes the programs in which the measures are offered. Some measures are offered in multiple programs.
    - **Sector and Program Name mapping will be as follows**:

Sector	Fuel	Full Program Name
Residential	Electric	Residential New Construction
		Residential HVAC
		EnergyWise Single Family
		EnergyWise Multifamily
		Home Energy Reports
		Residential Consumer Products
	Gas	Residential New Construction
		Residential HVAC
		EnergyWise Single Family
		EnergyWise Multifamily
		Home Energy Reports
Residential Income Eligible	Electric	Income Eligible Single Family
		Income Eligible Multifamily
	Gas	Income Eligible Single Family
		Income Eligible Multifamily
Commercial & Industrial	Electric	Large Commercial New Construction
		Large C&I Retrofit
		Small Business Direct Install

	Gas	Large Commercial New Construction
		Large C&I Retrofit
		Small Business Direct Install
		C&I Multifamily

- **Algorithm Type:** This section describes which of four methods of savings calculation applies to a measure
    - Deemed: The same savings are allocated to every unit of a measure
    - Engineering Algorithm with Deemed Inputs: Measure savings are calculated with an engineering formula, the inputs of which are constant for all units of a measure.
    - Engineering Algorithm with Site Specific Inputs: Measure savings are calculated with an engineering formula, the inputs of which depend on data from the installation site.
    - Custom: Each unit of a measure receives a unique savings calculation that depends on site specific data.
- **Units:** This section describes what is installed or affected by an efficiency measure (e.g. a boiler or a participant). It defines the quantity counted for savings.
- **Algorithm:** This section will describe the method for calculating the primary energy savings in appropriate units, i.e., kWh for electric energy savings or MMBtu for natural gas energy savings. The savings algorithm will be provided in a form similar to the following

  $\Delta kWh = \Delta kW \times Hours$

  Similarly, the method for calculating electric demand savings will be provided in a form similar to the following:

  $\Delta kW = (Watts_{BASE} - Watts_{EE})/1000$

  Below the savings algorithms, a table contains the definitions (and, in some cases, default values) of each input in the equation(s). The inputs for a particular measure may vary and will be reflected as such in this table (see example below).

ΔkWh	=	gross annual kWh savings from the measure
ΔkW	=	gross connected kW savings from the measure
Hours	=	average hours of use per year
WattsBASE	=	baseline connected kW
WattsEE	=	energy efficient connected kW

- **Hours**: The operating hours for equipment that is either on or off, or equivalent full load hours for technologies that operate at partial loads, or reduced hours for controls. Reference tables will be used as needed to avoid repetitive entries.
- **Measure Gross Savings per Unit:** This table summarizes the unit resource impacts of each efficiency offering within a measure category (e.g., the savings for boilers of different efficiencies and ratings in the Boiler measure category). The source for each

value is referenced.

- **Non-Energy Impacts:** The non-energy impacts are shown for each efficiency measure under Annual and One-Time headings, depending on their recommended application approach. The NEIs are shown with more detail in Appendix B.

- **Measure Life:** Measure Life includes equipment life and the effects of measure persistence. Equipment life is the number of years that a measure is installed and will operate until failure. Measure persistence takes into account business turnover, early retirement of installed equipment, and other reasons measures might be removed or discontinued**.**

Other impact factors are defined in the next section.

Impact Factors for Calculating Adjusted Gross and Net Savings

Rhode Island Energy uses the algorithms in the Measure Characterization sections to calculate the gross savings for energy efficiency measures. Impact factors are then applied to make various adjustments to the gross savings estimate to account for the performance of individual measures or energy efficiency programs as a whole in achieving energy reductions as assessed through evaluation studies. Impacts factors address both the technical performance of energy efficiency measures and programs, accounting for the measured energy and demand reductions realized compared to the gross estimated reductions, as well as the programs' effect on the market for energy efficient products and services.

This section describes the types of impact factors used to make such adjustments, and how those impacts are applied to gross savings estimates. Definitions of the impact factors and other terms are also provided in the Glossary (Appendix E).

Types of Impact Factors

The impact factors used to adjust savings fall into one of two categories:

Impact factors used to adjust gross savings:

- In-Service Rate ("ISR")
- Savings Persistence Factor ("SPF")
- Realization Rate ("RR")
- Summer and Winter Peak Demand Coincidence Factors ("CF").

Impact factors used to calculate net savings:

- Free-Ridership ("FR") and Spillover ("SO") Rates
- Net-to-Gross Ratios ("NTG").

The **in-service rate** is the actual portion of efficient units that are installed. For example, efficient lamps may have an in-service rate less than 1.00 since some lamps are purchased as replacement units and are not immediately installed. The ISR is 1.00 for most measures.

The **savings persistence factor** is the portion of first-year energy or demand savings expected to persist over the life of the energy efficiency measure. The SPF is developed by conducting surveys of installed equipment several years after installation to determine the actual operational capability of the equipment. The SPF is 1.00 for most measures.

In contrast to savings persistence, *measure persistence* takes into account business turnover, early retirement of installed equipment, and other reasons the installed equipment might be removed or discontinued. Measure persistence is generally incorporated as part of the measure life, and therefore is not included as a separate impact factor.

The **realization rate** is used to adjust the gross savings (as calculated by the savings algorithms) based on impact evaluation studies. The realization rate is equal to the ratio of measure savings developed from an impact evaluation to the estimated measure savings derived from the savings algorithms. The realization rate does not include the effects of any other impact factors. Depending on the impact evaluation study, there may be separate realization rates for energy (kWh), peak demand (kW), or fossil fuel energy (MMBtu).

A **coincidence factor** adjusts the connected load kW savings derived from the savings algorithm. A coincidence factor represents the fraction of the connected load reduction expected to occur at the same time as a particular system peak period. The coincidence factor includes both coincidence and diversity factors combined into one number, thus there is no need for a separate diversity factor in this TRM.

Coincidence factors are provided for the on-peak period as defined by the ISO New England for the Forward Capacity Market ("FCM") and are calculated consistently with the FCM methodology. Electric demand reduction during the ISO New England peak periods is defined as follows:

- Summer On-Peak: average demand reduction from 1:00-5:00 PM on non-holiday weekdays in June July, and August
- Winter On-Peak: average demand reduction from 5:00-7:00 PM on non-holiday weekdays in December and January

The values described as Coincidence Factors in the TRM are not always consistent with the strict definition of a Coincidence Factor (CF). It would be more accurate to define the Coincidence Factor as "the value that is multiplied by the Gross kW value to calculate the average kW reduction coincident with the on-peak periods." A coincidence factor of 1.00 may be used because the coincidence is already included in the estimate of Gross kW; this is often the case when the "Max kW Reduction" is not calculated and instead the "Gross kW" is estimated using the annual kWh reduction estimate and a load shape model.

A **free-rider** is a customer who participates in an energy efficiency program (and gets an incentive) but who would have installed some or all of the same measure(s) on their own, with no change in timing of the installation, if the program had not been available. The **free-ridership rate** is the percentage of savings attributable to participants who would have installed the measures in the absence of program intervention.

The **spillover rate** is the percentage of savings attributable to a measure or program, but additional to the gross (tracked) savings of a program. Spillover includes the effects of 1) participants in the program who install additional energy efficient measures outside of the program as a result of participating in the program, and 2) non-participants who install or influence the installation of energy efficient measures as a result of being aware of the program. These two components are the **participant spillover** (SOP) and **non-participant spillover** (SONP).

The **net savings** value is the final value of savings that is attributable to a measure or program. Net savings differs from gross savings because it includes the effects of the free-ridership and/or spillover rates.

The **net-to-gross** (NTG) ratio is the ratio of net savings to the gross savings adjusted by any impact factors (i.e., the "adjusted" gross savings). Depending on the evaluation study, the NTG ratio may be determined from the free-ridership and spillover rates, if available, or it may be a distinct value with no separate specification of FR and SO values.

Standard Net–to–Gross Formulas

The TRM measure entries provide algorithms or methodologies for calculating the gross energy and demand savings for each category of efficiency measures. The following standard formulas show how the impact factors are applied to calculate the net savings. These are the calculations used by Rhode Island Energy to track and report gross and net savings for its energy efficiency programs in Rhode Island.

- **Calculation of Net Annual Electric Energy Savings**
  net_kWh = gross_kWh × SPF × ISR × RRE × NTG

- **Calculation of Net Summer Electric Peak Demand Coincident kW Savings**
  $net\_kW_{SP} = gross\_kW \times SPF \times ISR \times RR_{SP} \times CF_{SP} \times NTG$

- **Calculation of Net Winter Electric Peak Demand Coincident kW Savings**
  $net\_kW_{WP} = gross\_kW \times SPF \times ISR \times RR_{WP} \times CF_{WP} \times NTG$

- **Calculation of Net Annual Natural Gas Energy Savings**
  $net\_MMBtu = gross\_MMBtu \times SPF \times ISR \times RR_{G} \times NTG$

Where:
gross_kWh = Gross Annual kWh Savings
net_kWh = Net Annual kWh Savings
$gross\_kW_{SP}$ = Gross Connected kW Savings (summer peak)
$gross\_kW_{WP}$ = Gross Connected kW Savings (winter peak)
net_kW_{SP} = Adjusted Gross Connected kW Savings (winter peak)
net_kW_{WP} = Net Coincident kW Savings (winter peak)
gross_MMBtu = Gross Annual MMBtu Savings
net_MMBtu = Net Annual MMBtu Savings
SPF = Savings Persistence Factor
ISR = In-Service Rate
CF_{SP} = Peak Coincidence Factor (summer peak)
CF_{WP} = Peak Coincidence Factor (winter peak)
RR_{E} = Realization Rate for electric energy (kWh)
RR_{G} = Realization Rate for gas (MMBtu)

RR_{SP} = Realization Rate for summer peak kW
RR_{WP} = Realization Rate for winter peak kW
NTG = Net-to-Gross Ratio
FR = Free-Ridership Factor
SOP = Participant Spillover Factor
SONP = Non-Participant Spillover Factor

Depending on the evaluation study methodology:

- NTG is equal to (1 – FR + SO_P + SO_{NP}), or
- NTG is a single value with no distinction of FR, SO_P, SO_{NP}, and/or other factors that cannot be reliably isolated.

Measure Characterizations

EnergyWise Multifamily, Electric

Aerator

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Flow Control | **Measure Sub Type:** Faucet Aerator

Program: EnergyWise Multifamily

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity.

Baseline Description

The baseline efficiency case is 2.2 GPM or greater faucet.

Measures

Measure Name	Unique Identifier
Aerator - Elec	Electric Residential EnergyWise Multifamily Aerator - Elec
Aerator - Oil	Electric Residential EnergyWise Multifamily Aerator - Oil
Aerator - Other	Electric Residential EnergyWise Multifamily Aerator - Other

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less aerator installed.

Savings Method

Calculated using site-specific inputs

Unit

Installed faucet aerator.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Aerator - Elec	38.00	0.009					
Aerator - Oil			0.20				
Aerator - Other				0.20			

Energy Impact Factors

Measure	Measure Life
Aerator - Elec	7
Aerator - Oil	
Aerator - Other	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Aerator	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Aerator - Elec	1.00	1.00	ls_08_Electric
Aerator - Oil	N/A	N/A	ls_00_Electric
Aerator - Other	N/A	N/A	ls_00_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
	359				
Aerator - Elec		$0.714			
Aerator - Oil		$0.714			
Aerator - Other		$0.714			

Water Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Aerator	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Aerator - Elec	$5.00 / measure	$5.00 / measure
Aerator - Oil	$5.00 / measure	$5.00 / measure
Aerator - Other	$5.00 / measure	$5.00 / measure

Air Sealing

Sector: Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** Air Sealing | **Measure Sub Type:**

Program: EnergyWise Multifamily

Measure Description

Thermal shell air leaks are sealed through strategic use and location of air-tight materials.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)

Measures

Measure Name	Unique Identifier
Air Sealing - Elec	Electric Residential EnergyWise Multifamily Air Sealing - Elec
Air Sealing - Elec w/AC	Electric Residential EnergyWise Multifamily Air Sealing - Elec w/AC
Air Sealing - Oil	Electric Residential EnergyWise Multifamily Air Sealing - Oil
Air Sealing - Other	Electric Residential EnergyWise Multifamily Air Sealing - Other

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.

Savings Method

Calculated using site-specific inputs

Unit

Completed air sealing project.

Savings Equation

Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM

Gross kW = Gross kWh × kW/kWh

Where:

Stories = Total stories in the multi-family building

SQFT = Area of building in square feet

CFM/SQFT_pre = Estimate of pre-retrofit air leakagein CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor

CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of theimproved roof and floor

deltakWh/CFM = Average annual kWh reduction per CFM

Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM

kW/kWh = Average kW reduction per kWh reduction

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Air Sealing - Elec	Calc	Calc					
Air Sealing - Elec w/AC	Calc	Calc					
Air Sealing - Oil		Calc	Calc				
Air Sealing - Other		Calc		Calc			

Electric kWh Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Electric kW Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Oil MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Propane MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Air Sealing - Elec Air Sealing - Elec w/AC Air Sealing - Oil Air Sealing - Other	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Air Sealing	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Air Sealing - Elec	1.00	1.00	ls_208_Electric
Air Sealing - Elec w/AC	1.00	1.00	ls_11_Electric
Air Sealing - Oil	N/A	N/A	ls_00_Electric
Air Sealing - Other	N/A	N/A	ls_00_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Air Sealing - Elec		$20.648			
Air Sealing - Elec w/AC		$20.648			
Air Sealing - Oil		$20.648			
Air Sealing - Other					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Air Sealing	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Air Sealing - Elec	$1.05 / kWh	$1.05 / kWh
Air Sealing - Elec w/AC	$1.05 / kWh	$1.05 / kWh
Air Sealing - Oil	$100.00 / MMBtu	$100.00 / MMBtu
Air Sealing - Other		

Boiler Reset Control - Oil

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Boiler Control

Program: EnergyWise Multifamily

Measure Description

Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand.

Baseline Description

The baseline efficiency case is a boiler without reset controls

Measures

Measure Name	Unique Identifier
Boiler Reset Control - Oil	Electric Residential EnergyWise Multifamily Boiler Reset Control - Oil

Savings Principle

The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load.

Savings Method

Unit

Installation of boiler reset control on existing boiler

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Boiler Reset Control - Oil			37.30				

Oil MMBtu Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Boiler Reset Control - Oil	15

Measure Life Source: ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.https://www.aceee.org/files/pdf/2006_BoilerControls.pdf

Measure	ISR	RRe Gas	RRe Electric
Boiler Reset Control - Oil	1.00	0.86	0.86

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Boiler Reset Control - Oil	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Boiler Reset Control - Oil					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler Reset Control - Oil	0.14	0.00	0.00	0.86

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler Reset Control - Oil		

Common Int EISA Exempt

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Lighting | **Measure Type:** Lighting | **Measure Sub Type:** Interior

Program: EnergyWise Multifamily

Measure Description

The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.

Baseline Description

The baseline efficiency case is blend of incandescent, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.

Measures

Measure Name	Unique Identifier
Common Int EISA Exempt	Electric Residential EnergyWise Multifamily Common Int EISA Exempt

Savings Principle

The high efficiency case is and ENERGY STAR® qualified LED fixture.

Savings Method

Calculated

Unit

Rebated lamp or fixture.

Savings Equation

Gross kWh = [(QTY_pre × Watts_pre × Hours_base) - (QTY_ee × Watts_ee × Hours_ee)]/1000 × 52

Gross kW = [(QTY_pre × Watts_pre) - (QTY_ee × Watts_ee)]/1000

Where:

QTY_pre = Quantity of pre-retrofit fixtures/bulbs

QTY_ee = Quantity of efficient fixtures/bulbs installed

Watts_pre = Rated watts of pre-retrofit fixtures/bulbs

Watts_ee = Rated watts of efficient fixtures/bulbs installed

Hours_pre = Weekly hours of operation for pre-retrofit case lighting fixtures/bulbs

Hours_ee = Weekly hours of operation for efficient lighting fixtures/bulbs

1000 = Watts per kW

52 = Weeks per year

Hours: N/A

Hours Note: Multifamily common area hours are site specific

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Common Int EISA Exempt	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Common Int EISA Exempt	1

Measure Life Note: Based on MA EUL assumptions

Measure	ISR	RRe Gas	RRe Electric
Common Int EISA Exempt	1.00		1.00

ISR Source: Navigant (2018). Multi-Family Program Impact and Net-to-Gross Evaluation (RES 44). https://ma-eeac.org/wp-content/uploads/RES-44_Multi-family-Program-Impact-Evaluation_FINAL_SO-Rates-Updated.pdf

Measure	RR sp	RR wp	Loadshape ID
Common Int EISA Exempt	1.00	1.00	ls_04_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Common Int EISA Exempt		$15.517		$0.030	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Common Int EISA Exempt	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Common Int EISA Exempt	$52.00 / measure	$52.00 / measure

Custom

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Custom **Measure Type:** Custom **Measure Sub Type:** Custom

Program: EnergyWise Multifamily

Measure Description

Vendors install a variety of measures at multifamily facilities. Measures include

Baseline Description

For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the facility.

Measures

Measure Name	Unique Identifier
Custom	Electric Residential EnergyWise Multifamily Custom

Savings Principle

The high efficiency scenario is specific to the facility and may include one or more energy efficiency measures.

Savings Method

Calculated using site-specific inputs

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom	Calc	Calc	Calc	Calc			

Energy Impact Factors

Measure	Measure Life
Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Custom	1.00		0.86

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Custom	1.00	1.00	ls_213_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom	$12,000.00 / project	$9,000.00 / project

CUSTOM CHP

Sector: Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: CHP | **Measure Type:** CHP | **Measure Sub Type:** CHP

Program: EnergyWise Multifamily

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
CUSTOM CHP	Electric Residential EnergyWise Multifamily CUSTOM CHP

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CUSTOM CHP	Calc	Calc	Calc				

Energy Impact Factors

Measure	Measure Life
CUSTOM CHP	multi

Measure	ISR	RRe Gas	RRe Electric
CUSTOM CHP	1.00		0.86

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
CUSTOM CHP	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CUSTOM CHP	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CUSTOM CHP	0.28	0.02	0.02	0.76

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CUSTOM CHP		

CUSTOM CIRCULATOR

Sector: Residential

Fuel: Electric

Program Type: Custom

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Demand Circulator

Program: EnergyWise Multifamily

Measure Description

Installation of a demand controller on a re-circulation loop.

Baseline Description

Full time operation of re-circ pump.

Measures

Measure Name	Unique Identifier
CUSTOM CIRCULATOR	Electric Residential EnergyWise Multifamily CUSTOM CIRCULATOR

Savings Principle

The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs.

Savings Method

Calc

Unit

Installed recirc controller

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CUSTOM CIRCULATOR	Calc	Calc					

Electric kWh Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Electric kW Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
CUSTOM CIRCULATOR	15

Measure	ISR	RRe Gas	RRe Electric
CUSTOM CIRCULATOR	1.00		0.86

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
CUSTOM CIRCULATOR	0.86	0.86	ls_214_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CUSTOM CIRCULATOR					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CUSTOM CIRCULATOR	0.00	0.00	0.00	1.00

NTG Source: The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CUSTOM CIRCULATOR	$2.16 / kWh	$1.62 / kWh

DHW

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Water Heating **Measure Type:** Water Heater **Measure Sub Type:** Water Heater

Program: EnergyWise Multifamily

Measure Description

Installation of high efficiency water heating equipment to replace the exisiting inefficient water heater.

Baseline Description

The baseline efficiency case is a stand-alone tank water heater.

Measures

Measure Name	Unique Identifier
DHW	Electric Residential EnergyWise Multifamily DHW

Savings Principle

The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.66

Savings Method

Calc

Unit

Installed water heating system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
DHW	Calc	Calc	Calc	Calc			

Electric kWh Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Electric kW Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
DHW	13

Measure Life Source: DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE; Page 10.

Measure	ISR	RRe Gas	RRe Electric
DHW	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
DHW	1.00	1.00	ls_215_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
DHW		$0.772			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DHW	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DHW		

Heat Pumps

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Heat Pumps **Measure Sub Type:** Heat Pump

Program: EnergyWise Multifamily

Measure Description

Installation of a heat pump displacing electric, oil, or propane heat.

Baseline Description

The baseline efficiency case is the existing site conditions

Measures

Measure Name	Unique Identifier
Heat Pumps	Electric Residential EnergyWise Multifamily Heat Pumps

Savings Principle

The high efficiency case will vary by site

Savings Method

Calc

Unit

Installation of heat pump

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Heat Pumps	Calc	0.000					

Energy Impact Factors

Measure	Measure Life
Heat Pumps	20

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
Heat Pumps	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Heat Pumps	1.00	1.00	ls_149_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Heat Pumps					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Pumps	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Pumps	$4.50 / kWh	$3.40 / kWh

HVAC, Custom

Sector: Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** HVAC | **Measure Sub Type:**

Program: EnergyWise Multifamily

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
HVAC, Custom	Electric Residential EnergyWise Multifamily HVAC, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
HVAC, Custom	Calc	Calc	Calc	Calc	Calc	Calc	

Energy Impact Factors

Measure	Measure Life
HVAC, Custom	multi

Measure	ISR	RRe Gas	RRe Electric
HVAC, Custom	1.00		0.86

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
HVAC, Custom	1.00	1.00	ls_237_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
HVAC, Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC, Custom	0.14	0.00	0.00	0.86

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC, Custom		

Insulation

Sector: Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** Insulation | **Measure Sub Type:**

Program: EnergyWise Multifamily

Measure Description

Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.

Baseline Description

The baseline efficiency case is any existing home shell measures.

Measures

Measure Name	Unique Identifier
Insulation - Elec w/AC	Electric Residential EnergyWise Multifamily Insulation - Elec w/AC
Insulation - Oil	Electric Residential EnergyWise Multifamily Insulation - Oil
Insulation - Other	Electric Residential EnergyWise Multifamily Insulation - Other

Savings Principle

The high efficiency case includes increased weatherization insulation levels.

Savings Method

Calculated using site-specific inputs

Unit

Completed insulation project.

Savings Equation

Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post)

Gross kW = Gross kWh × kW/kWh

Where:

SQFT = Square feet of insulation installed

deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation

R_pre = R-Value of the existing insulation

R_post =R-Value of the new installed insulation

Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM

kW/kWh = Average annual kW reduction per kWh reduction

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Insulation - Elec w/AC	Calc	Calc					
Insulation - Oil	Calc	Calc	Calc				
Insulation - Other	Calc	Calc		Calc			

Electric kWh Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Electric kW Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Insulation - Elec w/AC	25
Insulation - Oil	
Insulation - Other	

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Insulation	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Insulation - Elec w/AC	0.86	0.86	ls_238_Electric
Insulation - Oil	N/A	N/A	ls_00_Electric
Insulation - Other	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Insulation - Elec w/AC		$58.251			
Insulation - Oil		$58.251			
Insulation - Other		$58.251			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Insulation	0.33	0.01	0.00	0.68

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Insulation - Elec w/AC	$2.40 / kWh	$1.80 / kWh
Insulation - Oil	$158.00 / MMBtu	$118.00 / MMBtu
Insulation - Other	$70.00 / MMBtu	$53.00 / MMBtu

Pipe Wrap DHW

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Insulation **Measure Sub Type:** Pipe Insulation

Program: EnergyWise Multifamily

Measure Description

Installation of insulation to reduce water heating energy.

Baseline Description

The baseline case is uninsulated heated water pipes.

Measures

Measure Name	Unique Identifier
Pipe Wrap DHW - Elec Pipe Wrap DHW - Oil Pipe Wrap DHW - Other	Electric Residential EnergyWise Multifamily Pipe Wrap DHW - Elec Electric Residential EnergyWise Multifamily Pipe Wrap DHW - Oil Electric Residential EnergyWise Multifamily Pipe Wrap DHW - Other

Savings Principle

The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.

Savings Method

Deemed

Unit

Linear Foot

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Pipe Wrap DHW - Elec	24.90	0.006					
Pipe Wrap DHW - Oil			0.15				
Pipe Wrap DHW - Other				0.15			

Electric kWh Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kW Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Oil MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Propane MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Pipe Wrap DHW - Elec	15
Pipe Wrap DHW - Oil	
Pipe Wrap DHW - Other	

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Pipe Wrap DHW	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Pipe Wrap DHW - Elec	1.00	1.00	ls_08_Electric
Pipe Wrap DHW - Oil	N/A	N/A	ls_00_Electric
Pipe Wrap DHW - Other	1.00	1.00	ls_240_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Pipe Wrap DHW - Elec					
Pipe Wrap DHW - Oil					
Pipe Wrap DHW - Other					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe Wrap DHW	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe Wrap DHW - Elec	$3.00 / linear feet	$3.00 / linear feet
Pipe Wrap DHW - Oil	$3.00 / linear feet	$3.00 / linear feet
Pipe Wrap DHW - Other	$3.00 / linear feet	$3.00 / linear feet

Programmable Thermostat

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Thermostat

Program: EnergyWise Multifamily

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable Thermostat - Elec w/ AC	Electric Residential EnergyWise Multifamily Programmable Thermostat - Elec w/ AC
Programmable Thermostat - Oil	Electric Residential EnergyWise Multifamily Programmable Thermostat - Oil

Savings Principle

The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.

Savings Method

Deemed

Unit

Installed thermostat

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Programmable Thermostat - Elec w/ AC	278.00	0.236					
Programmable Thermostat - Oil	29.00	0.025	1.60				

Electric kWh Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kW Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Oil MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Programmable Thermostat - Elec w/ AC	19
Programmable Thermostat - Oil	

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable Thermostat	0.95		1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Programmable Thermostat - Elec w/ AC	1.00	1.00	ls_187_Electric
Programmable Thermostat - Oil	1.00	1.00	ls_85_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Programmable Thermostat - Elec w/ AC		$17.141			
Programmable Thermostat - Oil		$17.141			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable Thermostat	0.48	0.01	0.00	0.53

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable Thermostat - Elec w/ AC	$125.00 / measure	$125.00 / measure
Programmable Thermostat - Oil	$125.00 / measure	$125.00 / measure

Showerhead

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: EnergyWise Multifamily

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.

Measures

Measure Name	Unique Identifier
Showerhead - Elec	Electric Residential EnergyWise Multifamily Showerhead - Elec
Showerhead - Oil	Electric Residential EnergyWise Multifamily Showerhead - Oil
Showerhead - Other	Electric Residential EnergyWise Multifamily Showerhead - Other

Savings Principle

The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Showerhead - Elec	246.00	0.059					
Showerhead - Oil			1.40				
Showerhead - Other				1.40			

Energy Impact Factors

Measure	Measure Life
Showerhead - Elec	15
Showerhead - Oil	
Showerhead - Other	

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Showerhead	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Showerhead - Elec	1.00	1.00	ls_08_Electric
Showerhead - Oil	N/A	N/A	ls_00_Electric
Showerhead - Other	N/A	N/A	ls_00_Electric

RRsp Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Showerhead - Elec	1786	$0.714			
Showerhead - Oil	1786	$0.714			
Showerhead - Other	1786	$0.714			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Showerhead	0.08	0.01	0.00	0.93

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Showerhead - Elec	$25.00 / measure	$25.00 / measure
Showerhead - Oil	$25.00 / measure	$25.00 / measure
Showerhead - Other	$25.00 / measure	$25.00 / measure

Smart Strips

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Plug Load | **Measure Type:** Smart Strips | **Measure Sub Type:** Smart Strip

Program: EnergyWise Multifamily

Measure Description

The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.

Baseline Description

The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on

Measures

Measure Name	Unique Identifier
Smart Strips	Electric Residential EnergyWise Multifamily Smart Strips

Savings Principle

The high efficiency case is the use of a smart strip or advanced smart strip.

Savings Method

Deemed

Unit

Rebated smart strip.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Smart Strips	105.00	0.019					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Energy Impact Factors

Measure	Measure Life
Smart Strips	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Smart Strips	0.84		0.92

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Smart Strips	0.92	0.92	ls_06_Electric

RRsp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRwp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Smart Strips					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Smart Strips	0.31	0.01	0.00	0.70

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Smart Strips	$23.00 / measure	$23.00 / measure

TSV Showerhead

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: EnergyWise Multifamily

Measure Description

A showerhead with a control that limits flow once water is heated.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.

Measures

Measure Name	Unique Identifier
TSV Showerhead - Elec TSV Showerhead - Oil TSV Showerhead - Other	Electric Residential EnergyWise Multifamily TSV Showerhead - Elec Electric Residential EnergyWise Multifamily TSV Showerhead - Oil Electric Residential EnergyWise Multifamily TSV Showerhead - Other

Savings Principle

The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.

Savings Method

Deemed

Unit

Installed showerhead.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
TSV Showerhead - Elec	315.00	0.076					
TSV Showerhead - Oil		Calc	1.60				
TSV Showerhead - Other	25.00	Calc		1.60			

Energy Impact Factors

Measure	Measure Life
TSV Showerhead - Elec	15
TSV Showerhead - Oil	
TSV Showerhead - Other	

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
TSV Showerhead	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
TSV Showerhead - Elec	1.00	1.00	ls_08_Electric
TSV Showerhead - Oil	N/A	N/A	ls_00_Electric
TSV Showerhead - Other	N/A	N/A	ls_00_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
	2130				
TSV Showerhead - Elec		$0.714			
TSV Showerhead - Oil		$0.714			
TSV Showerhead - Other		$0.714			

Water Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
TSV Showerhead	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
TSV Showerhead - Elec	$40.00 / measure	$40.00 / measure
TSV Showerhead - Oil	$40.00 / measure	$40.00 / measure
TSV Showerhead - Other	$40.00 / measure	$40.00 / measure

VFD

Sector: Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: EnergyWise Multifamily

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
VFD	Electric Residential EnergyWise Multifamily VFD

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calc

Unit

Installed VFD

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N128

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VFD	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
VFD	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
VFD	1.00		0.99

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
VFD	0.99	0.99	ls_242_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
VFD					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VFD	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VFD	$5.50 / kWh	$4.00 / kWh

Energy Wise Single Family, Electric

Aerator

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Flow Control | **Measure Sub Type:** Faucet Aerator

Program: EnergyWise Single Family

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a residential setting with service water heated by electricity.

Baseline Description

The baseline efficiency case is the existing faucet aerator with 2.2 GPM or greater flow rate.

Measures

Measure Name	Unique Identifier
Aerator, Electric	Electric Residential EnergyWise Single Family Aerator, Electric
Aerator, Oil	Electric Residential EnergyWise Single Family Aerator, Oil
Aerator, Others	Electric Residential EnergyWise Single Family Aerator, Others

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less installed.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Aerator, Electric	28.00	0.010					
Aerator, Oil			0.15				
Aerator, Others				0.14			

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Oil MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Propane MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Aerator, Electric	7
Aerator, Oil	
Aerator, Others	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Aerator	0.86		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

ISR Note: For mailed-in faucet aerators, ISR is assumed at 59% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Aerator, Electric	1.00	1.00	ls_08_Electric
Aerator, Oil	N/A	N/A	ls_00_Electric
Aerator, Others	1.00	1.00	ls_192_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Aerator, Electric	269				
Aerator, Oil					
Aerator, Others					

Water Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Aerator	0.27	0.01	0.04	0.78

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Aerator, Electric	$7.00 / measure	$7.00 / measure
Aerator, Oil	$7.00 / measure	$7.00 / measure
Aerator, Others	$7.00 / measure	$7.00 / measure

Electric Resistance to MSHP

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Heating

Measure Sub Type: Heat Pump Electrification

Program: EnergyWise Single Family

Measure Description

The purchase and installation of high efficiency mini-split heat pump system to replace an electric resistance heating system.

Baseline Description

The baseline efficiency case for heating is a residential electric resistance heating system. The baseline efficiency case for cooling is a residential window AC unit with EER 9.8. For calculations, baseline is a SEER 15 and HSPF 3.4 system.

Measures

Measure Name	Unique Identifier
Electric Resistance to MSHP	Electric Residential EnergyWise Single Family Electric Resistance to MSHP

Savings Principle

The minimum program qualifications for the high efficiency case is a 15.2 SEER2 8.5 HPSF2 system. The high efficiency case is an ENERGY STAR® qualified air-source heat pump. For calculations, the high efficiency case is a SEER 19.2, HSPF 10.4 ductless mini split heat pump.

Savings Method

Deemed

Unit

Installed high-efficiency mini-split heat pump system for heating and cooling.

Savings Equation

Heating Gross kWh = Qty*deltakWh_heating

Cooling Gross kWh = Qty*deltakWh_cooling

Cooling Gross kW = Qty*deltakW

Where:

Qty = Total number of units.

deltakWh_heating = Average annual heating kWh reduction per unit.

deltakWh_cooling = Average annual cooling kWh reduction per unit.

deltakW = Average annual kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Electric Resistance to MSHP	6549.00	2.830					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
Electric Resistance to MSHP	17

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
Electric Resistance to MSHP	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Electric Resistance to MSHP	1.00	1.00	ls_90_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Electric Resistance to MSHP		$199.109			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Electric Resistance to MSHP	0.31	0.22	0.04	0.95

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Electric Resistance to MSHP	$7,000.00 / measure	$4,400.00 / measure

Participant

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Participant **Measure Type:** Participant **Measure Sub Type:** Participant

Program: EnergyWise Single Family

Measure Description

This row identifies a participant for tracking and cost purposes.

Baseline Description

Measures

Measure Name	Unique Identifier
Participant	Electric Residential EnergyWise Single Family Participant

Savings Principle

Savings Method

Unit

Savings Equation

N/A

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Participant							

Energy Impact Factors

Measure	Measure Life
Participant	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Participant	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Participant	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Participant					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Participant	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Participant	$375.00 / participant	$375.00 / participant

Pipe Insulation

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Insulation **Measure Sub Type:** Pipe Insulation

Program: EnergyWise Single Family

Measure Description

Insulation upgrades to existing water heating system pipes

Baseline Description

The baseline case is uninsulated heated water pipes.

Measures

Measure Name	Unique Identifier
Pipe Insulation, Electric	Electric Residential EnergyWise Single Family Pipe Insulation, Electric
Pipe Insulation, Oil	Electric Residential EnergyWise Single Family Pipe Insulation, Oil
Pipe Insulation, Others	Electric Residential EnergyWise Single Family Pipe Insulation, Others

Savings Principle

The high efficiency case includes pipe wrap

Savings Method

Deemed

Unit

Insulated equipment

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Pipe Insulation, Electric	46.00	0.010					
Pipe Insulation, Oil			0.30				
Pipe Insulation, Others				0.30			

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Propane MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Pipe Insulation, Electric Pipe Insulation, Oil Pipe Insulation, Others	15

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Pipe Insulation	0.98		1.00

ISR Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Pipe Insulation, Electric	1.00	1.00	ls_08_Electric
Pipe Insulation, Oil	N/A	N/A	ls_00_Electric
Pipe Insulation, Others	N/A	N/A	ls_00_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Pipe Insulation, Electric					
Pipe Insulation, Oil					
Pipe Insulation, Others					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe Insulation	0.27	0.01	0.04	0.78

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe Insulation, Electric	$7.00 / measure	$7.00 / measure
Pipe Insulation, Oil	$7.00 / measure	$7.00 / measure
Pipe Insulation, Others	$7.00 / measure	$7.00 / measure

Pre-weatherization

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Whole Home

Measure Type: Weatherization

Measure Sub Type: Pre-Weatherization

Program: EnergyWise Single Family

Measure Description

Rebate for customers to improve home to make it ready for Wx install; non-energy related measures such as asbestos removal or remove knob and tube wiring

Baseline Description

N/A

Measures

Measure Name	Unique Identifier
Pre-weatherization	Electric Residential EnergyWise Single Family Pre-weatherization

Savings Principle

Savings Method

N/A

Unit

Rebated Pre-Wx

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Pre-weatherization							

Energy Impact Factors

Measure	Measure Life
Pre-weatherization	1

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Pre-weatherization	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Pre-weatherization	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Pre-weatherization					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pre-weatherization	0.14	0.01	0.04	0.91

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pre-weatherization	$250.00 / home	$250.00 / home

Programmable Thermostat

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Thermostat

Program: EnergyWise Single Family

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

The baseline efficiency case is an HVAC system without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable Thermostat - Elec Programmable Thermostat, Oil Programmable Thermostat, Others	Electric Residential EnergyWise Single Family Programmable Thermostat - Elec Electric Residential EnergyWise Single Family Programmable Thermostat, Oil Electric Residential EnergyWise Single Family Programmable Thermostat, Others

Savings Principle

The high efficiency case is an HVAC system with a programmable thermostat installed.

Savings Method

Deemed

Unit

Installed programmable thermostat.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Programmable Thermostat - Elec	222.60	0.170					
Programmable Thermostat, Oil	27.00	0.040	2.07				
Programmable Thermostat, Others	27.00	0.040		2.07			

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Propane MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
Programmable Thermostat - Elec Programmable Thermostat, Oil Programmable Thermostat, Others	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable Thermostat	0.88		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

ISR Note: For mailed-in thermostats, ISR is assumed at 59% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable Thermostat - Elec	1.00	1.00	ls_87_Electric
Programmable Thermostat, Oil	1.00	1.00	ls_11_Electric
Programmable Thermostat, Others	1.00	1.00	ls_11_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Programmable Thermostat - Elec		$4.474			
Programmable Thermostat, Oil		$4.474			
Programmable Thermostat, Others		$4.474			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable Thermostat	0.47	0.01	0.04	0.58

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable Thermostat - Elec	$100.00 / measure	$100.00 / measure
Programmable Thermostat, Oil	$100.00 / measure	$100.00 / measure
Programmable Thermostat, Others	$100.00 / measure	$100.00 / measure

Refrigerator Brush

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Refrigeration

Measure Type: Refrigeration O&M

Measure Sub Type: Refrigerator Brush

Program: EnergyWise Single Family

Measure Description

The cleaning of refrigerator coils.

Baseline Description

A refrigerator with uncleaned coils.

Measures

Measure Name	Unique Identifier
Refrigerator Brush	Electric Residential EnergyWise Single Family Refrigerator Brush

Savings Principle

A refrigerator with coils cleaned by an auditor.

Savings Method

Deemed

Unit

Per brushed refrigerator coil

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerator Brush	10.90	0.002					

Electric kWh Source: DNV GL (2016). RI Impact Evaluation of 2014 EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160816_py2014_ri_energywise_report.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Refrigerator Brush	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Refrigerator Brush	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Refrigerator Brush	1.00	1.00	ls_07_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Refrigerator Brush					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerator Brush	0.00	0.00	0.04	1.04

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerator Brush	$5.00 / measure	$5.00 / measure

Showerhead

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: EnergyWise Single Family

Measure Description

A showerhead with a control that limits flow once water is heated.

Baseline Description

The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less.

Measures

Measure Name	Unique Identifier
Showerhead - Elec	Electric Residential EnergyWise Single Family Showerhead - Elec
Showerhead - Oil	Electric Residential EnergyWise Single Family Showerhead - Oil
Showerhead - Other	Electric Residential EnergyWise Single Family Showerhead - Other

Savings Principle

The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.

Savings Method

Deemed

Unit

Installed showerhead

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Showerhead - Elec	213.00	0.050					
Showerhead - Oil			1.20				
Showerhead - Other				1.10			

Energy Impact Factors

Measure	Measure Life
Showerhead - Elec	15
Showerhead - Oil	
Showerhead - Other	

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Showerhead	0.85		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

ISR Note: For mailed-in showerheads, ISR is assumed at 53% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Showerhead - Elec	1.00	1.00	ls_193_Electric
Showerhead - Oil	N/A	N/A	ls_00_Electric
Showerhead - Other	N/A	N/A	ls_00_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
	1565				
Showerhead - Elec			$0.037		
Showerhead - Oil			$0.037		
Showerhead - Other			$0.037		

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Showerhead	0.27	0.01	0.04	0.78

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Showerhead - Elec	$30.00 / measure	$30.00 / measure
Showerhead - Oil	$30.00 / measure	$30.00 / measure
Showerhead - Other	$30.00 / measure	$30.00 / measure

Smart Strip

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Plug Load | **Measure Type:** Smart Strips | **Measure Sub Type:** Smart Strip

Program: EnergyWise Single Family

Measure Description

The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.

Baseline Description

The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on

Measures

Measure Name	Unique Identifier
Smart Strip	Electric Residential EnergyWise Single Family Smart Strip

Savings Principle

The high efficiency case is the use of a smart strip or advanced smart strip.

Savings Method

Deemed

Unit

Rebated smart strip.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Smart Strip	105.00	0.020					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Smart Strip	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Smart Strip	0.84		0.92

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Smart Strip	0.92	0.92	ls_06_Electric

RRsp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRwp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Smart Strip					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Smart Strip	0.31	0.01	0.04	0.74

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Smart Strip	$22.00 / measure	$22.00 / measure

Weatherization

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Insulation **Measure Sub Type:** Shell

Program: EnergyWise Single Family

Measure Description

Installation of weatherization measures such as air sealing and insulation upgrades in existing facilities

Baseline Description

The baseline efficiency case is any existing home shell measures.

Measures

Measure Name	Unique Identifier
Weatherization, Electric	Electric Residential EnergyWise Single Family Weatherization, Electric
Weatherization, Oil	Electric Residential EnergyWise Single Family Weatherization, Oil
Weatherization, Others	Electric Residential EnergyWise Single Family Weatherization, Others

Savings Principle

Savings Method

The high efficiency case includes increased weatherization insulation levels.

Unit

Deemed

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: Completed insulation project.

Hours Source: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Weatherization, Electric	765.00	0.640					
Weatherization, Oil	64.00	0.080	12.40				
Weatherization, Others	64.00	0.080		12.40			

Electric kWh Source: Cadeo (2023). EnergyWise Single Family Weatherization Impact Evaluation.

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Cadeo (2023). EnergyWise Single Family Weatherization Impact Evaluation.

Propane MMBtu Source: Cadeo (2023). EnergyWise Single Family Weatherization Impact Evaluation.

Energy Impact Factors

Measure	Measure Life
Weatherization, Electric	20
Weatherization, Oil	
Weatherization, Others	

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report.
https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Weatherization	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Weatherization, Electric	1.00	1.00	ls_87_Electric
Weatherization, Oil	1.00	1.00	ls_11_Electric
Weatherization, Others	1.00	1.00	ls_11_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Weatherization, Electric		$73.179			
Weatherization, Oil		$73.179			
Weatherization, Others		$73.179			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Weatherization	0.14	0.01	0.04	0.91

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Weatherization, Electric	$4,000.00 / home	$4,000.00 / home
Weatherization, Oil	$4,150.00 / home	$2,650.00 / home
Weatherization, Others	$3,600.00 / home	$2,300.00 / home

WiFi Thermostat

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Thermostat

Program: EnergyWise Single Family

Measure Description

Installation of wifi thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system with either a manual or a programmable thermostat.

Measures

Measure Name	Unique Identifier
WiFi Thermostat - AC Only WiFi Thermostat - Oil WiFi Thermostat - Others WiFi Thermostat - Electric	Electric Residential EnergyWise Single Family WiFi Thermostat - AC Only Electric Residential EnergyWise Single Family WiFi Thermostat - Oil Electric Residential EnergyWise Single Family WiFi Thermostat - Others Electric Residential EnergyWise Single Family WiFi Thermostat - Electric

Savings Principle

The high efficiency case is an HVAC system providing space heating with a wifi thermostat installed.

Savings Method

Deemed

Unit

Installed programmable thermostat.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
WiFi Thermostat - AC Only	51.00	0.080					
WiFi Thermostat - Oil	27.00	0.040	2.79				
WiFi Thermostat - Others	27.00	0.040		2.79			
WiFi Thermostat - Electric	222.60	0.170					

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
WiFi Thermostat - AC Only WiFi Thermostat - Oil WiFi Thermostat - Others WiFi Thermostat - Electric	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
WiFi Thermostat	0.88		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

ISR Note: For mailed-in thermostats, ISR is assumed at 59% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
WiFi Thermostat - AC Only	1.00	1.00	ls_11_Electric
WiFi Thermostat - Oil	1.00	1.00	ls_11_Electric
WiFi Thermostat - Others	1.00	1.00	ls_11_Electric
WiFi Thermostat - Electric	1.00	1.00	ls_87_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
WiFi Thermostat - AC Only		$4.474			
WiFi Thermostat - Oil		$4.474			
WiFi Thermostat - Others		$4.474			
WiFi Thermostat - Electric		$4.474			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi Thermostat	0.47	0.01	0.04	0.58

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi Thermostat - AC Only	$300.00 / measure	$200.00 / measure
WiFi Thermostat - Oil	$300.00 / measure	$200.00 / measure
WiFi Thermostat - Others	$300.00 / measure	$200.00 / measure
WiFi Thermostat - Electric	$300.00 / measure	$200.00 / measure

Home Energy Reports, Electric

Existing Dual Fuel

Sector: Residential

Fuel: Electric

Program Type: Custom

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to electric and gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
Existing Dual Fuel	Electric Residential Home Energy Reports Existing Dual Fuel

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Existing Dual Fuel	Calc	Calc					

Electric kWh Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Existing Dual Fuel	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
Existing Dual Fuel	1.00		1.08

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Existing Dual Fuel	1.08	1.08	ls_04_Electric

RRsp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

RRwp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Existing Dual Fuel					

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Existing Dual Fuel	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Existing Dual Fuel		

Existing Electric

Sector: Residential

Fuel: Electric

Program Type: Custom

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
Existing Electric	Electric Residential Home Energy Reports Existing Electric

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Existing Electric	Calc	Calc					

Electric kWh Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Existing Electric	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
Existing Electric	1.00		1.08

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Existing Electric	1.08	1.08	ls_04_Electric

RRsp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

RRwp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Existing Electric					

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Existing Electric	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Existing Electric		

New Movers Dual Fuel

Sector: Residential

Fuel: Electric

Program Type: Custom

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to electric and gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
New Movers Dual Fuel	Electric Residential Home Energy Reports New Movers Dual Fuel

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
New Movers Dual Fuel	Calc	Calc					

Electric kWh Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
New Movers Dual Fuel	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
New Movers Dual Fuel	1.00		0.67

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
New Movers Dual Fuel	0.67	0.67	ls_04_Electric

RRsp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

RRwp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
New Movers Dual Fuel					

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
New Movers Dual Fuel	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
New Movers Dual Fuel		

New Movers Electric

Sector: Residential

Fuel: Electric

Program Type: Custom

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to electric customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
New Movers Electric	Electric Residential Home Energy Reports New Movers Electric

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
New Movers Electric	Calc	Calc					

Electric kWh Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
New Movers Electric	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
New Movers Electric	1.00		0.67

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
New Movers Electric	0.67	0.67	ls_04_Electric

RRsp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

RRwp Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
New Movers Electric					

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
New Movers Electric	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
New Movers Electric		

Residential Consumer Products, Electric

Advanced Power Strips

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Plug Load | **Measure Type:** Smart Strips | **Measure Sub Type:** Smart Strip

Program: Residential Consumer Products

Measure Description

The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.

Baseline Description

The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on

Measures

Measure Name	Unique Identifier
Advanced Power Strips - Tier 2	Electric Residential Residential Consumer Products Advanced Power Strips - Tier 2
Advanced Power Strips - Tier 2 OS	Electric Residential Residential Consumer Products Advanced Power Strips - Tier 2 OS

Savings Principle

The high efficiency case is the use of a smart strip or advanced smart strip.

Savings Method

Deemed

Unit

Rebated smart strip.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	207.00	0.020					
Advanced Power Strips - Tier 2	207.00	0.020					
Advanced Power Strips - Tier 2 OS	207.00	0.020					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Energy Impact Factors

Measure	Measure Life
Advanced Power Strips - Tier 2 Advanced Power Strips - Tier 2 OS	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Advanced Power Strips	0.74		0.92

ISR Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Advanced Power Strips - Tier 2	0.92	0.92	ls_06_Electric
Advanced Power Strips - Tier 2 OS	0.92	0.92	ls_06_Electric

RRsp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRwp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Advanced Power Strips - Tier 2					
Advanced Power Strips - Tier 2 OS					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Advanced Power Strips	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Advanced Power Strips - Tier 2	$101.00 / measure	$35.00 / measure
Advanced Power Strips - Tier 2 OS	$202.00 / measure	$35.00 / measure

Clothes Washer Most Efficient

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Clothes Washers **Measure Sub Type:** Washer

Program: Residential Consumer Products

Measure Description

This measure promotes the purchase of a Most Efficient ENERGY STAR® clothes washer.

Baseline Description

The baseline is IECC 2024 Code; requires clothes washer to have max annual energy consumption not greater than 130 kWh/yr.

Measures

Measure Name	Unique Identifier
Clothes Washer Most Efficient	Electric Residential Residential Consumer Products Clothes Washer Most Efficient

Savings Principle

ENERGY STAR® qualified clothes washer on the Most Efficient list.

Savings Method

Deemed

Unit

Per clothes washer

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Clothes Washer Most Efficient	29.25	0.020					

Electric kWh Note: RI assumption using 2024 Energy Star and Energy Star Most Efficient Data

Energy Impact Factors

Measure	Measure Life
Clothes Washer Most Efficient	14

Measure Life Source: DOE (2017). Technical Support Document: Residential Clothes Washer. EERE-2017-BT-STD-0003-0030. https://www.regulations.gov/document/EERE-2017-BT-STD-0014-0030

Measure	ISR	RRe Gas	RRe Electric
Clothes Washer Most Efficient	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Clothes Washer Most Efficient	1.00	1.00	ls_142_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Clothes Washer Most Efficient	2083				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Clothes Washer Most Efficient	0.10	0.00	0.00	0.90

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Clothes Washer Most Efficient	$126.00 / measure	$25.00 / measure

Dehumidifier

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Dehumidifiers **Measure Sub Type:** Dehumidifier

Program: Residential Consumer Products

Measure Description

The Installation of high efficiency dehumidifiers and the turn-in of existing inefficient dehumidifiers.

Baseline Description

Standard efficiency.

Measures

Measure Name	Unique Identifier
Dehumidifier	Electric Residential Residential Consumer Products Dehumidifier

Savings Principle

The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh. The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh.

Savings Method

Calculated using deemed inputs

Unit

Per dehumidifier

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dehumidifier	82.30	0.019					

Electric kWh Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Dehumidifier	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Dehumidifier	0.99		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Dehumidifier	1.00	1.00	ls_79_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Dehumidifier					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dehumidifier	0.51	0.00	0.00	0.49

NTG Source: NMR Group, Inc. (2021). Residential Products Net-to-Gross Study. https://ma-eeac.org/wp-content/uploads/MA20X04-E-PRODNTG_Res-Products-NTG-Report_FINAL_2021.06.08.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dehumidifier	$61.00 / measure	$30.00 / measure

Dehumidifier Most Efficient

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Appliances | **Measure Type:** Dehumidifiers | **Measure Sub Type:** Dehumidifier

Program: Residential Consumer Products

Measure Description

The installation of an ENERGY STAR® Most Efficient Dehumidifier with a capacity of >25 and ≤ 50 pints/day.

Baseline Description

The baseline for this measure is an ENERGY STAR® dehumidifier with a capacity of >25 and ≤ 50 pints/day.

Measures

Measure Name	Unique Identifier
Dehumidifier Most Efficient	Electric Residential Residential Consumer Products Dehumidifier Most Efficient

Savings Principle

ENERGY STAR® qualified dehumidifier on the Most Efficient list.

Savings Method

Calculated using deemed inputs

Unit

Per dehumidifer

Savings Equation

ΔkWh = (((Avg Capacity * 0.473) / 24) * Hours) * (1 / (L/kWh_Base) – 1 / (L/kWh_Eff))

Where:

Avg Capacity = Average capacity of the unit (pints/day)

0.473 = Constant to convert Pints to Liters

24 = Constant to convert Liters/day to Liters/hour

Hours = Runhours per year

L/kWh = Liters of water per kWh consumed

L/kWh_Base = ≥1.80

L/kWh_Eff = ≥3.30

Hours: 2200

Hours Note: Based on Mattison et al., “Dehumidifiers: A Major Consumer of Residential Electricity”, Cautley et al., “Dehumidification and Subslab Ventilation in Wisconsin Homes” and Yang et al., “Dehumidifier Use in the U.S. Residential Sector”, all indicating average usage around 2,200 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dehumidifier Most Efficient	47.00	0.011					

Energy Impact Factors

Measure	Measure Life
Dehumidifier Most Efficient	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Dehumidifier Most Efficient	0.99		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Dehumidifier Most Efficient	1.00	1.00	ls_79_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Dehumidifier Most Efficient					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dehumidifier Most Efficient	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dehumidifier Most Efficient	$75.00 / measure	$17.00 / measure

Dehumidifier Recycling

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Dehumidifiers **Measure Sub Type:** Dehumidifier

Program: Residential Consumer Products

Measure Description

Recycling of old dehumidifiers

Baseline Description

Operating inefficient unit.

Measures

Measure Name	Unique Identifier
Dehumidifier Recycling	Electric Residential Residential Consumer Products Dehumidifier Recycling

Savings Principle

Recycling of inefficient unit.

Savings Method

Deemed

Unit

Per dehumidifer

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dehumidifier Recycling	407.10	0.035					

Electric kWh Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Dehumidifier Recycling	4

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Dehumidifier Recycling	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Dehumidifier Recycling	1.00	1.00	ls_79_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Dehumidifier Recycling					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dehumidifier Recycling	0.59	0.00	0.00	0.41

NTG Source: NMR Group, Inc. (2021). Appliance Recycling Net Savings Update (MA20X03-E-ARNTG). https://ma-eeac.org/wp-content/uploads/MA-20X03-E-Appliance-Recycling-NTGReport_FINAL_2021.07.23-clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dehumidifier Recycling	$66.00 / measure	$35.00 / measure

Dryer Most Efficient

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Clothes Dryers **Measure Sub Type:** Dryer

Program: Residential Consumer Products

Measure Description

The installation of a Most Efficient EnergyStar Dryer.

Baseline Description

A new electric dryer.

Measures

Measure Name	Unique Identifier
Dryer Most Efficient	Electric Residential Residential Consumer Products Dryer Most Efficient

Savings Principle

ENERGY STAR® qualified electric dryer on the Most Efficient list.

Savings Method

Deemed

Unit

Installed EnergyStar dryer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dryer Most Efficient	212.79	0.061					

Electric kWh Source: EPA Research (2020). Energy Star Retail Products Platform.

Energy Impact Factors

Measure	Measure Life
Dryer Most Efficient	16

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Dryer Most Efficient	0.99		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Dryer Most Efficient	1.00	1.00	ls_75_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Dryer Most Efficient					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dryer Most Efficient	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dryer Most Efficient	$76.00 / measure	$30.00 / measure

EnergyStar Dryer

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Clothes Dryers **Measure Sub Type:** Dryer

Program: Residential Consumer Products

Measure Description

The installation of an EnergyStar clothes dryer .

Baseline Description

A new electric dryer.

Measures

Measure Name	Unique Identifier
EnergyStar Dryer	Electric Residential Residential Consumer Products EnergyStar Dryer

Savings Principle

An EnergyStar electric dryer.

Savings Method

Deemed

Unit

Installed EnergyStar dryer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
EnergyStar Dryer	160.00	0.046					

Electric kWh Source: DOE (2015). 10 CFR Part 431 March 27, 2015. Energy Conservation Program: Energy Conservation Standards for Residential Clothes Dryers. Table II.7. http://www.gpo.gov/fdsys/pkg/FR-2015-03-27/pdf/2015-07058.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
EnergyStar Dryer	16

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
EnergyStar Dryer	0.99		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
EnergyStar Dryer	1.00	1.00	ls_75_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
EnergyStar Dryer					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
EnergyStar Dryer	0.48	0.00	0.00	0.52

NTG Source: NMR Group, Inc. (2021). Residential Products Net-to-Gross Study. https://ma-eeac.org/wp-content/uploads/MA20X04-E-PRODNTG_Res-Products-NTG-Report_FINAL_2021.06.08.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
EnergyStar Dryer	$76.00 / measure	$50.00 / measure

Freezer Recycling

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Recycling **Measure Sub Type:** Freezer Recycling

Program: Residential Consumer Products

Measure Description

The retirement of old, inefficient secondary refrigerators and freezers.

Baseline Description

The baseline efficiency case is an old, inefficient secondary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use.

Measures

Measure Name	Unique Identifier
Freezer Recycling	Electric Residential Residential Consumer Products Freezer Recycling

Savings Principle

The high efficiency case assumes no replacement of secondary unit.

Savings Method

Deemed

Unit

Removal of existing refrigerator or freezer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Freezer Recycling	754.00	0.110					

Electric kWh Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Freezer Recycling	8

Measure Life Source: EPA Research (2014), Energy Star Commercial Equipment Calculator, Freezer Calcs, https://www.energystar.gov/sites/default/files/asset/document/commercial_kitchen_equipment_calculator.xlsx. Assume 2/3rd of measure life for recycling - MA Common assumption

Measure	ISR	RRe Gas	RRe Electric
Freezer Recycling	1.00		0.83

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Measure	RR sp	RR wp	Loadshape ID
Freezer Recycling	0.83	0.83	ls_78_Electric

RRsp Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

RRwp Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Freezer Recycling					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Freezer Recycling	0.50	0.00	0.00	0.50

NTG Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Freezer Recycling	$202.00 / measure	$95.00 / measure

Low E Storm Windows

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Building Shell

Measure Type: Windows

Measure Sub Type: Storm Windows, electric heat

Program: Residential Consumer Products

Measure Description

The installation of Low E storm windows over existing windows.

Baseline Description

The base case is existing windows.

Measures

Measure Name	Unique Identifier
Low E Storm Windows, electric heat Low E Storm Windows, gas heat Low E Storm Windows, other heat	Electric Residential Residential Consumer Products Low E Storm Windows, electric heat Electric Residential Residential Consumer Products Low E Storm Windows, gas heat Electric Residential Residential Consumer Products Low E Storm Windows, other heat

Savings Principle

The high efficiency case is Low E storm windows installed over existing windows.

Savings Method

Deemed

Unit

Installed Low E storm windows.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Low E Storm Windows, electric heat	229.00	0.180					
Low E Storm Windows, gas heat	5.00	0.004			0.76		
Low E Storm Windows, other heat	5.00	0.004	0.76				

Electric kWh Source: Pacific Northwest National Laboratory for the U.S. Department of Energy (2015). Energy Savings of Low-E Storm Windows and Panels across US Climate Zones.
https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24826.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Pacific Northwest National Laboratory for the U.S. Department of Energy (2015). Energy Savings of Low-E Storm Windows and Panels across US Climate Zones.
https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24826.pdf

Gas Heat MMBtu Source: Pacific Northwest National Laboratory for the U.S. Department of Energy (2015). Energy Savings of Low-E Storm Windows and Panels across US Climate Zones.
https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24826.pdf

Energy Impact Factors

Measure	Measure Life
Low E Storm Windows, electric heat	20
Low E Storm Windows, gas heat	
Low E Storm Windows, other heat	

Measure Life Source: Pacific Northwest National Laboratory for the U.S. Department of Energy (2015). Energy Savings of Low-E Storm Windows and Panels across US Climate Zones.
https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24826.pdf

Measure	ISR	RRe Gas	RRe Electric
Low E Storm Windows	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Low E Storm Windows, electric heat	1.00	1.00	ls_84_Electric
Low E Storm Windows, gas heat	1.00	1.00	ls_84_Electric
Low E Storm Windows, other heat	1.00	1.00	ls_84_Electric
	1.00	1.00	

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Low E Storm Windows, electric heat		$8.274			
Low E Storm Windows, gas heat					
Low E Storm Windows, other heat		$8.274			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low E Storm Windows	0.04	0.00	0.00	0.96

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low E Storm Windows, electric heat	$56.00 / measure	$25.00 / measure
Low E Storm Windows, gas heat	$56.00 / measure	$25.00 / measure
Low E Storm Windows, other heat	$56.00 / measure	$25.00 / measure

Low Flow Showerhead w/TSV

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: Residential Consumer Products

Measure Description

A showerhead with a control that limits flow once water is heated.

Baseline Description

The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less.

Measures

Measure Name	Unique Identifier
Low Flow Showerhead w/ TSV - Elec Low Flow Showerhead w/ TSV - Oil Low Flow Showerhead w/ TSV - Other	Electric Residential Residential Consumer Products Low Flow Showerhead w/ TSV - Elec Electric Residential Residential Consumer Products Low Flow Showerhead w/ TSV - Oil Electric Residential Residential Consumer Products Low Flow Showerhead w/ TSV - Other

Savings Principle

The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Low Flow Showerhead w/ TSV - Elec	247.00	0.060					
Low Flow Showerhead w/ TSV - Oil			1.32				
Low Flow Showerhead w/ TSV - Other				1.22			

Energy Impact Factors

Measure	Measure Life
Low Flow Showerhead w/ TSV - Elec	15
Low Flow Showerhead w/ TSV - Oil	
Low Flow Showerhead w/ TSV - Other	

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Low Flow Showerhead w/TSV	0.78		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Low Flow Showerhead w/ TSV - Elec	1.00	1.00	ls_08_Electric
Low Flow Showerhead w/ TSV - Oil	N/A	N/A	ls_00_Electric
Low Flow Showerhead w/ TSV - Other	N/A	N/A	ls_00_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Low Flow Showerhead w/ TSV - Elec	3022				
Low Flow Showerhead w/ TSV - Oil					
Low Flow Showerhead w/ TSV - Other					

Water Source: PGE Low Flow Showerhead and Thermostatic Restriction Valve

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low Flow Showerhead w/TSV	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low Flow Showerhead w/ TSV - Elec	$40.00 / measure	$15.00 / measure
Low Flow Showerhead w/ TSV - Oil	$40.00 / measure	$15.00 / measure
Low Flow Showerhead w/ TSV - Other	$40.00 / measure	$15.00 / measure

Pool pump (variable)

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Pump

Program: Residential Consumer Products

Measure Description

The installation of a 2-speed or variable speed drive pool pump. Operating a pool pump for a longer period of time at a lower wattage can move the same amount of water using significantly less energy.

Baseline Description

The baseline efficiency case is a single speed pump.

Measures

Measure Name	Unique Identifier
Pool pump (variable)	Electric Residential Residential Consumer Products Pool pump (variable)

Savings Principle

The high efficiency case is a 2-speed or variable speed pump.

Savings Method

Calculated using deemed inputs

Unit

Installed efficient pool pump.

Savings Equation

Gross kWh = Qty × kWh_base × %SAVE

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

kWh_base = Deemed average annual kWh consumption per baseline unit.

%SAVE = Deemed average savings factor.

DeltakW = Deemed average kW reduction per unit.

Hours: N/A

Hours Note: Hours are considered on a case-by-case basis since they are dependent on seasonal factors, pool size, and treatment conditions.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Pool pump (variable)	1284.00	1.350					

Electric kWh Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Electric kW Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Energy Impact Factors

Measure	Measure Life
Pool pump (variable)	6

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Pool pump (variable)	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Pool pump (variable)	1.00	1.00	ls_80_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Pool pump (variable)					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pool pump (variable)	0.11	0.00	0.00	0.89

NTG Source: NMR Group, Inc. (2021). Residential Products Net-to-Gross Study. https://ma-eeac.org/wp-content/uploads/MA20X04-E-PRODNTG_Res-Products-NTG-Report_FINAL_2021.06.08.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pool pump (variable)	$677.00 / measure	$500.00 / measure

Refrigerator Most Efficient

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Appliances | **Measure Type:** Refrigerators | **Measure Sub Type:** Refrigerator

Program: Residential Consumer Products

Measure Description

This measure covers the replacement of an existing inefficient refrigerator with a new efficient refrigerator.

Baseline Description

For Top Ten® and Most Efficient® refrigerators, the baseline is a 50% mix of available Energy Star® and Federal standard compliant refrigerators. For Energy Star® refrigerators, the baseline is a refrigerator that meets Federal standards.

Measures

Measure Name	Unique Identifier
Refrigerator Most Efficient	Electric Residential Residential Consumer Products Refrigerator Most Efficient

Savings Principle

The high efficiency case is an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking.

Savings Method

Deemed

Unit

Installed high-efficiency refrigerator

Savings Equation

Gross kWh = Qty × (kWh_base - kWh_ee)

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

kWh_base = Deemed average demand per baseline unit.

kWh_ee = Deemed average demand per high-efficiency unit.

DeltakW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerator Most Efficient	95.70	0.017					

Electric kWh Source: EPA Research (2020). Energy Star Retail Products Platform.

Electric kW Source: Cadmus Demand Impact Model (2012). Estimated using the demand allocation methodology, Prepared for the Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Refrigerator Most Efficient	12

Measure Life Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Measure	ISR	RRe Gas	RRe Electric
Refrigerator Most Efficient	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Refrigerator Most Efficient	1.00	1.00	ls_07_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Refrigerator Most Efficient			$1.773		

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerator Most Efficient	0.25	0.00	0.00	0.75

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerator Most Efficient	$116.00 / measure	$25.00 / measure

Refrigerator Recycling

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Appliances

Measure Type: Recycling

Measure Sub Type: Refrigerator Recycling

Program: Residential Consumer Products

Measure Description

The retirement of old, inefficient secondary refrigerators and freezers.

Baseline Description

The baseline efficiency case is an old, inefficient secondary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use.

Measures

Measure Name	Unique Identifier
Refrigerator Recycling	Electric Residential Residential Consumer Products Refrigerator Recycling

Savings Principle

The high efficiency case assumes no replacement of secondary unit.

Savings Method

Deemed

Unit

Removal of existing refrigerator or freezer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerator Recycling	983.00	0.180					

Electric kWh Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Refrigerator Recycling	4

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Refrigerator Recycling	1.00		0.90

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Measure	RR sp	RR wp	Loadshape ID
Refrigerator Recycling	0.90	0.90	ls_07_Electric

RRsp Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

RRwp Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Refrigerator Recycling					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerator Recycling	0.54	0.00	0.00	0.46

NTG Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerator Recycling	$214.00 / measure	$95.00 / measure

Room AC (10.8)

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Cooling **Measure Sub Type:** Room AC

Program: Residential Consumer Products

Measure Description

The installation of ENERGY STAR® qualified room air conditioners. ENERGY STAR® qualified air conditioners are typically 10% more efficient than models meeting federal standards.

Baseline Description

The baseline efficiency case is a window AC unit that meets the minimum federal efficiency standard for efficiency which currently is EER 9.8.

Measures

Measure Name	Unique Identifier
Room AC (10.8)	Electric Residential Residential Consumer Products Room AC (10.8)

Savings Principle

The high efficiency level is a room AC unit meeting or exceeding the federal efficiency standard by 10% or more. Average size is 10,000 Btu and average EERs is 10.8.

Savings Method

Deemed

Unit

Installed high-efficiency room air-conditioner.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Room AC (10.8)	36.00	0.060					

Electric kWh Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Room AC (10.8)	12

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Room AC (10.8)	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Room AC (10.8)	1.00	1.00	ls_18_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Room AC (10.8)					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Room AC (10.8)	0.44	0.00	0.00	0.56

NTG Source: NMR Group, Inc. (2021). Residential Products Net-to-Gross Study. https://ma-eeac.org/wp-content/uploads/MA20X04-E-PRODNTG_Res-Products-NTG-Report_FINAL_2021.06.08.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Room AC (10.8)	$44.00 / measure	$40.00 / measure

Room AC Most Efficient

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Cooling **Measure Sub Type:** Room AC

Program: Residential Consumer Products

Measure Description

The installation of an ENERGY STAR® Most Efficient Room AC.

Baseline Description

The baseline for this measure is a new room air conditioner that meets the federal standard requirements.

Measures

Measure Name	Unique Identifier
Room AC Most Efficient	Electric Residential Residential Consumer Products Room AC Most Efficient

Savings Principle

ENERGY STAR® qualified room air conditioner on the Most Efficient list.

Savings Method

Deemed

Unit

Installed most efficient room air-conditioner.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Room AC Most Efficient	145.00	0.220					

Electric kWh Source: EPA Research (2020). Energy Star Retail Products Platform.

Electric kW Source: EPA Research (2020). Energy Star Retail Products Platform.

Energy Impact Factors

Measure	Measure Life
Room AC Most Efficient	12

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Room AC Most Efficient	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Room AC Most Efficient	1.00	1.00	ls_18_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Room AC Most Efficient					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Room AC Most Efficient	0.44	0.00	0.00	0.56

NTG Source: NMR Group, Inc. (2021). Residential Products Net-to-Gross Study. https://ma-eeac.org/wp-content/uploads/MA20X04-E-PRODNTG_Res-Products-NTG-Report_FINAL_2021.06.08.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Room AC Most Efficient	$100.00 / measure	$17.00 / measure

Room air cleaners

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Plug Load | **Measure Type:** Room Air Cleaners | **Measure Sub Type:** Room Air Cleaner

Program: Residential Consumer Products

Measure Description

Rebates provided for the purchase of an ENERGY STAR® qualified room air cleaner.

Baseline Description

The baseline efficiency case is a unit with 1.0 CADR/Wattdust.

Measures

Measure Name	Unique Identifier
Room air cleaners	Electric Residential Residential Consumer Products Room air cleaners

Savings Principle

The current EnergyStar specification requires a minimum of 2.0 CADR/Wattdust. However, the ENERGY STAR average CADR/Watt (Dust) of models available in their US market database (approximately 170 models) is approximately 3.5 CADR/Wattdust. Therefore it isassumed that the high efficiency unit has a 3.0 CADR/Wattdust.

Savings Method

Deemed

Unit

Rebated ENERGY STAR® room air cleaner

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 8760

Hours Note: It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Room air cleaners	391.00	0.090					

Electric kWh Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Room air cleaners	9

Measure Life Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Measure	ISR	RRe Gas	RRe Electric
Room air cleaners	0.97		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Room air cleaners	1.00	1.00	ls_79_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Room air cleaners					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Room air cleaners	0.37	0.00	0.00	0.63

NTG Source: NMR Group, Inc. (2021). Residential Products Net-to-Gross Study. https://ma-eeac.org/wp-content/uploads/MA20X04-E-PRODNTG_Res-Products-NTG-Report_FINAL_2021.06.08.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Room air cleaners	$84.00 / measure	$40.00 / measure

Smart Strips

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Plug Load **Measure Type:** Smart Strips **Measure Sub Type:** Smart Strip

Program: Residential Consumer Products

Measure Description

The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.

Baseline Description

The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on

Measures

Measure Name	Unique Identifier
Smart Strips	Electric Residential Residential Consumer Products Smart Strips

Savings Principle

The high efficiency case is the use of a smart strip or advanced smart strip.

Savings Method

Deemed

Unit

Per smart strip

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Smart Strips	105.00	0.020					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Smart Strips	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Smart Strips	0.81		0.92

ISR Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Smart Strips	0.92	0.92	ls_06_Electric

RRsp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Smart Strips					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Smart Strips	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Smart Strips	$32.00 / measure	$10.00 / measure

Thermostatic Shut-Off Valve

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: Residential Consumer Products

Measure Description

A showerhead with a control that limits flow once water is heated (thermostatic shut-off valve).

Baseline Description

The Baseline Efficiency case is an existing standard-flow showerhead (2.5 GPM) with no thermostatic shut-off valve.

Measures

Measure Name	Unique Identifier
Thermostatic Shutoff Valve - Elec Thermostatic Shut-off Valve - Oil Thermostatic Shut-off Valve - Other	Electric Residential Residential Consumer Products Thermostatic Shutoff Valve - Elec Electric Residential Residential Consumer Products Thermostatic Shut-off Valve - Oil Electric Residential Residential Consumer Products Thermostatic Shut-off Valve - Other

Savings Principle

The high efficiency case is a standard-flow showerhead (2.5 GPM) with the addition of the stand-alone thermostatic shut-off valve.

Savings Method

Deemed

Unit

Per Showerhead

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Thermostatic Shutoff Valve - Elec	76.00	0.020					
Thermostatic Shut-off Valve - Oil			0.43				
Thermostatic Shut-off Valve - Other				0.38			

Energy Impact Factors

Measure	Measure Life
Thermostatic Shutoff Valve - Elec Thermostatic Shut-off Valve - Oil Thermostatic Shut-off Valve - Other	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Thermostatic Shut-Off Valve	0.78		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Thermostatic Shutoff Valve - Elec	1.00	1.00	ls_08_Electric
Thermostatic Shut-off Valve - Oil	N/A	N/A	ls_00_Electric
Thermostatic Shut-off Valve - Other	N/A	N/A	ls_00_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Thermostatic Shutoff Valve - Elec Thermostatic Shut-off Valve - Oil Thermostatic Shut-off Valve - Other	621				

Water Source: National Grid (2014). Review of ShowerStart evolve.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Thermostatic Shut-Off Valve	0.03	0.00	0.00	0.97

NTG Source: The Cadmus Group, Inc (2008). EnergyWise 2008 Program Evaluation.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Thermostatic Shutoff Valve - Elec	$30.00 / measure	$11.50 / measure
Thermostatic Shut-off Valve - Oil	$30.00 / measure	$11.50 / measure
Thermostatic Shut-off Valve - Other	$30.00 / measure	$11.50 / measure

Tricklestar Keyboard

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Other

Measure Type: Tricklestar Keyboards

Measure Sub Type: Tricklestar Keyboard

Program: Residential Consumer Products

Measure Description

The basic measures puts the PC/laptop to sleep when the user is absent from the PC.

Baseline Description

The baseline efficiency is using a normal keyboard.

Measures

Measure Name	Unique Identifier
Tricklestar Keyboard	Electric Residential Residential Consumer Products Tricklestar Keyboard

Savings Principle

The high efficiency case is using a tricklestar keyboard

Savings Method

Deemed

Unit

Per tricklestar keyboard

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Tricklestar Keyboard	105.00	0.067					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: Energuide.be (2023). How much power does a computer use? And how much CO2 does that represent? https://www.energuide.be/en/questions-answers/how-much-power-does-a-computer-use-and-how-much-co2-does-that-represent/54/

Energy Impact Factors

Measure	Measure Life
Tricklestar Keyboard	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Tricklestar Keyboard	0.81		0.92

ISR Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Tricklestar Keyboard	0.92	0.92	ls_06_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Tricklestar Keyboard					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Tricklestar Keyboard	0.31	0.01	0.00	0.70

NTG Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Tricklestar Keyboard	$101.00 / measure	$25.00 / measure

Residential HVAC, Electric

ACDOWNSIZE

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Windows **Measure Sub Type:**

Program: Residential HVAC

Measure Description

Reduction in system size consistent with manual J calculations.

Baseline Description

The baseline efficiency case is a system that is not sized in accordance with a manual J calculation.

Measures

Measure Name	Unique Identifier
ACDOWNSIZE	Electric Residential Residential HVAC ACDOWNSIZE

Savings Principle

The high efficiency case is a system that is sized in accordance with a manual J calculation.

Savings Method

Deemed

Unit

Completed job (assume downsize 1/2 ton).

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
ACDOWNSIZE	203.00	0.295					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Note: Updated based on historic measure mix

Energy Impact Factors

Measure	Measure Life
ACDOWNSIZE	18

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
ACDOWNSIZE	1.00		1.00

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
ACDOWNSIZE	1.00	1.00	ls_11_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
ACDOWNSIZE		$0.788			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ACDOWNSIZE	0.15	0.00	0.00	0.85

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ACDOWNSIZE	$250.00 / measure	$150.00 / measure

CENTRAL AC

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Cooling | **Measure Sub Type:** Central AC

Program: Residential HVAC

Measure Description

The purchase and installation of high efficiency central air-conditioning (CAC) unit rather than a standard CAC system, and/or to replace an existing inefficient CAC system.

Baseline Description

The baseline efficiency case is a blend of code-compliant central air-conditioning system with SEER = 14 and EER = 11. For early replacement installations, the baseline is an HVAC unit with rated SEER = 14 and an actual SEER efficiency of 12.0.

Measures

Measure Name	Unique Identifier
CENTRAL AC	Electric Residential Residential HVAC CENTRAL AC

Savings Principle

The high efficiency case is a SEER 16.8, EER 13 central AC unit.

Savings Method

Calculated using deemed inputs

Unit

Installed high-efficiency central AC system for cooling.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C

Gross kW = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee)

Where:

Tons = Deemed average equipment capacity: 2.7 tons for 16 SEER unit / 3.1 tons for 18 SEER unit

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment.

SEER_ee = Seasonal Energy Efficiency Ratio of new equipment.

Hours_C = Deemed average equivalent full load cooling hours

Hours: 419

Hours Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Hours Note: The equivalent full load cooling hours are 360 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CENTRAL AC	223.20	0.350					

Electric kWh Source: Guidehouse (2021). Comprehensive TRM Review/RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Baseline update can be found in first source and calculations for savings can be found in second source.

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Note: Updated based on historic measure mix

Energy Impact Factors

Measure	Measure Life
CENTRAL AC	15

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
CENTRAL AC	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Massachusetts Common Assumption

Measure	RR sp	RR wp	Loadshape ID
CENTRAL AC	1.00	1.00	ls_227_Electric

RRsp Note: Massachusetts Common Assumption

RRwp Note: Massachusetts Common Assumption

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CENTRAL AC		$6.669			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CENTRAL AC	0.34	0.22	0.00	0.87

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CENTRAL AC	$1,342.00 / measure	$0.00 / measure

Central Heat Pump

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Heat Pumps

Measure Sub Type: Heat Pump Electrification

Program: Residential HVAC

Measure Description

The installation of a high efficiency rated heat pump (15 SEER 9 HSPF). (EnergyStar v6.1)

Baseline Description

The baseline efficiency case is a non- energy efficient rated central heat pump with SEER 14, HSPF 8.2 for replace on failure. For early retirement, over the remaining life of the existing heat pump unit, the baseline assumes SEER 10 and HPSF 7.

Measures

Measure Name	Unique Identifier
Central Heat Pump	Electric Residential Residential HVAC Central Heat Pump

Savings Principle

The minimum program qualifications for the high efficiency case is a 15.2 SEER2 8.1 HPSF2 system for replace on failure. For calculations of savings, the following is assumed: For replace on failure, the high efficiency case is a SEER 17.6, 9.8 HPSF central heat pump. For early retirement, the high efficiency case is a code compliant SEER 14, HPSF 8.2 heat pump unit.

Savings Method

Calculated using deemed inputs

Unit

Installed high-efficiency heat pump system for heating and cooling.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + (1/HSPF_base - 1/HSPF_ee) × Hours_H]

Gross kW = Tons × (kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee),(1/HSPF_base - 1/HSPF_ee)]

Where:

Tons = Deemed average equipment capacity: 2.5 tons for 16 SEER unit / 2.8 tons for 18 SEER unit

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment.

SEER_ee = Seasonal Energy Efficiency Ratio of new equipment.

Hours_C = Deemed average equivalent full load cooling hours

HSPF_base = Heating efficiency of baseline equipment.

HSPF_ee = Heating efficiency of new equipment.

Hours_H = Deemed average equivalent full load heating hours

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Central Heat Pump	1533.20	0.580					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
Central Heat Pump	20

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
Central Heat Pump	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Central Heat Pump	1.00	1.00	ls_12_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Central Heat Pump		$8.219			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Central Heat Pump	0.34	0.22	0.00	0.87

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Central Heat Pump	$2,100.00 / measure	$1,050.00 / measure

CoolSmart AC QIV ES

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: HVAC O&M

Measure Sub Type: Central AC Quality Install

Program: Residential HVAC

Measure Description

The verification of proper charge and airflow during installation of new Central AC system.

Baseline Description

The baseline efficiency case is a cooling system not installed according to manufacturer specifications.

Measures

Measure Name	Unique Identifier
CoolSmart AC QIV ES	Electric Residential Residential HVAC CoolSmart AC QIV ES

Savings Principle

The high efficiency case is the same cooling system installed according to manufacturer specifications.

Savings Method

Calculated using deemed inputs

Unit

Completed quality installation verification (QIV) on new central AC system.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE

Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE

Where:

Tons = Deemed average equipment capacity: 2.7 tons

12 kBtu/hr per ton = Conversion factor

SEER = Seasonal Energy Efficiency Ratio of existing equipment

Hours_C = Deemed average equivalent full load cooling hours

5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.

EER = Peak efficiency of existing equipment

Hours: 419

Hours Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Hours Note: Equivalent full load hours are 1200 hours/year for heating and 419 hours/year for cooling

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CoolSmart AC QIV ES	40.30	0.064					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
CoolSmart AC QIV ES	18

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
CoolSmart AC QIV ES	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
CoolSmart AC QIV ES	1.00	1.00	ls_11_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CoolSmart AC QIV ES		$1.884			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CoolSmart AC QIV ES	0.34	0.12	0.10	0.88

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CoolSmart AC QIV ES	$222.00 / measure	$175.00 / measure

CoolSmart AC Tuneup

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Central AC **Measure Sub Type:** Tune up

Program: Residential HVAC

Measure Description

Tune-up of an existing central AC system.

Baseline Description

The baseline efficiency case is a standard residential central AC system that does not operating according to manufacturer specifications.

Measures

Measure Name	Unique Identifier
CoolSmart AC Tuneup	Electric Residential Residential HVAC CoolSmart AC Tuneup

Savings Principle

The high efficiency case is the same baseline system but which operates according to manufacturer specifications.

Savings Method

Calculated using deemed inputs

Unit

Completed tune-up of existing central ac system.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE

Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE

Where:

Tons = Deemed average equipment capacity: 2.7 tons

12 kBtu/hr per ton = Conversion factor

SEER = Seasonal Energy Efficiency Ratio of existing equipment

Hours_C = Deemed average equivalent full load cooling hours

5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.

EER = Peak efficiency of existing equipment

Hours: 419

Hours Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Hours Note: Equivalent full load hours are 1200 hours/year for heating and 419 hours/year for cooling

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CoolSmart AC Tuneup	45.10	0.072					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
CoolSmart AC Tuneup	5

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
CoolSmart AC Tuneup	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
CoolSmart AC Tuneup	1.00	1.00	ls_11_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CoolSmart AC Tuneup		$1.884			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CoolSmart AC Tuneup	0.34	0.12	0.10	0.88

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CoolSmart AC Tuneup		

CoolSmart HP QIV ES

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: HVAC O&M

Measure Sub Type: Heat Pump Quality Install

Program: Residential HVAC

Measure Description

The verification of proper charge and airflow during installation of new Heat Pump systems.

Baseline Description

The baseline efficiency case is a heating and cooling system not installed according to manufacturer specifications.

Measures

Measure Name	Unique Identifier
CoolSmart HP QIV ES	Electric Residential Residential HVAC CoolSmart HP QIV ES

Savings Principle

The high efficiency case is the same heating and cooling system not installed according to manufacturer specifications.

Savings Method

Calculated using deemed inputs

Unit

Completed quality installation verification (QIV) on new heat pump system.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE

Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE

Where:

Tons = Deemed average equipment capacity: 3.03 tons

12 kBtu/hr per ton = Conversion factor

SEER= Seasonal Energy Efficiency Ratio of existing equipment

HSPF = Heating efficiency of existing equipment

Hours_C = Deemed average equivalent full load cooling hours

Hours_H = Deemed average equivalent full load heating hours

5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.

EER = Peak efficiency of existing equipment

Hours: 419

Hours Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Hours Note: Equivalent full load hours are 1200 hours/year for heating and 419 hours/year for cooling

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CoolSmart HP QIV ES	265.60	0.097					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Note: Updated based on historic measure mix

Energy Impact Factors

Measure	Measure Life
CoolSmart HP QIV ES	18

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
CoolSmart HP QIV ES	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
CoolSmart HP QIV ES	1.00	1.00	ls_162_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CoolSmart HP QIV ES		$1.884			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CoolSmart HP QIV ES	0.34	0.12	0.10	0.88

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CoolSmart HP QIV ES	$222.00 / measure	$175.00 / measure

CoolSmart HP Tuneup

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: HVAC O&M

Measure Sub Type: Heat Pump Tune Up

Program: Residential HVAC

Measure Description

Tune-up of an existing heat pump system.

Baseline Description

The baseline efficiency case is a standard residential heat pump system that does not operating according to manufacturer specifications.

Measures

Measure Name	Unique Identifier
CoolSmart HP Tuneup	Electric Residential Residential HVAC CoolSmart HP Tuneup

Savings Principle

The high efficiency case is the same baseline system but which operates according to manufacturer specifications.

Savings Method

Calculated using deemed inputs

Unit

Completed tune-up of existing heat pump system

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER × Hours_C + 1/HSPF × Hours_H) × %SAVE

Gross kW = Tons × (kBtu/hr per ton) × max[(1/EER),(1/HSPF)] × %SAVE

Where:

Tons = Deemed average equipment capacity: 3.03 tons

12 kBtu/hr per ton = Conversion factor

SEER= Seasonal Energy Efficiency Ratio of existing equipment

HSPF = Heating efficiency of existing equipment

Hours_C = Deemed average equivalent full load cooling hours

Hours_H = Deemed average equivalent full load heating hours

5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.

EER = Peak efficiency of existing equipment

Hours: 419

Hours Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Hours Note: Equivalent full load hours are 1200 hours/year for heating and 419 hours/year for cooling

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CoolSmart HP Tuneup	341.90	0.400					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Note: Updated based on historic measure mix

Energy Impact Factors

Measure	Measure Life
CoolSmart HP Tuneup	5

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
CoolSmart HP Tuneup	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
CoolSmart HP Tuneup	1.00	1.00	ls_163_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CoolSmart HP Tuneup		$1.884			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CoolSmart HP Tuneup	0.34	0.12	0.10	0.88

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CoolSmart HP Tuneup	$221.00 / measure	$200.00 / measure

ECM Pumps

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Motors | **Measure Sub Type:** ECM Motor

Program: Residential HVAC

Measure Description

Heating hot water circulation retrofit projects replacing the existing hot water circulation systems with ECM pumps and zone valves.

Baseline Description

The baseline case is standard efficiency steady-state motor without variable speed capabilities.

Measures

Measure Name	Unique Identifier
ECM Pumps	Electric Residential Residential HVAC ECM Pumps

Savings Principle

The efficient case is the installation of a pump with an electronically commutated motor (ECM) with variable speed capabilities on a boiler.

Savings Method

Deemed

Unit

Installed ECM circulator pump retrofit project.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
ECM Pumps	75.20	0.041					

Electric kWh Source: Residential Baseline Study - ECM Pumps (Report has not been finalized)

Electric kW Source: RI_PAs_2021-2023 PLAN Electric H&C Savings Workbook 08-11-2020

Energy Impact Factors

Measure	Measure Life
ECM Pumps	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
ECM Pumps	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
ECM Pumps	1.00	1.00	ls_82_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
ECM Pumps					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ECM Pumps	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ECM Pumps	$133.00 / measure	$100.00 / measure

Elec Res to HP ducted or mix ducted

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Heating

Measure Sub Type: Heat Pump Electrification

Program: Residential HVAC

Measure Description

The purchase and installation of high efficiency heat pump (ducted or mix ducted) to replace an electric resistance heating system.

Baseline Description

The baseline efficiency case for heating is a residential electric resistance heating system.

The baseline efficiency case for cooling is a residential window AC unit with EER 9.8.

Measures

Measure Name	Unique Identifier
Elec Res to HP ducted or mix ducted	Electric Residential Residential HVAC Elec Res to HP ducted or mix ducted

Savings Principle

The high efficiency case is an ENERGY STAR® qualified air-source heat pump.

Savings Method

Deemed

Unit

Installed high-efficiency heat pump system (ducted or mix ducted) for heating and cooling.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Elec Res to HP ducted or mix ducted	6549.00	2.830					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
Elec Res to HP ducted or mix ducted	15

Measure Life Source: Regional Technical Forum (2023). Ductless Heat Pumps for Zonal Heat SF.https://rtf.nwcouncil.org/measure/ductless-heat-pumps-zonal-heat-sf/

Measure	ISR	RRe Gas	RRe Electric
Elec Res to HP ducted or mix ducted	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Elec Res to HP ducted or mix ducted	1.00	1.00	ls_228_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Elec Res to HP ducted or mix ducted					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Elec Res to HP ducted or mix ducted	0.31	0.22	0.00	0.91

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Elec Res to HP ducted or mix ducted		

Electric Resistance to MSHP

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Heating

Measure Sub Type: Heat Pump Electrification

Program: Residential HVAC

Measure Description

The purchase and installation of high efficiency mini-split heat pump system to replace an electric resistance heating system. (EnergyStar v6.1)

Baseline Description

The baseline efficiency case for heating is a residential electric resistance heating system. The baseline efficiency case for cooling is a residential window AC unit with EER 9.8. For calculations, baseline is a SEER 15 and HSPF 3.4 system.

Measures

Measure Name	Unique Identifier
Electric Resistance to MSHP	Electric Residential Residential HVAC Electric Resistance to MSHP

Savings Principle

The minimum program qualifications for the high efficiency case is a 15.2 SEER2 8.5 HPSF2 system. The high efficiency case is an ENERGY STAR® qualified air-source heat pump. For calculations, the high efficiency case is a SEER 19.2, HSPF 10.4 ductless mini split heat pump.

Savings Method

Deemed

Unit

Installed high-efficiency mini-split heat pump system for heating and cooling.

Savings Equation

Heating Gross kWh = Qty*deltakWh_heating

Cooling Gross kWh = Qty*deltakWh_cooling

Cooling Gross kW = Qty*deltakW

Where:

Qty = Total number of units.

deltakWh_heating = Average annual heating kWh reduction per unit.

deltakWh_cooling = Average annual cooling kWh reduction per unit.

deltakW = Average annual kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Electric Resistance to MSHP	6549.00	2.830					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
Electric Resistance to MSHP	17

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
Electric Resistance to MSHP	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Electric Resistance to MSHP	1.00	1.00	ls_90_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Electric Resistance to MSHP		$199.109			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Electric Resistance to MSHP	0.31	0.22	0.00	0.90

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Electric Resistance to MSHP	$6,824.00 / measure	$3,250.00 / measure

HPWH, Electric

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Heat Pump Water Heater

Program: Residential HVAC

Measure Description

Installation of a heat pump water heater (HPWH) instead of an electric resistance water heater.

Baseline Description

The baseline efficiency case is a new, standard efficiency electric resistance hot water heater.

Measures

Measure Name	Unique Identifier
HPWH, Electric - <55 gallon HPWH, Electric - >55 gallon, UEF 2.70	Electric Residential Residential HVAC HPWH, Electric - <55 gallon Electric Residential Residential HVAC HPWH, Electric - >55 gallon, UEF 2.70

Savings Principle

The high efficiency case is a high efficiency heat pump water heater.

Savings Method

Deemed

Unit

Installed heat pump water heater.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
HPWH, Electric - <55 gallon	1712.00	0.340					
HPWH, Electric - >55 gallon, UEF 2.70	360.00	0.040					

Energy Impact Factors

Measure	Measure Life
HPWH, Electric - <55 gallon HPWH, Electric - >55 gallon, UEF 2.70	13

Measure Life Source: NREL (2016). Field Performance of Heat Pump Water Heaters in the Northeast. https://www.nrel.gov/docs/fy16osti/64904.pdf

Measure	ISR	RRe Gas	RRe Electric
HPWH, Electric	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
HPWH, Electric - <55 gallon	1.00	1.00	ls_83_Electric
HPWH, Electric - >55 gallon, UEF 2.70	1.00	1.00	ls_83_Electric
	1.00	1.00	

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
HPWH, Electric - <55 gallon					
HPWH, Electric - >55 gallon, UEF 2.70					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HPWH, Electric	0.19	0.12	0.00	0.93

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HPWH, Electric - <55 gallon	$1,119.00 / measure	$625.00 / measure
HPWH, Electric - >55 gallon, UEF 2.70	$677.00 / measure	$150.00 / measure

Mini Split Heat Pump QIV

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: HVAC O&M

Measure Sub Type: Central AC Quality Install

Program: Residential HVAC

Measure Description

The verification of proper charge and airflow during installation of new Central AC system.

Baseline Description

The baseline efficiency case is a cooling system and heating system not installed according to manufacturer specifications.

Measures

Measure Name	Unique Identifier
Mini Split Heat Pump QIV	Electric Residential Residential HVAC Mini Split Heat Pump QIV

Savings Principle

The high efficiency case is the same cooling and heating system installed according to manufacturer specifications.

Savings Method

Calculated using deemed inputs

Unit

Completed QIV on new AC system

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × 1/SEER × Hours_C × %SAVE

Gross kW = Tons × (kBtu/hr per ton) × 1/EER × %SAVE

Where:

Tons = Deemed average equipment capacity: 2.7 tons

12 kBtu/hr per ton = Conversion factor

SEER = Seasonal Energy Efficiency Ratio of existing equipment

Hours_C = Deemed average equivalent full load cooling hours

5%SAVE = Average percent demand reduction; National Grid assumption based on regional PA working groups.

EER = Peak efficiency of existing equipment

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Mini Split Heat Pump QIV	82.30	0.029					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Note: Updated based on historic measure mix

Energy Impact Factors

Measure	Measure Life
Mini Split Heat Pump QIV	17

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
Mini Split Heat Pump QIV	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Mini Split Heat Pump QIV	1.00	1.00	ls_161_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Mini Split Heat Pump QIV		$1.884			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Mini Split Heat Pump QIV	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Mini Split Heat Pump QIV	$144.00 / measure	$120.00 / measure

MiniSplit HP

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heat Pumps **Measure Sub Type:** Ductless

Program: Residential HVAC

Measure Description

The installation of a more efficient rated Ductless MiniSplit system (15 SEER, 10 HSPF) (EnergyStar v6.1)

Baseline Description

The baseline efficiency case is a non- energy efficient rated ductless mini split heat pump with SEER 15, HSPF 8.2.

Measures

Measure Name	Unique Identifier
MiniSplit HP	Electric Residential Residential HVAC MiniSplit HP

Savings Principle

The minimum program qualifications for the high efficiency case is a 15.2 SEER2 8.5 HPSF2 system. For calculations, the high efficiency case is a SEER 19.7, HPSF 11.2 ductless mini split heat pump.

Savings Method

Calculated using deemed inputs

Unit

Installed high-efficiency mini-split heat pump system for heating and cooling.

Savings Equation

Gross kWh = Tons × (12 kBtu/hr per ton) × [(1/SEER_base - 1/SEER_EE) × Hours_c + (1/HSPF_base - 1/HSPF_EE) × Hours_h)]

Gross kW = Tons × (12 kBtu/hr per ton) × max[(1/SEER_base - 1/SEER_ee),(1/HSPF_base - 1/HSPF_ee)]

Where:

Tons = Deemed average equipmentcapacity: 1.8 tons for 18 SEER unit / 1.1 tons for 20 SEER unit

SEER_base = Seasonal Energy Efficiency Ratio of baseline equipment

SEER_ee = Seasonal Energy Efficiency Ratio of new equipment

HSPF_base = Heating Season Performance Factor of baseline equipment

HSPF_ee = Heating Season Performance Factor of new equipment

Hours_c = Equivalent full load cooling hours

Hours_h = Equivalent full load heating hours

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
MiniSplit HP	584.20	0.170					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kWh Note: Updated based on historic measure mix

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
MiniSplit HP	17

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
MiniSplit HP	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
MiniSplit HP	1.00	1.00	ls_164_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
MiniSplit HP		$4.743			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
MiniSplit HP	0.34	0.22	0.00	0.87

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MiniSplit HP	$716.00 / measure	$460.00 / measure

WiFi programmable thermostat with cooling (oil)

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Thermostat

Program: Residential HVAC

Measure Description

Installation of WiFi thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system providing space heating and cooling with either a manual or programmable thermostat.

Measures

Measure Name	Unique Identifier
WiFi programmable thermostat with cooling (oil)	Electric Residential Residential HVAC WiFi programmable thermostat with cooling (oil)

Savings Principle

The high efficiency case is an HVAC system that has a wi-fi thermostat installed.

Savings Method

Deemed

Unit

Installed WiFi-enabled thermostat.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
WiFi programmable thermostat with cooling (oil)	18.00	0.030	2.79				

Electric kWh Source: Navigant (2018). Wi-Fi Thermostat Impact Evaluation-Secondary Research Study. https://ma-eeac.org/wp-content/uploads/Wi-Fi-Thermostat-Impact-Evaluation-Secondary-Literature-Study_FINAL.pdf

Electric kW Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Oil MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
WiFi programmable thermostat with cooling (oil)	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
WiFi programmable thermostat with cooling (oil)	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
WiFi programmable thermostat with cooling (oil)	1.00	1.00	ls_227_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
WiFi programmable thermostat with cooling (oil)		$4.474			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi programmable thermostat with cooling (oil)	0.13	0.12	0.00	0.99

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi programmable thermostat with cooling (oil)	$270.00 / measure	$75.00 / measure

WiFi Thermostat, AC Only

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Residential HVAC

Measure Description

Installation of WiFi thermostats with the ability to adjust air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system providing space cooling with either a manual or programmable thermostat.

Measures

Measure Name	Unique Identifier
WiFi Thermostat, AC Only	Electric Residential Residential HVAC WiFi Thermostat, AC Only

Savings Principle

The high efficiency case is an HVAC system that has a wi-fi thermostat installed.

Savings Method

Deemed

Unit

Installed WiFi-enabled thermostat.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
WiFi Thermostat, AC Only	64.40	0.050					

Electric kWh Source: Navigant (2018). Wi-Fi Thermostat Impact Evaluation-Secondary Research Study. https://ma-eeac.org/wp-content/uploads/Wi-Fi-Thermostat-Impact-Evaluation-Secondary-Literature-Study_FINAL.pdf

Electric kW Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Energy Impact Factors

Measure	Measure Life
WiFi Thermostat, AC Only	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
WiFi Thermostat, AC Only	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
WiFi Thermostat, AC Only	1.00	1.00	ls_227_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
WiFi Thermostat, AC Only		$4.474			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi Thermostat, AC Only	0.13	0.12	0.00	0.99

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi Thermostat, AC Only	$270.00 / measure	$75.00 / measure

Window

Sector: Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Building Shell | **Measure Type:** Windows | **Measure Sub Type:**

Program: Residential HVAC

Measure Description

Early replacement of a single pane window either with or without a storm with a triple pane window.

Baseline Description

The baseline efficiency case is a single pane window with or without a storm.

Measures

Measure Name	Unique Identifier
Window -Electric Resistance	Electric Residential Residential HVAC Window -Electric Resistance
Window -Heat Pump	Electric Residential Residential HVAC Window -Heat Pump
Window -Oil	Electric Residential Residential HVAC Window -Oil
Window -Propane	Electric Residential Residential HVAC Window -Propane

Savings Principle

The high efficiency case is an Energy Star qualified triple pane window.

Savings Method

Deemed

Unit

Replacement of window with single pane either with or without a storm with a triple pane window.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Window -Electric Resistance	131.00	0.130					
Window -Heat Pump	69.00	0.050					
Window -Oil	7.00	0.010	0.60				
Window -Propane	7.00	0.010		0.60			

Electric kWh Note: Massachusetts Common Assumption

Electric kW Note: Massachusetts Common Assumption

Energy Impact Factors

Measure	Measure Life
Window -Electric Resistance Window -Heat Pump Window -Oil Window -Propane	17

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Window	1.00		1.00

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Window -Electric Resistance	1.00	1.00	ls_264_Electric
Window -Heat Pump	1.00	1.00	ls_265_Electric
Window -Oil	1.00	1.00	ls_266_Electric
Window -Propane	1.00	1.00	ls_267_Electric
	1.00	1.00	

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Window -Electric Resistance		$8.274			
Window -Heat Pump		$8.274			
Window -Oil		$8.274			
Window -Propane		$8.274			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Window	0.04	0.00	0.00	0.96

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Window -Electric Resistance	$251.00 / measure	$75.00 / measure
Window -Heat Pump	$255.00 / measure	$75.00 / measure
Window -Oil	$255.00 / measure	$75.00 / measure
Window -Propane	$255.00 / measure	$75.00 / measure
	$255.00 / measure	$75.00 / measure

Residential New Construction, Electric

Clothes Washer

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Whole Home **Measure Type:** Clothes Washer **Measure Sub Type:** Clothes Washer

Program: Residential New Construction

Measure Description

The installation of an Energy Star clotheswasher in a Residential New Construction home.

Baseline Description

The baseline is IECC 2024 Code; requires clothes washer to have max annual energy consumption not greater than 130 kWh/yr.

Measures

Measure Name	Unique Identifier
Clothes Washer	Electric Residential Residential New Construction Clothes Washer

Savings Principle

An Energy Star clotheswasher uses less electricity and water to clean clothes.

Savings Method

Deemed

Unit

Installed clothes washer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Clothes Washer	27.70	0.020					

Electric kWh Note: RI assumption using 2024 Energy Star and Energy Star Most Efficient Data

Energy Impact Factors

Measure	Measure Life
Clothes Washer	14

Measure Life Source: DOE (2017). Technical Support Document: Residential Clothes Washer. EERE-2017-BT-STD-0003-0030. https://www.regulations.gov/document/EERE-2017-BT-STD-0014-0030

Measure	ISR	RRe Gas	RRe Electric
Clothes Washer	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Clothes Washer	1.00	1.00	ls_142_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Clothes Washer					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Clothes Washer	0.30	0.00	0.00	0.70

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Clothes Washer		

Codes and Standards

Sector: Residential

Fuel: Electric

Program Type: Custom

Measure Category: Whole Home

Measure Type: Codes and Standards

Measure Sub Type: Codes and Standards

Program: Residential New Construction

Measure Description

Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island.

Baseline Description

Un-influenced adoption curve of federal minimum codes and standards.

Measures

Measure Name	Unique Identifier
Codes and Standards	Electric Residential Residential New Construction Codes and Standards

Savings Principle

Accelerated adoption of advancing energy codes and equipment standards.

Savings Method

Calculated based on attribution study

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Codes and Standards	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Codes and Standards	20

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Codes and Standards	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Codes and Standards	1.00	1.00	ls_140_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Codes and Standards					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Codes and Standards	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Codes and Standards		

Cooling

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Cooling

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
Cooling - Tier 1	Electric Residential Residential New Construction Cooling - Tier 1
Cooling - Tier 2	Electric Residential Residential New Construction Cooling - Tier 2
Cooling - Tier 3	Electric Residential Residential New Construction Cooling - Tier 3

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Completed ESH heating, cooling, or DHW project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc					
Cooling - Tier 1	Calc						
Cooling - Tier 2	Calc						
Cooling - Tier 3	Calc						

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Note: Supplied by vendor

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Cooling - Tier 1	25
Cooling - Tier 2	
Cooling - Tier 3	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Cooling	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Cooling - Tier 1	1.00	1.00	ls_11_Electric
Cooling - Tier 2	1.00	1.00	ls_11_Electric
Cooling - Tier 3	1.00	1.00	ls_11_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Cooling - Tier 1					
Cooling - Tier 2					
Cooling - Tier 3					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Cooling	0.25	0.00	0.00	0.75

NTG Source: NMR Group, Inc (2021). Low Rise Residential New Construction NTG Study (MA20X05-B-RNCNTG). https://ma-eeac.org/wp-content/uploads/MA20X05-B-RNCNTG_Low-rise-RNC-NTG_FinalDraft-07272021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Cooling - Tier 1		
Cooling - Tier 2		
Cooling - Tier 3		

CP

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** CP

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
CP - Cooling	Electric Residential Residential New Construction CP - Cooling
CP - DHW	Electric Residential Residential New Construction CP - DHW
CP - Heating	Electric Residential Residential New Construction CP - Heating

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Completed ESH heating, cooling, or DHW project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc	Calc	Calc			
CP - Cooling	Calc						
CP - DHW	Calc						
CP - Heating	Calc			6.70			

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
CP - Cooling	Multi
CP - DHW	25
CP - Heating	15
	25

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
CP	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
CP - Cooling	1.00	1.00	ls_11_Electric
CP - DHW	1.00	1.00	ls_219_Electric
CP - Heating	1.00	1.00	ls_03_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CP - Cooling					
CP - DHW					
CP - Heating		$148.164			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CP	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CP - Cooling	$1,204.00 / home	$843.00 / home
CP - DHW		
CP - Heating		

DHW

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** DHW

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
DHW - Tier 1	Electric Residential Residential New Construction DHW - Tier 1
DHW - Tier 2	Electric Residential Residential New Construction DHW - Tier 2
DHW - Tier 3	Electric Residential Residential New Construction DHW - Tier 3

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Completed ESH heating, cooling, or DHW project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc	Calc	Calc			
DHW - Tier 1	Calc						
DHW - Tier 2	Calc						
DHW - Tier 3	Calc						

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Note: Supplied by vendor

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
DHW - Tier 1	15
DHW - Tier 2	
DHW - Tier 3	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
DHW	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
DHW - Tier 1	1.00	1.00	ls_220_Electric
DHW - Tier 2	1.00	1.00	ls_220_Electric
DHW - Tier 3	1.08	1.00	ls_220_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
DHW - Tier 1					
DHW - Tier 2					
DHW - Tier 3					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DHW	0.25	0.00	0.00	0.75

NTG Source: NMR Group, Inc (2021). Low Rise Residential New Construction NTG Study (MA20X05-B-RNCNTG). https://ma-eeac.org/wp-content/uploads/MA20X05-B-RNCNTG_Low-rise-RNC-NTG_FinalDraft-07272021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DHW - Tier 1		
DHW - Tier 2		
DHW - Tier 3		

Dishwasher

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Whole Home **Measure Type:** Dishwasher **Measure Sub Type:** Dishwasher

Program: Residential New Construction

Measure Description

The installation of an Energy Star Dishwasher in a Residential New Construction home.

Baseline Description

A standard non-Energy Star Dishwasher.

Measures

Measure Name	Unique Identifier
Dishwasher	Electric Residential Residential New Construction Dishwasher

Savings Principle

An Energy Star dishwasher uses less electricity and water to clean dishes.

Savings Method

Deemed

Unit

Installed dish washer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher	39.00	0.005					

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher	11

Measure Life Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Measure	ISR	RRe Gas	RRe Electric
Dishwasher	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher	1.00	1.00	ls_142_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Dishwasher					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher	0.91	0.00	0.00	0.09

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher		

Heating

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Heating

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
Heating - Tier 1	Electric Residential Residential New Construction Heating - Tier 1
Heating - Tier 2	Electric Residential Residential New Construction Heating - Tier 2
Heating - Tier 3	Electric Residential Residential New Construction Heating - Tier 3

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Completed ESH heating, cooling, or DHW project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc	Calc	Calc			
Heating - Tier 1	Calc			2.57			
Heating - Tier 2	Calc			6.26			
Heating - Tier 3	Calc			10.49			

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Note: Supplied by vendor

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Heating - Tier 1	25
Heating - Tier 2	
Heating - Tier 3	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Heating	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Heating - Tier 1	1.00	1.00	ls_03_Electric
Heating - Tier 2	1.00	1.00	ls_03_Electric
Heating - Tier 3	1.00	1.00	ls_03_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Heating - Tier 1		$148.164			
Heating - Tier 2		$148.164			
Heating - Tier 3		$148.164			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating	0.25	0.00	0.00	0.75

NTG Source: NMR Group, Inc (2021). Low Rise Residential New Construction NTG Study (MA20X05-B-RNCNTG). https://ma-eeac.org/wp-content/uploads/MA20X05-B-RNCNTG_Low-rise-RNC-NTG_FinalDraft-07272021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating - Tier 1	$2,210.00 / home	$1,547.00 / home
Heating - Tier 2	$7,433.00 / home	$5,203.00 / home
Heating - Tier 3	$11,761.00 / home	$8,233.00 / home

HERS

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Home Energy Reports **Measure Sub Type:** Behavior

Program: Residential New Construction

Measure Description

The cooling, DHW, and heating savings resulting from the Home Energy Reports program.

Baseline Description

The baseline case is the performance of the house before participation in the program.

Measures

Measure Name	Unique Identifier
HERS - Cooling	Electric Residential Residential New Construction HERS - Cooling
HERS - DHW	Electric Residential Residential New Construction HERS - DHW
HERS - Heating	Electric Residential Residential New Construction HERS - Heating

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site specific inputs

Unit

Completed HERS heating, cooling, or DHW project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc	Calc		Calc		
HERS - Cooling	Calc						
HERS - DHW	Calc						
HERS - Heating	Calc						

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
HERS - Cooling	25
HERS - DHW	
HERS - Heating	

Measure Life Note: Common measure life for insulation measures.

Measure	ISR	RRe Gas	RRe Electric
HERS	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
HERS - Cooling	1.00	1.00	ls_217_Electric
HERS - DHW	1.00	1.00	ls_217_Electric
HERS - Heating	1.00	1.00	ls_219_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
HERS - Cooling					
HERS - DHW					
HERS - Heating					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HERS	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HERS - Cooling		
HERS - DHW		
HERS - Heating		

MFHR, Elec

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Adaptive Reuse

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
MFHR - Cooling	Electric Residential Residential New Construction MFHR - Cooling
MFHR - DHW	Electric Residential Residential New Construction MFHR - DHW
MFHR - Heating	Electric Residential Residential New Construction MFHR - Heating
MFHR - Lighting	Electric Residential Residential New Construction MFHR - Lighting

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Completed ESH heating, cooling, DHW, or lighting project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc	Calc	Calc	Calc	Calc	Calc
MFHR - Cooling	Calc						
MFHR - DHW	Calc						
MFHR - Heating	Calc						
MFHR - Lighting							

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
MFHR - Cooling	Multi
MFHR - DHW	25
MFHR - Heating	15
MFHR - Lighting	25
	1

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
MFHR, Elec	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
MFHR - Cooling	1.00	1.00	ls_225_Electric
MFHR - DHW	1.00	1.00	ls_223_Electric
MFHR - Heating	1.00	1.00	ls_224_Electric
MFHR - Lighting	1.00	1.00	ls_226_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
MFHR - Cooling		$6.669			
MFHR - DHW					
MFHR - Heating		$7.203			
MFHR - Lighting					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
MFHR, Elec	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MFHR - Cooling	$1,294.00 / home	$795.00 / home
MFHR - DHW	$1,294.00 / home	$795.00 / home
MFHR - Heating	$1,294.00 / home	$795.00 / home
MFHR - Lighting		

Refrigerators

Sector: Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Refrigerators **Measure Sub Type:** Refrigerator

Program: Residential New Construction

Measure Description

This measure covers the replacement of an existing inefficient refrigerator with a new efficient refrigerator.

Baseline Description

Existing refrigerator continues to operate.

Measures

Measure Name	Unique Identifier
Refrigerators	Electric Residential Residential New Construction Refrigerators

Savings Principle

The high efficiency case is an Energy Star® refrigerator or a model that is ENERGY STAR® rated and included in the Most Efficient® or Top Ten USA® ranking.

Savings Method

Calculated using deemed inputs

Unit

Installed refrigerator

Savings Equation

Gross kWh = Qty × (kWh_base - kWh_ee)

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

kWh_base = Deemed average demand per baseline unit.

kWh_ee = Deemed average demand per high-efficiency unit.

DeltakW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerators	95.70	0.017					

Electric kWh Source: EPA Research (2020). Energy Star Retail Products Platform.

Electric kW Source: Cadmus Demand Impact Model (2012). Estimated using the demand allocation methodology, Prepared for the Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Refrigerators	12

Measure Life Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Measure	ISR	RRe Gas	RRe Electric
Refrigerators	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Refrigerators	1.00	1.00	ls_142_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Refrigerators					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerators	0.54	0.00	0.00	0.46

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerators		

Renovation Rehab Cooling, Elec

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Cooling

Program: Residential New Construction

Measure Description

The cooling savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab - Cooling Tier 1, Elec Renovation Rehab - Cooling Tier 2, Elec Renovation Rehab - Cooling Tier 3, Elec	Electric Residential Residential New Construction Renovation Rehab - Cooling Tier 1, Elec Electric Residential Residential New Construction Renovation Rehab - Cooling Tier 2, Elec Electric Residential Residential New Construction Renovation Rehab - Cooling Tier 3, Elec

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Renovation Rehab - Cooling Tier 1, Elec	Calc	Calc	20.59				
Renovation Rehab - Cooling Tier 2, Elec	Calc	Calc		7.07			
Renovation Rehab - Cooling Tier 3, Elec	Calc	Calc					

Electric kWh Note: Supplied by vendor

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Renovation Rehab - Cooling Tier 1, Elec	25
Renovation Rehab - Cooling Tier 2, Elec	
Renovation Rehab - Cooling Tier 3, Elec	

Measure Life Note: Common measure life for insulation measures.

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Cooling, Elec	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab - Cooling Tier 1, Elec	1.00	1.00	ls_139_Electric
Renovation Rehab - Cooling Tier 2, Elec	1.00	1.00	ls_139_Electric
Renovation Rehab - Cooling Tier 3, Elec	1.00	1.00	ls_139_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Renovation Rehab - Cooling Tier 1, Elec					
Renovation Rehab - Cooling Tier 2, Elec					
Renovation Rehab - Cooling Tier 3, Elec					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Cooling, Elec	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab - Cooling Tier 1, Elec		
Renovation Rehab - Cooling Tier 2, Elec		
Renovation Rehab - Cooling Tier 3, Elec		

Renovation Rehab CP, Elec

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** CP

Program: Residential New Construction

Measure Description

The heating, cooling, and DHW savings resulting from Renovation Rehab CP projects. The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation. The DHW savings resulting from RenovationRehab projects that include more efficient water heating systems. The cooling savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab CP - Cooling, Elec Renovation Rehab CP - DHW, Elec Renovation Rehab CP - Heating, Elec	Electric Residential Residential New Construction Renovation Rehab CP - Cooling, Elec Electric Residential Residential New Construction Renovation Rehab CP - DHW, Elec Electric Residential Residential New Construction Renovation Rehab CP - Heating, Elec

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete CP Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
			Calc	Calc	Calc		
Renovation Rehab CP - Cooling, Elec	Calc	Calc					
Renovation Rehab CP - DHW, Elec	Calc	Calc					
Renovation Rehab CP - Heating, Elec	Calc	Calc					

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Oil MMBtu Source: 0

Energy Impact Factors

Measure	Measure Life
Renovation Rehab CP - Cooling, Elec	25
Renovation Rehab CP - DHW, Elec	
Renovation Rehab CP - Heating, Elec	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab CP, Elec	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab CP - Cooling, Elec	1.00	1.00	ls_141_Electric
Renovation Rehab CP - DHW, Elec	1.00	1.00	ls_141_Electric
Renovation Rehab CP - Heating, Elec	1.00	1.00	ls_141_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Renovation Rehab CP - Cooling, Elec Renovation Rehab CP - DHW, Elec Renovation Rehab CP - Heating, Elec		$148.164			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab CP, Elec	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab CP - Cooling, Elec Renovation Rehab CP - DHW, Elec Renovation Rehab CP - Heating, Elec	$1,204.00 / home	$843.00 / home

Renovation Rehab Domestic Hot Water, Elec

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** DHW

Program: Residential New Construction

Measure Description

The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab - DHW Tier 1, Elec Renovation Rehab - DHW Tier 2, Elec Renovation Rehab - DHW Tier 3, Elec	Electric Residential Residential New Construction Renovation Rehab - DHW Tier 1, Elec Electric Residential Residential New Construction Renovation Rehab - DHW Tier 2, Elec Electric Residential Residential New Construction Renovation Rehab - DHW Tier 3, Elec

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Renovation Rehab - DHW Tier 1, Elec	Calc	Calc	20.60				
Renovation Rehab - DHW Tier 2, Elec	Calc	Calc		7.07			
Renovation Rehab - DHW Tier 3, Elec	Calc	Calc					

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Note: Supplied by vendor

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Renovation Rehab - DHW Tier 1, Elec	15
Renovation Rehab - DHW Tier 2, Elec	
Renovation Rehab - DHW Tier 3, Elec	

Measure Life Note: Common measure life for insulation measures.

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Domestic Hot Water, Elec	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab - DHW Tier 1, Elec	1.00	1.00	ls_139_Electric
Renovation Rehab - DHW Tier 2, Elec	1.00	1.00	ls_139_Electric
Renovation Rehab - DHW Tier 3, Elec	1.00	1.00	ls_139_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Renovation Rehab - DHW Tier 1, Elec					
Renovation Rehab - DHW Tier 2, Elec					
Renovation Rehab - DHW Tier 3, Elec					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Domestic Hot Water, Elec	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab - DHW Tier 1, Elec		
Renovation Rehab - DHW Tier 2, Elec		
Renovation Rehab - DHW Tier 3, Elec		

Renovation Rehab Heating, Elec

Sector: Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Heating

Program: Residential New Construction

Measure Description

The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab - Heating Tier 1, Elec Renovation Rehab - Heating Tier 2, Elec Renovation Rehab - Heating Tier 3, Elec	Electric Residential Residential New Construction Renovation Rehab - Heating Tier 1, Elec Electric Residential Residential New Construction Renovation Rehab - Heating Tier 2, Elec Electric Residential Residential New Construction Renovation Rehab - Heating Tier 3, Elec

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Renovation Rehab - Heating Tier 1, Elec	Calc	Calc	20.67				
Renovation Rehab - Heating Tier 2, Elec	Calc	Calc		7.10			
Renovation Rehab - Heating Tier 3, Elec	Calc	Calc					

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Note: Supplied by vendor

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Renovation Rehab - Heating Tier 1, Elec	25
Renovation Rehab - Heating Tier 2, Elec	
Renovation Rehab - Heating Tier 3, Elec	

Measure Life Note: Common measure life for insulation measures.

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Heating, Elec	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab - Heating Tier 1, Elec	1.00	1.00	ls_139_Electric
Renovation Rehab - Heating Tier 2, Elec	1.00	1.00	ls_139_Electric
Renovation Rehab - Heating Tier 3, Elec	1.00	1.00	ls_139_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Renovation Rehab - Heating Tier 1, Elec		$148.164			
Renovation Rehab - Heating Tier 2, Elec		$148.164			
Renovation Rehab - Heating Tier 3, Elec		$148.164			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Heating, Elec	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab - Heating Tier 1, Elec	$2,866.00 / home	$2,006.00 / home
Renovation Rehab - Heating Tier 2, Elec	$4,219.00 / home	$2,953.00 / home
Renovation Rehab - Heating Tier 3, Elec	$21,577.00 / home	$15,104.00 / home

Showerheads

Sector: Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: Residential New Construction

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.

Measures

Measure Name	Unique Identifier
Showerheads	Electric Residential Residential New Construction Showerheads

Savings Principle

The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Showerheads	240.60	0.059					

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: Navigant (2018). Res 1 - MA Baseline Load Shape Study. https://ma-eeac.org/wp-content/uploads/RES-1-FINAL-Comprehensive-Report-2018-07-27.pdf

Energy Impact Factors

Measure	Measure Life
Showerheads	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Showerheads	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Showerheads	1.00	1.00	ls_143_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rates are 100% since savings estimates are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Showerheads	1565				

Water Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Showerheads	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Showerheads		

Income Eligible Multifamily, Electric

Aerator

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** Faucet Aerator

Program: Income Eligible Multifamily

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity.

Baseline Description

The baseline efficiency case is 2.2 GPM or greater faucet.

Measures

Measure Name	Unique Identifier
Aerator - Electric Aerator - Oil Aerator - Other	Electric Income Eligible Residential Income Eligible Multifamily Aerator - Electric Electric Income Eligible Residential Income Eligible Multifamily Aerator - Oil Electric Income Eligible Residential Income Eligible Multifamily Aerator - Other

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less aerator installed.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Aerator - Electric	38.00	0.009					
Aerator - Oil			0.20				
Aerator - Other				0.20			

Electric kWh Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Oil MMBtu Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Propane MMBtu Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Aerator - Electric	7
Aerator - Oil	
Aerator - Other	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Aerator	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRe Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Aerator - Electric	1.00	1.00	ls_246_Electric
Aerator - Oil	N/A	N/A	ls_00_Electric
Aerator - Other	N/A	N/A	ls_00_Electric

RRsp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRwp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Aerator - Electric	359	$0.714			$0.006
Aerator - Oil		$0.714			$0.006
Aerator - Other		$0.714			$0.006

Water Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NTG Note: Realization rate is assumed 100% because energy savings are custom calculated.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Aerator	0.00	0.00	0.00	1.00

NTG Note: Realization rate is assumed 100% because energy savings are custom calculated.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Aerator - Electric	$5.00 / measure	$5.00 / measure
Aerator - Oil	$5.00 / measure	$5.00 / measure
Aerator - Other		

Air Sealing

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Custom

Measure Category: Building Shell

Measure Type: Air Sealing

Measure Sub Type: Air Sealing/Infiltration

Program: Income Eligible Multifamily

Measure Description

Thermal shell air leaks are sealed through strategic use and location of air-tight materials.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)

Measures

Measure Name	Unique Identifier
Air Sealing - Elec	Electric Income Eligible Residential Income Eligible Multifamily Air Sealing - Elec
Air Sealing - Elec w/AC	Electric Income Eligible Residential Income Eligible Multifamily Air Sealing - Elec w/AC
Air Sealing - Oil	Electric Income Eligible Residential Income Eligible Multifamily Air Sealing - Oil
Air Sealing - Other	Electric Income Eligible Residential Income Eligible Multifamily Air Sealing - Other

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.

Savings Method

Calculated using site-specific inputs

Unit

Completed air sealing project.

Savings Equation

Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM

Gross kW = Gross kWh × kW/kWh

Where:

Stories = Total stories in the multi-family building

SQFT = Area of building in square feet

CFM/SQFT_pre = Estimate of pre-retrofit air leakagein CFM/SQFT based on number of stories in the building and air-tightness ratings of the existing roof and floor

CFM/SQFT_post = Estimate of post-retrofit air leakage in CFM/SQFT based on number of stories in the building and air-tightness ratings of theimproved roof and floor

deltakWh/CFM = Average annual kWh reduction per CFM

Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM

kW/kWh = Average kW reduction per kWh reduction

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Air Sealing - Elec	Calc	Calc					
Air Sealing - Elec w/AC	Calc	Calc					
Air Sealing - Oil	Calc	Calc	Calc				
Air Sealing - Other	Calc	Calc		Calc			

Energy Impact Factors

Measure	Measure Life
Air Sealing - Elec Air Sealing - Elec w/AC Air Sealing - Oil Air Sealing - Other	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report.
https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Air Sealing	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Air Sealing - Elec	1.00	1.00	ls_247_Electric
Air Sealing - Elec w/AC	1.00	1.00	ls_86_Electric
Air Sealing - Oil	1.00	1.00	ls_11_Electric
Air Sealing - Other	1.00	1.00	ls_166_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Air Sealing - Elec		$405.379			$0.006
Air Sealing - Elec w/AC		$405.379			$0.006
Air Sealing - Oil		$405.379			$0.006
Air Sealing - Other		$405.379			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Air Sealing	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Air Sealing - Elec	$1.05 / kWh	$1.05 / kWh
Air Sealing - Elec w/AC	$1.05 / kWh	$1.05 / kWh
Air Sealing - Oil	$100.00 / MMBtu	$100.00 / MMBtu
Air Sealing - Other	$110.00 / MMBtu	$110.00 / MMBtu

Boiler Reset Control

Sector: Income Eligible Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Boiler Control

Program: Income Eligible Multifamily

Measure Description

Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand.

Baseline Description

The baseline efficiency case is a boiler without reset controls

Measures

Measure Name	Unique Identifier
Boiler Reset Control - Oil	Electric Income Eligible Residential Income Eligible Multifamily Boiler Reset Control - Oil
Boiler Reset Control - Other	Electric Income Eligible Residential Income Eligible Multifamily Boiler Reset Control - Other

Savings Principle

The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load.

Savings Method

Unit

Installation of boiler reset control on existing boiler

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Boiler Reset Control - Oil			37.30				
Boiler Reset Control - Other				37.30			

Energy Impact Factors

Measure	Measure Life
Boiler Reset Control - Oil	15
Boiler Reset Control - Other	

Measure Life Source: ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.https://www.aceee.org/files/pdf/2006_BoilerControls.pdf

Measure	ISR	RRe Gas	RRe Electric
Boiler Reset Control	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Boiler Reset Control - Oil	N/A	N/A	ls_00_Electric
Boiler Reset Control - Other	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Boiler Reset Control - Oil					
Boiler Reset Control - Other					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler Reset Control	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler Reset Control - Oil		
Boiler Reset Control - Other		

Custom

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Custom **Measure Type:** Multi-family **Measure Sub Type:** Low Income

Program: Income Eligible Multifamily

Measure Description

Vendors install a variety of measures at multifamily facilities. Measures include

Baseline Description

For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the facility.

Measures

Measure Name	Unique Identifier
Custom	Electric Income Eligible Residential Income Eligible Multifamily Custom

Savings Principle

The high efficiency scenario is specific to the facility and may include one or more energy efficiency measures.

Savings Method

Calc

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom	Calc	Calc	Calc	Calc	Calc	Calc	

Energy Impact Factors

Measure	Measure Life
Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Custom	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Custom	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom	$300,000.00 / project	$300,000.00 / project

CUSTOM CIRCULATOR

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Custom

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Demand Circulator

Program: Income Eligible Multifamily

Measure Description

Installation of a demand controller on a re-circulation loop.

Baseline Description

Full time operation of re-circ pump.

Measures

Measure Name	Unique Identifier
CUSTOM CIRCULATOR	Electric Income Eligible Residential Income Eligible Multifamily CUSTOM CIRCULATOR

Savings Principle

The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs.

Savings Method

Calc

Unit

Installed recirculation controller

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CUSTOM CIRCULATOR	Calc				Calc		

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
CUSTOM CIRCULATOR	multi

Measure	ISR	RRe Gas	RRe Electric
CUSTOM CIRCULATOR	1.00	1.00	0.99

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
CUSTOM CIRCULATOR	0.99	0.99	ls_244_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
CUSTOM CIRCULATOR					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CUSTOM CIRCULATOR	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CUSTOM CIRCULATOR	$3.60 / kWh	$3.60 / kWh

DHW

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Water Heating **Measure Type:** Water Heater **Measure Sub Type:** Water Heater

Program: Income Eligible Multifamily

Measure Description

Installation of high efficiency water heating equipment to replace the existing inefficient water heater.

Baseline Description

The baseline efficiency case is a stand-alone tank water heater.

Measures

Measure Name	Unique Identifier
DHW	Electric Income Eligible Residential Income Eligible Multifamily DHW

Savings Principle

The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.66

Savings Method

Calc

Unit

Installed water heating system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
DHW	Calc	Calc	Calc	Calc			

Electric kWh Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Electric kW Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
DHW	multi

Measure	ISR	RRe Gas	RRe Electric
DHW	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
DHW	1.00	1.00	ls_246_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
DHW		$1.404			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DHW	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DHW		

EISA Exempt Lighting - Common Int

Sector: Income Eligible Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** EISA Exempt | **Measure Sub Type:**

Program: Income Eligible Multifamily

Measure Description

The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.

Baseline Description

The baseline efficiency case is blend of incandescents, halogens, CFLs and other bulbs types, as provided by market research or for EISA exempt bulbs and bulbs installed through an home energy audit, the base line is a 65 Watt incandescent.

Measures

Measure Name	Unique Identifier
EISA Exempt Lighting - Common Int	Electric Income Eligible Residential Income Eligible Multifamily EISA Exempt Lighting - Common Int

Savings Principle

The high efficiency case is and ENERGY STAR® qualified LED fixture.

Savings Method

Calculated using site-specific inputs

Unit

Rebated lamp or fixture.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Hours Source: NMR Group,Inc. (2014). Northeast Residential Lighting Hours-of-Use Study. https://neep.org/sites/default/files/resources/Northeast-Residential-Lighting-Hours-of-Use-Study-Final-Report1.pdf

Hours Note: Multifamily common area hours are site specific. Multifamily dwelling unit hours defined by room type from NMR HOU study.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
EISA Exempt Lighting - Common Int	185.90	0.046					

Electric kW Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
EISA Exempt Lighting - Common Int	1

Measure Life Note: Based on MA EUL assumptions

Measure	ISR	RRe Gas	RRe Electric
EISA Exempt Lighting - Common Int	1.00		1.00

ISR Source: Navigant (2018). Multi-Family Program Impact and Net-to-Gross Evaluation (RES 44). https://ma-eeac.org/wp-content/uploads/RES-44_Multi-family-Program-Impact-Evaluation_FINAL_SO-Rates-Updated.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
EISA Exempt Lighting - Common Int	1.00	1.00	ls_04_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
EISA Exempt Lighting - Common Int		$21.412	$13.334	$0.033	$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
EISA Exempt Lighting - Common Int	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
EISA Exempt Lighting - Common Int	$32.00 / measure	$32.00 / measure

Fixtures

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Lighting **Measure Type:** Interior **Measure Sub Type:** LED Fixture

Program: Income Eligible Multifamily

Measure Description

The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.

Baseline Description

The baseline efficiency case is a combination of an incandescent bulb and halogen bulb

Measures

Measure Name	Unique Identifier
Fixtures	Electric Income Eligible Residential Income Eligible Multifamily Fixtures

Savings Principle

The high efficiency case is and ENERGY STAR® qualified LED fixture.

Savings Method

Deemed

Unit

Rebated lamp or fixture.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Fixtures	34.00	0.009					

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Fixtures	1

Measure Life Note: Based on MA EUL assumptions

Measure	ISR	RRe Gas	RRe Electric
Fixtures	0.95		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

ISR Note: For mailed-in LEDs, ISR is assumed at 83% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Fixtures	1.00	1.00	ls_178_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Fixtures					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Fixtures	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Fixtures		

Heat Pumps

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Heat Pumps **Measure Sub Type:** Heat Pump

Program: Income Eligible Multifamily

Measure Description

Installation of a heat pump displacing electric, oil, or propane heat.

Baseline Description

The baseline efficiency case is the existing site conditions

Measures

Measure Name	Unique Identifier
Heat Pumps	Electric Income Eligible Residential Income Eligible Multifamily Heat Pumps

Savings Principle

The high efficiency case will vary by site

Savings Method

Calc

Unit

Installation of heat pump

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Heat Pumps	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Heat Pumps	20

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
Heat Pumps	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Heat Pumps	1.00	1.00	ls_179_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Heat Pumps					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Pumps	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Pumps	$3.09 / kWh	$3.09 / kWh

HVAC, Custom

Sector: Income Eligible Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** HVAC | **Measure Sub Type:**

Program: Income Eligible Multifamily

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
HVAC, Custom	Electric Income Eligible Residential Income Eligible Multifamily HVAC, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
HVAC, Custom	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
HVAC, Custom	multi

Measure	ISR	RRe Gas	RRe Electric
HVAC, Custom	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
HVAC, Custom	1.00	1.00	ls_245_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
HVAC, Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC, Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC, Custom		

Insulation

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Building Shell **Measure Type:** Insulation **Measure Sub Type:**

Program: Income Eligible Multifamily

Measure Description

Shell insulation upgrades applied in existing facilities including improved insulation in attics, basements and sidewalls.

Baseline Description

The baseline efficiency case is any existing home shell measures.

Measures

Measure Name	Unique Identifier
Insulation - Elec with AC Insulation - Oil Insulation - Other	Electric Income Eligible Residential Income Eligible Multifamily Insulation - Elec with AC Electric Income Eligible Residential Income Eligible Multifamily Insulation - Oil Electric Income Eligible Residential Income Eligible Multifamily Insulation - Other

Savings Principle

The high efficiency case includes increased weatherization insulation levels.

Savings Method

Calculated using site-specific inputs

Unit

Completed insulation project.

Savings Equation

Gross kWh = SQFT × deltakWh/SQFT × (1/R_pre - 1/R_post)

Gross kW = Gross kWh × kW/kWh

Where:

SQFT = Square feet of insulation installed

deltakWh/SQFT = Average annual kWh reduction per SQFT of insulation

R_pre = R-Value of the existing insulation

R_post =R-Value of the new installed insulation

Gross kWh = Stories × SQFT × (CFM/SQFT_pre - CFM/SQFT_post) × deltakWh/CFM

kW/kWh = Average annual kW reduction per kWh reduction

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Calc						
Insulation - Elec with AC		Calc					
Insulation - Oil			Calc				
Insulation - Other				Calc			

Electric kWh Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Electric kW Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Insulation - Elec with AC	25
Insulation - Oil	
Insulation - Other	

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Insulation	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Insulation - Elec with AC	1.00	1.00	ls_247_Electric
Insulation - Oil	1.00	1.00	ls_11_Electric
Insulation - Other	1.00	1.00	ls_180_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Insulation - Elec with AC		$405.379			$0.006
Insulation - Oil		$405.379			$0.006
Insulation - Other		$405.379			$0.006

NTG Note: Consistent with MA TRM

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Insulation	0.00	0.00	0.00	1.00

NTG Note: Consistent with MA TRM

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Insulation - Elec with AC	$2.40 / kWh	$2.40 / kWh
Insulation - Oil	$180.00 / MMBtu	$180.00 / MMBtu
Insulation - Other	$230.00 / MMBtu	$230.00 / MMBtu

LED Fixture

Sector: Income Eligible Residential | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** LED Fixture | **Measure Sub Type:**

Program: Income Eligible Multifamily

Measure Description

The installation of Light-Emitting Diode (LED) screw-in bulbs and fixtures. LEDs offer comparable luminosity to incandescent bulbs at significantly less wattage and significantly longer lamp lifetimes.

Baseline Description

The baseline efficiency case is blend of incandescents, CFLs and other bulbs types, as provided by market research or for a home energy audit, the base line is a 65 Watt incandescent.

Measures

Measure Name	Unique Identifier
LED Fixture - Common Ext LED Fixture - Common Int LED Fixture - Linear, Common Int	Electric Income Eligible Residential Income Eligible Multifamily LED Fixture - Common Ext Electric Income Eligible Residential Income Eligible Multifamily LED Fixture - Common Int Electric Income Eligible Residential Income Eligible Multifamily LED Fixture - Linear, Common Int

Savings Principle

The high efficiency case is and ENERGY STAR® qualified LED fixture.

Savings Method

Calculated using site-specific inputs

Unit

Rebated lamp or fixture.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Hours Source: NMR Group,Inc. (2014). Northeast Residential Lighting Hours-of-Use Study. https://neep.org/sites/default/files/resources/Northeast-Residential-Lighting-Hours-of-Use-Study-Final-Report1.pdf

Hours Note: Multifamily common area hours are site specific. Multifamily dwelling unit hours defined by room type from NMR HOU study.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
LED Fixture - Common Ext	503.00	0.126					
LED Fixture - Common Int	206.00	0.052					
LED Fixture - Linear, Common Int	206.00	0.052					

Electric kWh Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
LED Fixture - Common Ext LED Fixture - Common Int LED Fixture - Linear, Common Int	1

Measure Life Note: Based on MA EUL assumptions

Measure	ISR	RRe Gas	RRe Electric
LED Fixture	1.00		1.00

ISR Source: Navigant (2018). Multi-Family Program Impact and Net-to-Gross Evaluation (RES 44). https://ma-eeac.org/wp-content/uploads/RES-44_Multi-family-Program-Impact-Evaluation_FINAL_SO-Rates-Updated.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
LED Fixture - Common Ext	1.00	1.00	ls_04_Electric
LED Fixture - Common Int	1.00	1.00	ls_04_Electric
LED Fixture - Linear, Common Int	1.00	1.00	ls_171_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
LED Fixture - Common Ext		$21.412	$13.950	$0.033	$0.006
LED Fixture - Common Int		$21.412	$13.950	$0.033	$0.006
LED Fixture - Linear, Common Int		$21.412	$13.950	$0.033	$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
LED Fixture	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
LED Fixture - Common Ext	$330.00 / measure	$330.00 / measure
LED Fixture - Common Int	$200.00 / measure	$200.00 / measure
LED Fixture - Linear, Common Int	$200.00 / measure	$200.00 / measure

Pipe Wrap DHW - Elec

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Insulation **Measure Sub Type:** Pipe Insulation

Program: Income Eligible Multifamily

Measure Description

Installation of insulation to reduce water heating energy.

Baseline Description

The baseline case is uninsulated heated water pipes.

Measures

Measure Name	Unique Identifier
Pipe Wrap DHW - Elec	Electric Income Eligible Residential Income Eligible Multifamily Pipe Wrap DHW - Elec

Savings Principle

The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.

Savings Method

Deemed

Unit

Linear Foot

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Pipe Wrap DHW - Elec	24.90	0.006					

Electric kWh Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Oil MMBtu Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Propane MMBtu Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Pipe Wrap DHW - Elec	15

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Pipe Wrap DHW - Elec	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Pipe Wrap DHW - Elec	1.00	1.00	ls_08_Electric

RRsp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRwp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Pipe Wrap DHW - Elec		$8.139			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe Wrap DHW - Elec	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe Wrap DHW - Elec	$3.00 / linear feet	$3.00 / linear feet

Programmable Thermostat - Elec with AC

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Income Eligible Multifamily

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable Thermostat - Elec with AC	Electric Income Eligible Residential Income Eligible Multifamily Programmable Thermostat - Elec with AC

Savings Principle

The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.

Savings Method

Deemed

Unit

Installed thermostat

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Programmable Thermostat - Elec with AC	278.00	0.209					

Electric kWh Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Oil MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Programmable Thermostat - Elec with AC	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable Thermostat - Elec with AC	0.95		1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRe Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Programmable Thermostat - Elec with AC	1.00	1.00	ls_247_Electric

RRsp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRwp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Programmable Thermostat - Elec with AC		$19.080			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable Thermostat - Elec with AC	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable Thermostat - Elec with AC	$125.00 / measure	$125.00 / measure

Showerhead

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: Income Eligible Multifamily

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.

Measures

Measure Name	Unique Identifier
Showerhead - Elec Showerhead - Oil Showerhead - Other	Electric Income Eligible Residential Income Eligible Multifamily Showerhead - Elec Electric Income Eligible Residential Income Eligible Multifamily Showerhead - Oil Electric Income Eligible Residential Income Eligible Multifamily Showerhead - Other

Savings Principle

The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.

Savings Method

Deemed

Unit

Installed showerhead.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Showerhead - Elec	246.00	0.059					
Showerhead - Oil			1.40				
Showerhead - Other				1.40			

Energy Impact Factors

Measure	Measure Life
Showerhead - Elec	15
Showerhead - Oil	
Showerhead - Other	

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure Life Note: National Grid assumption based on regional PA working groups.

Measure	ISR	RRe Gas	RRe Electric
Showerhead	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Showerhead - Elec	1.00	1.00	ls_246_Electric
Showerhead - Oil	N/A	N/A	ls_00_Electric
Showerhead - Other	N/A	N/A	ls_00_Electric

RRsp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRwp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
	1786				
Showerhead - Elec	1786	$0.714			$0.006
Showerhead - Oil	1786	$0.714			$0.006
Showerhead - Other	1786	$0.714			$0.006

Water Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Showerhead	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Showerhead - Elec	$25.00 / measure	$25.00 / measure
Showerhead - Oil	$25.00 / measure	$25.00 / measure
Showerhead - Other	$25.00 / measure	$25.00 / measure

Smart Strips

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Plug Load **Measure Type:** Smart Strips **Measure Sub Type:** Smart Strip

Program: Income Eligible Multifamily

Measure Description

The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.

Baseline Description

The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on

Measures

Measure Name	Unique Identifier
Smart Strips	Electric Income Eligible Residential Income Eligible Multifamily Smart Strips

Savings Principle

The high efficiency case is the use of a smart strip or advanced smart strip.

Savings Method

Deemed

Unit

Rebated smart strip.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Smart Strips	105.00	0.019					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Smart Strips	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Smart Strips	0.84		0.92

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Smart Strips	0.92	0.92	ls_06_Electric

RRsp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRwp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Smart Strips					$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Smart Strips	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Smart Strips	$23.00 / measure	$23.00 / measure

TSV Showerhead

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: Income Eligible Multifamily

Measure Description

A showerhead with a control that limits flow once water is heated.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.

Measures

Measure Name	Unique Identifier
TSV Showerhead - Elec	Electric Income Eligible Residential Income Eligible Multifamily TSV Showerhead - Elec
TSV Showerhead - Oil	Electric Income Eligible Residential Income Eligible Multifamily TSV Showerhead - Oil
TSV Showerhead - Other	Electric Income Eligible Residential Income Eligible Multifamily TSV Showerhead - Other

Savings Principle

The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.

Savings Method

Deemed

Unit

Installed showerhead.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
TSV Showerhead - Elec	315.00	0.076					
TSV Showerhead - Oil			1.60				
TSV Showerhead - Other				1.60			

Energy Impact Factors

Measure	Measure Life
TSV Showerhead - Elec	15
TSV Showerhead - Oil	
TSV Showerhead - Other	

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
TSV Showerhead	0.90		1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Measure	RR sp	RR wp	Loadshape ID
TSV Showerhead - Elec	1.00	1.00	ls_246_Electric
TSV Showerhead - Oil	1.00	1.00	ls_08_Electric
TSV Showerhead - Other	N/A	N/A	ls_00_Electric

RRsp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRwp Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
	2130				
TSV Showerhead - Elec		$0.714			$0.006
TSV Showerhead - Oil		$0.714			$0.006
TSV Showerhead - Other		$0.714			$0.006

Water Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
TSV Showerhead	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
TSV Showerhead - Elec	$40.00 / measure	$40.00 / measure
TSV Showerhead - Oil	$40.00 / measure	$40.00 / measure
TSV Showerhead - Other	$40.00 / measure	$40.00 / measure

VFD

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Income Eligible Multifamily

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
VFD	Electric Income Eligible Residential Income Eligible Multifamily VFD

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calc

Unit

Installed VFD

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N128

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VFD	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
VFD	multi

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
VFD	1.00		0.99

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
VFD	0.99	0.99	ls_248_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
VFD					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VFD	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VFD	$2.70 / kWh	$2.70 / kWh

Water Heating, Custom

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Custom

Measure Category: Water Heating **Measure Type:** Water Heater **Measure Sub Type:** Water Heater

Program: Income Eligible Multifamily

Measure Description

Installation of high efficiency water heating equipment to replace the existing inefficient water heater.

Baseline Description

The baseline efficiency case is a stand-alone tank water heater.

Measures

Measure Name	Unique Identifier
Water Heating, Custom	Electric Income Eligible Residential Income Eligible Multifamily Water Heating, Custom

Savings Principle

The high efficiency case is a stand-alone storage water heater with an energy factor >= 0.66

Savings Method

Calc

Unit

Installed water heating system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Water Heating, Custom	Calc	Calc	Calc	Calc			

Electric kWh Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Electric kW Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Water Heating, Custom	13

Measure Life Source: DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE; Page 10.

Measure	ISR	RRe Gas	RRe Electric
Water Heating, Custom	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Water Heating, Custom	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Water Heating, Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Water Heating, Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Water Heating, Custom		

WiFi Thermostat

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Income Eligible Multifamily

Measure Description

Installation of a wifi thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

The baseline efficiency case is an HVAC system providing space heating without a WiFi thermostat.

Measures

Measure Name	Unique Identifier
WiFi Thermostat	Electric Income Eligible Residential Income Eligible Multifamily WiFi Thermostat

Savings Principle

The high efficiency case is an HVAC system providing space heating with a WiFi thermostat installed.

Savings Method

Deemed

Unit

Installed thermostat

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
WiFi Thermostat	64.00	0.155					

Electric kWh Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
WiFi Thermostat	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
WiFi Thermostat	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
WiFi Thermostat	1.00	1.00	ls_183_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
WiFi Thermostat					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi Thermostat	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi Thermostat	$275.00 / measure	$275.00 / measure

Income Eligible Single Family, Electric

Basic Educational Measures

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Whole Home **Measure Type:** Audit **Measure Sub Type:** Educational Kit

Program: Income Eligible Single Family

Measure Description

Installation of basic educational measures during an audit to help customers become more aware of energy efficiency.

Baseline Description

The baseline efficiency case assumes no measures installed.

Measures

Measure Name	Unique Identifier
Basic Educational Measures	Electric Income Eligible Residential Income Eligible Single Family Basic Educational Measures

Savings Principle

The high efficiency case includes basic educational measures such as CFLs, low flow showerheads, pool and air conditioner timers, torchieres, and programmable thermostats.

Savings Method

Deemed

Unit

Completed audit.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Basic Educational Measures	21.00	0.004					

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Basic Educational Measures	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Basic Educational Measures	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Basic Educational Measures	1.00	1.00	ls_06_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Basic Educational Measures		$12.768			$0.005

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Basic Educational Measures	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Basic Educational Measures	$180.00 / kit	$180.00 / kit

Dehumidifier Rebate

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Dehumidifiers **Measure Sub Type:** Dehumidifier

Program: Income Eligible Single Family

Measure Description

The Installation of high efficiency dehumidifiers and the turn-in of existing inefficient dehumidifiers.

Baseline Description

The baseline efficiency case is the existing dehumidifier. It is assumed that low-income customers would otherwise replace their dehumidifiers with a used inefficient unit.

Measures

Measure Name	Unique Identifier
Dehumidifier Rebate	Electric Income Eligible Residential Income Eligible Single Family Dehumidifier Rebate

Savings Principle

The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh. The high efficiency case is an ENERGY STAR® replacement unit with an efficiency of 1.47 L/kWh.

Savings Method

Calculated using deemed inputs

Unit

Per dehumidifier

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dehumidifier Rebate	489.40	0.110					

Electric kWh Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Dehumidifier Rebate	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Dehumidifier Rebate	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dehumidifier Rebate	1.00	1.00	ls_79_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Dehumidifier Rebate					$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dehumidifier Rebate	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dehumidifier Rebate	$275.00 / measure	$275.00 / measure

Domestic Hot Water Measure, Oil

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Flow Control Measures

Program: Income Eligible Single Family

Measure Description

Domestic hot water measures include high-efficiency low-flow showerheads and faucet aerators that can save water and water heating energy.

Baseline Description

The baseline efficiency case is the existing domestic hot water equipment.

Measures

Measure Name	Unique Identifier
Domestic Hot Water Measure, Oil	Electric Income Eligible Residential Income Eligible Single Family Domestic Hot Water Measure, Oil

Savings Principle

The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.

Savings Method

Deemed

Unit

Installed DHW efficiency measure.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Domestic Hot Water Measure, Oil			0.90				

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Energy Impact Factors

Measure	Measure Life
Domestic Hot Water Measure, Oil	13

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure Life Note: National Grid assumption based on regional PA working groups.

Measure	ISR	RRe Gas	RRe Electric
Domestic Hot Water Measure, Oil	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Domestic Hot Water Measure, Oil	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Domestic Hot Water Measure, Oil	4028		$2.118		$0.006

Water Source: NMR Group, Inc., Tetra Tech (2011). Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation. Prepared for Massachusetts Program Administrators.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Domestic Hot Water Measure, Oil	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Domestic Hot Water Measure, Oil	$20.00 / measure	$20.00 / measure

Early Retirement Clothes Washer & Dryer

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Appliances

Measure Type: ER CW & Dryer

Measure Sub Type: ER ele DHW washer & ele dryer

Program: Income Eligible Single Family

Measure Description

The replacement and recycling of a working top-loading clothes washer with an agitator with an Energy Star rated washing machine.

Baseline Description

The baseline efficiency case is the existing clothes washer & dryer.

Measures

Measure Name	Unique Identifier
Early Retirement Clothes Washer Elec DHW & Elec Dryer Early Retirement Clothes Washer Elec DHW & Gas Dryer Early Retirement Clothes Washer Gas DHW & Elec Dryer Early Retirement Clothes Washer Gas DHW & Gas Dryer Early Retirement Clothes Washer Oil DHW & Elec Dryer Early Retirement Clothes Washer Propane DHW & Elec Dryer	Electric Income Eligible Residential Income Eligible Single Family Early Retirement Clothes Washer Elec DHW & Elec Dryer Electric Income Eligible Residential Income Eligible Single Family Early Retirement Clothes Washer Elec DHW & Gas Dryer Electric Income Eligible Residential Income Eligible Single Family Early Retirement Clothes Washer Gas DHW & Elec Dryer Electric Income Eligible Residential Income Eligible Single Family Early Retirement Clothes Washer Gas DHW & Gas Dryer Electric Income Eligible Residential Income Eligible Single Family Early Retirement Clothes Washer Oil DHW & Elec Dryer Electric Income Eligible Residential Income Eligible Single Family Early Retirement Clothes Washer Propane DHW & Elec Dryer

Savings Principle

The high efficiency case is a new high efficiency washer & dryer.

Savings Method

Calculated using deemed inputs

Unit

Installed high-efficiency washer & dryer.

Savings Equation

ΔkWh = [(Capacity x 1/IMEFbase x Ncycles) * (%CWkwhbase + %DHWkwhbase + %Dryerkwhbase)] - [(Capacity x 1/IMEFeff x Ncycles) x (%CWkwheff + %DHWkwheff + %Dryerkwheff)]

ΔMMBTUs = [(Capacity x 1/MEFbase x Ncycles) x ((%DHWffbase x reff) + %Dryerffbase] - [(Capacity x 1/MEFeff x Ncycles) x (%DHWffeff x reff) + %Dryergaseff]xMMBTUconvert

where:

Capacity = washer volume in ft3. Existing top loading washer is 3.09 ft3, new standard efficiency top loading washer is 3.38 ft3, ENERGY STAR front loading is 3.90 ft

IMEF = Integrated Modified Energy Factor and is measured in ft3 /kWh/cycle

Ncycles = 283 loads per year1

%CWkwh = % of total kWh energy consumption for clothes washer operation (different for baseline and efficient unit).

%DHWkwh = % of total kWh energy consumption used for water heating (different for baseline and efficient unit). If water is heated by gas or propane this is 0%

%DHWff = % of total kWh energy consumption for dryer operation (different for baseline and efficient unit). If the dryer is gas this is 0%

%Dryerkwh = % of total fossil fuel energy consumption used for water heating (different for baseline and efficient unit). If water is heated by electric this is 0%.

%Dryerff = % of total fossil fuel energy consumption for dryer operation (different for baseline and efficient unit). If the dryer is electric this is 0%.

r_eff = recovery energy factor used to account for the difference in recovery efficiencies of electric and gas/oil/propane hot water heaters. Electric water heaters are 100% efficient while other water heaters are 75% efficient. The ratio is 1.33 (100%/75%)

MMBTU_convert = Conversion factor from kWh to MMBTU is 0.003412

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Early Retirement Clothes Washer Elec DHW & Elec Dryer	588.00	0.160					
Early Retirement Clothes Washer Elec DHW & Gas Dryer	307.00	0.080				0.96	
Early Retirement Clothes Washer Gas DHW & Elec Dryer	327.00	0.090				1.28	
Early Retirement Clothes Washer Gas DHW & Gas Dryer	46.00	0.010				2.24	
Early Retirement Clothes Washer Oil DHW & Elec Dryer	327.00	0.090	1.28				
Early Retirement Clothes Washer Propane DHW & Elec Dryer	327.00	0.090		1.28			

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Propane MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Gas DHW MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Energy Impact Factors

Measure	Measure Life
Early Retirement Clothes Washer Elec DHW & Elec Dryer	14
Early Retirement Clothes Washer Elec DHW & Gas Dryer	
Early Retirement Clothes Washer Gas DHW & Elec Dryer	
Early Retirement Clothes Washer Gas DHW & Gas Dryer	
Early Retirement Clothes Washer Oil DHW & Elec Dryer	
Early Retirement Clothes Washer Propane DHW & Elec Dryer	

Measure Life Source: DOE (2017). Technical Support Document: Residential Clothes Washer. EERE-2017-BT-STD-0003-0030. https://www.regulations.gov/document/EERE-2017-BT-STD-0014-0030

Measure	ISR	RRe Gas	RRe Electric
Early Retirement Clothes Washer & Dryer	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Early Retirement Clothes Washer Elec DHW & Elec Dryer	1.00	1.00	ls_01_Electric
Early Retirement Clothes Washer Elec DHW & Gas Dryer	1.00	1.00	ls_01_Electric
Early Retirement Clothes Washer Gas DHW & Elec Dryer	1.00	1.00	ls_01_Electric
Early Retirement Clothes Washer Gas DHW & Gas Dryer	1.00	1.00	ls_01_Electric
Early Retirement Clothes Washer Oil DHW & Elec Dryer	1.00	1.00	ls_01_Electric
Early Retirement Clothes Washer Propane DHW & Elec Dryer	1.00	1.00	ls_01_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
	4777				
Early Retirement Clothes Washer Elec DHW & Elec Dryer					$0.006
Early Retirement Clothes Washer Elec DHW & Gas Dryer					$0.006
Early Retirement Clothes Washer Gas DHW & Elec Dryer					$0.006
Early Retirement Clothes Washer Gas DHW & Gas Dryer					$0.006
Early Retirement Clothes Washer Oil DHW & Elec Dryer					$0.006
Early Retirement Clothes Washer Propane DHW & Elec Dryer					$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Early Retirement Clothes Washer & Dryer	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Early Retirement Clothes Washer Elec DHW & Elec Dryer	$770.00 / measure	$770.00 / measure
Early Retirement Clothes Washer Elec DHW & Gas Dryer	$770.00 / measure	$770.00 / measure
Early Retirement Clothes Washer Gas DHW & Elec Dryer	$770.00 / measure	$770.00 / measure
Early Retirement Clothes Washer Gas DHW & Gas Dryer	$770.00 / measure	$770.00 / measure
Early Retirement Clothes Washer Oil DHW & Elec Dryer	$770.00 / measure	$770.00 / measure
Early Retirement Clothes Washer Propane DHW & Elec Dryer	$770.00 / measure	$770.00 / measure

Heating System Retrofit-Boiler

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Retrofit Boiler

Program: Income Eligible Single Family

Measure Description

The installation of high efficiency boiler.

Baseline Description

The baseline is the existing heating system.

Measures

Measure Name	Unique Identifier
Heating System Retrofit - Boiler, Oil	Electric Income Eligible Residential Income Eligible Single Family Heating System Retrofit - Boiler, Oil
Heating System Retrofit - Boiler, Other	Electric Income Eligible Residential Income Eligible Single Family Heating System Retrofit - Boiler, Other

Savings Principle

The high efficiency case includes replacing heating systems with higher efficiency systems.

Savings Method

Calculated using site-specific inputs

Unit

Heating system

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Heating System Retrofit - Boiler, Oil	10.00	0.005	7.80				
Heating System Retrofit - Boiler, Other	16.00	0.009		7.90			

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Propane MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Energy Impact Factors

Measure	Measure Life
Heating System Retrofit - Boiler, Oil Heating System Retrofit - Boiler, Other	23

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Heating System Retrofit-Boiler	1.00		0.86

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Heating System Retrofit - Boiler, Oil	1.00	1.00	ls_200_Electric
Heating System Retrofit - Boiler, Other	1.00	1.00	ls_200_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Heating System Retrofit - Boiler, Oil		$378.916			$0.006
Heating System Retrofit - Boiler, Other		$378.916			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating System Retrofit-Boiler	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating System Retrofit - Boiler, Oil	$5,500.00 / measure	$5,500.00 / measure
Heating System Retrofit - Boiler, Other	$5,500.00 / measure	$5,500.00 / measure

Heating System Retrofit-Furnace

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Retrofit Furnace

Program: Income Eligible Single Family

Measure Description

The installation of high efficiency furnace.

Baseline Description

The baseline is the existing heating system.

Measures

Measure Name	Unique Identifier
Heating System Retrofit - Furnace, Oil	Electric Income Eligible Residential Income Eligible Single Family Heating System Retrofit - Furnace, Oil
Heating System Retrofit - Furnace, Other	Electric Income Eligible Residential Income Eligible Single Family Heating System Retrofit - Furnace, Other

Savings Principle

The high efficiency case includes replacing heating systems with higher efficiency systems.

Savings Method

Calculated using site-specific inputs

Unit

Heating system

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Heating System Retrofit - Furnace, Oil	10.00	0.005	7.80				
Heating System Retrofit - Furnace, Other	16.00	0.009		7.90			

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Propane MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Energy Impact Factors

Measure	Measure Life
Heating System Retrofit - Furnace, Oil Heating System Retrofit - Furnace, Other	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Heating System Retrofit-Furnace	1.00		0.86

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Heating System Retrofit - Furnace, Oil	1.00	1.00	ls_200_Electric
Heating System Retrofit - Furnace, Other	1.00	1.00	ls_200_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Heating System Retrofit - Furnace, Oil		$378.916			$0.006
Heating System Retrofit - Furnace, Other		$378.916			$0.006

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating System Retrofit-Furnace	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating System Retrofit - Furnace, Oil	$5,500.00 / measure	$5,500.00 / measure
Heating System Retrofit - Furnace, Other	$5,500.00 / measure	$5,500.00 / measure

HP Water Heaters

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Appliances

Measure Type: Heat Pump Water Heaters

Measure Sub Type: Heat Pump Water Heaters

Program: Income Eligible Single Family

Measure Description

Installation of a heat pump water heater (HPWH) <55 gallons instead of an electric resistance water heater.

Baseline Description

The baseline efficiency case is a new, standard efficiency electric resistance hot water heater <55 gallons.

Measures

Measure Name	Unique Identifier
HP Water Heaters	Electric Income Eligible Residential Income Eligible Single Family HP Water Heaters

Savings Principle

The high efficiency case is a high efficiency heat pump water heater <55 gallons.

Savings Method

Deemed

Unit

Per Water Heater

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
HP Water Heaters	1712.00	0.125					

Electric kWh Source: Guidehouse (2021). Heat Pump Water Heaters - 2021 Quick Hit Study. https://ma-eeac.org/wp-content/uploads/MA21R39-E-HPWHQH_Task-3-Findings-Memo_15Oct2021-1.pdf

Electric kW Source: Guidehouse (2021). Heat Pump Water Heaters - 2021 Quick Hit Study. https://ma-eeac.org/wp-content/uploads/MA21R39-E-HPWHQH_Task-3-Findings-Memo_15Oct2021-1.pdf

Energy Impact Factors

Measure	Measure Life
HP Water Heaters	15

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
HP Water Heaters	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
HP Water Heaters	1.00	1.00	ls_83_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
HP Water Heaters		$5.269			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HP Water Heaters	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HP Water Heaters	$2,131.00 / measure	$2,131.00 / measure

MSHP - Electric Resistance

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Heat Pumps **Measure Sub Type:** Ductless

Program: Income Eligible Single Family

Measure Description

The purchase and installation of high efficiency mini-split heat pump system to replace an electric resistance heating system.

Baseline Description

The baseline efficiency case for heating is a residential electric resistance heating system. The baseline efficiency case for heating is a residential oil boiler with 82 AFUE. The baseline efficiency case for cooling is a residential window AC unit withEER 9.8.

Measures

Measure Name	Unique Identifier
MSHP - Electric Resistance	Electric Income Eligible Residential Income Eligible Single Family MSHP - Electric Resistance

Savings Principle

The high efficiency case is an ENERGY STAR® qualified air-source heat pump.

Savings Method

Deemed

Unit

Installed high-efficiency air-source heat pump system for heating and cooling.

Savings Equation

Heating Gross kWh = Qty*deltakWh_heating

Cooling Gross kWh = Qty*deltakWh_cooling

Cooling Gross kW = Qty*deltakW

Where:

Qty = Total number of units.

deltakWh_heating = Average annual heating kWh reduction per unit.

deltakWh_cooling = Average annual cooling kWh reduction per unit.

deltakW = Average annual kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
MSHP - Electric Resistance	6549.00	2.830					

Electric kWh Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Electric kW Source: RI_2022 Annual PLan Electric H&C Savings Workbook_06-14-2021

Energy Impact Factors

Measure	Measure Life
MSHP - Electric Resistance	17

Measure Life Source: Michaels Energy (2022). X2001A: Connecticut Measure Life/EUL Update Study-Residential Measures. https://energizect.com/sites/default/files/2022-07/CT%20X2001A%20EUL%20Res%20Measure%20Report%20FINAL060522.pdf

Measure	ISR	RRe Gas	RRe Electric
MSHP - Electric Resistance	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
MSHP - Electric Resistance			ls_90_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
MSHP - Electric Resistance		$199.109			

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
MSHP - Electric Resistance	0.00	0.00	0.00	1.00

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MSHP - Electric Resistance	$16,000.00 / home	$16,000.00 / home

Programmable Thermostat

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Income Eligible Single Family

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

The baseline efficiency case is an HVAC system providing space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable Thermostat - AC Only	Electric Income Eligible Residential Income Eligible Single Family Programmable Thermostat - AC Only
Programmable Thermostat - Electric Heating and Cooling	Electric Income Eligible Residential Income Eligible Single Family Programmable Thermostat - Electric Heating and Cooling
Programmable Thermostat - Oil	Electric Income Eligible Residential Income Eligible Single Family Programmable Thermostat - Oil
Programmable Thermostat - Other	Electric Income Eligible Residential Income Eligible Single Family Programmable Thermostat - Other

Savings Principle

The high efficiency case is an HVAC system providing space heating with a programmable thermostat installed.

Savings Method

Deemed

Unit

Installed programmable thermostat.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Programmable Thermostat - AC Only	72.00	0.038					
Programmable Thermostat - Electric Heating and Cooling	251.70	0.194					
Programmable Thermostat - Oil	8.70	0.014	2.07				
Programmable Thermostat - Other	11.20	0.018		2.07			

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Propane MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
Programmable Thermostat - AC Only Programmable Thermostat - Electric Heating and Cooling Programmable Thermostat - Oil Programmable Thermostat - Other	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable Thermostat	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable Thermostat - AC Only	1.00	1.00	ls_197_Electric
Programmable Thermostat - Electric Heating and Cooling	1.00	1.00	ls_88_Electric
Programmable Thermostat - Oil	1.00	1.00	ls_11_Electric
Programmable Thermostat - Other	1.00	1.00	ls_11_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Programmable Thermostat - AC Only		$50.544			$0.006
Programmable Thermostat - Electric Heating and Cooling		$50.544			$0.006
Programmable Thermostat - Oil		$50.544			$0.006
Programmable Thermostat - Other		$50.544			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable Thermostat	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable Thermostat - AC Only	$150.00 / measure	$150.00 / measure
Programmable Thermostat - Electric Heating and Cooling	$150.00 / measure	$150.00 / measure
Programmable Thermostat - Oil	$150.00 / measure	$150.00 / measure
Programmable Thermostat - Other		

Replacement Freezer

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Freezers **Measure Sub Type:** Freezer

Program: Income Eligible Single Family

Measure Description

This measure covers the replacement of an existing inefficient freezer with a new energy efficient model.

Baseline Description

The baseline efficiency case for both the replaced and baseline new freezer is represented by the existing freezer. It is assumed that low-income customers would replace their freezers with a used inefficient unit.

Measures

Measure Name	Unique Identifier
Replacement Freezer	Electric Income Eligible Residential Income Eligible Single Family Replacement Freezer

Savings Principle

The high efficiency case is a new high efficiency freezer.

Savings Method

Calculated using deemed inputs

Unit

Installed high-efficiency freezer.

Savings Equation

Gross kWh = Qty × (kWh_base - kWh_ee)

Gross kW = Qty × (kWh_base - kWh_ee) / Hours

Where:

Qty = Total number of units.

kW_base = Deemed average demand per baseline unit.

kW_ee = Deemed average demand per high-efficiency unit.

Hours = Deemed average annualoperating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Replacement Freezer	333.00	0.050					

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Replacement Freezer	12

Measure Life Source: EPA Research (2014), Energy Star Commercial Equipment Calculator, Freezer Calcs, https://www.energystar.gov/sites/default/files/asset/document/commercial_kitchen_equipment_calculator.xlsx. Assume 2/3rd of measure life for recycling - MA Common assumption

Measure	ISR	RRe Gas	RRe Electric
Replacement Freezer	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Replacement Freezer	1.00	1.00	ls_78_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Replacement Freezer		$1.584	$32.764		$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Replacement Freezer	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Replacement Freezer	$600.00 / measure	$600.00 / measure

Replacement Refrigerator

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Refrigerators **Measure Sub Type:** Refrigerator

Program: Income Eligible Single Family

Measure Description

This measure covers the replacement of an existing inefficient refrigerator with a new ENERGY STAR® rated refrigerator.

Baseline Description

The baseline efficiency case is the existing refrigerator. It is assumed that low-income customers would otherwise replace their refrigerators with a used inefficient unit.

Measures

Measure Name	Unique Identifier
Replacement Refrigerator	Electric Income Eligible Residential Income Eligible Single Family Replacement Refrigerator

Savings Principle

The high efficiency case is an ENERGY STAR® rated refrigerator that meets the ENERGY STAR® criteria for full-sized refrigerators (7.75 cubic feet), using at least 20% less energy than models meeting the minimum Federal government standard.

Savings Method

Calculated using deemed inputs

Unit

Installed high-efficiency refrigerator.

Savings Equation

Gross kWh = Qty × (kWh_base - kWh_ee)

Gross kW = Qty × (kWh_base - kWh_ee) / Hours

Where:

Qty = Total number of units.

kW_base = Deemed average demand per baseline unit.

kW_ee = Deemed average demand per high-efficiency unit.

Hours = Deemed average annualoperating hours.

Hours: 8760

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Replacement Refrigerator	467.00	0.080					

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Replacement Refrigerator	15

Measure Life Source: DOE (2021). Technical Support Document: Refrigerators, Refrigerator-freezers, and Freezers. EERE-2017-BT-STD-0014-0030. https://www.regulations.gov/document/EERE-2017-BT-STD-0003-0020

Measure	ISR	RRe Gas	RRe Electric
Replacement Refrigerator	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Replacement Refrigerator	1.00	1.00	ls_07_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Replacement Refrigerator		$1.584	$32.764		$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Replacement Refrigerator	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Replacement Refrigerator	$1,100.00 / measure	$1,100.00 / measure

Smart Strips

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Plug Load **Measure Type:** Smart Strips **Measure Sub Type:** Smart Strip

Program: Income Eligible Single Family

Measure Description

The basic measures switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels. The advanced measure shuts devices off after it no longer senses activity from their infrared controls.

Baseline Description

The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on.

Measures

Measure Name	Unique Identifier
Smart Strips	Electric Income Eligible Residential Income Eligible Single Family Smart Strips

Savings Principle

The high efficiency case is the use of a smart strip or advanced smart strip.

Savings Method

Calculated using deemed inputs

Unit

Rebated smart strip.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Smart Strips	105.00	0.020					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Smart Strips	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Smart Strips	0.81		0.92

ISR Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Smart Strips	0.92	0.92	ls_06_Electric

RRsp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRwp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Smart Strips					$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Smart Strips	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Smart Strips	$20.00 / measure	$20.00 / measure

Weatherization

Sector: Income Eligible Residential

Fuel: Electric

Program Type: Prescriptive

Measure Category: Building Shell

Measure Type: Insulation & Air sealing

Measure Sub Type: Weatherization

Program: Income Eligible Single Family

Measure Description

Installation of weatherization measures such as air sealing and insulation in homes heated with electricity, oil, or propane. Non-heating electric savings are achieved from reduced fan run time for heating and cooling systems.

Baseline Description

The baseline efficiency case is any existing home shell measures.

Measures

Measure Name	Unique Identifier
Weatherization, Electric Weatherization, Oil Weatherization, Other	Electric Income Eligible Residential Income Eligible Single Family Weatherization, Electric Electric Income Eligible Residential Income Eligible Single Family Weatherization, Oil Electric Income Eligible Residential Income Eligible Single Family Weatherization, Other

Savings Principle

The high efficiency case can be a combination of increased insulation, air sealing, duct sealing, and other improvements to the home shell.

Savings Method

Deemed

Unit

Completed weatherization project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Weatherization, Electric	1231.00	0.950					
Weatherization, Oil	95.00	0.950	13.00				
Weatherization, Other	93.00	0.950		12.00			

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Oil MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Propane MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Energy Impact Factors

Measure	Measure Life
Weatherization, Electric Weatherization, Oil Weatherization, Other	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Weatherization	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Weatherization, Electric	1.00	1.00	ls_88_Electric
Weatherization, Oil	1.00	1.00	ls_88_Electric
Weatherization, Other	1.00	1.00	ls_206_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Weatherization, Electric		$613.442			$0.006
Weatherization, Oil		$613.442			$0.006
Weatherization, Other		$613.442			$0.006

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Weatherization	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Weatherization, Electric	$5,500.00 / home	$5,500.00 / home
Weatherization, Oil	$5,500.00 / home	$5,500.00 / home
Weatherization, Other	$5,500.00 / home	$5,500.00 / home

Wi-Fi Thermostat

Sector: Income Eligible Residential **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Income Eligible Single Family

Measure Description

Installation of wifi thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system with either a manual or a programmable thermostat.

Measures

Measure Name	Unique Identifier
Wi-Fi Thermostat - AC Only Wi-Fi Thermostat - Oil Wi-Fi Thermostat - Other	Electric Income Eligible Residential Income Eligible Single Family Wi-Fi Thermostat - AC Only Electric Income Eligible Residential Income Eligible Single Family Wi-Fi Thermostat - Oil Electric Income Eligible Residential Income Eligible Single Family Wi-Fi Thermostat - Other

Savings Principle

The high efficiency case is an HVAC system providing space cooling and heating with a wifi thermostat installed.

Savings Method

Deemed

Unit

Installed programmable thermostat.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Wi-Fi Thermostat - AC Only	64.00	0.090					
Wi-Fi Thermostat - Oil	64.00	0.090	2.78				
Wi-Fi Thermostat - Other	64.00	0.090		2.78			

Electric kWh Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Electric kWh Note: The total cooling savings of 64 kWh were adjusted to reflect the percent of homes that have cooling which based on the MA Residential Baseline study is 28 percent.

Electric kW Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
Wi-Fi Thermostat - AC Only Wi-Fi Thermostat - Oil Wi-Fi Thermostat - Other	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
Wi-Fi Thermostat	1.00		1.00

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Wi-Fi Thermostat - AC Only	1.00	1.00	ls_207_Electric
Wi-Fi Thermostat - Oil	1.00	1.00	ls_207_Electric
Wi-Fi Thermostat - Other	1.00	1.00	ls_207_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Wi-Fi Thermostat - AC Only		$50.544			$0.006
Wi-Fi Thermostat - Oil		$50.544			$0.006
Wi-Fi Thermostat - Other		$50.544			$0.006

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Wi-Fi Thermostat	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Wi-Fi Thermostat - AC Only	$275.00 / measure	$275.00 / measure
Wi-Fi Thermostat - Oil	$275.00 / measure	$275.00 / measure
Wi-Fi Thermostat - Other	$275.00 / measure	$275.00 / measure

Window AC Replacements

Sector: Income Eligible Residential | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Cooling | **Measure Sub Type:** Window AC

Program: Income Eligible Single Family

Measure Description

Replacement of existing inefficient room air conditioners with more efficient models. This is only offered as a measure when an AC timer would not reduce usage during the peak period.

Baseline Description

The baseline efficiency case is the existing air conditioning unit.

Measures

Measure Name	Unique Identifier
Window AC Replacements	Electric Income Eligible Residential Income Eligible Single Family Window AC Replacements

Savings Principle

The high efficiency case is the high efficiency room air conditioning unit.

Savings Method

Deemed

Unit

Replacement of existing window AC with high-efficiency window AC.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Hours Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Hours Note: Calculated for Multifamily applications and not applicable for single family.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Window AC Replacements	71.00	0.110					

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Window AC Replacements	12

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Window AC Replacements	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Window AC Replacements	1.00	1.00	ls_18_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh
Window AC Replacements		$60.947			$0.006

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Window AC Replacements	0.00	0.00	0.00	1.00

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Window AC Replacements	$385.00 / measure	$385.00 / measure

Large C&I New Construction, Electric

Advanced Building

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Custom

Measure Category: Whole Building

Measure Type: Advanced Building

Measure Sub Type: Advanced Building

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Advanced Building	Electric Commercial & Industrial Large C&I New Construction Advanced Building

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Advanced Building	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Advanced Building	multi

Measure Life Note: Assume 1/3 of measure life

Measure	ISR	RRe Gas	RRe Electric
Advanced Building	1.00		0.47

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2019). Rhode Island Commercial and Industrial Impact Evaluation of 2013-2015 Custom CDA Installations. http://rieermc.ri.gov/wp-content/uploads/2019/05/ri_cda_programreport_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Advanced Building	0.47	0.47	ls_117_Electric

RRsp Source: DNV GL (2019). Rhode Island Commercial and Industrial Impact Evaluation of 2013-2015 Custom CDA Installations. http://rieermc.ri.gov/wp-content/uploads/2019/05/ri_cda_programreport_final.pdf

RRwp Source: DNV GL (2019). Rhode Island Commercial and Industrial Impact Evaluation of 2013-2015 Custom CDA Installations. http://rieermc.ri.gov/wp-content/uploads/2019/05/ri_cda_programreport_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Advanced Building	Calc						

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Advanced Building	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Advanced Building	$0.69 / kWh	Incentive: $0.45 / kWh

Air Cooled AC

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** AC | **Measure Sub Type:** Air cooled

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
Air Cooled AC - 5.4-11.25 T	Electric Commercial & Industrial Large C&I New Construction Air Cooled AC - 5.4-11.25 T
Air Cooled AC - 11.25-20 T	Electric Commercial & Industrial Large C&I New Construction Air Cooled AC - 11.25-20 T
Air Cooled AC - 20-63 T	Electric Commercial & Industrial Large C&I New Construction Air Cooled AC - 20-63 T
Air Cooled AC - over 63 T	Electric Commercial & Industrial Large C&I New Construction Air Cooled AC - over 63 T

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed unitary AC system for space cooling.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

EER_base = Energy Efficiency Ratio of baseline equipment: code. Since IECC 2012 does not provide EER requirements for equipment < 5.4 tons, assume the following conversion: EER ≈ SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc					
Air Cooled AC - 5.4-11.25 T	Calc						
Air Cooled AC - 11.25-20 T	Calc						
Air Cooled AC - 20-63 T	Calc						
Air Cooled AC - over 63 T	Calc						

Gas Heat MMBtu Source: 0.00

Energy Impact Factors

Measure	Measure Life
Air Cooled AC - 5.4-11.25 T	15
Air Cooled AC - 11.25-20 T	
Air Cooled AC - 20-63 T	
Air Cooled AC - over 63 T	

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Air Cooled AC	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Measure	RR sp	RR wp	Loadshape ID
Air Cooled AC - 5.4-11.25 T	1.00	1.00	ls_104_Electric
Air Cooled AC - 11.25-20 T	1.00	1.00	ls_104_Electric
Air Cooled AC - 20-63 T	1.00	1.00	ls_104_Electric
Air Cooled AC - over 63 T	1.00	1.00	ls_104_Electric

RRsp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

RRwp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Air Cooled AC - 5.4-11.25 T							
Air Cooled AC - 11.25-20 T							
Air Cooled AC - 20-63 T							
Air Cooled AC - over 63 T							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Air Cooled AC	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Air Cooled AC - 5.4-11.25 T	$0.30 / kWh	$0.25 / kWh
Air Cooled AC - 11.25-20 T	$0.30 / kWh	$0.25 / kWh
Air Cooled AC - 20-63 T	$0.30 / kWh	$0.25 / kWh
Air Cooled AC - over 63 T	$0.30 / kWh	$0.25 / kWh

AirCChiller

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** AC **Measure Sub Type:** Chiller

Program: Large C&I New Construction

Measure Description

This measure promotes the installation of efficient air-cooled water chilling packages for comfort cooling applications. Eligible chillers include air-cooled chillers for single chiller systems or for the lead chiller only in multi-chiller systems.

Baseline Description

The baseline efficiency case for new installations assumes compliance with the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code. Appendix A, Table 9 details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
AirCChiller - IPLV	Electric Commercial & Industrial Large C&I New Construction AirCChiller - IPLV
AirCChiller - Peak	Electric Commercial & Industrial Large C&I New Construction AirCChiller - Peak
AirCChiller - 150to300T	Electric Commercial & Industrial Large C&I New Construction AirCChiller - 150to300T
AirCChiller - to150T	Electric Commercial & Industrial Large C&I New Construction AirCChiller - to150T

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed high-efficiency chiller for space cooling.

Savings Equation

Gross kWh = Tons × 12 × (1/EER_base - 1/EER_ee) × Hours_C

Gross kW = Tons × 12 × (1/EER_base - 1/EER_ee) × LF

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

EER_base = Energy Efficiency Ratio of baseline equipment: code

Reference Table 9

EER_ee = Energy Efficiency Ratio of the efficient equipment: site-specific.

Hours_C = Equivalent full load cooling hours

Reference Table 11

LF = Load Factor

12 = Conversion factor: 12 kBtu/hr per ton.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis; in the absence of site specific information, 1,328 hours can be used as a default.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc					
AirCChiller - IPLV	Calc						
AirCChiller - Peak	Calc						
AirCChiller - 150to300T	Calc						
AirCChiller - to150T	Calc						

Electric kWh Note: Algorithm inputs are based on engineering estimates of cooling hours and 2024 International Code Council (2024).

Electric kW Note: Algorithm inputs are based on engineering estimates of cooling hours and 2024 International Code Council (2024).

Energy Impact Factors

Measure	Measure Life
AirCChiller - IPLV AirCChiller - Peak AirCChiller - 150to300T AirCChiller - to150T	23

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report.
https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
AirCChiller	1.00		1.07

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2012 National Grid-Rhode Island Prescriptive Chiller Program.
http://rieermc.ri.gov/wp-content/uploads/2017/08/20160722_py2012_ri_prescriptive_chiller_report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
AirCChiller - IPLV	1.00	1.00	ls_103_Electric
AirCChiller - Peak	1.00	1.00	ls_103_Electric
AirCChiller - 150to300T	1.00	1.00	ls_103_Electric
AirCChiller - to150T	1.00	1.00	ls_103_Electric

RRsp Note: RRsp & RRwp are set to 1.00 because evaluation results set coincidence factor.

RRwp Note: RRsp & RRwp are set to 1.00 because evaluation results set coincidence factor.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
AirCChiller - IPLV							
AirCChiller - Peak							
AirCChiller - 150to300T							
AirCChiller - to150T							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
AirCChiller	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
AirCChiller - IPLV	$0.40 / kWh	$0.26 / kWh
AirCChiller - Peak	$0.40 / kWh	$0.26 / kWh
AirCChiller - 150to300T	$0.40 / kWh	$0.26 / kWh
AirCChiller - to150T	$0.40 / kWh	$0.26 / kWh

AirHP

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heat Pump **Measure Sub Type:** Air Source

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

The baseline efficiency case for new installations assumes compliance with the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code. Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I New Construction AirHP - Pkg to5.4T
AirHP - Pkg to5.4T	Electric Commercial & Industrial Large C&I New Construction AirHP - 5.4-11.25T
AirHP - 5.4-11.25T	Electric Commercial & Industrial Large C&I New Construction AirHP - 11.25-20T
AirHP - 11.25-20T	Electric Commercial & Industrial Large C&I New Construction AirHP - over20T
AirHP - over20T	

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed heat pump system for space cooling and heating.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H]

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code

HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific.

Hours_H = Equivalent full load heating hours

CR = Capacity Ratio converts rated coolingcapacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric enefits Analysis Update. Prepared for Dave Weber, NSTAR.

EER_base = EnergyEfficiency Ratio of baseline equipment.

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc					
AirHP - Pkg to5.4T	Calc						
AirHP - 5.4-11.25T	Calc						
AirHP - 11.25-20T	Calc						
AirHP - over20T	Calc						

Electric kWh Note: Algorithm inputs are based on engineering estimates of cooling hours and 2024 International Code Council (2024).

Electric kW Note: Algorithm Inputs based on UI and CL&P Program Savings Documentation for 2011 Program Year, Section 2.2.2 C&I LO Cooling - Unitary AC & Heat Pumps

Energy Impact Factors

Measure	Measure Life
AirHP - Pkg to5.4T AirHP - 5.4-11.25T AirHP - 11.25-20T AirHP - over20T	12

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
AirHP	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Energy realization rate is 100% because deemed savings are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
AirHP - Pkg to5.4T	1.00	1.00	ls_104_Electric
AirHP - 5.4-11.25T	1.00	1.00	ls_104_Electric
AirHP - 11.25-20T	1.00	1.00	ls_104_Electric
AirHP - over20T	1.00	1.00	ls_104_Electric

RRsp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

RRwp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
AirHP - Pkg to5.4T							
AirHP - 5.4-11.25T							
AirHP - 11.25-20T							
AirHP - over20T							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
AirHP	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
AirHP - Pkg to5.4T	$0.62 / kWh	$0.40 / kWh
AirHP - 5.4-11.25T	$0.23 / kWh	$0.15 / kWh
AirHP - 11.25-20T	$0.19 / kWh	$0.13 / kWh
AirHP - over20T		

Boiler, Draft Fan

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Boiler, Draft Fan	Electric Commercial & Industrial Large C&I New Construction Boiler, Draft Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Boiler, Draft Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Boiler, Draft Fan	15

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Boiler, Draft Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Boiler, Draft Fan	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Boiler, Draft Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler, Draft Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler, Draft Fan	$0.48 / kWh	Incentive: $0.31 / kWh

Boiler, Feedwater Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Boiler, Feedwater Pump	Electric Commercial & Industrial Large C&I New Construction Boiler, Feedwater Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Boiler, Feedwater Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Boiler, Feedwater Pump	15

Measure Life Source: California Public Utilities Commission (CPUC), Energy Division (2008). EUL_Summary_10-1-08.xls.

Measure	ISR	RRe Gas	RRe Electric
Boiler, Feedwater Pump	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Boiler, Feedwater Pump	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Boiler, Feedwater Pump				$0.003			

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler, Feedwater Pump	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler, Feedwater Pump	$0.48 / kWh	Incentive: $0.31 / kWh

Building Exhaust Fan

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Building Exhaust Fan	Electric Commercial & Industrial Large C&I New Construction Building Exhaust Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Building Exhaust Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Building Exhaust Fan	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Building Exhaust Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Building Exhaust Fan	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Building Exhaust Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building Exhaust Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building Exhaust Fan	$0.48 / kWh	Incentive: $0.31 / kWh

Building Shell

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** BLD SHELL | **Measure Sub Type:** BLD SHELL

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Building Shell	Electric Commercial & Industrial Large C&I New Construction Building Shell

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Building Shell	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Building Shell	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Building Shell	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Building Shell	0.74	0.98	ls_188_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Building Shell	Calc			$0.037			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building Shell	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building Shell	$0.77 / kWh	Incentive: $0.50 / kWh

Chiller

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** CHILLER | **Measure Sub Type:** CHILLER

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Chiller	Electric Commercial & Industrial Large C&I New Construction Chiller

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Chiller	Calc	Calc	Calc				

Energy Impact Factors

Measure	Measure Life
Chiller	multi

Measure	ISR	RRe Gas	RRe Electric
Chiller	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Chiller	0.74	0.98	ls_119_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Chiller	Calc			$0.022			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Chiller	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Chiller	$0.81 / kWh	Incentive: $0.53 / kWh

Chiller, Water Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Chiller, Water Pump	Electric Commercial & Industrial Large C&I New Construction Chiller, Water Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Chiller, Water Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Chiller, Water Pump	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Chiller, Water Pump	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Chiller, Water Pump	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Chiller, Water Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Chiller, Water Pump	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Chiller, Water Pump	$0.48 / kWh	Incentive: $0.31 / kWh

CHP

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: CHP | **Measure Type:** CHP | **Measure Sub Type:** CHP

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
CHP	Electric Commercial & Industrial Large C&I New Construction CHP

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CHP	Calc	Calc	Calc				

Energy Impact Factors

Measure	Measure Life
CHP	15,20,25

Measure	ISR	RRe Gas	RRe Electric
CHP	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
CHP	1.00	1.00	ls_189_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
CHP	Calc			$-0.015			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CHP	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CHP		

Codes and Standards

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Custom

Measure Category: Codes and Standards

Measure Type: Codes and Standards

Measure Sub Type: Codes and Standards

Program: Large C&I New Construction

Measure Description

Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island.

Baseline Description

Un-influenced adoption curve of federal minimum codes and standards.

Measures

Measure Name	Unique Identifier
Codes and Standards	Electric Commercial & Industrial Large C&I New Construction Codes and Standards

Savings Principle

Accelerated adoption of advancing energy codes and equipment standards.

Savings Method

Calculated based on attribution study

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Codes and Standards	Calc	Calc					

Electric kWh Source: NMR (2017). Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study. http://rieermc.ri.gov/wp-content/uploads/2018/03/ri-ccei-attribution-and-savings-final-report-12-12-17-clean.pdf

Gas Heat MMBtu Source: NMR (2017). Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study. http://rieermc.ri.gov/wp-content/uploads/2018/03/ri-ccei-attribution-and-savings-final-report-12-12-17-clean.pdf

Energy Impact Factors

Measure	Measure Life
Codes and Standards	20

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Codes and Standards	1.00		1.00

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
Codes and Standards	1.00	1.00	ls_113_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Codes and Standards							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Codes and Standards	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Codes and Standards		

Commercial Electric Combination Oven

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Oven

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® commercial oven. ENERGY STAR® commercial ovens save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates.

Baseline Description

The weighted baseline efficiency case for a combination oven is a commercial combination oven with a cooking energy efficiency of 74% with a production capacity of 100 pounds per hour for oven mode and 53% steam cooking energy efficiency, with a production capacity of 150 pounds per hour for steam mode. Idle energy is assumed to be 2.47 kW for oven mode and 5.0 kW for steam mode.

Measures

Measure Name	Unique Identifier
Commercial Electric Combination Oven	Electric Commercial & Industrial Large C&I New Construction Commercial Electric Combination Oven

Savings Principle

The high efficiency case for a combination oven is a commercial combination oven with a cooking energy efficiency of 78% with a production capacity of 119 pounds per hour for oven mode, and 63% cooking energy efficiency with a production capacity of 177 pounds per hour for steam mode, and idle energy rate of 1.3 kW for convection mode and 1.5 kW for steam mode.

Savings Method

Deemed

Unit

Installed high-efficiency commercial electric oven.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial Electric Combination Oven	8870.00	2.030					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Commercial Electric Combination Oven	12

Measure Life Source: FTSC Research (2009), Energy Star Commercial Kitchen Calculator, Oven Calcs, https://www.energystar.gov/sites/default/files/asset/document/commercial_kitchen_equipment_calculator.xlsx

Measure	ISR	RRe Gas	RRe Electric
Commercial Electric Combination Oven	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Commercial Electric Combination Oven	1.00	1.00	ls_111_Electric

RRsp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

RRwp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial Electric Combination Oven							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial Electric Combination Oven	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial Electric Combination Oven	$0.28 / kWh	Incentive: $0.18 / kWh

Commercial Electric Convection Oven

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Oven

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® commercial oven. ENERGY STAR® commercial ovens save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates.

Baseline Description

The weighted baseline efficiency case is a convection oven with a cooking energy efficiency of 70%, production capacity of 90 pounds per hour, and idle energy rate of 1.66 kW.

Measures

Measure Name	Unique Identifier
Commercial Electric Convection Oven	Electric Commercial & Industrial Large C&I New Construction Commercial Electric Convection Oven

Savings Principle

The high efficiency case is a convection oven with a cooking energy efficiency of 76%, production capacity of 90 pounds per hour, and idle energy rate of 1.3 kW.

Savings Method

Deemed

Unit

Installed high-efficiency commercial electric oven.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial Electric Convection Oven	1796.00	0.410					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Commercial Electric Convection Oven	12

Measure Life Source: CEEL (2016). Ultra-Low Temperature Freezers: Opening the Door to Energy Savings in Laboratories.

Measure	ISR	RRe Gas	RRe Electric
Commercial Electric Convection Oven	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Commercial Electric Convection Oven	1.00	1.00	ls_111_Electric

RRsp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

RRwp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial Electric Convection Oven							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial Electric Convection Oven	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial Electric Convection Oven	$0.36 / kWh	Incentive: $0.23 / kWh

Commercial Electric Fryer - Large

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Fryer

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® commercial fryer, which saves energy during preheating, cooking, and idling.

Baseline Description

The weighted baseline efficiency case is a deep-fat fryer with a cooking efficiency of 79%, a shortening capacity of up to 100 pounds, and an idle energy rate of 1.11 kW.

Measures

Measure Name	Unique Identifier
Commercial Electric Fryer - Large	Electric Commercial & Industrial Large C&I New Construction Commercial Electric Fryer - Large

Savings Principle

The high efficiency case is a deep-fat fryer with a cooking energy efficiency of 86%, a shortening capacity of over 70 pounds, and an idle energy rate of 0.75 kW.

Savings Method

Deemed

Unit

Installed high-efficiency electric fryer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 3756

Hours Note: Fryers are assumed to operate 313 days per year, or 6 days per week, based on a MA common assumption.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial Electric Fryer - Large	2438.00	0.460					

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Commercial Electric Fryer - Large	12

Measure Life Source: Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Gas Fryer.

Measure	ISR	RRe Gas	RRe Electric
Commercial Electric Fryer - Large	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100%

Measure	RR sp	RR wp	Loadshape ID
Commercial Electric Fryer - Large	1.00	1.00	ls_111_Electric

RRsp Note: Realization rate is assumed to be 100%

RRwp Note: Realization rate is assumed to be 100%

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial Electric Fryer - Large							

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial Electric Fryer - Large	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial Electric Fryer - Large	$0.15 / kWh	Incentive: $0.10 / kWh

Commercial Electric Fryer - Standard

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Fryer

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® commercial fryer, which saves energy during preheating, cooking, and idling.

Baseline Description

The weighted baseline efficiency case is a deep-fat fryer with a cooking efficiency of 79%, a shortening capacity of up to 65 pounds, and an idle energy rate of 1.02 kW.

Measures

Measure Name	Unique Identifier
Commercial Electric Fryer - Standard	Electric Commercial & Industrial Large C&I New Construction Commercial Electric Fryer - Standard

Savings Principle

The high efficiency case is a deep-fat fryer with a cooking energy efficiency of 86%, a shortening capacity of up to 70 pounds, and an idle energy rate of 0.75 kW.

Savings Method

Deemed

Unit

Installed high-efficiency electric fryer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 3756

Hours Note: Fryers are assumed to operate 313 days per year, or 6 days per week, based on a MA common assumption.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial Electric Fryer - Standard	2017.00	0.460					

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Commercial Electric Fryer - Standard	12

Measure Life Source: Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Gas Fryer.

Measure	ISR	RRe Gas	RRe Electric
Commercial Electric Fryer - Standard	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100%

Measure	RR sp	RR wp	Loadshape ID
Commercial Electric Fryer - Standard	1.00	1.00	ls_111_Electric

RRsp Note: Realization rate is assumed to be 100%

RRwp Note: Realization rate is assumed to be 100%

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial Electric Fryer - Standard							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial Electric Fryer - Standard	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial Electric Fryer - Standard	$0.14 / kWh	Incentive: $0.09 / kWh

Commercial Electric Griddle

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Griddle

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® griddle. ENERGY STAR® griddles save energy during preheat, cooking and idle times due to improved cooking efficiency, and preheat and idle energy rates.

Baseline Description

The baseline efficiency case is a typically sized, 6 sq. ft. commercial griddle with a cooking energy efficiency of 65%, production capacity of 35 pounds per hour, and idle energy rate of 400 W/sq. ft.

Measures

Measure Name	Unique Identifier
Commercial Electric Griddle	Electric Commercial & Industrial Large C&I New Construction Commercial Electric Griddle

Savings Principle

The high efficiency case is a typically sized, 6 sq. ft. commercial griddle with a cooking energy efficiency of 75%, production capacity of 49.2 pounds per hour, and idle energy rate of 293 W/sq. ft.

Savings Method

Deemed

Unit

Installed high-efficiency commercial electric griddle.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 3756

Hours Note: Griddles are assumed to operate 313 days per year. The average griddle is assumed to operate 12 hours a day, or 3756 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial Electric Griddle	2639.00	0.600					

Electric kWh Source: Energy Star (2021). Energy Star Calculator - Blended Baseline, Increased MQE

Electric kW Source: Energy Star (2021). Energy Star Calculator - Blended Baseline, Increased MQE

Energy Impact Factors

Measure	Measure Life
Commercial Electric Griddle	12

Measure Life Source: Food Service Technology Center (2011). Electric Griddle Life-Cycle Cost Calculator. Accessed on 10/12/2011.

Measure	ISR	RRe Gas	RRe Electric
Commercial Electric Griddle	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Commercial Electric Griddle	1.00	1.00	ls_111_Electric

RRsp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

RRwp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial Electric Griddle							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial Electric Griddle	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial Electric Griddle	$0.48 / kWh	Incentive: $0.31 / kWh

Commercial electric steamer

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Steamer

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® commercial steam cooker. ENERGY STAR® steam cookers save energy during cooling and idle times due to improved cooking efficiency and idle energy rates.

Baseline Description

The Baseline Efficiency case is an electric steam cooker with a cooking efficiency of 26%, pan production capacity of 70.0 pounds per hour, preheat energy of 1.5 kWh, and idle energy rate of 1.0 kW

Measures

Measure Name	Unique Identifier
Commercial electric steamer	Electric Commercial & Industrial Large C&I New Construction Commercial electric steamer

Savings Principle

The High Efficiency case is an ENERGY STAR® electric steam cooker with a cooking energy efficiency of 68%, pan production capacity of 88.0 pounds per hour, preheat energy of 1.5 kWh, and an idle energy rate of 0.26 kW.

Savings Method

Deemed

Unit

Installed high-efficiency commercial electric steamer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial electric steamer	3082.00	1.070					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Commercial electric steamer	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Commercial electric steamer	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Commercial electric steamer	1.00	1.00	ls_111_Electric

RRsp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

RRwp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial electric steamer	69975						

Water Source: Energy Star Calculator - New Baselines and Efficiencies 082721.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial electric steamer	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial electric steamer	$0.12 / kWh	Incentive: $0.08 / kWh

Commercial Refrigeration

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Refrigeration **Measure Type:** Refrigeration **Measure Sub Type:** REFRG COMM

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Commercial Refrigeration	Electric Commercial & Industrial Large C&I New Construction Commercial Refrigeration

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial Refrigeration	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Commercial Refrigeration	multi

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Commercial Refrigeration	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Commercial Refrigeration	0.74	0.98	ls_109_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial Refrigeration	Calc			$0.014			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial Refrigeration	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial Refrigeration	$0.71 / kWh	Incentive: $0.46 / kWh

Comprehensive Design

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Building **Measure Type:** COMP DESIGN **Measure Sub Type:** COMP DESIGN

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Comprehensive Design	Electric Commercial & Industrial Large C&I New Construction Comprehensive Design

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Comprehensive Design	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Comprehensive Design	multi

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Comprehensive Design	1.00		0.47

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2019). Rhode Island Commercial and Industrial Impact Evaluation of 2013-2015 Custom CDA Installations. http://rieermc.ri.gov/wp-content/uploads/2019/05/ri_cda_programreport_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Comprehensive Design	0.47	0.47	ls_117_Electric

RRsp Source: DNV GL (2019). Rhode Island Commercial and Industrial Impact Evaluation of 2013-2015 Custom CDA Installations. http://rieermc.ri.gov/wp-content/uploads/2019/05/ri_cda_programreport_final.pdf

RRwp Source: DNV GL (2019). Rhode Island Commercial and Industrial Impact Evaluation of 2013-2015 Custom CDA Installations. http://rieermc.ri.gov/wp-content/uploads/2019/05/ri_cda_programreport_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Comprehensive Design	Calc						

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Comprehensive Design	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Comprehensive Design	$0.68 / kWh	Incentive: $0.47 / kWh

Compressed Air

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Compressed Air **Measure Type:** COMP AIR **Measure Sub Type:** COMP AIR

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Compressed Air	Electric Commercial & Industrial Large C&I New Construction Compressed Air

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Compressed Air	Calc	Calc	Calc				

Energy Impact Factors

Measure	Measure Life
Compressed Air	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Compressed Air	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Compressed Air	0.74	0.98	ls_118_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Compressed Air	Calc			$0.029			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Compressed Air	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Compressed Air	$0.60 / kWh	Incentive: $0.39 / kWh

Compressed Air Nozzle

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Compressed Air **Measure Type:** CAIR Nozzle **Measure Sub Type:** CAIR Nozzle

Program: Large C&I New Construction

Measure Description

The installation of an efficient CAIR nozzle.

Baseline Description

The baseline efficiency case is the installation of a standard CAIR nozzle.

Measures

Measure Name	Unique Identifier
Compressed Air Nozzle	Electric Commercial & Industrial Large C&I New Construction Compressed Air Nozzle

Savings Principle

The high efficiency case is the installation of an efficient CAIR nozzle.

Savings Method

Calculated using site-specific inputs

Unit

Installed CAIR nozzle.

Savings Equation

Gross kWh = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM × Hours

Gross kW = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM

Where:

CFM_pipe = CFM capacity of piping: site-specific

0.049 deltaCFM/CFM_pipe = Average CFM saved per CFM of piping capacity

0.24386 deltakW/CFM = Average demand savings per CFM; Based on regional analysis assuming a typical timed drain settings discharge scenario.

Hours = Annual operating hours of the zero loss condensate drain: site-specific

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Compressed Air Nozzle	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Compressed Air Nozzle	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Compressed Air Nozzle	1.00		1.44

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
Compressed Air Nozzle	1.00	1.00	ls_112_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Compressed Air Nozzle				$0.043			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Compressed Air Nozzle	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Compressed Air Nozzle	$0.43 / kWh	Incentive: $0.28 / kWh

Conveyor Broiler

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Broiler **Measure Sub Type:** Conveyor Broiler

Program: Large C&I New Construction

Measure Description

Installation of a energy efficient underfired broiler to replace a conventional automatic constant input rate conveyor broiler. This measure has both electric and gas savings.

Baseline Description

Baseline broiler must be an automatic conveyor broiler capable of maintaining a temperature above 600 F with a tested idle rate greater than 60 kBtu/h for size 22-28" wide, greater than 70 kBtu/h for >28" wide, and greater than 40 kBtu/h for <22" wide.

Measures

Measure Name	Unique Identifier
Conveyor Broiler - 22-28" wide Conveyor Broiler - >28" wide Conveyor Broiler - <22" wide	Electric Commercial & Industrial Large C&I New Construction Conveyor Broiler - 22-28" wide Electric Commercial & Industrial Large C&I New Construction Conveyor Broiler - >28" wide Electric Commercial & Industrial Large C&I New Construction Conveyor Broiler - <22" wide

Savings Principle

The high efficiency case for a conveyor broiler must have a catalyst and an input rate less than 80 kBtu/h or a dual stage or modulating gas valve with a capability of throttling the input rate below 80 kBtu/h. Baseline broiler must be replaced by a broiler similar in size or smaller. Must be installed under a Type II Hood.

Savings Method

Deemed

Unit

Per Conveyor Broiler

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Conveyor Broiler - 22-28" wide	6403.00	0.280					
Conveyor Broiler - >28" wide	23849.00	0.280					
Conveyor Broiler - <22" wide	7144.00	0.280					

Electric kWh Source: SoCalGas. (2019). Commercial Conveyor Broilers workpaper WPSCGNRCC171226A11. http://deeresources.net/workpapers

Electric kW Source: SoCalGas. (2019). Commercial Conveyor Broilers workpaper WPSCGNRCC171226A11. http://deeresources.net/workpapers

Energy Impact Factors

Measure	Measure Life
Conveyor Broiler - 22-28" wide Conveyor Broiler - >28" wide Conveyor Broiler - <22" wide	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Conveyor Broiler	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Conveyor Broiler - 22-28" wide	1.00	1.00	ls_111_Electric
Conveyor Broiler - >28" wide	1.00	1.00	ls_111_Electric
Conveyor Broiler - <22" wide	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Conveyor Broiler - 22-28" wide Conveyor Broiler - >28" wide Conveyor Broiler - <22" wide							

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Conveyor Broiler	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Conveyor Broiler - 22-28" wide Conveyor Broiler - >28" wide Conveyor Broiler - <22" wide	$1.51 / kWh	$0.98 / kWh

Cooling Tower Fan

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Cooling Tower Fan	Electric Commercial & Industrial Large C&I New Construction Cooling Tower Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Cooling Tower Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Cooling Tower Fan	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Cooling Tower Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Cooling Tower Fan	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Cooling Tower Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Cooling Tower Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Cooling Tower Fan	$0.48 / kWh	Incentive: $0.31 / kWh

Custom HVAC

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** HVAC | **Measure Sub Type:** HVAC

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Custom HVAC	Electric Commercial & Industrial Large C&I New Construction Custom HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom HVAC	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Custom HVAC	multi

Measure	ISR	RRe Gas	RRe Electric
Custom HVAC	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom HVAC	0.74	0.98	ls_119_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom HVAC	Calc			$0.022			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom HVAC	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom HVAC	$0.81 / kWh	Incentive: $0.54 / kWh

Deck Oven

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Oven

Program: Large C&I New Construction

Measure Description

Installation of a high efficiency commercial electric deck oven.

Baseline Description

The baseline efficiency case is a commercial electric deck oven with a cooking energy efficiency of 40% and a 1.8 kW idle energy rate.

Measures

Measure Name	Unique Identifier
Deck Oven	Electric Commercial & Industrial Large C&I New Construction Deck Oven

Savings Principle

The high efficiency case is an electric commercial deck oven with cooking energy efficiency of at least 60% and has an idle of 1.3 kW or less.

Savings Method

Deemed

Unit

Installed high-efficiency commercial electric deck oven.

Savings Equation

Gross kWh = Qty × (kW_base - kW_ee) × Hours

Gross kW = Qty × (kW_base - kW_ee)

Where:

Qty = Total number of units.

kW_base = Deemed average demand per baseline unit.

kW_ee = Deemed average demand per high-efficiency unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Deck Oven	7519.00	1.545					

Electric kWh Source: American Society for Testing and Materials (ASTM). 2010. ASTM F1965-99, Standard Test Method for the Performance of Deck Ovens. West Conshohocken (PA): ASTM International.

Electric kW Source: American Society for Testing and Materials (ASTM). 2010. ASTM F1965-99, Standard Test Method for the Performance of Deck Ovens. West Conshohocken (PA): ASTM International.

Energy Impact Factors

Measure	Measure Life
Deck Oven	12

Measure Life Source: CEEL (2016). Ultra-Low Temperature Freezers: Opening the Door to Energy Savings in Laboratories.

Measure	ISR	RRe Gas	RRe Electric
Deck Oven	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Deck Oven	1.00	1.00	ls_111_Electric

RRsp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

RRwp Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Deck Oven							

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Deck Oven	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Deck Oven	$0.46 / kWh	Incentive: $0.30 / kWh

Demand Control Kitchen Ventilation

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Kitchen Equipment **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of a demand control kitchen ventilation (DCKV). The DCKV must not have been a code requirement at the time of installation for systems >5000 CFM via retrofit program to be eligible. Codes with IECC 2015 (Item: C.403.2.8) or newer (IECC 2018 - C403.7.5) mandate DCKV for systems with >5000 CFM except in prescriptive scenarios where the system would not have been justified (e.g. high transfer air, or energy recovery on >50% of air stream). Systems that used this alternate pathway (e.g. installing a DOAS), would not need a DCKV hood and savings would be expected to be much lower than conventional deemed values, therefore would still not be eligible. IECC 2018 also requires hood compliance to UL 710 in >5000 cfm total kitchen hood exhaust rate scenarios.

Baseline Description

The baseline is a kitchen vent hood without DCKV.

Measures

Measure Name	Unique Identifier
Demand Control Kitchen Ventilation	Electric Commercial & Industrial Large C&I New Construction Demand Control Kitchen Ventilation

Savings Principle

The high efficiency case is a DCKV system that are <= 5000 CFM. The DCKV system must have 1) have temperature sensors within the hood or hood exhaust collar, and (2) the ventilation controller must reduce the hood flow rate when the cooking equipment isbeing lightly used. Eligible equipment may also have optical (smoke) sensors, but this is not a requirement.

Savings Method

Deemed

Unit

Per CFM of exhaust system

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Demand Control Kitchen Ventilation	1.22						0.39

Energy Impact Factors

Measure	Measure Life
Demand Control Kitchen Ventilation	20

Measure Life Source: CEE (2010). Commercial Kitchen Ventilation: An Energy Efficiency Program Administrator's Guide to Demand Control Ventilation. (pg. 9). The 20-year measure life estimate is based on interviews with manufacturer and industry experts. From IL TRM.

Measure	ISR	RRe Gas	RRe Electric
Demand Control Kitchen Ventilation	1.00		

Measure	RR sp	RR wp	Loadshape ID
Demand Control Kitchen Ventilation	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Demand Control Kitchen Ventilation							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Demand Control Kitchen Ventilation	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Demand Control Kitchen Ventilation	$2.18 / kWh	Incentive: $0.53 / kWh

DHW ECM Pump

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** DHW **Measure Sub Type:** Pump

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency DHW circulator pump with an ECM.

Baseline Description

The baseline system is a pump without an EC motor. The baseline system may have no control, a timer, aquastat, or be on demand. The baseline system is assumed to run a weighted average of these four control types.

Measures

Measure Name	Unique Identifier
DHW ECM Pump - <= 1/8 HP	Electric Commercial & Industrial Large C&I New Construction DHW ECM Pump - <= 1/8 HP
DHW ECM Pump - <=1/20 HP	Electric Commercial & Industrial Large C&I New Construction DHW ECM Pump - <=1/20 HP
DHW ECM Pump - 1/20 to 1/8 HP	Electric Commercial & Industrial Large C&I New Construction DHW ECM Pump - 1/20 to 1/8 HP
DHW ECM Pump - 1/8 to 1/6 HP	Electric Commercial & Industrial Large C&I New Construction DHW ECM Pump - 1/8 to 1/6 HP
DHW ECM Pump - 1/6 to 3/4 HP	Electric Commercial & Industrial Large C&I New Construction DHW ECM Pump - 1/6 to 3/4 HP
DHW ECM Pump - 3/4 to 3 HP	Electric Commercial & Industrial Large C&I New Construction DHW ECM Pump - 3/4 to 3 HP

Savings Principle

The high efficiency case is a DHW circulator pump with an ECM.

Savings Method

Deemed

Unit

Per Pump

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
DHW ECM Pump - <= 1/8 HP	462.00	0.034					
DHW ECM Pump - <=1/20 HP	462.00	0.034					
DHW ECM Pump - 1/20 to 1/8 HP	462.00	0.034					
DHW ECM Pump - 1/8 to 1/6 HP	639.00	0.056					
DHW ECM Pump - 1/6 to 3/4 HP	1507.00	0.132					
DHW ECM Pump - 3/4 to 3 HP	3013.00	0.234					

Electric kWh Source: The Cadmus Group. (2017). Circulator Pump Technical Memo.

Electric kW Source: The Cadmus Group. (2017). Circulator Pump Technical Memo.

Energy Impact Factors

Measure	Measure Life
DHW ECM Pump - <= 1/8 HP	15
DHW ECM Pump - <=1/20 HP	
DHW ECM Pump - 1/20 to 1/8 HP	
DHW ECM Pump - 1/8 to 1/6 HP	
DHW ECM Pump - 1/6 to 3/4 HP	
DHW ECM Pump - 3/4 to 3 HP	

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
DHW ECM Pump	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
DHW ECM Pump - <= 1/8 HP	1.00	1.00	ls_194_Electric
DHW ECM Pump - <=1/20 HP	1.00	1.00	ls_194_Electric
DHW ECM Pump - 1/20 to 1/8 HP	1.00	1.00	ls_194_Electric
DHW ECM Pump - 1/8 to 1/6 HP	1.00	1.00	ls_194_Electric
DHW ECM Pump - 1/6 to 3/4 HP	1.00	1.00	ls_194_Electric
DHW ECM Pump - 3/4 to 3 HP	1.00	1.00	ls_194_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
DHW ECM Pump - <= 1/8 HP							
DHW ECM Pump - <=1/20 HP							
DHW ECM Pump - 1/20 to 1/8 HP							
DHW ECM Pump - 1/8 to 1/6 HP							
DHW ECM Pump - 1/6 to 3/4 HP							
DHW ECM Pump - 3/4 to 3 HP							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DHW ECM Pump	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DHW ECM Pump - <= 1/8 HP	$0.60 / kWh	$0.39 / kWh
DHW ECM Pump - <=1/20 HP	$0.60 / kWh	$0.39 / kWh
DHW ECM Pump - 1/20 to 1/8 HP	$0.60 / kWh	$0.39 / kWh
DHW ECM Pump - 1/8 to 1/6 HP	$0.60 / kWh	$0.39 / kWh
DHW ECM Pump - 1/6 to 3/4 HP	$0.60 / kWh	$0.39 / kWh
DHW ECM Pump - 3/4 to 3 HP	$0.60 / kWh	$0.39 / kWh

Dishwasher - High Temperature Door Type

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: High Temp, Door Type

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a

booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 0.7 kW idle energy rate and 0.92 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - High Temperature Door Type	Electric Commercial & Industrial Large C&I New Construction Dishwasher - High Temperature Door Type

Savings Principle

The high efficiency case is a commercial dishwasher with 0.55 kW idle energy rate and 0.89 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - High Temperature Door Type	1558.00	0.240					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - High Temperature Door Type	15

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - High Temperature Door Type	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - High Temperature Door Type	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - High Temperature Door Type	35000						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - High Temperature Door Type	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - High Temperature Door Type	$0.34 / kWh	Incentive: $0.22 / kWh

Dishwasher - High Temperature Multi Tank Conveyor

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: High Temp, Door Type

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a

booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 2.31 kW idle energy rate and 0.64 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - High Temperature Multi Tank Conveyor	Electric Commercial & Industrial Large C&I New Construction Dishwasher - High Temperature Multi Tank Conveyor

Savings Principle

The high efficiency case is a commercial dishwasher with 1.85 kW idle energy rate and 0.54 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - High Temperature Multi Tank Conveyor	8587.00	1.310					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - High Temperature Multi Tank Conveyor	20

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - High Temperature Multi Tank Conveyor	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - High Temperature Multi Tank Conveyor	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - High Temperature Multi Tank Conveyor	80754						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - High Temperature Multi Tank Conveyor	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - High Temperature Multi Tank Conveyor	$0.15 / kWh	Incentive: $0.10 / kWh

Dishwasher - High Temperature Pots and Pans

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: High Temp, Door Type

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a

booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 2.07 kW idle energy rate and 0.56 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - High Temperature Pots and Pans	Electric Commercial & Industrial Large C&I New Construction Dishwasher - High Temperature Pots and Pans

Savings Principle

The high efficiency case is a commercial dishwasher with 0.9 kW idle energy rate and 0.58 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - High Temperature Pots and Pans	1159.00	0.180					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - High Temperature Pots and Pans	10

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - High Temperature Pots and Pans	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - High Temperature Pots and Pans	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - High Temperature Pots and Pans	10517						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - High Temperature Pots and Pans	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - High Temperature Pots and Pans	$1.38 / kWh	Incentive: $0.90 / kWh

Dishwasher - High Temperature Single Tank Conveyor

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: High Temp, Single Tank

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a

booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 1.57 kW idle energy rate and 0.77 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - High Temperature Single Tank Conveyor	Electric Commercial & Industrial Large C&I New Construction Dishwasher - High Temperature Single Tank Conveyor

Savings Principle

The high efficiency case is a commercial dishwasher with 1.20 kW idle energy rate and 0.70 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - High Temperature Single Tank Conveyor	4937.00	0.750					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - High Temperature Single Tank Conveyor	20

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - High Temperature Single Tank Conveyor	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - High Temperature Single Tank Conveyor	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - High Temperature Single Tank Conveyor	21300						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - High Temperature Single Tank Conveyor	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - High Temperature Single Tank Conveyor	$0.55 / kWh	Incentive: $0.36 / kWh

Dishwasher - High Temperature Under Counter

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: High Temp, Under Counter

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® high temperature commercial dishwasher in a building with gas domestic hot water. High temperature dishwashers use a

booster heater to raise the rinse water temperature to 1800 F – hot enough to sterilize dishes and assist in drying. Electric savings are achieved through savings to the electric booster.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 0.54 kW idle energy rate and 0.88 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - High Temperature Under Counter	Electric Commercial & Industrial Large C&I New Construction Dishwasher - High Temperature Under Counter

Savings Principle

The high efficiency case is a commercial dishwasher with 0.30 kW idle energy rate and 0.86 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - High Temperature Under Counter	1528.00	0.230					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - High Temperature Under Counter	10

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - High Temperature Under Counter	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - High Temperature Under Counter	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - High Temperature Under Counter	5400						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - High Temperature Under Counter	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - High Temperature Under Counter	$0.45 / kWh	Incentive: $0.29 / kWh

Dishwasher - Low Temperature Door Type

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Food Service | **Measure Type:** Dishwasher | **Measure Sub Type:** Low Temp, Door Type

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® low temperature commercial dishwasher in a facility with electric hot water heating. Low temperature dishwashers use the hot water supplied by the kitchen's existing water heater and use a chemical sanitizing agentin the final rinse cycle and sometimes a drying agent.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 0.60 kW idle energy rate and 1.23 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - Low Temperature Door Type	Electric Commercial & Industrial Large C&I New Construction Dishwasher - Low Temperature Door Type

Savings Principle

The high efficiency case is a commercial dishwasher with 0.30 kW idle energy rate and 0.79 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - Low Temperature Door Type	2082.00	0.320					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - Low Temperature Door Type	15

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - Low Temperature Door Type	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - Low Temperature Door Type	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - Low Temperature Door Type	80600						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - Low Temperature Door Type	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - Low Temperature Door Type	$0.23 / kWh	Incentive: $0.15 / kWh

Dishwasher - Low Temperature Multi Tank Conveyor

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: Low Temp, Single tank

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® low temperature commercial dishwasher in a facility with electric hot water heating. Low temperature dishwashers use the hot water supplied by the kitchen's existing water heater and use a chemical sanitizing agentin the final rinse cycle and sometimes a drying agent.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 2.00 kW idle energy rate and 0.62 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - Low Temperature Multi Tank Conveyor	Electric Commercial & Industrial Large C&I New Construction Dishwasher - Low Temperature Multi Tank Conveyor

Savings Principle

The high efficiency case is a commercial dishwasher with 1.00 kW idle energy rate and 0.54 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - Low Temperature Multi Tank Conveyor	8485.00	1.290					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - Low Temperature Multi Tank Conveyor	20

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - Low Temperature Multi Tank Conveyor	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - Low Temperature Multi Tank Conveyor	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - Low Temperature Multi Tank Conveyor	93900						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - Low Temperature Multi Tank Conveyor	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - Low Temperature Multi Tank Conveyor		

Dishwasher - Low Temperature Single Tank Conveyor

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: Low Temp, Single tank

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® low temperature commercial dishwasher in a facility with electric hot water heating. Low temperature dishwashers use the hot water supplied by the kitchen's existing water heater and use a chemical sanitizing agentin the final rinse cycle and sometimes a drying agent.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 1.52 kW idle energy rate and 0.86 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - Low Temperature Single Tank Conveyor	Electric Commercial & Industrial Large C&I New Construction Dishwasher - Low Temperature Single Tank Conveyor

Savings Principle

The high efficiency case is a commercial dishwasher with 0.84 kW idle energy rate and 0.79 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - Low Temperature Single Tank Conveyor	5709.00	0.870					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - Low Temperature Single Tank Conveyor	20

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - Low Temperature Single Tank Conveyor	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - Low Temperature Single Tank Conveyor	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - Low Temperature Single Tank Conveyor	65100						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - Low Temperature Single Tank Conveyor	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - Low Temperature Single Tank Conveyor	$0.23 / kWh	Incentive: $0.15 / kWh

Dishwasher - Low Temperature Under Counter

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Dishwasher

Measure Sub Type: Low Temp, Under Counter

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® low temperature commercial dishwasher in a facility with electric hot water heating. Low temperature dishwashers use the hot water supplied by the kitchen's existing water heater and use a chemical sanitizing agentin the final rinse cycle and sometimes a drying agent.

Baseline Description

The weighted baseline efficiency case is a commercial dishwasher with 0.50 kW idle energy rate and 1.24 gal/rack water consumption.

Measures

Measure Name	Unique Identifier
Dishwasher - Low Temperature Under Counter	Electric Commercial & Industrial Large C&I New Construction Dishwasher - Low Temperature Under Counter

Savings Principle

The high efficiency case is a commercial dishwasher with 0.25 kW idle energy rate and 1.19 gal/rack water consumption or lower following ENERGY STAR efficiency requirements.

Savings Method

Deemed

Unit

Installed Dishwasher

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 5634

Hours Note: Dishwashers are assumed to operate 313 days per year. The average dishwasher is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dishwasher - Low Temperature Under Counter	1650.00	0.250					

Electric kWh Source: DNV (2023). Kitchen Equipment ISP Study.

Electric kW Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Dishwasher - Low Temperature Under Counter	10

Measure Life Source: Savings Calculator for ENERGY STAR® Certified Commercial Kitchen Equipment: Dishwasher Calcs. <http://www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx >

Measure	ISR	RRe Gas	RRe Electric
Dishwasher - Low Temperature Under Counter	1.00	1.00	1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dishwasher - Low Temperature Under Counter	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dishwasher - Low Temperature Under Counter	12700						

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dishwasher - Low Temperature Under Counter	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dishwasher - Low Temperature Under Counter	$0.23 / kWh	Incentive: $0.15 / kWh

Dual enthalpy economizer controls

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Economizer

Program: Large C&I New Construction

Measure Description

The measure is to upgrade the outside-air dry-bulb economizer to a dual enthalpy economizer. The system will continuously monitor the enthalpy of both the outside air and return air. The system will control the system dampers adjust the outside quantity based on the two readings.

Baseline Description

The baseline efficiency case for this measure assumes the relevant HVAC equipment is operating with a fixed dry-bulb economizer.

Measures

Measure Name	Unique Identifier
Dual enthalpy economizer controls	Electric Commercial & Industrial Large C&I New Construction Dual enthalpy economizer controls

Savings Principle

The high efficiency case is the installation of an outside air economizer utilizing two enthalpy sensors, one for outdoor air and one for return air.

Savings Method

Deemed

Unit

Total tons of controlled cooling capacity.

Savings Equation

ΔkWh = (kBtu/h)(1 Ton/12 kBtu / h)(SAVEkWh)

ΔkW = (kBtu/h)(1 Ton/12 kBtu / h)(SAVEkW)

Where:

kBtu/h = Capacity of the cooling equipment in kBtu per hour (1 ton of cooling capacity equals

12kBtu/h).

SAVEkWh = Average annual kWh reduction per ton of cooling capacity: 38.2 289 kWh/ton (1),(2)

SAVEkW = Average kW reduction per ton of cooling capacity: 0.289 0 kW/ton

(1) (2022). New York Standard Approach for Estimating Energy Savings from Energy Efficiency

Programs. Residential, Multi-Family, and Commercial/Industrial Measures. Version 9. New York

TRM calculated unit energy savings from a DOE-2.2 simulation of a series of prototypical small

commercial buildings. Cadeo mapped New York savings to Massachusetts cities using weather

data and comparing HDD, CDD, wet-bulb and dry-bulb temperatures.

(2). Cadeo weighted savings by building type using US Energy Information Administration Commercial Buildings Energy Consumption Survey (CBECS), 2018 microdata.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dual enthalpy economizer controls	Calc	Calc					

Electric kWh Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Electric kW Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Dual enthalpy economizer controls	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Dual enthalpy economizer controls	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Measure	RR sp	RR wp	Loadshape ID
Dual enthalpy economizer controls	1.00	1.00	ls_114_Electric

RRsp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

RRwp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dual enthalpy economizer controls							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dual enthalpy economizer controls	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dual enthalpy economizer controls	$0.14 / kWh	Incentive: $0.09 / kWh

ECM Pump

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** HVAC **Measure Sub Type:** Pump

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency circulator pump with an ECM.

Baseline Description

The baseline system is a pump without an EC motor. The baseline system may have no control, a timer, aquastat, or be on demand. The baseline system is assumed to run a weighted average of these four control types.

Measures

Measure Name	Unique Identifier
ECM Pump - <= 1/8 HP	Electric Commercial & Industrial Large C&I New Construction ECM Pump - <= 1/8 HP
ECM Pump - <=1/20 HP	Electric Commercial & Industrial Large C&I New Construction ECM Pump - <=1/20 HP
ECM Pump - 1/20 to 1/8 HP	Electric Commercial & Industrial Large C&I New Construction ECM Pump - 1/20 to 1/8 HP
ECM Pump 3/4 to 3 HP	Electric Commercial & Industrial Large C&I New Construction ECM Pump 3/4 to 3 HP
ECM Pump 1/8 to 1/6 HP	Electric Commercial & Industrial Large C&I New Construction ECM Pump 1/8 to 1/6 HP
ECM Pump - 1/6 to 3/4 HP	Electric Commercial & Industrial Large C&I New Construction ECM Pump - 1/6 to 3/4 HP

Savings Principle

The high efficiency case is a circulator pump with an ECM.

Savings Method

Deemed

Unit

Per Pump

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
ECM Pump - <= 1/8 HP	221.00	0.034					
ECM Pump - <=1/20 HP	221.00	0.034					
ECM Pump - 1/20 to 1/8 HP	221.00	0.034					
ECM Pump 3/4 to 3 HP	1437.00	0.234					
ECM Pump 1/8 to 1/6 HP	305.00	0.056					
ECM Pump - 1/6 to 3/4 HP	719.00	0.132					

Electric kWh Source: The Cadmus Group. (2017). Circulator Pump Technical Memo.

Electric kW Source: The Cadmus Group. (2017). Circulator Pump Technical Memo.

Energy Impact Factors

Measure	Measure Life
ECM Pump - <= 1/8 HP	15
ECM Pump - <=1/20 HP	
ECM Pump - 1/20 to 1/8 HP	
ECM Pump 3/4 to 3 HP	
ECM Pump 1/8 to 1/6 HP	
ECM Pump - 1/6 to 3/4 HP	

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
ECM Pump	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
ECM Pump - <= 1/8 HP	1.00	1.00	ls_115_Electric
ECM Pump - <=1/20 HP	1.00	1.00	ls_115_Electric
ECM Pump - 1/20 to 1/8 HP	1.00	1.00	ls_115_Electric
ECM Pump 3/4 to 3 HP	1.00	1.00	ls_115_Electric
ECM Pump 1/8 to 1/6 HP	1.00	1.00	ls_115_Electric
ECM Pump - 1/6 to 3/4 HP	1.00	1.00	ls_115_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
ECM Pump - <= 1/8 HP							
ECM Pump - <=1/20 HP							
ECM Pump - 1/20 to 1/8 HP							
ECM Pump 3/4 to 3 HP							
ECM Pump 1/8 to 1/6 HP							
ECM Pump - 1/6 to 3/4 HP							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ECM Pump	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ECM Pump - <= 1/8 HP	$0.47 / kWh	$0.30 / kWh
ECM Pump - <=1/20 HP	$0.47 / kWh	$0.30 / kWh
ECM Pump - 1/20 to 1/8 HP		
ECM Pump 3/4 to 3 HP		
ECM Pump 1/8 to 1/6 HP		
ECM Pump - 1/6 to 3/4 HP		

Electric HW Spray Valve

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Spray Valve **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of an electric hot water spray valve

Baseline Description

The baseline efficiency case is a 1.6 GPM spray valve.

Measures

Measure Name	Unique Identifier
Electric HW Spray Valve	Electric Commercial & Industrial Large C&I New Construction Electric HW Spray Valve

Savings Principle

The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.1 GPM.

Savings Method

Deemed based on algorithm

Unit

Installed pre-rinse spray valve.

Savings Equation

ΔkWh = units * [(GPM_baseline - GPM_ee) *Hrs * 60* (T_PRSV- T_main)*8.33/(3,412 BTU/kWh* Eff_gas)]

$\Delta MMBtu$ = units * [(GPM_baseline - GPM_ee) *Hrs * 60* (T_PRSV- T_main)*8.33/(1,000,000 BTU/MMBtu * Eff_gas)]

Where:

Units = number of measures installed under the program

GPM_baseline = Flow rate of existing PRSV, default 1.6 GPM (1)

GPM_ee = Flow rate of high efficiency installed PRSV, default 1.1 GPM (2)

Eff_gas = Water heater efficiency (natural gas), default 80% Et (3)

Eff_elec = Water heater efficiency (electric), default 98% Et (3)

T_PRSV = Average end-use temperature (°F), default 108°F (4)

T_main = Supply water temperature in water main (°F), default 55.7°F (5)

Hrs = Annual operating hours of PRSV, default 333 hrs (6)

60 = minutes per hour

8.33= Energy required (BTU) to heat one gallon of water by one-degree Fahrenheit

365 = Days in one year

1,000,000 = Conversion factor, on MMBtu equals 1,000,000 BTU

(1) Federal Standard – PRSV manufactured on or after January 1, 2006, and before January 28,2019, shall have a flow rate of not more than 1.6 gallons per minute; https://www.epa.gov/watersense/pre-rinse-spray-valves

(2) Based on program maximum flow rate.

(3) 2022-05 Final Determination Technical Support Document Energy Conservation Program forConsumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Page 7-8. https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf

(4) 2022-05 Final Determination Technical Support Document Energy Conservation Program for

Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse

Spray Valves. Page 7-7 (based on 5 field studies) https://downloads.regulations.gov/EERE-2019-

BT-STD-0034-0020/content.pdf

(5) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Table 7.4.1 Weighted Average Annual Main Water Temperature by Census Division and Building Type (Non-education Buildings in New England.) https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf Based on Burch, J., and C. Christensen. Towards Development of an Algorithm for Mains Water Temperature. 2007. Proceedings of the2007 ASES Annual Conference: Cleveland, OH.

(6) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Table 7.2.3 Weighted Average Annual CPSV Operating Time (Weighted Average Operating Time Across Building Types) https://downloads.regulations.gov/EERE-2019-BT-STD 0034-0020/content.pdf

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Electric HW Spray Valve	1300.00						

Electric kWh Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Electric kW Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Electric HW Spray Valve	5

Measure Life Source: U.S. Dept of Energy (2015). Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. https://www.regulations.gov/document/EERE-2014-BT-STD-0027-0050

Measure	ISR	RRe Gas	RRe Electric
Electric HW Spray Valve	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Electric HW Spray Valve	1.00	1.00	ls_111_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Electric HW Spray Valve							

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Electric HW Spray Valve	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Electric HW Spray Valve	$0.89 / kWh	Incentive: $0.58 / kWh

EMS

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Building **Measure Type:** EMS **Measure Sub Type:** EMS

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
EMS	Electric Commercial & Industrial Large C&I New Construction EMS

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
EMS	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
EMS	10,15

Measure	ISR	RRe Gas	RRe Electric
EMS	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
EMS	0.74	0.98	ls_119_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
EMS	Calc			$0.039			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
EMS	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
EMS	$0.81 / kWh	Incentive: $0.53 / kWh

FEI Rated Fans

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Fan **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The Fan Energy Index (FEI) is a new fan efficiency metric that allows for the comparison of different fans at application specific operating conditions. FEI is incorporated in ASHRAE 90.1-2019 and IECC-2021. It is only applicable to stand-alone fans, andnot for fans embedded in packaged equipment.

Baseline Description

The baseline FEI is 1.0 for constant speed and 0.95 for variable speed fan operation.

Measures

Measure Name	Unique Identifier
FEI Rated Fans, Variable Speed	Electric Commercial & Industrial Large C&I New Construction FEI Rated Fans, Variable Speed
FEI Rated Fans, Constant Speed	Electric Commercial & Industrial Large C&I New Construction FEI Rated Fans, Constant Speed

Savings Principle

The high efficiency case is a FEI rated fans higher than the baseline requirements.

Savings Method

Calculated using deemed inputs

Unit

Per fan

Savings Equation

ΔkW = HP * LF * Conversion/ Avg_Motor Efficiency * ((1- ControlFactor) * (1/FEIBaseline - 1/FEI) + Int_VFD_Factor)

$\Delta kWh = \Delta kW$ * Hours

LF: constant 65%; variable 90%

ControlFactor: constant 0%; variable 33%

Int_VFD_Factor: constant 0%; variable 33%

Using an average hours of 4781 for commercial applications. Average hours is based off of Table 15.1 from Excel CO DSM 2024 Plan.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Calc	Calc					
FEI Rated Fans, Variable Speed							
FEI Rated Fans, Constant Speed							

Energy Impact Factors

Measure	Measure Life
FEI Rated Fans, Variable Speed	15
FEI Rated Fans, Constant Speed	20

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
FEI Rated Fans	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
FEI Rated Fans, Variable Speed	1.00	1.00	ls_110_Electric
FEI Rated Fans, Constant Speed	1.00	1.00	ls_110_Electric
			ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
FEI Rated Fans, Variable Speed							
FEI Rated Fans, Constant Speed							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
FEI Rated Fans	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
FEI Rated Fans, Variable Speed	$0.18 / kWh	$0.11 / kWh
FEI Rated Fans, Constant Speed	$0.12 / kWh	$0.09 / kWh

Food Service

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Food Service | **Measure Type:** FOOD | **Measure Sub Type:** FOOD

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Food Service	Electric Commercial & Industrial Large C&I New Construction Food Service

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Food Service	Calc	Calc	Calc			Calc	

Energy Impact Factors

Measure	Measure Life
Food Service	10,15

Measure	ISR	RRe Gas	RRe Electric
Food Service	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Food Service	0.74	0.98	ls_188_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Food Service	Calc						

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Food Service	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Food Service	$0.60 / kWh	Incentive: $0.39 / kWh

Freezer Glass Door

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Freezer **Measure Sub Type:** Door

Program: Large C&I New Construction

Measure Description

Installation of an Energy Star rated freezer with a glass door.

Baseline Description

The baseline efficiency case is a freezer with standard energy consumption.

Measures

Measure Name	Unique Identifier
Freezer Glass Door - <15 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Glass Door - <15 ft3
Freezer Glass Door - 15 to 29.9 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Glass Door - 15 to 29.9 ft3
Freezer Glass Door - 30 to 49.9 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Glass Door - 30 to 49.9 ft3
Freezer Glass Door - >50 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Glass Door - >50 ft3

Savings Principle

The high efficiency case is an Energy Star rated freezer.

Savings Method

Deemed

Unit

Per freezer

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Freezer Glass Door - <15 ft3	427.00	0.050					
Freezer Glass Door - 15 to 29.9 ft3	681.00	0.080					
Freezer Glass Door - 30 to 49.9 ft3	1062.00	0.120					
Freezer Glass Door - >50 ft3	1466.00	0.170					

Electric kWh Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Electric kW Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
Freezer Glass Door - <15 ft3 Freezer Glass Door - 15 to 29.9 ft3 Freezer Glass Door - 30 to 49.9 ft3 Freezer Glass Door - >50 ft3	12

Measure Life Source: EPA Research (2014), Energy Star Commercial Equipment Calculator, Freezer Calcs, https://www.energystar.gov/sites/default/files/asset/document/commercial_kitchen_equipment_calculator.xlsx. Assume 2/3rd of measure life for recycling - MA Common assumption

Measure	ISR	RRe Gas	RRe Electric
Freezer Glass Door	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Freezer Glass Door - <15 ft3	1.00	1.00	ls_111_Electric
Freezer Glass Door - 15 to 29.9 ft3	1.00	1.00	ls_111_Electric
Freezer Glass Door - 30 to 49.9 ft3	1.00	1.00	ls_111_Electric
Freezer Glass Door - >50 ft3	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Freezer Glass Door - <15 ft3							
Freezer Glass Door - 15 to 29.9 ft3							
Freezer Glass Door - 30 to 49.9 ft3							
Freezer Glass Door - >50 ft3							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Freezer Glass Door	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Freezer Glass Door - <15 ft3	$0.81 / kWh	$0.53 / kWh
Freezer Glass Door - 15 to 29.9 ft3	$0.73 / kWh	$0.48 / kWh
Freezer Glass Door - 30 to 49.9 ft3	$0.29 / kWh	$0.19 / kWh
Freezer Glass Door - >50 ft3	$0.31 / kWh	$0.20 / kWh

Freezer Solid Door

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Freezer **Measure Sub Type:** Door

Program: Large C&I New Construction

Measure Description

Installation of an Energy Star rated freezer with a solid door.

Baseline Description

The baseline efficiency case is a freezer with standard energy consumption.

Measures

Measure Name	Unique Identifier
Freezer Solid Door - <15 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Solid Door - <15 ft3
Freezer Solid Door - 15 to 29.9 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Solid Door - 15 to 29.9 ft3
Freezer Solid Door - 30 to 49.9 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Solid Door - 30 to 49.9 ft3
Freezer Solid Door - >50 ft3	Electric Commercial & Industrial Large C&I New Construction Freezer Solid Door - >50 ft3

Savings Principle

The high efficiency case is an Energy Star rated freezer.

Savings Method

Deemed

Unit

Per freezer

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Freezer Solid Door - <15 ft3	427.00	0.020					
Freezer Solid Door - 15 to 29.9 ft3	681.00	0.060					
Freezer Solid Door - 30 to 49.9 ft3	1062.00	0.060					
Freezer Solid Door - >50 ft3	1486.00	0.070					

Electric kWh Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Electric kW Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
Freezer Solid Door - <15 ft3 Freezer Solid Door - 15 to 29.9 ft3 Freezer Solid Door - 30 to 49.9 ft3 Freezer Solid Door - >50 ft3	12

Measure Life Source: EPA Research (2014), Energy Star Commercial Equipment Calculator, Freezer Calcs, https://www.energystar.gov/sites/default/files/asset/document/commercial_kitchen_equipment_calculator.xlsx. Assume 2/3rd of measure life for recycling - MA Common assumption

Measure	ISR	RRe Gas	RRe Electric
Freezer Solid Door	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Freezer Solid Door - <15 ft3	1.00	1.00	ls_111_Electric
Freezer Solid Door - 15 to 29.9 ft3	1.00	1.00	ls_111_Electric
Freezer Solid Door - 30 to 49.9 ft3	1.00	1.00	ls_111_Electric
Freezer Solid Door - >50 ft3	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Freezer Solid Door - <15 ft3							
Freezer Solid Door - 15 to 29.9 ft3							
Freezer Solid Door - 30 to 49.9 ft3							
Freezer Solid Door - >50 ft3							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Freezer Solid Door	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Freezer Solid Door - <15 ft3	$1.63 / kWh	$1.06 / kWh
Freezer Solid Door - 15 to 29.9 ft3	$1.03 / kWh	$0.67 / kWh
Freezer Solid Door - 30 to 49.9 ft3	$0.57 / kWh	$0.37 / kWh
Freezer Solid Door - >50 ft3	$0.78 / kWh	$0.51 / kWh

Freezer, Ultra Low Temperature

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Refrigeration

Measure Type: Freezers

Measure Sub Type: Ultra Low Temperature

Program: Large C&I New Construction

Measure Description

The installation of an ENERGY STAR qualified ultra-low temperature (-80 °C) freezer.

Baseline Description

The base case is defined as a standard efficiency ULT Freezer (-80 °C) with a standard efficiency dual cascade refrigeration system.

Measures

Measure Name	Unique Identifier
Freezer, Ultra Low Temperature	Electric Commercial & Industrial Large C&I New Construction Freezer, Ultra Low Temperature

Savings Principle

The high efficiency case is ENERGY STAR qualified under the Ultra Low Temperature Freezer Specification.

Savings Method

Deemed

Unit

Per unit

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: NA

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Freezer, Ultra Low Temperature	5142.00	0.540					

Electric kWh Source: DNV (2023). ISP Recommendations: Ultra-Low Temperature Freezers. https://ma-eeac.org/wp-content/uploads/MA23C02-B-ISPREPOS-ULT-Freezers-FINAL-2.pdf

Energy Impact Factors

Measure	Measure Life
Freezer, Ultra Low Temperature	10

Measure Life Source: DNV GL (2018) ERS Portfolio Model Methods and Assumptions - Electric and Natural Gas Memo.

Measure	ISR	RRe Gas	RRe Electric
Freezer, Ultra Low Temperature	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Freezer, Ultra Low Temperature	1.00	1.00	ls_111_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Freezer, Ultra Low Temperature							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Freezer, Ultra Low Temperature	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Freezer, Ultra Low Temperature	$0.62 / kWh	Incentive: $0.40 / kWh

Ground Source Heat Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Heat Pumps | **Measure Sub Type:** Ground Source

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
Ground Source Heat Pump - closed loop to 11.25 tons	Electric Commercial & Industrial Large C&I New Construction Ground Source Heat Pump - closed loop to 11.25 tons
Groundwater Source Heat Pump - Open Loop to 11.25 tons	Electric Commercial & Industrial Large C&I New Construction Groundwater Source Heat Pump - Open Loop to 11.25 tons

Savings Principle

The high efficiency case assumes a high-efficiency air cooled, water source, ground water source, or ground source heat pump system that exceeds the energy efficiency requirements of the International Energy Conservation Code (IECC) 2024.

Savings Method

Calculated using site-specific inputs

Unit

Installed heat pump system for space cooling / heating.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H]

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code

HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific.

Hours_H = Equivalent full load heating hours

CR = Capacity Ratio converts rated coolingcapacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric enefits Analysis Update. Prepared for Dave Weber, NSTAR.

EER_base = EnergyEfficiency Ratio of baseline equipment.

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Calc	Calc					
Ground Source Heat Pump - closed loop to 11.25 tons							
Groundwater Source Heat Pump - Open Loop to 11.25 tons							

Energy Impact Factors

Measure	Measure Life
Ground Source Heat Pump - closed loop to 11.25 tons	25
Groundwater Source Heat Pump - Open Loop to 11.25 tons	

Measure Life Source: DNV GL (20121). Ground Source Heat Pump eTRM Measure Review (MA20C15-B-GSHP). https://ma-eeac.org/wp-content/uploads/MA20C15-B-GSHP_GroundSourceHeatPump_final.pdf

Measure	ISR	RRe Gas	RRe Electric
Ground Source Heat Pump	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Measure	RR sp	RR wp	Loadshape ID
Ground Source Heat Pump - closed loop to 11.25 tons	1.05	1.05	ls_194_Electric
Groundwater Source Heat Pump - Open Loop to 11.25 tons	1.05	1.05	ls_194_Electric

RRsp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

RRwp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Ground Source Heat Pump - closed loop to 11.25 tons							
Groundwater Source Heat Pump - Open Loop to 11.25 tons							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Ground Source Heat Pump	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Ground Source Heat Pump - closed loop to 11.25 tons		
Groundwater Source Heat Pump - Open Loop to 11.25 tons		

Hand Wrapper

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Refrigeration **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

A commercial on-demand hand-wrap machine that replaces a conventional or always-on hand-wrap machine

Baseline Description

The baseline is a Commercial Electric Hand-wrap Machine always on.

Measures

Measure Name	Unique Identifier
Hand Wrapper	Electric Commercial & Industrial Large C&I New Construction Hand Wrapper

Savings Principle

On-demand Hand-wrap Machine with Mechanical or Optical Control System

Savings Method

Deemed

Unit

Installed hand-wrap machine

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Hand Wrapper	1565.00	0.181					

Electric kWh Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Electric kW Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
Hand Wrapper	10

Measure Life Source: University of California, Office of the President, Purchasing Services (2018). Useful Life Index, G8605: Cutters, Slicers, Saws, Choppers, Graters, Grinders, Universal Mach, Food Prep. https://www.caetrm.com/media/reference-documents/UC_EUL_for_Hand_Wrap_Food_Prep_2018.pdf

Measure	ISR	RRe Gas	RRe Electric
Hand Wrapper	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because savings are based on researched assumptions.

Measure	RR sp	RR wp	Loadshape ID
Hand Wrapper	1.00	1.00	ls_111_Electric

RRsp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

RRwp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Hand Wrapper							

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hand Wrapper	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hand Wrapper	$0.11 / kWh	Incentive: $0.07 / kWh

Heating Hot Water Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Heating Hot Water Pump	Electric Commercial & Industrial Large C&I New Construction Heating Hot Water Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Heating Hot Water Pump	Calc	Calc					

Gas Heat MMBtu Source: 0.00

Energy Impact Factors

Measure	Measure Life
Heating Hot Water Pump	15

Measure Life Source: DEER 2020 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Heating Hot Water Pump	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Heating Hot Water Pump	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Heating Hot Water Pump				$0.003			

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating Hot Water Pump	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating Hot Water Pump	$0.48 / kWh	Incentive: $0.31 / kWh

High Efficiency Condensing Units

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Refrigeration **Measure Type:** Condensing Unit **Measure Sub Type:** Refrigeration

Program: Large C&I New Construction

Measure Description

The installation of a High Efficiency Condensing Unit (HECU) with a floating heat pressure control and scroll compressor. Savings are broken out per component of the HECU.

Baseline Description

The baseline efficiency case for the HECU measure is a condensing unit with a standard compressor efficiency rating, no floating head pressure controls, and single speed compressor fan motors.

Measures

Measure Name	Unique Identifier
High Efficiency Condensing Units - Floating Head Pressure Control	Electric Commercial & Industrial Large C&I New Construction High Efficiency Condensing Units - Floating Head Pressure Control
High Efficiency Condensing Units - Scroll Compressor	Electric Commercial & Industrial Large C&I New Construction High Efficiency Condensing Units - Scroll Compressor

Savings Principle

The high efficiency case for the HECU measure must have scroll compressor technology, incorporate floating head pressure controls, and have the ability to modulate compressor fan speed.

Savings Method

Deemed

Unit

Per HECU

Savings Equation

Refer to Appendix A Table 14

Hours: N/A

Hours Note: Refer to Appendix A Table 14

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Deemed	Deemed					
High Efficiency Condensing Units - Floating Head Pressure Control							
High Efficiency Condensing Units - Scroll Compressor							

Electric kWh Note: Refer to Appendix A Table 14

Electric kW Note: Refer to Appendix A Table 14

Energy Impact Factors

Measure	Measure Life
High Efficiency Condensing Units - Floating Head Pressure Control High Efficiency Condensing Units - Scroll Compressor	13

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
High Efficiency Condensing Units	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
High Efficiency Condensing Units - Floating Head Pressure Control	1.00	1.00	ls_116_Electric
High Efficiency Condensing Units - Scroll Compressor	1.00	1.00	ls_116_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
High Efficiency Condensing Units - Floating Head Pressure Control High Efficiency Condensing Units - Scroll Compressor							

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
High Efficiency Condensing Units	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
High Efficiency Condensing Units - Floating Head Pressure Control High Efficiency Condensing Units - Scroll Compressor	$0.45 / kWh $0.45 / kWh	$0.29 / kWh $0.29 / kWh

High Efficiency Evaporating Units

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Evaporator | **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency evaporator unit for walk-in cold storage applications.

Baseline Description

The baseline is an evaporator with ECM fan motors, no evaporator fan motor or smart defrost controls, and a thermostatic expansion valve.

Measures

Measure Name	Unique Identifier
High Efficiency Evaporating Units	Electric Commercial & Industrial Large C&I New Construction High Efficiency Evaporating Units

Savings Principle

The high efficiency case is a high efficiency evaporator with fan motor controls, evaporator coil smart defrost controls, and an electronic expansion valve.

Savings Method

Deemed based on algorithm

Unit

Per fan evaporator

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
High Efficiency Evaporating Units	Calc	Calc					

Electric kWh Note: Refer to Appendix A Table 20.

Electric kW Note: Refer to Appendix A Table 20.

Energy Impact Factors

Measure	Measure Life
High Efficiency Evaporating Units	15

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure Life Note: Refer to VT TRM measure High Efficiency Evaporators

Measure	ISR	RRe Gas	RRe Electric
High Efficiency Evaporating Units	1.00		

Measure	RR sp	RR wp	Loadshape ID
High Efficiency Evaporating Units	1.00	1.00	ls_115_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
High Efficiency Evaporating Units							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
High Efficiency Evaporating Units	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
High Efficiency Evaporating Units	$2.69 / kWh	Incentive: $0.63 / kWh

High Performance Contact Conveyor Toaster

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Toaster

Measure Sub Type: High Performance

Program: Large C&I New Construction

Measure Description

The Installation of a high performance contact conveyor toaster.

Baseline Description

The baseline is >3.75 W/bun from the 2022 CA eTRM.

Measures

Measure Name	Unique Identifier
High Performance Contact Conveyor Toaster	Electric Commercial & Industrial Large C&I New Construction High Performance Contact Conveyor Toaster

Savings Principle

The efficient equipment must be <= 3.75 W/bun.

Savings Method

Deemed

Unit

Installed high performance contact conveyor toaster.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
High Performance Contact Conveyor Toaster	2340.00	0.361					

Electric kWh Source: CA eTRM

Electric kW Source: CA eTRM

Energy Impact Factors

Measure	Measure Life
High Performance Contact Conveyor Toaster	12

Measure Life Source: CEEL (2016). Ultra-Low Temperature Freezers: Opening the Door to Energy Savings in Laboratories.

Measure	ISR	RRe Gas	RRe Electric
High Performance Contact Conveyor Toaster	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because savings are based on researched assumptions.

Measure	RR sp	RR wp	Loadshape ID
High Performance Contact Conveyor Toaster	1.00	1.00	ls_270_Electric

RRsp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

RRwp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
High Performance Contact Conveyor Toaster				$0.012			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
High Performance Contact Conveyor Toaster	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
High Performance Contact Conveyor Toaster	$1.08 / kWh	Incentive: $0.70 / kWh

High Volume Low Speed (HVLS) Fan

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Fan **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of a high volume low speed (HVLS) fan that move more cubic feet of air per watt than conventional circulating fans.

Baseline Description

The baseline is a conventional circulating fan.

Measures

Measure Name	Unique Identifier
High Volume Low Speed (HVLS) Fan	Electric Commercial & Industrial Large C&I New Construction High Volume Low Speed (HVLS) Fan

Savings Principle

The high efficiency case is a high volume low speed (HVLS) fan.

Savings Method

Calculated using deemed inputs

Unit

Per fan

Savings Equation

ΔkW = Wconventional - WHVLS/1,000

$\Delta kWh = \Delta kW$ * HOU

where:

Wconventional = Wattage of conventional fan

WHVLS = Wattage of high volume low speed fan

HOU = hours of use; assumed 1,755 based on average from PA 2021 TRM.

Refer to Table 19 in Appendix A forthe default values for Wconventional and WHVLS.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
High Volume Low Speed (HVLS) Fan	Calc						

Energy Impact Factors

Measure	Measure Life
High Volume Low Speed (HVLS) Fan	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
High Volume Low Speed (HVLS) Fan	1.00		

Measure	RR sp	RR wp	Loadshape ID
High Volume Low Speed (HVLS) Fan	1.00	1.00	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
High Volume Low Speed (HVLS) Fan							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
High Volume Low Speed (HVLS) Fan	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
High Volume Low Speed (HVLS) Fan	$1.51 / kWh	Incentive: $0.23 / kWh

Hot Food Holding Bin

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Cooking Equipment

Measure Sub Type: Hot Food Holding Bin

Program: Large C&I New Construction

Measure Description

A commercial hot food holding bin with energy consumption of less than or equal to 40 watts per slot.

Baseline Description

The baseline is a hot food holding bin with energy consumption of greater than 40 watts per slot.

Measures

Measure Name	Unique Identifier
Hot Food Holding Bin	Electric Commercial & Industrial Large C&I New Construction Hot Food Holding Bin

Savings Principle

The high efficiency case is a hot food holding bin with energy consumption equal to or less than 40 watts per slot.

Savings Method

Deemed

Unit

Per slot

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Hot Food Holding Bin	163.00	0.025					

Electric kWh Source: Southern California Gas Company (SCG). 2023. "Holding_Bin_Data_Summary_Final_Analysis__02062023.xlsx."

Electric kW Source: Southern California Gas Company (SCG). 2023. "Holding_Bin_Data_Summary_Final_Analysis__02062023.xlsx."

Energy Impact Factors

Measure	Measure Life
Hot Food Holding Bin	12

Measure Life Source: Energy Star (2021). Energy Star Calculator - Blended Baseline, Increased MQE

Measure	ISR	RRe Gas	RRe Electric
Hot Food Holding Bin	1.00		

Measure	RR sp	RR wp	Loadshape ID
Hot Food Holding Bin	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Hot Food Holding Bin							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hot Food Holding Bin	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hot Food Holding Bin	$0.93 / kWh	Incentive: $0.31 / kWh

Hot Food Holding Cabinet

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Hot Food Cabinet **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of a commercial hot food holding cabinet.

Baseline Description

The baseline efficiency for a HRHC are the following: Full size is less than or equal to 0.65 kW idle rate, 3/4 size is less than or equal to 0.51 kW idle rate, and 1/2 size is less than or equal to 0.31 kW idle rate.

Measures

Measure Name	Unique Identifier
Hot Food Holding Cabinet - 3/4 Hot Food Holding Cabinet - Full Hot Food Holding Cabinet - 1/2	Electric Commercial & Industrial Large C&I New Construction Hot Food Holding Cabinet - 3/4 Electric Commercial & Industrial Large C&I New Construction Hot Food Holding Cabinet - Full Electric Commercial & Industrial Large C&I New Construction Hot Food Holding Cabinet - 1/2

Savings Principle

A HFHC that incorporates better insulation, reducing heat loss, and may also offer additional energy saving devices such as magnetic door gaskets, auto-door closures, or dutch doors. 1/2 size idle energy rate is 172 W. 3/4 size idle energy rate is 258 W.

Savings Method

Deemed

Unit

Per hot food cabinet

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: 4695

Hours Note: Hot food holding cabinets assumed to operate 313 days per year617 for 15 hours a day, or 4,695 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		0.150					
Hot Food Holding Cabinet - 3/4	498.00	0.150					
Hot Food Holding Cabinet - Full	498.00	0.150					
Hot Food Holding Cabinet - 1/2	498.00	0.150					

Electric kWh Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Electric kW Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
Hot Food Holding Cabinet - 3/4 Hot Food Holding Cabinet - Full Hot Food Holding Cabinet - 1/2	12

Measure Life Source: Energy Star (2021). Energy Star Calculator - Blended Baseline, Increased MQE

Measure	ISR	RRe Gas	RRe Electric
Hot Food Holding Cabinet	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Hot Food Holding Cabinet - 3/4	1.00	1.00	ls_111_Electric
Hot Food Holding Cabinet - Full	1.00	1.00	ls_111_Electric
Hot Food Holding Cabinet - 1/2	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Hot Food Holding Cabinet - 3/4 Hot Food Holding Cabinet - Full Hot Food Holding Cabinet - 1/2				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hot Food Holding Cabinet	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hot Food Holding Cabinet - 3/4	$1.13 / kWh	$0.73 / kWh
Hot Food Holding Cabinet - Full	$0.53 / kWh	$0.35 / kWh
Hot Food Holding Cabinet - 1/2	$0.91 / kWh	$0.59 / kWh

HVAC Fan

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** HVAC **Measure Sub Type:** Fan

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
HVAC Fan - Return	Electric Commercial & Industrial Large C&I New Construction HVAC Fan - Return
HVAC Fan - Supply	Electric Commercial & Industrial Large C&I New Construction HVAC Fan - Supply

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Calc	Calc					
HVAC Fan - Return							
HVAC Fan - Supply							

Energy Impact Factors

Measure	Measure Life
HVAC Fan - Return	15
HVAC Fan - Supply	

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
HVAC Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
HVAC Fan - Return	1.00	1.00	ls_110_Electric
HVAC Fan - Supply	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
HVAC Fan - Return				$0.003			
HVAC Fan - Supply				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC Fan - Return	$0.48 / kWh	$0.31 / kWh
HVAC Fan - Supply	$0.48 / kWh	$0.31 / kWh

Ice Machine

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Food Service | **Measure Type:** Ice Machine | **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

Installation of a qualified ENERGY STAR® commercial ice machine.

Baseline Description

The baseline efficiency case is a non-ENERGY STAR® commercial ice machine.

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I New Construction Ice Machine - Ice Making Head
Ice Machine - Ice Making Head	Electric Commercial & Industrial Large C&I New Construction Ice Machine - Cont. Remote
Ice Machine - Cont. Remote	Electric Commercial & Industrial Large C&I New Construction Ice Machine - Ice Self Contained
Ice Machine - Ice Self Contained	Electric Commercial & Industrial Large C&I New Construction Ice Machine - Remote/Split
Ice Machine - Remote/Split	

Savings Principle

The high efficiency case is a commercial ice machine meeting the ENERGY STAR® Specifications V3.0 Efficiency Requirements.

Savings Method

Deemed

Unit

Per ice machine

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 5634

Hours Note: Ice making machines are assumed to operate 365 days per year. The average ice making machine is assumed to operate 18 hours per day, or 5,634 hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Ice Machine - Ice Making Head	1574.00	0.300					
Ice Machine - Cont. Remote	3235.00	0.300					
Ice Machine - Ice Self Contained	680.00	0.300					
Ice Machine - Remote/Split	1322.00	0.300					

Electric kWh Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Electric kW Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
Ice Machine - Ice Making Head Ice Machine - Cont. Remote Ice Machine - Ice Self Contained Ice Machine - Remote/Split	9

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Ice Machine	1.00		1.00

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Ice Machine - Ice Making Head	1.00	1.00	ls_111_Electric
Ice Machine - Cont. Remote	1.00	1.00	ls_111_Electric
Ice Machine - Ice Self Contained	1.00	1.00	ls_111_Electric
Ice Machine - Remote/Split	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Ice Machine - Ice Making Head	3322						
Ice Machine - Cont. Remote							
Ice Machine - Ice Self Contained	3526						
Ice Machine - Remote/Split							

Water Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Ice Machine	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Ice Machine - Ice Making Head	$0.38 / kWh	$0.25 / kWh
Ice Machine - Cont. Remote	$0.13 / kWh	$0.09 / kWh
Ice Machine - Ice Self Contained	$0.43 / kWh	$0.28 / kWh
Ice Machine - Remote/Split	$0.10 / kWh	$0.06 / kWh

Induction Cooktop

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Infrared Chargrill

Program: Large C&I New Construction

Measure Description

Installation of an induction cooktop.

Baseline Description

The baseline efficiency case is traditional electric resistance cooktop.

Measures

Measure Name	Unique Identifier
Induction Cooktop	Electric Commercial & Industrial Large C&I New Construction Induction Cooktop

Savings Principle

The high efficiency case is a cooktop with an induction heating element.

Savings Method

Deemed

Unit

Installed induction cooktop

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Induction Cooktop	2488.00	0.570					

Electric kWh Source: Food Service Technology Center (2013). Vollrath HIDC/HIMC Induction Range Comparison Appliance Test Report.

Electric kW Source: Food Service Technology Center (2013). Vollrath HIDC/HIMC Induction Range Comparison Appliance Test Report.

Energy Impact Factors

Measure	Measure Life
Induction Cooktop	12

Measure Life Source: DEER 2020 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Induction Cooktop	1.00		

Measure	RR sp	RR wp	Loadshape ID
Induction Cooktop	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Induction Cooktop							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Induction Cooktop	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Induction Cooktop	$0.44 / kWh	Incentive: $0.30 / kWh

Lab Freezers

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Refrigeration **Measure Type:** Freezers **Measure Sub Type:** Lab-Grade

Program: Large C&I New Construction

Measure Description

Installation of laboratory grade high performance freezers.

Baseline Description

The baseline is 40% more energy use than ENERGY STAR unit provided in the Cold Storage Forecast Assumptions Word Document.

Measures

Measure Name	Unique Identifier
Lab Freezer, >22	Electric Commercial & Industrial Large C&I New Construction Lab Freezer, >22
Lab Freezer, 6<V<22	Electric Commercial & Industrial Large C&I New Construction Lab Freezer, 6<V<22

Savings Principle

The high efficiency is

Savings Method

Deemed

Unit

Installed lab freezer.

Savings Equation

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Lab Freezer, >22	1984.00	0.230					
Lab Freezer, 6<V<22	1748.00	0.200					

Electric kWh Source: 2021. Covid Lab Equipment 2021 MA-RI Forecast by Percentage of Sales.

Electric kW Source: 2021. Covid Lab Equipment 2021 MA-RI Forecast by Percentage of Sales.

Energy Impact Factors

Measure	Measure Life
Lab Freezer, >22	10
Lab Freezer, 6<V<22	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Lab Freezers	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Lab Freezer, >22	1.00	1.00	ls_111_Electric
Lab Freezer, 6<V<22	1.00	1.00	ls_111_Electric
	1.00	1.00	

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lab Freezer, >22							
Lab Freezer, 6<V<22							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lab Freezers	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lab Freezer, >22	$1.36 / kWh	$0.00 / kWh
Lab Freezer, 6<V<22	$3.33 / kWh	$0.00 / kWh

Lab Refrigerators

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Refrigeration **Measure Type:** Refrigerators **Measure Sub Type:** Lab-Grade

Program: Large C&I New Construction

Measure Description

Installation of laboratory grade high performance refrigerators.

Baseline Description

The baseline is 40% more energy use than ENERGY STAR unit provided in the Cold Storage Forecast Assumptions Word Document.

Measures

Measure Name	Unique Identifier
Lab Refrigerator, >44 Lab Refrigerator, 25<V<44 Lab Refrigerator, 6<V<25	Electric Commercial & Industrial Large C&I New Construction Lab Refrigerator, >44 Electric Commercial & Industrial Large C&I New Construction Lab Refrigerator, 25<V<44 Electric Commercial & Industrial Large C&I New Construction Lab Refrigerator, 6<V<25

Savings Principle

The high efficiency is

Savings Method

Deemed

Unit

Installed lab refrigerator.

Savings Equation

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Lab Refrigerator, >44	1163.00	0.130					
Lab Refrigerator, 25<V<44	851.00	0.100					
Lab Refrigerator, 6<V<25	721.00	0.080					

Electric kWh Source: 2021. Covid Lab Equipment 2021 MA-RI Forecast by Percentage of Sales.

Electric kW Source: 2021. Covid Lab Equipment 2021 MA-RI Forecast by Percentage of Sales.

Energy Impact Factors

Measure	Measure Life
Lab Refrigerator, >44 Lab Refrigerator, 25<V<44 Lab Refrigerator, 6<V<25	10

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Lab Refrigerators	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Lab Refrigerator, >44	1.00	1.00	ls_111_Electric
Lab Refrigerator, 25<V<44	1.00	1.00	ls_111_Electric
Lab Refrigerator, 6<V<25	1.00	1.00	ls_111_Electric
	1.00	1.00	

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lab Refrigerator, >44							
Lab Refrigerator, 25<V<44							
Lab Refrigerator, 6<V<25							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lab Refrigerators	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lab Refrigerator, >44	$0.97 / kWh	$0.00 / kWh
Lab Refrigerator, 25<V<44	$1.64 / kWh	$0.00 / kWh
Lab Refrigerator, 6<V<25	$3.50 / kWh	$0.00 / kWh

LEDS

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Lighting **Measure Type:** LEDS **Measure Sub Type:** LEDS

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
LEDS	Electric Commercial & Industrial Large C&I New Construction LEDS

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
LEDS	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
LEDS	multi

Measure	ISR	RRe Gas	RRe Electric
LEDS	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
LEDS	0.94	0.75	ls_120_Electric

RRsp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

RRwp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
LEDS	Calc			$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
LEDS	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
LEDS	$0.53 / kWh	Incentive: $0.33 / kWh

Lighting Controls

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Lighting | **Measure Type:** Controls | **Measure Sub Type:** Controls

Program: Large C&I New Construction

Measure Description

This measure promotes the installation of lighting controls in lost-opportunity applications. Promoted technologies include occupancy sensors, daylight dimming controls, and integrated controls.

Baseline Description

The baseline efficiency case assumes code-compliant controls.

Measures

Measure Name	Unique Identifier
Lighting Controls - Dimming Lighting Controls - Integrated Lighting Controls - Sensor Lighting Controls - Exterior Lighting Controls - Street Light Exterior	Electric Commercial & Industrial Large C&I New Construction Lighting Controls - Dimming Electric Commercial & Industrial Large C&I New Construction Lighting Controls - Integrated Electric Commercial & Industrial Large C&I New Construction Lighting Controls - Sensor Electric Commercial & Industrial Large C&I New Construction Lighting Controls - Exterior Electric Commercial & Industrial Large C&I New Construction Lighting Controls - Street Light Exterior

Savings Principle

The high efficiency case involves lighting fixtures connected to controls that reduce the baseline hours of operation.

Savings Method

Calc

Unit

Installed lighting controls project.

Savings Equation

Gross kWh = ControlledkW * hours_base * (%Save)

Gross kW = ControlledkW

where:

%Save = Percentage of kWh that is saved by utilized the control maeasure

Savings factors are deemed based on study results. Refer to Table XX in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
					0.00		
Lighting Controls - Dimming	Calc	Calc					
Lighting Controls - Integrated	Calc	Calc					
Lighting Controls - Sensor	Calc	Calc					
Lighting Controls - Exterior	Calc	Calc					
Lighting Controls - Street Light Exterior	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Lighting Controls - Dimming	See Table 13 in Appendix A
Lighting Controls - Integrated	9
Lighting Controls - Sensor	11
Lighting Controls - Exterior	9
Lighting Controls - Street Light Exterior	9
	9

Measure Life Source: Dan Mellinger (2022). Lighting Control Measure Life Memo.

Measure	ISR	RRe Gas	RRe Electric
Lighting Controls	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Lighting Controls - Dimming	1.00	1.00	ls_106_Electric
Lighting Controls - Integrated	1.00	1.00	ls_106_Electric
Lighting Controls - Sensor	1.00	1.00	ls_106_Electric
Lighting Controls - Exterior	1.00	1.00	ls_106_Electric
Lighting Controls - Street Light Exterior	1.00	1.00	ls_106_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lighting Controls - Dimming				$0.073			
Lighting Controls - Integrated				$0.073			
Lighting Controls - Sensor				$0.073			
Lighting Controls - Exterior				$0.073			
Lighting Controls - Street Light Exterior				$0.073			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lighting Controls	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lighting Controls - Dimming	$0.34 / kWh	$0.23 / kWh
Lighting Controls - Integrated	$0.34 / kWh	$0.23 / kWh
Lighting Controls - Sensor	$0.34 / kWh	$0.23 / kWh
Lighting Controls - Exterior	$0.34 / kWh	$0.23 / kWh
Lighting Controls - Street Light Exterior	$0.34 / kWh	$0.22 / kWh

Lighting Controls, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** Custom | **Measure Sub Type:** Lighting

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Lighting Controls, Custom	Electric Commercial & Industrial Large C&I New Construction Lighting Controls, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours

Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)

Where:

QTY_base_i = Quantity of baseline fixtures in location i

Watts_base_i = Connected wattage of baseline fixtures in location i

QTY_ee_j = Quantity of efficient fixtures in location j

Watts_ee_j = Connected wattage of efficient fixtures in location j

1,000 Watts per kW = Conversion factor

Hours = Lighting annual hours of operation: site-specific.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N128

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Lighting Controls, Custom	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Lighting Controls, Custom	multi

Measure Life Note: Consistent with MA TRM

Measure	ISR	RRe Gas	RRe Electric
Lighting Controls, Custom	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Lighting Controls, Custom	0.94	0.75	ls_120_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lighting Controls, Custom				$0.091			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lighting Controls, Custom	0.28	0.02	0.02	0.76

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lighting Controls, Custom	$0.53 / kWh	Incentive: $0.36 / kWh

Lighting Systems, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** Interior | **Measure Sub Type:** Efficient Lighting

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Lighting Systems, Custom	Electric Commercial & Industrial Large C&I New Construction Lighting Systems, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Lighting Systems, Custom	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Lighting Systems, Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Lighting Systems, Custom	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Lighting Systems, Custom	0.94	0.75	ls_120_Electric

RRsp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

RRwp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lighting Systems, Custom	Calc			$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lighting Systems, Custom	0.28	0.02	0.02	0.76

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lighting Systems, Custom	$0.53 / kWh	Incentive: $0.33 / kWh

LoadComp

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: High Efficiency Air Compressors

Measure Sub Type:

Program: Large C&I New Construction

Measure Description

The installation of oil flooded, rotary screw compressors with Load/No Load capacity control scheme to improve compression efficiencies at partial loads, including a properly sized air receiver.

Baseline Description

The baseline efficiency case is a typical modulating compressor with blow down valve.

Measures

Measure Name	Unique Identifier
LOADCOMP-25HP	Electric Commercial & Industrial Large C&I New Construction LOADCOMP-25HP
LOADCOMP-75HP	Electric Commercial & Industrial Large C&I New Construction LOADCOMP-75HP

Savings Principle

The high efficiency case is an oil-flooded, rotary screw compressor with Load/No Load capacity control with a properly sized air receiver.

Savings Method

Calculated using site-specific inputs

Unit

Total horsepower (hp) of installed air compressor capacity.

Savings Equation

Gross kWh = HP_compressor × deltakW/HP × Hours

Gross kW = HP_compressor × deltakW/HP

Where:

HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific

Hours = Annual operating hours of the air compressor: site-specific

deltakW/HP = Air compressor kW reduction per HP

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Calc						
LOADCOMP-25HP		Calc					
LOADCOMP-75HP		Calc					

Electric kWh Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Electric kW Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Energy Impact Factors

Measure	Measure Life
LOADCOMP-25HP LOADCOMP-75HP	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
LoadComp	1.00		1.44

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
LOADCOMP-25HP	1.00	1.00	ls_112_Electric
LOADCOMP-75HP	1.00	1.00	ls_112_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
LOADCOMP-25HP				$0.043			
LOADCOMP-75HP				$0.043			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
LoadComp	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
LOADCOMP-25HP	$0.43 / kWh	$0.28 / kWh
LOADCOMP-75HP	$0.43 / kWh	$0.28 / kWh

Low pressure drop filter

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Low Pressure Drop Filters

Measure Sub Type: Low Pressure Drop Filter

Program: Large C&I New Construction

Measure Description

Filters remove solids and aerosols from compressed air systems. Low pressure drop filters have longer lives and lower pressure drops than traditional coalescing filters resulting in higher efficiencies.

Baseline Description

The baseline efficiency case is a standard coalescing filter with initial drop of between 1 and 2 pounds per sq inch (psi) with an end of life drop of 10 psi.

Measures

Measure Name	Unique Identifier
Low pressure drop filter	Electric Commercial & Industrial Large C&I New Construction Low pressure drop filter

Savings Principle

The high efficiency case is a low pressure drop filter with initial drop not exceeding 1 psi when new and 3 psi at element change. Filters must be deep-bed, “mist eliminator” style and installed on a single operating compressor rated 15 – 75 HP.

Savings Method

Calculated using site-specific inputs

Unit

Installed filter.

Savings Equation

GrosskWh = [(HPcomp) x (0.7457) / eff] x [((Existing P) - (Adjusted P)) / (2x100)] x (Hours)

GrosskW = [(HPcomp) x (0.7457) / eff] x [((Existing P) - (Adjusted P)) / (2x100)]

Where:

HPCOMP = Average compressor load. Site specific.

0.7457 = Conversionfrom HP to kW.

eff = Full Load NEMA Premium Motor Efficiency, see table 15 in Appendix A

2 x 100 = % Savings calculated with the assumption that for every 2 psi increase in discharge pressure, energy consumption will increase by approximately 1%

Hours = Annual operating hours of the lower pressure drop filter. Site specific.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Low pressure drop filter	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Low pressure drop filter	5

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure Life Note: Assumes 1/3 of the savings of compressed air

Measure	ISR	RRe Gas	RRe Electric
Low pressure drop filter	1.00		1.44

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
Low pressure drop filter	1.00	1.00	ls_112_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Low pressure drop filter				$0.043			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low pressure drop filter	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low pressure drop filter	$0.43 / kWh	Incentive: $0.28 / kWh

Make Up Air Fan

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Make Up Air Fan	Electric Commercial & Industrial Large C&I New Construction Make Up Air Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Make Up Air Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Make Up Air Fan	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Make Up Air Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Make Up Air Fan	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Make Up Air Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Make Up Air Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Make Up Air Fan	$0.48 / kWh	Incentive: $0.31 / kWh

MFHR

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Adaptive Reuse

Program: Large C&I New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I New Construction MFHR - Cooling
MFHR - Cooling	Electric Commercial & Industrial Large C&I New Construction
MFHR - DHW	MFHR - DHW
MFHR - Heating	Electric Commercial & Industrial Large C&I New Construction
MFHR - Lighting	MFHR - Heating
	Electric Commercial & Industrial Large C&I New Construction MFHR - Lighting

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Completed ESH heating, cooling, DHW, or lighting project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
			Calc	Calc	Calc	Calc	Calc
MFHR - Cooling	Calc	Calc					
MFHR - DHW	Calc	Calc					
MFHR - Heating	Calc	Calc					
MFHR - Lighting	Calc						

Energy Impact Factors

Measure	Measure Life
MFHR - Cooling	multi
MFHR - DHW	25
MFHR - Heating	15
MFHR - Lighting	25
	11

Measure	ISR	RRe Gas	RRe Electric
MFHR	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed 100% because energy savings are custom calculated.

Measure	RR sp	RR wp	Loadshape ID
MFHR - Cooling	1.00	1.00	ls_251_Electric
MFHR - DHW	1.00	1.00	ls_252_Electric
MFHR - Heating	1.00	1.00	ls_253_Electric
MFHR - Lighting	1.00	1.00	ls_254_Electric

RRsp Note: Realization rate is assumed 100% because energy savings are custom calculated.

RRwp Note: Realization rate is assumed 100% because energy savings are custom calculated.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
MFHR - Cooling							
MFHR - DHW							
MFHR - Heating							
MFHR - Lighting							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
MFHR	0.28	0.02	0.02	0.76

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MFHR - Cooling	$0.60 / kWh	$0.39 / kWh
MFHR - DHW	$0.60 / kWh	$0.39 / kWh
MFHR - Heating	$0.60 / kWh	$0.39 / kWh
MFHR - Lighting	$0.60 / kWh	$0.39 / kWh

Motor

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Motors/Drives | **Measure Type:** MOTOR | **Measure Sub Type:** MOTOR

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Motor	Electric Commercial & Industrial Large C&I New Construction Motor

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Motor	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Motor	multi

Measure	ISR	RRe Gas	RRe Electric
Motor	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Motor	0.74	0.98	ls_147_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Motor	Calc			$0.019			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Motor	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Motor	$0.34 / kWh	Incentive: $0.22 / kWh

ODP Motor

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Motor **Measure Sub Type:** ODP

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
ODP-1200F ODP-1200N ODP-1200S ODP-1800F ODP-1800N ODP-1800S ODP-3600F ODP-3600N ODP-3600S	Electric Commercial & Industrial Large C&I New Construction ODP-1200F Electric Commercial & Industrial Large C&I New Construction ODP-1200N Electric Commercial & Industrial Large C&I New Construction ODP-1200S Electric Commercial & Industrial Large C&I New Construction ODP-1800F Electric Commercial & Industrial Large C&I New Construction ODP-1800N Electric Commercial & Industrial Large C&I New Construction ODP-1800S Electric Commercial & Industrial Large C&I New Construction ODP-3600F Electric Commercial & Industrial Large C&I New Construction ODP-3600N Electric Commercial & Industrial Large C&I New Construction ODP-3600S

Savings Principle

Savings Method

Unit

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
ODP-1200F	Calc	Calc					
ODP-1200N	Calc	Calc					
ODP-1200S	Calc	Calc					
ODP-1800F	Calc	Calc					
ODP-1800N	Calc	Calc					
ODP-1800S	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
ODP-1200F	15
ODP-1200N	
ODP-1200S	
ODP-1800F	
ODP-1800N	
ODP-1800S	
ODP-3600F	
ODP-3600N	
ODP-3600S	

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
ODP Motor	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
ODP-1200F	1.00	1.00	ls_110_Electric
ODP-1200N	1.00	1.00	ls_110_Electric
ODP-1200S	1.00	1.00	ls_110_Electric
ODP-1800F	1.00	1.00	ls_110_Electric
ODP-1800N	1.00	1.00	ls_110_Electric
ODP-1800S	1.00	1.00	ls_110_Electric
ODP-3600F	1.00	1.00	ls_110_Electric
ODP-3600N	1.00	1.00	ls_110_Electric
ODP-3600S	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
ODP-1200F				$0.003			
ODP-1200N				$0.003			
ODP-1200S				$0.003			
ODP-1800F				$0.003			
ODP-1800N				$0.003			
ODP-1800S				$0.003			
ODP-3600F				$0.003			
ODP-3600N				$0.003			
ODP-3600S				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ODP Motor	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ODP-1200F	$0.45 / kWh	$0.29 / kWh
ODP-1200N	$0.45 / kWh	$0.29 / kWh
ODP-1200S	$0.45 / kWh	$0.29 / kWh
ODP-1800F	$0.45 / kWh	$0.29 / kWh
ODP-1800N	$0.45 / kWh	$0.29 / kWh
ODP-1800S	$0.45 / kWh	$0.29 / kWh
ODP-3600F	$0.45 / kWh	$0.29 / kWh
ODP-3600N	$0.45 / kWh	$0.29 / kWh
ODP-3600S	$0.45 / kWh	$0.29 / kWh

Other

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Other | **Measure Type:** OTHER | **Measure Sub Type:** Other

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Other	Electric Commercial & Industrial Large C&I New Construction Other

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Other	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Other	multi

Measure	ISR	RRe Gas	RRe Electric
Other	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Other	0.74	0.98	ls_123_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Other	Calc						

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Other	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Other	$0.60 / kWh	Incentive: $0.39 / kWh

Packaged Terminal Air Conditioner

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** PTAC | **Measure Sub Type:** PTAC

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
Packaged Terminal Air Conditioner	Electric Commercial & Industrial Large C&I New Construction Packaged Terminal Air Conditioner

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed unitary AC system for space cooling.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

EER_base = Energy Efficiency Ratio of baseline equipment: code. Since IECC 2012 does not provide EER requirements for equipment < 5.4 tons, assume the following conversion: EER ≈ SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Packaged Terminal Air Conditioner	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Packaged Terminal Air Conditioner	15

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Packaged Terminal Air Conditioner	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Measure	RR sp	RR wp	Loadshape ID
Packaged Terminal Air Conditioner	1.00	1.00	ls_104_Electric

RRsp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

RRwp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Packaged Terminal Air Conditioner							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Packaged Terminal Air Conditioner	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Packaged Terminal Air Conditioner	$0.33 / kWh	Incentive: $0.25 / kWh

Packaged Terminal Heat Pumps (PTHP)

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Heat Pumps

Measure Sub Type: Heat Pump, Packaged Terminal

Program: Large C&I New Construction

Measure Description

Installation of a high efficiency PTHP from a code level PTHP.

Baseline Description

The baseline is a code level PTHP.

Measures

Measure Name	Unique Identifier
Packaged Terminal Heat Pumps (PTHP)	Electric Commercial & Industrial Large C&I New Construction Packaged Terminal Heat Pumps (PTHP)

Savings Principle

The high efficiency case is a high efficiency PTHP

Savings Method

Deemed

Unit

Per PTHP

Savings Equation

Gross kWh = Qty × (kW_base - kW_ee) × Hours

Gross kW = Qty × (kW_base - kW_ee)

Where:

Qty = Total number of units.

kW_base = Deemed average demand per baseline unit.

kW_ee = Deemed average demand per high-efficiency unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Packaged Terminal Heat Pumps (PTHP)	1.00						

Electric kWh Note: Based on energy modeling of PNNL prototype buildings of small hotel, large hotel, and multifamily mid-rise

Electric kW Note: The peak demand occurs in the winter at low ambient temps when supplemental elec resistance heat is operational. As a result, there is no max kW demand reduction going from PTAC to high efficiency PTHP (existing buildings) or code level PTHP to high effic

Energy Impact Factors

Measure	Measure Life
Packaged Terminal Heat Pumps (PTHP)	8

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Packaged Terminal Heat Pumps (PTHP)	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization Rate is assumed 100%.

Measure	RR sp	RR wp	Loadshape ID
Packaged Terminal Heat Pumps (PTHP)	1.00	1.00	ls_274_Electric

RRwp Note: Realization Rate is assumed 100%.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Packaged Terminal Heat Pumps (PTHP)							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Packaged Terminal Heat Pumps (PTHP)	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Packaged Terminal Heat Pumps (PTHP)	$3.08 / kWh	Incentive: $0.00 / kWh

PEI H2O Pump, Continuous

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Pump **Measure Sub Type:** PEI H2O Pump

Program: Large C&I New Construction

Measure Description

The installation of a clean water pump with a constant speed.

Baseline Description

The baseline efficiency case for this measure is a PEI rating of 0.94 for a pump sized 1 <= hp <= 50 a and a PEI rating of 0.95 for a pump sized 50 <= hp <= 250.

Measures

Measure Name	Unique Identifier
PEI H2O PUMP - AG, C	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - AG, C
PEI H2O PUMP - COMM, C	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - COMM, C
PEI H2O PUMP - INDUS, C	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - INDUS, C
PEI H2O PUMP - MUNI, C	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - MUNI, C

Savings Principle

The high efficiency case for this measure is a PEI rating of 0.92 for a pump sized 1 <= hp <= 15, PEI rating of 0.88 and 0.90 for a pump sized 15 <= hp <= 50 and a PEI rating of 0.89, 0.91 and 0.93 for a pump sized 50 <= hp <= 250.

Savings Method

Calculated using site-specific inputs

Unit

Installed clean water pump

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Hours Source: Pacific Gas and Electric Company (PG&E). 2022. "SWWP004-02 Pump Database and PEI Analysis_5-12-22.xlsx.

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
PEI H2O PUMP - AG, C	354.30	0.080					
PEI H2O PUMP - COMM, C	531.99	0.080					
PEI H2O PUMP - INDUS, C	917.92	0.080					
PEI H2O PUMP - MUNI, C	320.06	0.080					

Electric kWh Source: NEEA (2019). Extended Motor Product Savings Validation Research on Clean Water Pumps and Circulators. https://www.neea.org/img/documents/XMP-Savings-Validation-Research-on-Clean-Water-Pumps-and-Circulators.pdf

Electric kW Source: NEEA (2019). Extended Motor Product Savings Validation Research on Clean Water Pumps and Circulators. https://www.neea.org/img/documents/XMP-Savings-Validation-Research-on-Clean-Water-Pumps-and-Circulators.pdf

Energy Impact Factors

Measure	Measure Life
PEI H2O PUMP - AG, C PEI H2O PUMP - COMM, C PEI H2O PUMP - INDUS, C PEI H2O PUMP - MUNI, C	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
PEI H2O Pump, Continuous	1.00		1.01

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
PEI H2O PUMP - AG, C	1.09	1.57	ls_195_Electric
PEI H2O PUMP - COMM, C	1.09	1.57	ls_195_Electric
PEI H2O PUMP - INDUS, C	1.09	1.57	ls_195_Electric
PEI H2O PUMP - MUNI, C	1.09	1.57	ls_195_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
PEI H2O PUMP - AG, C PEI H2O PUMP - COMM, C PEI H2O PUMP - INDUS, C PEI H2O PUMP - MUNI, C							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
PEI H2O Pump, Continuous	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
PEI H2O PUMP - AG, C PEI H2O PUMP - COMM, C PEI H2O PUMP - INDUS, C PEI H2O PUMP - MUNI, C	$0.18 / kWh	$0.12 / kWh

PEI H2O Pump, Variable

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Pump **Measure Sub Type:** PEI H2O Pump

Program: Large C&I New Construction

Measure Description

The installation of a clean water pump with a variable speed.

Baseline Description

The baseline efficiency case for this measure is a PEI rating of 0.47 for a pump sized 1 <= hp <= 15 and a PEI rating of 0.49 for a pump sized 15 <= hp <=250

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - AG, V
PEI H2O PUMP - AG, V	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - COMM, V
PEI H2O PUMP - COMM, V	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - INDUS, V
PEI H2O PUMP - INDUS, V	Electric Commercial & Industrial Large C&I New Construction PEI H2O PUMP - MUNI, V
PEI H2O PUMP - MUNI, V	

Savings Principle

The high efficiency case for this measure is a PEI rating of 0.43, 0.45, and 0.47 for a pump sized 15 <= hp <= 50 and a PEI rating of 0.45 and 0.47 for a pump sized 50 <= hp <= 250.

Savings Method

Calculated using site-specific inputs

Unit

Installed clean water pump

Savings Equation

Annual Electric Energy Savings

$\Delta kWh = hp \times 0.746 \times (1 - OF) \times (PEIbaseline - PEIee) \times LSAF \times hrs$

Summer Peak Coincident Demand Savings

$\Delta kW = hp \times 0.746 \times RLF \times (PEIbaseline - PEIee) \times CF$

Annual Fossil Fuel Energy Savings

$\Delta MMBtu = N/A$

where:

ΔkWh = Annual electricity energy savings

ΔkW = Peak coincident demand electric savings

ΔMMBtu = Annual fossil fuel energy savings

hp = Pump motor horsepower

OF = Oversize Factor

baseline = Characteristic of baseline condition

ee = Characteristic of energy efficient condition

PEI = Pump Energy Index

LSAF = Load Shape Adjustment Factor

hrs = Annual hours of operation

RLF = Rated load factor

CF = Coincidence factor

0.746 = Conversion factor (kW/hp), 746 watts equals one horsepower

Hours: N/A

Hours Source: Pacific Gas and Electric Company (PG&E). 2022. "SWWP004-02 Pump Database and PEI Analysis_5-12-22.xlsx.

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
PEI H2O PUMP - AG, V	Calc	Calc					
PEI H2O PUMP - COMM, V	Calc	Calc					
PEI H2O PUMP - INDUS, V	Calc	Calc					
PEI H2O PUMP - MUNI, V	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
PEI H2O PUMP - AG, V PEI H2O PUMP - COMM, V PEI H2O PUMP - INDUS, V PEI H2O PUMP - MUNI, V	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
PEI H2O Pump, Variable	1.00		1.01

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
PEI H2O PUMP - AG, V	1.09	1.57	ls_195_Electric
PEI H2O PUMP - COMM, V	1.09	1.57	ls_195_Electric
PEI H2O PUMP - INDUS, V	1.09	1.57	ls_195_Electric
PEI H2O PUMP - MUNI, V	1.09	1.57	ls_195_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
PEI H2O PUMP - AG, V							
PEI H2O PUMP - COMM, V							
PEI H2O PUMP - INDUS, V							
PEI H2O PUMP - MUNI, V							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
PEI H2O Pump, Variable	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
PEI H2O PUMP - AG, V		
PEI H2O PUMP - COMM, V		
PEI H2O PUMP - INDUS, V		
PEI H2O PUMP - MUNI, V		

Performance Lighting

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Lighting

Measure Type: Prescriptive Lighting

Measure Sub Type: Performance Lighting

Program: Large C&I New Construction

Measure Description

The installation of lighting systems that achieve lighting power densities below those required by RI building code.

Baseline Description

The baseline efficiency assumes compliance with lighting power density requirements as mandated by Rhode Island State Building Code, which currently reflects IECC 2024. IECC 2024 offers two compliance paths, the Building Area Method and Space-by-Space Method.

Measures

Measure Name	Unique Identifier
Performance Lighting - Tier 1 Exterior	Electric Commercial & Industrial Large C&I New Construction Performance Lighting - Tier 1 Exterior
Performance Lighting - Tier 1 Interior	Electric Commercial & Industrial Large C&I New Construction Performance Lighting - Tier 1 Interior
Performance Lighting Tier 2 & 3 Exterior	Electric Commercial & Industrial Large C&I New Construction Performance Lighting Tier 2 & 3 Exterior
Performance Lighting Tier 2 & 3 Interior	Electric Commercial & Industrial Large C&I New Construction Performance Lighting Tier 2 & 3 Interior

Savings Principle

The high efficiency scenario assumes lighting systems that achieve lighting power densities below those required by RI State Building Code. Actual site lighting power densities should be determined on a case-by-case basis. Please refer to the current yearapplication form for minimum percentage better than code efficiency requirements.

Savings Method

Calculated

Unit

Installed lighting performance project.

Savings Equation

Gross kWh = [SUM(LPD_base,i - LPD_proposed,i + LPD_proposed,i * controlled * %sav)* Area_i ×*Hours_i * 1/1000)]

Gross kW_fixture = [SUM(LPD_base_i - LPD_proposed,i)* Area_i* 1/1000

Gross kW_controlled = [SUM(LPD_proposed,i * Controlled) * Area_i * 1/1000

Where:

n = total number of spaces or 1 for building area method

Area_i = Floor area of location i (SQFT)

LPD_proposed,i = Proposed lighting power density for building or space type i (Watts/SQFT)

Controlled = % of controlled lighting above required amounts for each tier

Hours_j = Lighting annual hours of operation: site-specific.

1,000 Watts per kW = Conversion factor

%sav = Percentage of kWh that is saved by utilizing the control measure. Refer to Table XX in Appendix A for the savings control factors.

Note on Performance Lighting tiers: Performance Lighting has three tiers, for New Buildings & Major Renovations the min percentage of controlled lighting above required amounts at 0% for tier 1, 20% for tier 2, and 30% for tier 3. All other Performance Lighting programs have min percentage of controlled lighting above required amounts of 15% for tier 1, 35% for tier 2, and 45% for tier 3.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
					Calc		
Performance Lighting - Tier 1 Exterior	Calc	Calc	Calc				
Performance Lighting - Tier 1 Interior	Calc	Calc	Calc				
Performance Lighting Tier 2 & 3 Exterior	Calc	Calc	Calc				
Performance Lighting Tier 2 & 3 Interior	Calc	Calc	Calc				

Energy Impact Factors

Measure	Measure Life
Performance Lighting - Tier 1 Exterior	15
Performance Lighting - Tier 1 Interior	11
Performance Lighting Tier 2 & 3 Exterior	15
Performance Lighting Tier 2 & 3 Interior	11

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Performance Lighting	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Performance Lighting - Tier 1 Exterior	1.00	1.00	ls_106_Electric
Performance Lighting - Tier 1 Interior	1.00	1.00	ls_106_Electric
Performance Lighting Tier 2 & 3 Exterior	1.00	1.00	ls_106_Electric
Performance Lighting Tier 2 & 3 Interior	1.00	1.00	ls_106_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Performance Lighting - Tier 1 Exterior				$0.023			
Performance Lighting - Tier 1 Interior				$0.023			
Performance Lighting Tier 2 & 3 Exterior				$0.023			
Performance Lighting Tier 2 & 3 Interior				$0.023			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Performance Lighting	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Performance Lighting - Tier 1 Exterior	$0.34 / kWh	$0.21 / kWh
Performance Lighting - Tier 1 Interior	$0.34 / kWh	$0.21 / kWh
Performance Lighting Tier 2 & 3 Exterior	$0.34 / kWh	$0.21 / kWh
Performance Lighting Tier 2 & 3 Interior	$0.34 / kWh	$0.21 / kWh

Performance Lighting, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** LGHT-PERF | **Measure Sub Type:** LGHT-PERF

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Performance Lighting, Custom	Electric Commercial & Industrial Large C&I New Construction Performance Lighting, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Performance Lighting, Custom	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Performance Lighting, Custom	multi

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Performance Lighting, Custom	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Performance Lighting, Custom	0.94	0.75	ls_120_Electric

RRsp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

RRwp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Performance Lighting, Custom	Calc			$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Performance Lighting, Custom	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Performance Lighting, Custom	$0.53 / kWh	Incentive: $0.33 / kWh

Prescriptive Lighting

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Lighting | **Measure Type:** Prescriptive Lighting | **Measure Sub Type:** Lighting

Program: Large C&I New Construction

Measure Description

This measure promotes the installation of lighting fixtures in lost opportunity applications.

Baseline Description

The baseline efficiency case is determined using assumed baseline wattages for each of the installed fixtures unless baseline assumptions have been evaluated.

Measures

Measure Name	Unique Identifier
Prescriptive Lighting - EXT-24/7 Prescriptive Lighting - EXT-DUSKDAWN Prescriptive Lighting - Compact Prescriptive Lighting - Custom Prescriptive Lighting - Fluorescent Prescriptive Lighting - LED Case Ref Prescriptive Lighting - LED General Prescriptive Lighting - LED Sign	Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - EXT-24/7 Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - EXT-DUSKDAWN Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - Compact Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - Custom Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - Fluorescent Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - LED Case Ref Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - LED General Electric Commercial & Industrial Large C&I New Construction Prescriptive Lighting - LED Sign

Savings Principle

the high efficiency case is project-specific and is determined using actual fixture counts for the project and the wattage tables in Appendix A.

Savings Method

Calculated using site-specific inputs

Unit

Installed high-efficiency lighting project.

Savings Equation

Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours

Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)

Where:

QTY_base_i = Quantity of baseline fixtures in location i

Watts_base_i = Connected wattage of baseline fixtures in location i

QTY_ee_j = Quantity of efficient fixtures in location j

Watts_ee_j = Connected wattage of efficient fixtures in location j

1,000 Watts per kW = Conversion factor

Hours = Lighting annual hours of operation: site-specific.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
					0.00		
Prescriptive Lighting - EXT-24/7	Calc	Calc					
Prescriptive Lighting - EXT-DUSKDAWN	Calc	Calc					
Prescriptive Lighting - Compact	Calc	Calc					
Prescriptive Lighting - Custom	Calc	Calc					
Prescriptive Lighting - Fluorescent	Calc	Calc					
Prescriptive Lighting - LED Case Ref	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Prescriptive Lighting - EXT-24/7	15
Prescriptive Lighting - EXT-DUSKDAWN	15
Prescriptive Lighting - Compact	11
Prescriptive Lighting - Custom	11
Prescriptive Lighting - Fluorescent	11
Prescriptive Lighting - LED Case Ref	11
Prescriptive Lighting - LED General	11
Prescriptive Lighting - LED Sign	11

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Prescriptive Lighting	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Prescriptive Lighting - EXT-24/7	1.00	1.00	ls_106_Electric
Prescriptive Lighting - EXT-DUSKDAWN	1.00	1.00	ls_106_Electric
Prescriptive Lighting - Compact	1.00	1.00	ls_106_Electric
Prescriptive Lighting - Custom	1.00	1.00	ls_106_Electric
Prescriptive Lighting - Fluorescent	1.00	1.00	ls_106_Electric
Prescriptive Lighting - LED Case Ref	1.00	1.00	ls_106_Electric
Prescriptive Lighting - LED General	1.00	1.00	ls_106_Electric
Prescriptive Lighting - LED Sign	1.00	1.00	ls_106_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Prescriptive Lighting - EXT-24/7				$0.023			
Prescriptive Lighting - EXT-DUSKDAWN				$0.023			
Prescriptive Lighting - Compact				$0.023			
Prescriptive Lighting - Custom				$0.023			
Prescriptive Lighting - Fluorescent				$0.023			
Prescriptive Lighting - LED Case Ref				$0.023			
Prescriptive Lighting - LED General				$0.023			
Prescriptive Lighting - LED Sign				$0.023			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Prescriptive Lighting	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Prescriptive Lighting - EXT-24/7	$0.39 / kWh	$0.25 / kWh
Prescriptive Lighting - EXT-DUSKDAWN	$0.34 / kWh	$0.21 / kWh
Prescriptive Lighting - Compact	$0.34 / kWh	$0.21 / kWh
Prescriptive Lighting - Custom	$0.34 / kWh	$0.21 / kWh
Prescriptive Lighting - Fluorescent	$0.34 / kWh	$0.21 / kWh
Prescriptive Lighting - LED Case Ref	$0.34 / kWh	$0.21 / kWh
Prescriptive Lighting - LED General	$0.34 / kWh	$0.21 / kWh
Prescriptive Lighting - LED Sign	$0.34 / kWh	$0.21 / kWh

Process

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Process | **Measure Type:** PROCESS | **Measure Sub Type:** PROCESS

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Process	Electric Commercial & Industrial Large C&I New Construction Process

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Process	5,10,15,20

Measure	ISR	RRe Gas	RRe Electric
Process	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Process	0.74	0.98	ls_121_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process	Calc			$0.095			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process	$0.52 / kWh	Incentive: $0.34 / kWh

Process Cooling

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Process | **Measure Type:** PROC-COOLING | **Measure Sub Type:** PROC-COOLING

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Process Cooling	Electric Commercial & Industrial Large C&I New Construction Process Cooling

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process Cooling	Calc	Calc	Calc				

Energy Impact Factors

Measure	Measure Life
Process Cooling	multi

Measure	ISR	RRe Gas	RRe Electric
Process Cooling	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Process Cooling	0.74	0.98	ls_121_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process Cooling	Calc			$0.095			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process Cooling	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process Cooling	$0.50 / kWh	Incentive: $0.32 / kWh

Process Exhaust Fan

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Process Exhaust Fan	Electric Commercial & Industrial Large C&I New Construction Process Exhaust Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process Exhaust Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Process Exhaust Fan	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Process Exhaust Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Process Exhaust Fan	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process Exhaust Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process Exhaust Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process Exhaust Fan	$0.48 / kWh	Incentive: $0.31 / kWh

Process, Cool Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Process, Cool Pump	Electric Commercial & Industrial Large C&I New Construction Process, Cool Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process, Cool Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Process, Cool Pump	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Process, Cool Pump	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Process, Cool Pump	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process, Cool Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process, Cool Pump	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process, Cool Pump	$0.48 / kWh	Incentive: $0.31 / kWh

Radiant Conveyor Toasters

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Toaster

Program: Large C&I New Construction

Measure Description

A radiant conveyor toaster with an automatic energy savings or setback mode.

Baseline Description

The baseline is a commercial radiant toaster without automatic set back mode.

Measures

Measure Name	Unique Identifier
Radiant Conveyor Toaster 120V	Electric Commercial & Industrial Large C&I New Construction Radiant Conveyor Toaster 120V
Radiant Conveyor Toaster 208V	Electric Commercial & Industrial Large C&I New Construction Radiant Conveyor Toaster 208V

Savings Principle

The high efficiency case is a radiant conveyor toaster with an automatic energy savings or setback mode.

Savings Method

Deemed

Unit

Per unit

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Radiant Conveyor Toaster 120V	1510.00						
Radiant Conveyor Toaster 208V	2780.00						

Electric kWh Source: Energy Solutions (ES). 2022. "Conveyor Toaster Supporting Data R1.xlsx."

Electric kW Source: Energy Solutions (ES). 2022. "Conveyor Toaster Supporting Data R1.xlsx."

Energy Impact Factors

Measure	Measure Life
Radiant Conveyor Toaster 120V Radiant Conveyor Toaster 208V	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Radiant Conveyor Toasters	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Radiant Conveyor Toaster 120V	1.00	1.00	ls_270_Electric
Radiant Conveyor Toaster 208V	1.00	1.00	ls_270_Electric ls_270_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Radiant Conveyor Toaster 120V							
Radiant Conveyor Toaster 208V							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Radiant Conveyor Toasters	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Radiant Conveyor Toaster 120V	$0.31 / kWh	$0.13 / kWh
Radiant Conveyor Toaster 208V	$0.08 / kWh	$0.07 / kWh

Refrigerated Air Dryer

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Refrigerated Air Dryers

Measure Sub Type: Refrigerated Air Dryer

Program: Large C&I New Construction

Measure Description

The installation of cycling or variable frequency drive (VFD)-equipped refrigerated compressed air dryer. An efficient refrigerated dryer cycles on and off or uses a variable speed drive as required by the demand for compressed air instead of running continuously. Only properly sized refrigerated air dryers used in a single-compressor system are eligible.

Baseline Description

The baseline efficiency case is a non-cycling refrigerated air dryer.

Measures

Measure Name	Unique Identifier
Refrigerated Air Dryer - CAT<100	Electric Commercial & Industrial Large C&I New Construction Refrigerated Air Dryer - CAT<100
Refrigerated Air Dryer - CAT>400	Electric Commercial & Industrial Large C&I New Construction Refrigerated Air Dryer - CAT>400
Refrigerated Air Dryer - CAT-200	Electric Commercial & Industrial Large C&I New Construction Refrigerated Air Dryer - CAT-200
Refrigerated Air Dryer - CAT-300	Electric Commercial & Industrial Large C&I New Construction Refrigerated Air Dryer - CAT-300
Refrigerated Air Dryer - CAT-400	Electric Commercial & Industrial Large C&I New Construction Refrigerated Air Dryer - CAT-400

Savings Principle

The high efficiency case is a cycling refrigerated dryer or a refrigerated dryer equipped with a VFD.

Savings Method

Calculated using site-specific inputs

Unit

kW saved per CFM of installed air dryer capacity.

Savings Equation

Gross kWh = CFM_dryer × deltakW/CFM × Hours

Gross kW = CFM_dryer × deltakW/CFM

Where:

CFM_dryer = Full flow rated capacity of the refrigerated air dryer in cubic feet per minute (CFM), typically obtained from equipment's Compressed Air Gas Institute Datasheet: site-specific

deltakW/CFM = Refrigerated air dryer kW reduction per dryer full flow rated CFM

Hours = Annual operating hours of the refrigerated air dryer: site-specific

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis; RR adjusts for evaluation results.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		0.006					
Refrigerated Air Dryer - CAT<100	Calc	0.006					
Refrigerated Air Dryer - CAT>400	Calc	0.006					
Refrigerated Air Dryer - CAT-200	Calc	0.006					
Refrigerated Air Dryer - CAT-300	Calc	0.006					
Refrigerated Air Dryer - CAT-400	Calc	0.006					

Electric kWh Note: Algorithm Input kwh/CFM based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Electric kW Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Electric kW Note: kW/(rated CFM)

Gas Heat MMBtu Source: 0.00

Energy Impact Factors

Measure	Measure Life
Refrigerated Air Dryer - CAT<100	13
Refrigerated Air Dryer - CAT>400	
Refrigerated Air Dryer - CAT-200	
Refrigerated Air Dryer - CAT-300	
Refrigerated Air Dryer - CAT-400	

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Refrigerated Air Dryer	1.00		1.56

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
Refrigerated Air Dryer - CAT<100	1.00	1.00	ls_112_Electric
Refrigerated Air Dryer - CAT>400	1.00	1.00	ls_112_Electric
Refrigerated Air Dryer - CAT-200	1.00	1.00	ls_112_Electric
Refrigerated Air Dryer - CAT-300	1.00	1.00	ls_112_Electric
Refrigerated Air Dryer - CAT-400	1.00	1.00	ls_112_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerated Air Dryer - CAT<100				$0.043			
Refrigerated Air Dryer - CAT>400				$0.043			
Refrigerated Air Dryer - CAT-200				$0.043			
Refrigerated Air Dryer - CAT-300				$0.043			
Refrigerated Air Dryer - CAT-400				$0.043			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerated Air Dryer	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerated Air Dryer - CAT<100	$0.43 / kWh	$0.28 / kWh
Refrigerated Air Dryer - CAT>400	$0.43 / kWh	$0.28 / kWh
Refrigerated Air Dryer - CAT-200	$0.43 / kWh	$0.28 / kWh
Refrigerated Air Dryer - CAT-300	$0.43 / kWh	$0.28 / kWh
Refrigerated Air Dryer - CAT-400	$0.43 / kWh	$0.28 / kWh

Refrigerated Chef Base

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Refrigeration

Measure Sub Type: Refrigerated Chef Base

Program: Large C&I New Construction

Measure Description

The measure case is defined as a refrigerated chef base that uses energy less than or equal to the maximum daily energy consumption.

Baseline Description

The baseline efficiency are refrigerated chef bases with the following daily energy use intensity per exterior length: 35-54"- 0.6000 kWh/day/ft3, 55-73" - 0.5400 kWh/day/ft3, 75-89" - 0.4751 kWh/day/ft3, and 90-120" - 0.4700 kWh/day/ft3.

Measures

Measure Name	Unique Identifier
Refrigerated Chef Base - 35" to 54"	Electric Commercial & Industrial Large C&I New Construction Refrigerated Chef Base - 35" to 54"
Refrigerated Chef Base - 55" to 73"	Electric Commercial & Industrial Large C&I New Construction Refrigerated Chef Base - 55" to 73"
Refrigerated Chef Base - 74" to 89"	Electric Commercial & Industrial Large C&I New Construction Refrigerated Chef Base - 74" to 89"
Refrigerated Chef Base - 90" to 120"	Electric Commercial & Industrial Large C&I New Construction Refrigerated Chef Base - 90" to 120"

Savings Principle

The high efficiency case are refrigerated chef bases with the following daily energy use intensity based on the exterior length: 35-54"- 0.1800 kWh/day/ft3, 55-73" - 0.1600 kWh/day/ft3, 75-89" - 0.1400 kWh/day/ft3, and 90-120" - 0.1400 kWh/day/ft3.

Savings Method

Deemed based on algorithm

Unit

Daily Energy Use (kWh/day/ft3)

Savings Equation

Chef Base Daily Energy Use kWh/day/ft3 * 365 (# 0f days) = Annual Energy Consumption (kWh)/ft3

(Annual Energy Consumption Standard - Annual Energy Consumption Efficient) x Refrigerated Volume = kWh/yr

(Peak demand Intensity kW/ft3 Standard - Efficient) xRefrigerated Volume = Peak Demand Savings kW

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerated Chef Base - 35" to 54"	1052.00	0.115					
Refrigerated Chef Base - 55" to 73"	1637.00	0.177					
Refrigerated Chef Base - 74" to 89"	1985.00	0.214					
Refrigerated Chef Base - 90" to 120"	2673.00	0.289					

Electric kWh Source: Emerging Products (2016). Chef Bases for Foodservice Applications. https://www.caetrm.com/media/reference-documents/ET15SCE1010_Chef_Bases_Report_final2.pdf

Electric kW Source: Emerging Products (2016). Chef Bases for Foodservice Applications. https://www.caetrm.com/media/reference-documents/ET15SCE1010_Chef_Bases_Report_final2.pdf

Energy Impact Factors

Measure	Measure Life
Refrigerated Chef Base - 35" to 54"	12
Refrigerated Chef Base - 55" to 73"	
Refrigerated Chef Base - 74" to 89"	
Refrigerated Chef Base - 90" to 120"	

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Refrigerated Chef Base	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Refrigerated Chef Base - 35" to 54"	1.00	1.00	ls_111_Electric
Refrigerated Chef Base - 55" to 73"	1.00	1.00	ls_111_Electric
Refrigerated Chef Base - 74" to 89"	1.00	1.00	ls_111_Electric
Refrigerated Chef Base - 90" to 120"	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerated Chef Base - 35" to 54"							
Refrigerated Chef Base - 55" to 73"							
Refrigerated Chef Base - 74" to 89"							
Refrigerated Chef Base - 90" to 120"							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerated Chef Base	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerated Chef Base - 35" to 54"	$0.81 / kWh	$0.52 / kWh
Refrigerated Chef Base - 55" to 73"	$0.43 / kWh	$0.28 / kWh
Refrigerated Chef Base - 74" to 89"		
Refrigerated Chef Base - 90" to 120"		

Refrigerator Glass Door

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Refrigeration **Measure Type:** Door **Measure Sub Type:** Glass

Program: Large C&I New Construction

Measure Description

Installation of an Energy Star rated refrigerator with a glass door.

Baseline Description

The baseline efficiency case is a refrigerator with standard energy consumption.

Measures

Measure Name	Unique Identifier
Refrigerator Glass Door - <15 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Glass Door - <15 ft3
Refrigerator Glass Door - 15 to 29.9 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Glass Door - 15 to 29.9 ft3
Refrigerator Glass Door - 30 to 49.9 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Glass Door - 30 to 49.9 ft3
Refrigerator Glass Door - >50 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Glass Door - >50 ft3

Savings Principle

The high efficiency case is an Energy Star rated refrigerator.

Savings Method

Deemed

Unit

Per refrigerator

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerator Glass Door - <15 ft3	245.00	0.030					
Refrigerator Glass Door - 15 to 29.9 ft3	307.00	0.040					
Refrigerator Glass Door - 30 to 49.9 ft3	540.00	0.060					
Refrigerator Glass Door - >50 ft3	610.00	0.070					

Electric kWh Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Electric kW Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
Refrigerator Glass Door - <15 ft3 Refrigerator Glass Door - 15 to 29.9 ft3 Refrigerator Glass Door - 30 to 49.9 ft3 Refrigerator Glass Door - >50 ft3	12

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Refrigerator Glass Door	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Refrigerator Glass Door - <15 ft3	1.00	1.00	ls_111_Electric
Refrigerator Glass Door - 15 to 29.9 ft3	1.00	1.00	ls_111_Electric
Refrigerator Glass Door - 30 to 49.9 ft3	1.00	1.00	ls_111_Electric
Refrigerator Glass Door - >50 ft3	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerator Glass Door - <15 ft3							
Refrigerator Glass Door - 15 to 29.9 ft3							
Refrigerator Glass Door - 30 to 49.9 ft3							
Refrigerator Glass Door - >50 ft3							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerator Glass Door	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerator Glass Door - <15 ft3	$1.41 / kWh	$0.92 / kWh
Refrigerator Glass Door - 15 to 29.9 ft3	$0.88 / kWh	$0.57 / kWh
Refrigerator Glass Door - 30 to 49.9 ft3	$0.64 / kWh	$0.42 / kWh
Refrigerator Glass Door - >50 ft3	$0.95 / kWh	$0.61 / kWh

Refrigerator Solid Door

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Refrigeration **Measure Type:** Door **Measure Sub Type:** Solid

Program: Large C&I New Construction

Measure Description

Installation of an Energy Star rated refrigerator with a solid door.

Baseline Description

The baseline efficiency case is a refrigerator with standard energy consumption.

Measures

Measure Name	Unique Identifier
Refrigerator Solid Door - <15 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Solid Door - <15 ft3
Refrigerator Solid Door - 15 to 29.9 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Solid Door - 15 to 29.9 ft3
Refrigerator Solid Door - 30 to 49.9 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Solid Door - 30 to 49.9 ft3
Refrigerator Solid Door - >50 ft3	Electric Commercial & Industrial Large C&I New Construction Refrigerator Solid Door - >50 ft3

Savings Principle

The high efficiency case is an Energy Star rated refrigerator.

Savings Method

Deemed

Unit

Per refrigerator

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerator Solid Door - <15 ft3	170.00	0.020					
Refrigerator Solid Door - 15 to 29.9 ft3	255.00	0.030					
Refrigerator Solid Door - 30 to 49.9 ft3	245.00	0.040					
Refrigerator Solid Door - >50 ft3	376.00	0.050					

Electric kWh Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Electric kW Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
Refrigerator Solid Door - <15 ft3	12
Refrigerator Solid Door - 15 to 29.9 ft3	
Refrigerator Solid Door - 30 to 49.9 ft3	
Refrigerator Solid Door - >50 ft3	

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Refrigerator Solid Door	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Refrigerator Solid Door - <15 ft3	1.00	1.00	ls_111_Electric
Refrigerator Solid Door - 15 to 29.9 ft3	1.00	1.00	ls_111_Electric
Refrigerator Solid Door - 30 to 49.9 ft3	1.00	1.00	ls_111_Electric
Refrigerator Solid Door - >50 ft3	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerator Solid Door - <15 ft3							
Refrigerator Solid Door - 15 to 29.9 ft3							
Refrigerator Solid Door - 30 to 49.9 ft3							
Refrigerator Solid Door - >50 ft3							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerator Solid Door	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerator Solid Door - <15 ft3	$2.04 / kWh	$1.32 / kWh
Refrigerator Solid Door - 15 to 29.9 ft3	$1.06 / kWh	$0.69 / kWh
Refrigerator Solid Door - 30 to 49.9 ft3	$2.04 / kWh	$1.33 / kWh
Refrigerator Solid Door - >50 ft3	$1.54 / kWh	$1.00 / kWh

Room Air Cleaner

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Room Air Cleaners | **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of an ENERGY STAR® qualified room air cleaner for a classroom, small office, or small retail space.

Baseline Description

The baseline efficiency case is a unit with 2.0 CADR/Wattdust.

Measures

Measure Name	Unique Identifier
Room Air Cleaner - K-12 Room Air Cleaner - Office Room Air Cleaner - Retail	Electric Commercial & Industrial Large C&I New Construction Room Air Cleaner - K-12 Electric Commercial & Industrial Large C&I New Construction Room Air Cleaner - Office Electric Commercial & Industrial Large C&I New Construction Room Air Cleaner - Retail

Savings Principle

The current EnergyStar specification requires a minimum of 2.0 CADR/Wattdust. However, the ENERGY STAR average CADR/Watt (Dust) of models available in their US market database (approximately 170 models) is approximately 3.5 CADR/Wattdust. Therefore it isassumed that the high efficiency unit has a 3.0 CADR/Wattdust

Savings Method

Deemed

Unit

Installed ENERGY STAR® room air cleaner

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakWh / Hours

Where:

Qty = Total number of units.

deltakWh = Deemed average annual kWh reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Room Air Cleaner - K-12	214.08	0.075					
Room Air Cleaner - Office	316.43	0.075					
Room Air Cleaner - Retail	373.00	0.075					

Electric kWh Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Electric kW Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Energy Impact Factors

Measure	Measure Life
Room Air Cleaner - K-12 Room Air Cleaner - Office Room Air Cleaner - Retail	9

Measure Life Source: Environmental Protection Agency (2018). Savings Calculator for Energy Star Qualified Appliances.

Measure	ISR	RRe Gas	RRe Electric
Room Air Cleaner	0.97		1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Room Air Cleaner - K-12	1.00	1.00	ls_255_Electric
Room Air Cleaner - Office	1.00	1.00	ls_255_Electric
Room Air Cleaner - Retail	1.00	1.00	ls_255_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Room Air Cleaner - K-12							
Room Air Cleaner - Office							
Room Air Cleaner - Retail							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Room Air Cleaner	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Room Air Cleaner - K-12	$0.41 / kWh	$0.26 / kWh
Room Air Cleaner - Office	$0.41 / kWh	$0.26 / kWh
Room Air Cleaner - Retail	$0.41 / kWh	$0.26 / kWh

Sensors

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Sensors

Program: Large C&I New Construction

Measure Description

The measure is to the installation of occupancy sensors to control HVAC units.

Baseline Description

The baseline efficiency case assumes the equipment has no occupancy based controls.

Measures

Measure Name	Unique Identifier
Sensors	Electric Commercial & Industrial Large C&I New Construction Sensors

Savings Principle

The high efficiency case is the installation of controls that include occupancy sensors.

Savings Method

Deemed

Unit

Installed hotel occupancy sensor.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Sensors	438.00	0.090					

Electric kWh Source: National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors.

Electric kW Source: National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors.

Energy Impact Factors

Measure	Measure Life
Sensors	10

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Sensors	1.00		1.08

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Sensors	1.00	1.00	ls_119_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Sensors							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Sensors	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Sensors	$0.40 / kWh	Incentive: $0.26 / kWh

Soup Wells

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Soup Well

Program: Large C&I New Construction

Measure Description

An efficient commercial soup well that uses induction heating as primary form.

Baseline Description

The baseline is a commercial soup well that does not use induction heating as a primary form.

Measures

Measure Name	Unique Identifier
Soup Wells	Electric Commercial & Industrial Large C&I New Construction Soup Wells

Savings Principle

The high efficiency case is a commercial soup well that uses induction heating as primary form.

Savings Method

Deemed

Unit

Per well

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Soup Wells	189.00	0.076					

Electric kWh Source: Energy Solutions (ES). 2022. "Soup Well Supporting Data.xlsx."

Electric kW Source: Energy Solutions (ES). 2022. "Soup Well Supporting Data.xlsx."

Energy Impact Factors

Measure	Measure Life
Soup Wells	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Soup Wells	1.00		

Measure	RR sp	RR wp	Loadshape ID
Soup Wells	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Soup Wells							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Soup Wells	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Soup Wells	$1.48 / kWh	Incentive: $0.79 / kWh

Split system AC to 5.4 tons

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** AC | **Measure Sub Type:** Split

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
Split system AC to 5.4 tons	Electric Commercial & Industrial Large C&I New Construction Split system AC to 5.4 tons

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed unitary AC system for space cooling.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

EER_base = Energy Efficiency Ratio of baseline equipment: code. Since IECC 2012 does not provide EER requirements for equipment < 5.4 tons, assume the following conversion: EER ≈ SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Split system AC to 5.4 tons	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Split system AC to 5.4 tons	15

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Split system AC to 5.4 tons	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Measure	RR sp	RR wp	Loadshape ID
Split system AC to 5.4 tons	1.00	1.00	ls_104_Electric

RRsp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

RRwp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Split system AC to 5.4 tons							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Split system AC to 5.4 tons	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Split system AC to 5.4 tons	$0.33 / kWh	Incentive: $0.25 / kWh

Steam Table

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Steam Table

Program: Large C&I New Construction

Measure Description

An efficient commercial steam table with an idle rate of less than or equal to 160 W.

Baseline Description

The baseline is a commercial steam table with an idle rate of greater than 160 W.

Measures

Measure Name	Unique Identifier
Steam Table	Electric Commercial & Industrial Large C&I New Construction Steam Table

Savings Principle

The high efficiency case is a commercial steam table with an idle rate of less than or equal to 160 W.

Savings Method

Deemed

Unit

Per well

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Steam Table	283.00	0.098					

Electric kWh Source: Southern California Gas Company (SCG). 2023. "SWFS028-01_Steam_Table_Supporting_Data_07252023.xlsx."

Electric kW Source: Southern California Gas Company (SCG). 2023. "SWFS028-01_Steam_Table_Supporting_Data_07252023.xlsx."

Energy Impact Factors

Measure	Measure Life
Steam Table	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Steam Table	1.00		

Measure	RR sp	RR wp	Loadshape ID
Steam Table	1.00	1.00	ls_111_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Steam Table							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Steam Table	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Steam Table	$0.98 / kWh	Incentive: $0.71 / kWh

TEFC Motor

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
TEFC-1200F TEFC-1200N TEFC-1200S TEFC-1800F TEFC-1800N TEFC-1800S TEFC-3600F TEFC-3600N TEFC-3600S	Electric Commercial & Industrial Large C&I New Construction TEFC-1200F Electric Commercial & Industrial Large C&I New Construction TEFC-1200N Electric Commercial & Industrial Large C&I New Construction TEFC-1200S Electric Commercial & Industrial Large C&I New Construction TEFC-1800F Electric Commercial & Industrial Large C&I New Construction TEFC-1800N Electric Commercial & Industrial Large C&I New Construction TEFC-1800S Electric Commercial & Industrial Large C&I New Construction TEFC-3600F Electric Commercial & Industrial Large C&I New Construction TEFC-3600N Electric Commercial & Industrial Large C&I New Construction TEFC-3600S

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
TEFC-1200F	Calc	Calc					
TEFC-1200N	Calc	Calc					
TEFC-1200S	Calc	Calc					
TEFC-1800F	Calc	Calc					
TEFC-1800N	Calc	Calc					
TEFC-1800S	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
TEFC-1200F	15
TEFC-1200N	
TEFC-1200S	
TEFC-1800F	
TEFC-1800N	
TEFC-1800S	
TEFC-3600F	
TEFC-3600N	
TEFC-3600S	

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
TEFC Motor	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
TEFC-1200F	1.00	1.00	ls_110_Electric
TEFC-1200N	1.00	1.00	ls_110_Electric
TEFC-1200S	1.00	1.00	ls_110_Electric
TEFC-1800F	1.00	1.00	ls_110_Electric
TEFC-1800N	1.00	1.00	ls_110_Electric
TEFC-1800S	1.00	1.00	ls_110_Electric
TEFC-3600F	1.00	1.00	ls_110_Electric
TEFC-3600N	1.00	1.00	ls_110_Electric
TEFC-3600S	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
TEFC-1200F				$0.003			
TEFC-1200N				$0.003			
TEFC-1200S				$0.003			
TEFC-1800F				$0.003			
TEFC-1800N				$0.003			
TEFC-1800S				$0.003			
TEFC-3600F				$0.003			
TEFC-3600N				$0.003			
TEFC-3600S				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
TEFC Motor	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
TEFC-1200F	$0.45 / kWh	$0.29 / kWh
TEFC-1200N	$0.45 / kWh	$0.29 / kWh
TEFC-1200S	$0.45 / kWh	$0.29 / kWh
TEFC-1800F	$0.45 / kWh	$0.29 / kWh
TEFC-1800N	$0.45 / kWh	$0.29 / kWh
TEFC-1800S	$0.45 / kWh	$0.29 / kWh
TEFC-3600F	$0.45 / kWh	$0.29 / kWh
TEFC-3600N	$0.45 / kWh	$0.29 / kWh
TEFC-3600S	$0.45 / kWh	$0.29 / kWh

Transformers

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** TRNS | **Measure Sub Type:** TRNS

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Transformers	Electric Commercial & Industrial Large C&I New Construction Transformers

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Transformers	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Transformers	20,25

Measure	ISR	RRe Gas	RRe Electric
Transformers	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Transformers	0.74	0.98	ls_196_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Transformers							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Transformers	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Transformers	$0.62 / kWh	Incentive: $0.40 / kWh

VARICOMP, 75HP

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Compressor

Measure Sub Type: Variable compressor up to 75 HP

Program: Large C&I New Construction

Measure Description

The installation of oil flooded, rotary screw compressors with Variable Displacement capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver.

Baseline Description

The baseline efficiency case is a typical load / unload compressor.

Measures

Measure Name	Unique Identifier
VARICOMP, 75HP	Electric Commercial & Industrial Large C&I New Construction VARICOMP, 75HP

Savings Principle

The high efficiency case is an oil-flooded, rotary screw compressor with Variable Displacement capacity control with a properly sized air receiver.

Savings Method

Calculated using site-specific inputs

Unit

kW saved per horsepower (hp) of installed air compressor capacity.

Savings Equation

Gross kWh = HP_compressor × deltakW/HP × Hours

Gross kW = HP_compressor × deltakW/HP

Where:

HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific

Hours = Annual operating hours of the air compressor: site-specific

deltakW/HP = Air compressor kW reduction per HP

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis; RR adjusts for evaluation results.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VARICOMP, 75HP	Calc	0.190					

Electric kW Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Electric kW Note: kW/HP

Energy Impact Factors

Measure	Measure Life
VARICOMP, 75HP	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
VARICOMP, 75HP	1.00		1.44

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
VARICOMP, 75HP	1.00	1.00	ls_112_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VARICOMP, 75HP				$0.043			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VARICOMP, 75HP	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VARICOMP, 75HP	$0.48 / kWh	Incentive: $0.31 / kWh

Vending Miser - Glass Front Refrigerated Coolers

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Vending Miser **Measure Type:** Vending Miser **Measure Sub Type:** Vending Miser

Program: Large C&I New Construction

Measure Description

Standard efficiency glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity

Baseline Description

The baseline efficiency case is a standard efficiency glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Measures

Measure Name	Unique Identifier
Vending Miser - Glass Front Refrigerated Coolers	Electric Commercial & Industrial Large C&I New Construction Vending Miser - Glass Front Refrigerated Coolers

Savings Principle

The high efficiency case is a standard efficiency glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Savings Method

Deemed

Unit

Installed vending miser.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Vending Miser - Glass Front Refrigerated Coolers	1208.00	0.138					

Electric kWh Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Electric kW Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Energy Impact Factors

Measure	Measure Life
Vending Miser - Glass Front Refrigerated Coolers	5

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Vending Miser - Glass Front Refrigerated Coolers	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
Vending Miser - Glass Front Refrigerated Coolers	1.00	1.00	ls_271_Electric

RRsp Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

RRwp Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Vending Miser - Glass Front Refrigerated Coolers							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Vending Miser - Glass Front Refrigerated Coolers	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Vending Miser - Glass Front Refrigerated Coolers	$1.08 / kWh	Incentive: $0.70 / kWh

Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Vending Miser **Measure Type:** Vending Miser **Measure Sub Type:** Vending Miser

Program: Large C&I New Construction

Measure Description

Standard efficiency non-refrigerated snack vending machine with a control system capable of powering down lighting and refrigeration systems during periods of inactivity

Baseline Description

The baseline efficiency case is a standard efficiency nonrefrigerated snack vending machine without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Measures

Measure Name	Unique Identifier
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR	Electric Commercial & Industrial Large C&I New Construction Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR

Savings Principle

The high efficiency case is a standard efficiency nonrefrigerated snack vending machine without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Savings Method

Deemed

Unit

Installed vending miser.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR	343.00	0.039					

Electric kWh Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Electric kW Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Energy Impact Factors

Measure	Measure Life
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR	5

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR	1.00	1.00	ls_271_Electric

RRsp Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

RRwp Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Vending Miser - Non-Refrigerated Snack Vending Machines UPSTR	$1.08 / kWh	Incentive: $0.70 / kWh

Vending Miser - Refrigerated Beverage Vending Machines UPSTR

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Vending Miser **Measure Type:** Vending Miser **Measure Sub Type:** Vending Miser

Program: Large C&I New Construction

Measure Description

Standard efficiency refrigerated beverage vending machine with a control system capable of powering down lighting and refrigeration systems during periods of inactivity

Baseline Description

The baseline efficiency case is a standard efficiency refrigerated beverage vending machine without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Measures

Measure Name	Unique Identifier
Vending Miser - Refrigerated Beverage Vending Machines UPSTR	Electric Commercial & Industrial Large C&I New Construction Vending Miser - Refrigerated Beverage Vending Machines UPSTR

Savings Principle

The high efficiency case is a standard efficiency refrigerated beverage vending machine with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Savings Method

Deemed

Unit

Installed vending miser.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Vending Miser - Refrigerated Beverage Vending Machines UPSTR	1612.00	0.184					

Electric kWh Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Electric kW Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Energy Impact Factors

Measure	Measure Life
Vending Miser - Refrigerated Beverage Vending Machines UPSTR	5

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Vending Miser - Refrigerated Beverage Vending Machines UPSTR	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
Vending Miser - Refrigerated Beverage Vending Machines UPSTR	1.00	1.00	ls_271_Electric

RRsp Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

RRwp Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Vending Miser - Refrigerated Beverage Vending Machines UPSTR							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Vending Miser - Refrigerated Beverage Vending Machines UPSTR	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Vending Miser - Refrigerated Beverage Vending Machines UPSTR	$1.08 / kWh	Incentive: $0.70 / kWh

VFD Secondary

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Large C&I New Construction

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
VFD Secondary	Electric Commercial & Industrial Large C&I New Construction VFD Secondary

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VFD Secondary	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
VFD Secondary	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
VFD Secondary	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
VFD Secondary	1.00	1.00	ls_110_Electric

RRsp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VFD Secondary				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VFD Secondary	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VFD Secondary	$0.48 / kWh	Incentive: $0.31 / kWh

VRF AC

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** VRF **Measure Sub Type:** AC

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

The baseline efficiency case for new installations assumes compliance with the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code. Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I New Construction VRF AC - 11.25T-20T
VRF AC - 11.25T-20T	Electric Commercial & Industrial Large C&I New Construction VRF AC - 5.4T-11.25T
VRF AC - 5.4T-11.25T	Electric Commercial & Industrial Large C&I New Construction VRF AC - over 20T
VRF AC - over 20T	Electric Commercial & Industrial Large C&I New Construction VRF AC - to 5.4T
VRF AC - to 5.4T	

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed unitary AC system for space cooling.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × (1/SEER_base - 1/SEER_ee) × Hours_C

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

EER_base = Energy Efficiency Ratio of baseline equipment: code. Since IECC 2012 does not provide EER requirements for equipment < 5.4 tons, assume the following conversion: EER ≈ SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VRF AC - 11.25T-20T	Calc	Calc					
VRF AC - 5.4T-11.25T	Calc	Calc					
VRF AC - over 20T	Calc	Calc					
VRF AC - to 5.4T	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
VRF AC - 11.25T-20T VRF AC - 5.4T-11.25T VRF AC - over 20T VRF AC - to 5.4T	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
VRF AC	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Measure	RR sp	RR wp	Loadshape ID
VRF AC - 11.25T-20T	1.00	1.00	ls_104_Electric
VRF AC - 5.4T-11.25T	1.00	1.00	ls_104_Electric
VRF AC - over 20T	1.00	1.00	ls_104_Electric
VRF AC - to 5.4T	1.00	1.00	ls_104_Electric

RRsp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

RRwp Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VRF AC - 11.25T-20T							
VRF AC - 5.4T-11.25T							
VRF AC - over 20T							
VRF AC - to 5.4T							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VRF AC	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VRF AC - 11.25T-20T		
VRF AC - 5.4T-11.25T		
VRF AC - over 20T		
VRF AC - to 5.4T		

VRF HP

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** VRF **Measure Sub Type:** HP

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

The baseline efficiency case for new installations assumes compliance with the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code. Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I New Construction VRF HP - 11.25T-20T
VRF HP - 11.25T-20T	Electric Commercial & Industrial Large C&I New Construction VRF HP - 5.4T-11.25T
VRF HP - 5.4T-11.25T	Electric Commercial & Industrial Large C&I New Construction VRF HP - over 20T
VRF HP - over 20T	Electric Commercial & Industrial Large C&I New Construction VRF HP - to 5.4T
VRF HP - to 5.4T	

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed heat pump system for space cooling and heating.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H]

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code

HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific.

Hours_H = Equivalent full load heating hours

CR = Capacity Ratio converts rated coolingcapacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric enefits Analysis Update. Prepared for Dave Weber, NSTAR.

EER_base = EnergyEfficiency Ratio of baseline equipment.

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VRF HP - 11.25T-20T	Calc	Calc					
VRF HP - 5.4T-11.25T	Calc	Calc					
VRF HP - over 20T	Calc	Calc					
VRF HP - to 5.4T	Calc	Calc					

Electric kWh Note: Algorithm inputs are based on engineering estimates of cooling hours and 2024 International Code Council (2024).

Electric kW Note: Algorithm Inputs based on UI and CL&P Program Savings Documentation for 2011 Program Year, Section 2.2.2 C&I LO Cooling - Unitary AC & Heat Pumps

Energy Impact Factors

Measure	Measure Life
VRF HP - 11.25T-20T VRF HP - 5.4T-11.25T VRF HP - over 20T VRF HP - to 5.4T	17

Measure Life Source: DNV GL (2018). Expected Useful Life (EUL) Estimation for Air-Conditioning Equipment from Current Age Distribution Memo (Project 73 Track D). https://ma-eeac.org/wp-content/uploads/Final-memo-on-P73-Track-D-EUL-estimation-results-to-date-v2.pdf

Measure	ISR	RRe Gas	RRe Electric
VRF HP	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Measure	RR sp	RR wp	Loadshape ID
VRF HP - 11.25T-20T	1.00	1.00	ls_104_Electric
VRF HP - 5.4T-11.25T	1.00	1.00	ls_104_Electric
VRF HP - over 20T	1.00	1.00	ls_104_Electric
VRF HP - to 5.4T	1.00	1.00	ls_104_Electric

RRsp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

RRwp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VRF HP - 11.25T-20T							
VRF HP - 5.4T-11.25T							
VRF HP - over 20T							
VRF HP - to 5.4T							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VRF HP	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VRF HP - 11.25T-20T	$0.48 / kWh	$0.31 / kWh
VRF HP - 5.4T-11.25T	$0.41 / kWh	$0.27 / kWh
VRF HP - over 20T	$0.35 / kWh	$0.23 / kWh
VRF HP - to 5.4T		

VSD

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Motors/Drives | **Measure Type:** VSD | **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
VSD-Non HVAC	Electric Commercial & Industrial Large C&I New Construction VSD-Non HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VSD-Non HVAC	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
VSD-Non HVAC	multi

Measure	ISR	RRe Gas	RRe Electric
VSD	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
VSD-Non HVAC	0.74	0.98	ls_147_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VSD-Non HVAC	Calc			$0.019			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VSD	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VSD-Non HVAC	$0.34 / kWh	Incentive: $0.22 / kWh

VSD Compressor (15<=HP<=75)

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Compressor

Measure Sub Type: Variable Speed Drive Compressor

Program: Large C&I New Construction

Measure Description

The installation of oil flooded, rotary screw compressors with Variable Speed Drive capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver.

Baseline Description

The baseline efficiency case is a typical load / unload compressor.

Measures

Measure Name	Unique Identifier
VSD Compressor (15<=HP<=75)	Electric Commercial & Industrial Large C&I New Construction VSD Compressor (15<=HP<=75)

Savings Principle

The high efficiency case is an oil-flooded, rotary screw compressor with Variable Speed Drive capacity control with a properly sized air receiver.

Savings Method

Calculated using site-specific inputs

Unit

kW saved per horsepower (hp) of installed air compressor capacity.

Savings Equation

Gross kWh = HP_compressor × deltakW/HP × Hours

Gross kW = HP_compressor × deltakW/HP

Where:

HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific

Hours = Annual operating hours of the air compressor: site-specific

deltakW/HP = Air compressor kW reduction per HP

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis; RR adjusts for evaluation results.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VSD Compressor (15<=HP<=75)	Calc	0.190					

Electric kWh Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Electric kW Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Electric kW Note: kW/HP

Energy Impact Factors

Measure	Measure Life
VSD Compressor (15<=HP<=75)	13

Measure Life Source: DOE (2016). Technical Support Document: Air Compressors. EERE-2013-BT-STD-0040-0082. https://www.regulations.gov/document/EERE-2013-BT-STD-0040-0082

Measure	ISR	RRe Gas	RRe Electric
VSD Compressor (15<=HP<=75)	1.00		1.44

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
VSD Compressor (15<=HP<=75)	1.00	1.00	ls_112_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VSD Compressor (15<=HP<=75)				$0.043			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VSD Compressor (15<=HP<=75)	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VSD Compressor (15<=HP<=75)	$0.34 / kWh	Incentive: $0.22 / kWh

Water Source Heat Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Heat Pumps | **Measure Sub Type:** Ground Source

Program: Large C&I New Construction

Measure Description

This measure applies to the installation of high-efficiency single package or split system air source, water source, ground source (closed loop) and groundwater source (open loop) heat pump systems for space conditioning applications.

Baseline Description

Appendix A details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
Water Source Heat Pump	Electric Commercial & Industrial Large C&I New Construction Water Source Heat Pump

Savings Principle

The high efficiency case assumes a high-efficiency air cooled, water source, ground water source, or ground source heat pump system that exceeds the energy efficiency requirements of the International Energy Conservation Code (IECC) 2024.

Savings Method

Calculated using site-specific inputs

Unit

Installed heat pump system for space cooling / heating.

Savings Equation

Gross kWh = Tons × (kBtu/hr per ton) × [(1/SEER_base - 1/SEER_ee) × Hours_C + CR × (1/HSPF_base - 1/HSPF_ee) × Hours_H]

Gross kW = Tons × (kBtu/hr per ton) × (1/EER_base - 1/EER_ee)

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

12 kBtu/hr per ton = Conversion factor

SEER_base = Seasonal Energy Efficiency Ratio of the baseline equipment: code

SEER_ee = Seasonal energy efficiency ratio of the high-efficiency unit: site-specific.

Hours_C = Equivalent full load cooling hours

HSPF_base = Heating Seasonal Performance Factor for baseline equipment: code

HSPF_ee = Heating Seasonal Performance Factor for new efficient equipment: site-specific.

Hours_H = Equivalent full load heating hours

CR = Capacity Ratio converts rated coolingcapacity to heating capacity. For equipment with cooling capacity ≤ 5.4 tons, assume CR=1. For equipment > 5.4 tons, assume CR=1.15; Optimal Energy, Inc. (2008). Memo:Non-Electric enefits Analysis Update. Prepared for Dave Weber, NSTAR.

EER_base = EnergyEfficiency Ratio of baseline equipment.

EER_ee = Energy Efficiency Ratio of the new efficient equipment: site-specific. For equipment < 5.4 tons, assume the following conversion: EER≈SEER/1.1

Hours: N/A

Hours Source: KEMA (2011). C&I Unitary HVAC Load Shape Project Final Report. Prepared for the Regional Evaluation, Measurement and Verification Forum.

Hours Note: If site-specific data is unavailable, the average cooling EFLHs are taken as 855 hours while the average heating EFLHs are taken as 1137 hours.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Water Source Heat Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Water Source Heat Pump	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Water Source Heat Pump	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Measure	RR sp	RR wp	Loadshape ID
Water Source Heat Pump	1.05	1.05	ls_256_Electric

RRsp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

RRwp Source: The Fleming Group (1994). Persistence of Commercial/Industrial Non-Lighting Measures, Volume 2, Energy Efficient HVAC and Process Cooling Equipment. Prepared for NE Power Service Co.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Water Source Heat Pump							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Water Source Heat Pump	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Water Source Heat Pump	$0.69 / kWh	Incentive: $0.50 / kWh

WCChill

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** WCChill | **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

This measure promotes the installation of efficient water-cooled chilling packages for comfort cooling applications. Eligible chillers include water-cooled chillers for single chiller systems or for the lead chiller only in multi-chiller systems.

Baseline Description

The baseline efficiency case for new installations assumes compliance with the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code. Appendix A, Table 9 details the specific efficiency requirements by equipment type.

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I New Construction WCChill - over300T_IPLV_CEN
	Electric Commercial & Industrial Large C&I New Construction WCChill - over300T_IPLV_SCR
	Electric Commercial & Industrial Large C&I New Construction WCChill - over300T_PkkW_CEN
	Electric Commercial & Industrial Large C&I New Construction WCChill - over300T_PkkW_SCR
	Electric Commercial & Industrial Large C&I New Construction WCChill - to150T_IPLV_CEN
WCChill - over300T_IPLV_CEN	Electric Commercial & Industrial Large C&I New Construction WCChill - to150T_IPLV_SCR
WCChill - over300T_IPLV_SCR	Electric Commercial & Industrial Large C&I New Construction WCChill - to150T_PkkW_CEN
WCChill - over300T_PkkW_CEN	Electric Commercial & Industrial Large C&I New Construction WCChill - to150T_PkkW_SCR
WCChill - over300T_PkkW_SCR	Electric Commercial & Industrial Large C&I New Construction WCChill - 150-300T_IPLV
WCChill - to150T_IPLV_CEN	Electric Commercial & Industrial Large C&I New Construction WCChill - 150-300T_IPLV_CEN
WCChill - to150T_IPLV_SCR	Electric Commercial & Industrial Large C&I New Construction WCChill - 150-300T_IPLV_SCR
WCChill - to150T_PkkW_CEN	Electric Commercial & Industrial Large C&I New Construction WCChill - 150-300T_PkKW
WCChill - to150T_PkkW_SCR	Electric Commercial & Industrial Large C&I New Construction WCChill - 150-300T_PkKW_CEN
WCChill - 150-300T_IPLV	Electric Commercial & Industrial Large C&I New Construction WCChill - 150-300T_PkKW_SCR
WCChill - 150-300T_IPLV_CEN	Electric Commercial & Industrial Large C&I New Construction WCChill - 300-1000T_IPLV
WCChill - 150-300T_IPLV_SCR	Electric Commercial & Industrial Large C&I New Construction WCChill - 300-1000T_PkKW
WCChill - 150-300T_PkKW	Electric Commercial & Industrial Large C&I New Construction WCChill - 30-70T
WCChill - 150-300T_PkKW_CEN	Electric Commercial & Industrial Large C&I New Construction WCChill - 70-150T
WCChill - 150-300T_PkKW_SCR	
WCChill - 300-1000T_IPLV	
WCChill - 300-1000T_PkKW	
WCChill - 30-70T	
WCChill - 70-150T	

Savings Principle

The high efficiency case assumes the HVAC equipment exceeds the requirements of the current version of International Energy Conservation Code (IECC) as mandated by Rhode Island State Building Code.

Savings Method

Calculated using site-specific inputs

Unit

Installed high-efficiency chiller for space cooling.

Savings Equation

Gross kWh = Tons × (kW/ton_base - kW/ton_ee) × Hours_C

Gross kW = Tons × (kW/ton_base - kW/ton_ee) × LF

Where:

Tons = Rated cooling capacity of the installed equipment: site-specific.

kW/ton_base = Rated efficiency of baseline equipment: code

kW/ton_ee =Energy efficiency rating of the efficient equipment: site-specific.

Hours_C = Equivalent full load cooling hours

LF = Load Factor

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis; in the absence of site specific information, 1,328 hours can be used as a default.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
WCChill - over300T_IPLV_CEN	Calc	Calc					
WCChill - over300T_IPLV_SCR	Calc	Calc					
WCChill - over300T_PkkW_CEN	Calc	Calc					
WCChill - over300T_PkkW_SCR	Calc	Calc					
WCChill - to150T_IPLV_CEN	Calc	Calc					
WCChill - to150T_IPLV_SCR	Calc	Calc					

Electric kWh Note: Algorithm inputs are based on engineering estimates of cooling hours and 2024 International Code Council (2024).

Electric kW Note: Algorithm inputs are based on engineering estimates of cooling hours and 2024 International Code Council (2024).

Energy Impact Factors

Measure	Measure Life
WCChill - over300T_IPLV_CEN	23
WCChill - over300T_IPLV_SCR	
WCChill - over300T_PkkW_CEN	
WCChill - over300T_PkkW_SCR	
WCChill - to150T_IPLV_CEN	
WCChill - to150T_IPLV_SCR	
WCChill - to150T_PkkW_CEN	
WCChill - to150T_PkkW_SCR	
WCChill - 150-300T_IPLV	
WCChill - 150-300T_IPLV_CEN	
WCChill - 150-300T_IPLV_SCR	
WCChill - 150-300T_PkKW	
WCChill - 150-300T_PkKW_CEN	
WCChill - 150-300T_PkKW_SCR	
WCChill - 300-1000T_IPLV	
WCChill - 300-1000T_PkKW	
WCChill - 30-70T	
WCChill - 70-150T	

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
WCChill	1.00		1.08

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
WCChill - over300T_IPLV_CEN	1.00	1.00	ls_103_Electric
WCChill - over300T_IPLV_SCR	1.00	1.00	ls_103_Electric
WCChill - over300T_PkkW_CEN	1.00	1.00	ls_103_Electric
WCChill - over300T_PkkW_SCR	1.00	1.00	ls_103_Electric
WCChill - to150T_IPLV_CEN	1.00	1.00	ls_103_Electric
WCChill - to150T_IPLV_SCR	1.00	1.00	ls_103_Electric
WCChill - to150T_PkkW_CEN	1.00	1.00	ls_103_Electric
WCChill - to150T_PkkW_SCR	1.00	1.00	ls_103_Electric
WCChill - 150-300T_IPLV	1.00	1.00	ls_103_Electric
WCChill - 150-300T_IPLV_CEN	1.00	1.00	ls_103_Electric
WCChill - 150-300T_IPLV_SCR	1.00	1.00	ls_103_Electric
WCChill - 150-300T_PkKW	1.00	1.00	ls_103_Electric
WCChill - 150-300T_PkKW_CEN	1.00	1.00	ls_103_Electric
WCChill - 150-300T_PkKW_SCR	1.00	1.00	ls_103_Electric
WCChill - 300-1000T_IPLV	1.00	1.00	ls_103_Electric
WCChill - 300-1000T_PkKW	1.00	1.00	ls_103_Electric
WCChill - 30-70T	1.00	1.00	ls_103_Electric
WCChill - 70-150T	1.00	1.00	ls_103_Electric

RRsp Note: RRsp & RRwp are set to 1.00 because evaluation results set coincidence factor.

RRwp Note: RRsp & RRwp are set to 1.00 because evaluation results set coincidence factor.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
WCChill - over300T_IPLV_CEN							
WCChill - over300T_IPLV_SCR							
WCChill - over300T_PkkW_CEN							
WCChill - over300T_PkkW_SCR							
WCChill - to150T_IPLV_CEN							
WCChill - to150T_IPLV_SCR							
WCChill - to150T_PkkW_CEN							
WCChill - to150T_PkkW_SCR							
WCChill - 150-300T_IPLV							
WCChill - 150-300T_IPLV_CEN							
WCChill - 150-300T_IPLV_SCR							
WCChill - 150-300T_PkKW							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WCChill	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WCChill - over300T_IPLV_CEN	$0.46 / kWh	$0.30 / kWh
WCChill - over300T_IPLV_SCR	$0.46 / kWh	$0.30 / kWh
WCChill - over300T_PkkW_CEN	$0.46 / kWh	$0.30 / kWh
WCChill - over300T_PkkW_SCR	$0.46 / kWh	$0.30 / kWh
WCChill - to150T_IPLV_CEN	$0.46 / kWh	$0.30 / kWh
WCChill - to150T_IPLV_SCR	$0.46 / kWh	$0.30 / kWh
WCChill - to150T_PkkW_CEN	$0.46 / kWh	$0.30 / kWh
WCChill - to150T_PkkW_SCR	$0.46 / kWh	$0.30 / kWh
WCChill - 150-300T_IPLV	$0.46 / kWh	$0.30 / kWh
WCChill - 150-300T_IPLV_CEN	$0.46 / kWh	$0.30 / kWh
WCChill - 150-300T_IPLV_SCR	$0.46 / kWh	$0.30 / kWh
WCChill - 150-300T_PkKW	$0.46 / kWh	$0.30 / kWh
WCChill - 150-300T_PkKW_CEN	$0.46 / kWh	$0.30 / kWh
WCChill - 150-300T_PkKW_SCR	$0.46 / kWh	$0.30 / kWh
WCChill - 300-1000T_IPLV	$0.46 / kWh	$0.30 / kWh
WCChill - 300-1000T_PkKW	$0.46 / kWh	$0.30 / kWh
WCChill - 30-70T	$0.46 / kWh	$0.30 / kWh
WCChill - 70-150T	$0.46 / kWh	

Zero loss condensate drain

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Zero Loss Condensate Drains

Measure Sub Type: Zero Loss Condensate Drain

Program: Large C&I New Construction

Measure Description

Drains remove water from a compressed air system. Zero loss condensate drains remove water from a compressed air system without venting any air, resulting in less air demand and consequently greater efficiency.

Baseline Description

The baseline efficiency case is the installation of a standard condensate drain on a compressor system.

Measures

Measure Name	Unique Identifier
Zero loss condensate drain	Electric Commercial & Industrial Large C&I New Construction Zero loss condensate drain

Savings Principle

The high efficiency case is the installation of a zero loss condensate drain on a single operating compressor rated <= 75 HP.

Savings Method

Calculated using site-specific inputs

Unit

Installed drain.

Savings Equation

Gross kWh = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM × Hours

Gross kW = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM

Where:

CFM_pipe = CFM capacity of piping: site-specific

0.049 deltaCFM/CFM_pipe = Average CFM saved per CFM of piping capacity

0.24386 deltakW/CFM = Average demand savings per CFM; Based on regional analysis assuming a typical timed drain settings discharge scenario.

Hours = Annual operating hours of the zero loss condensate drain: site-specific

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Zero loss condensate drain	Calc	Calc					

Electric kWh Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Energy Impact Factors

Measure	Measure Life
Zero loss condensate drain	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Zero loss condensate drain	1.00		1.44

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
Zero loss condensate drain	1.00	1.00	ls_112_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Zero loss condensate drain				$0.043			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Zero loss condensate drain	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Zero loss condensate drain	$0.43 / kWh	Incentive: $0.28 / kWh

Large C&I Retrofit, Electric

Boiler, Draft Fan

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Boiler, Draft Fan	Electric Commercial & Industrial Large C&I Retrofit Boiler, Draft Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Boiler, Draft Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Boiler, Draft Fan	15

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Boiler, Draft Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Boiler, Draft Fan	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Boiler, Draft Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler, Draft Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler, Draft Fan	$0.50 / kWh	Incentive: $0.43 / kWh

Boiler, Feedwater Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Boiler, Feedwater Pump	Electric Commercial & Industrial Large C&I Retrofit Boiler, Feedwater Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Boiler, Feedwater Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Boiler, Feedwater Pump	15

Measure Life Source: California Public Utilities Commission (CPUC), Energy Division (2008). EUL_Summary_10-1-08.xls.

Measure	ISR	RRe Gas	RRe Electric
Boiler, Feedwater Pump	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Boiler, Feedwater Pump	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Boiler, Feedwater Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler, Feedwater Pump	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler, Feedwater Pump	$0.50 / kWh	Incentive: $0.43 / kWh

Building Exhaust Fan

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Building Exhaust Fan	Electric Commercial & Industrial Large C&I Retrofit Building Exhaust Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Building Exhaust Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Building Exhaust Fan	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Building Exhaust Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Building Exhaust Fan	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Building Exhaust Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building Exhaust Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building Exhaust Fan	$0.50 / kWh	Incentive: $0.43 / kWh

Building operator certification

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Whole Building **Measure Type:** BOC Training **Measure Sub Type:** Certification

Program: Large C&I Retrofit

Measure Description

The Building Operator Certification (BOC) class improves operators' ability to optimize / minimize gas and electricity use in buildings.

Baseline Description

The base case is a building operator without specific training on efficient use of gas and electricity in buildings.

Measures

Measure Name	Unique Identifier
Building operator certification	Electric Commercial & Industrial Large C&I Retrofit Building operator certification

Savings Principle

The high efficiency case is a building operator attending a class on improving the efficiency of gas and electricity use in buildings.

Savings Method

Deemed

Unit

kWh/SF/BOC completion

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Building operator certification	0.18						

Electric kWh Source: Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts PAs and EEAC

Energy Impact Factors

Measure	Measure Life
Building operator certification	5

Measure Life Source: Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts PAs and EEAC

Measure	ISR	RRe Gas	RRe Electric
Building operator certification	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Building operator certification	1.00	1.00	ls_249_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Building operator certification							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building operator certification	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building operator certification		

Building Shell

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** Whole Building | **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Building Shell	Electric Commercial & Industrial Large C&I Retrofit Building Shell

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Building Shell	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Building Shell	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Building Shell	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Building Shell	0.74	0.98	ls_257_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Building Shell	Calc						

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building Shell	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building Shell	$1.04 / kWh	Incentive: $0.85 / kWh

Chiller, Water Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Chiller, Water Pump	Electric Commercial & Industrial Large C&I Retrofit Chiller, Water Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Chiller, Water Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Chiller, Water Pump	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Chiller, Water Pump	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Chiller, Water Pump	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Chiller, Water Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Chiller, Water Pump	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Chiller, Water Pump	$0.50 / kWh	Incentive: $0.43 / kWh

Commercial Refrigeration

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Refrigeration **Measure Type:** Refrigeration **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Commercial Refrigeration	Electric Commercial & Industrial Large C&I Retrofit Commercial Refrigeration

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Commercial Refrigeration	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Commercial Refrigeration	multi

Measure	ISR	RRe Gas	RRe Electric
Commercial Refrigeration	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Commercial Refrigeration	0.74	0.98	ls_134_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Commercial Refrigeration	Calc			$0.052			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Commercial Refrigeration	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Commercial Refrigeration	$0.78 / kWh	Incentive: $0.44 / kWh

Comprehensive Retrofit (CR)

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Whole Building | **Measure Type:** Whole Building | **Measure Sub Type:** Whole Building

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Comprehensive Retrofit (CR)	Electric Commercial & Industrial Large C&I Retrofit Comprehensive Retrofit (CR)

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Comprehensive Retrofit (CR)	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Comprehensive Retrofit (CR)	multi

Measure	ISR	RRe Gas	RRe Electric
Comprehensive Retrofit (CR)	1.00		0.88

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2023). RI PY2021 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Comprehensive Retrofit (CR)	0.73	1.06	ls_260_Electric

RRsp Source: DNV (2023). RI PY2021 Custom Electric Installations.

RRwp Source: DNV (2023). RI PY2021 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Comprehensive Retrofit (CR)							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Comprehensive Retrofit (CR)	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Comprehensive Retrofit (CR)		

Compressed Air Nozzle

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Compressed Air | **Measure Type:** CAIR Nozzle | **Measure Sub Type:** CAIR Nozzle

Program: Large C&I Retrofit

Measure Description

The installation of an efficient CAIR nozzle.

Baseline Description

The baseline efficiency case is the installation of a standard CAIR nozzle.

Measures

Measure Name	Unique Identifier
Compressed Air Nozzle	Electric Commercial & Industrial Large C&I Retrofit Compressed Air Nozzle

Savings Principle

The high efficiency case is the installation of an efficient CAIR nozzle.

Savings Method

Calculated using site-specific inputs

Unit

Installed CAIR nozzle.

Savings Equation

Gross kWh = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM × Hours

Gross kW = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM

Where:

CFM_pipe = CFM capacity of piping: site-specific

0.049 deltaCFM/CFM_pipe = Average CFM saved per CFM of piping capacity

0.24386 deltakW/CFM = Average demand savings per CFM; Based on regional analysis assuming a typical timed drain settings discharge scenario.

Hours = Annual operating hours of the zero loss condensate drain: site-specific

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Compressed Air Nozzle	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Compressed Air Nozzle	13

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Compressed Air Nozzle	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.

Measure	RR sp	RR wp	Loadshape ID
Compressed Air Nozzle	1.00	1.00	ls_259_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Compressed Air Nozzle				$0.058			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Compressed Air Nozzle	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Compressed Air Nozzle		

Cooling Town Fan

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Cooling Town Fan	Electric Commercial & Industrial Large C&I Retrofit Cooling Town Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Cooling Town Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Cooling Town Fan	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Cooling Town Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Cooling Town Fan	0.99	0.99	ls_110_Electric

RRwp Note: The MA evaluation did not provide realization rates within sufficient precision so the they are assumed to be 100%, pending a future study by NEEP

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Cooling Town Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Cooling Town Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Cooling Town Fan	$0.50 / kWh	Incentive: $0.43 / kWh

Custom CHP

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: CHP | **Measure Type:** CHP | **Measure Sub Type:** CHP

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Custom CHP	Electric Commercial & Industrial Large C&I Retrofit Custom CHP

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom CHP	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Custom CHP	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Custom CHP	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Custom CHP	1.00	1.00	ls_124_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom CHP				$-0.015			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom CHP	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom CHP		

Custom Compressed Air

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Compressed Air **Measure Type:** Compressed Air **Measure Sub Type:** Compressed Air

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Custom Compressed Air	Electric Commercial & Industrial Large C&I Retrofit Custom Compressed Air

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom Compressed Air	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Custom Compressed Air	multi

Measure	ISR	RRe Gas	RRe Electric
Custom Compressed Air	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Compressed Air	0.74	0.98	ls_129_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom Compressed Air				$0.058			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Compressed Air	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Compressed Air	$0.12 / kWh	Incentive: $0.10 / kWh

Custom HVAC

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** HVAC | **Measure Sub Type:** HVAC

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Custom HVAC	Electric Commercial & Industrial Large C&I Retrofit Custom HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom HVAC	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Custom HVAC	multi

Measure	ISR	RRe Gas	RRe Electric
Custom HVAC	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom HVAC	0.74	0.98	ls_130_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom HVAC				$0.039			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom HVAC	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom HVAC	$0.90 / kWh	Incentive: $0.62 / kWh

Custom Lighting

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** Custom | **Measure Sub Type:** Lighting

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Custom Lighting	Electric Commercial & Industrial Large C&I Retrofit Custom Lighting

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours

Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)

Where:

QTY_base_i = Quantity of baseline fixtures in location i

Watts_base_i = Connected wattage of baseline fixtures in location i

QTY_ee_j = Quantity of efficient fixtures in location j

Watts_ee_j = Connected wattage of efficient fixtures in location j

1,000 Watts per kW = Conversion factor

Hours = Lighting annual hours of operation: site-specific.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N128

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom Lighting	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Custom Lighting	multi

Measure	ISR	RRe Gas	RRe Electric
Custom Lighting	1.00		0.93

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Lighting	0.99	0.99	ls_106_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom Lighting				$0.030			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Lighting	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Lighting		

Custom Motor

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Motor **Measure Sub Type:** Motor

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Custom Motor	Electric Commercial & Industrial Large C&I Retrofit Custom Motor

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom Motor	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Custom Motor	multi

Measure	ISR	RRe Gas	RRe Electric
Custom Motor	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Motor	0.74	0.98	ls_132_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom Motor				$0.019			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Motor	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Motor	$0.51 / kWh	Incentive: $0.44 / kWh

Custom Other

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Other | **Measure Type:** Other | **Measure Sub Type:** Other

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Custom Other	Electric Commercial & Industrial Large C&I Retrofit Custom Other

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom Other	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Custom Other	multi

Measure	ISR	RRe Gas	RRe Electric
Custom Other	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Other	0.74	0.98	ls_136_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom Other							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Other	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Other	$1.04 / kWh	Incentive: $0.22 / kWh

Custom process

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Process | **Measure Type:** Process | **Measure Sub Type:** Process

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Custom process	Electric Commercial & Industrial Large C&I Retrofit Custom process

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom process	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Custom process	multi

Measure	ISR	RRe Gas	RRe Electric
Custom process	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom process	0.74	0.98	ls_133_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom process				$0.102			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom process	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom process	$0.34 / kWh	Incentive: $0.24 / kWh

Custom Weatherization

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** Weatherization | **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Custom Weatherization	Electric Commercial & Industrial Large C&I Retrofit Custom Weatherization

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom Weatherization	Calc	Calc	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Custom Weatherization	multi

Measure	ISR	RRe Gas	RRe Electric
Custom Weatherization	1.00	0.83	0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Weatherization	0.74	0.98	ls_130_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom Weatherization							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Weatherization	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Weatherization		

Dual Enthalpy Economizer Control (DEEC)

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Controls

Measure Sub Type: Dual Enthalpy Economizer Control

Program: Large C&I Retrofit

Measure Description

The measure is to upgrade the outside-air dry-bulb economizer to a dual enthalpy economizer. The system will continuously monitor the enthalpy of both the outside air and return air. The system will control the system dampers adjust the outside quantity based on the two readings.

Baseline Description

The baseline efficiency case for this measure assumes the relevant HVAC equipment is operating with a fixed dry-bulb economizer.

Measures

Measure Name	Unique Identifier
Dual Enthalpy Economizer Control (DEEC)	Electric Commercial & Industrial Large C&I Retrofit Dual Enthalpy Economizer Control (DEEC)

Savings Principle

The high efficiency case is the installation of an outside air economizer utilizing two enthalpy sensors, one for outdoor air and one for return air.

Savings Method

Deemed

Unit

Total tons of controlled cooling capacity.

Savings Equation

ΔkWh = (kBtu/h)(1 Ton/12 kBtu / h)(SAVEkWh)

ΔkW = (kBtu/h)(1 Ton/12 kBtu / h)(SAVEkW)

Where:

kBtu/h = Capacity of the cooling equipment in kBtu per hour (1 ton of cooling capacity equals

12kBtu/h).

SAVEkWh = Average annual kWh reduction per ton of cooling capacity: 38.2 289 kWh/ton (1),(2)

SAVEkW = Average kW reduction per ton of cooling capacity: 0.289 0 kW/ton

(1) (2022). New York Standard Approach for Estimating Energy Savings from Energy Efficiency

Programs. Residential, Multi-Family, and Commercial/Industrial Measures. Version 9. New York

TRM calculated unit energy savings from a DOE-2.2 simulation of a series of prototypical small

commercial buildings. Cadeo mapped New York savings to Massachusetts cities using weather

data and comparing HDD, CDD, wet-bulb and dry-bulb temperatures.

(2). Cadeo weighted savings by building type using US Energy Information Administration Commercial Buildings Energy Consumption Survey (CBECS), 2018 microdata.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dual Enthalpy Economizer Control (DEEC)	Calc	Calc					

Electric kWh Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Electric kW Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Dual Enthalpy Economizer Control (DEEC)	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Dual Enthalpy Economizer Control (DEEC)	1.00		1.04

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Dual Enthalpy Economizer Control (DEEC)	1.03	1.03	ls_126_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dual Enthalpy Economizer Control (DEEC)				$0.116			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dual Enthalpy Economizer Control (DEEC)	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dual Enthalpy Economizer Control (DEEC)		

Energy Management System

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** EMS

Program: Large C&I Retrofit

Measure Description

The measure is the installation of a new building energy management system (EMS) or the expansion of an existing energy management system for control of non-lighting electric and gas end-uses in an existing building on existing equipment.

Baseline Description

The baseline case is the existing equipment and systems without the implemented controls.

Measures

Measure Name	Unique Identifier
	Electric Commercial & Industrial Large C&I Retrofit EMS 5k-40ksqft
EMS 5k-40ksqft	Electric Commercial & Industrial Large C&I Retrofit EMS 40k-80ksqft
EMS 40k-80ksqft	Electric Commercial & Industrial Large C&I Retrofit EMS 80k-200ksqft
EMS 80k-200ksqft	

Savings Principle

The high efficiency case is the installation of a new EMS or the expansion of an existing EMS to control additional non-lighting electric and/or gas equipment. The EMS must be installed in an existing building on existing equipment.

Savings Method

Custom

Unit

Upgrade to existing energy management system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = Gross kWh × deltaMMBtu_Gas/kWh

Gross MMBtu Oil = Gross kWh × deltaMMBtu_Oil/kWh

Where:

deltaMMBtu_Gas/kWh = Deemed average natural gas impact per gross electric energy impact

deltaMMBtu_Oil/kWh = Deemed average heating oil impact per gross electric energy impact

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
EMS 5k-40ksqft	Calc	Calc					
EMS 40k-80ksqft	Calc	Calc					
EMS 80k-200ksqft	Calc	Calc					

Electric kWh Note: Gross energy and deemed savings for sequences implemented in Energy Management Systems (EMS) are estimated using a statewide calculator.

Electric kW Note: Gross energy and deemed savings for sequences implemented in Energy Management Systems (EMS) are estimated using a statewide calculator.

Energy Impact Factors

Measure	Measure Life
EMS 5k-40ksqft EMS 40k-80ksqft EMS 80k-200ksqft	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Energy Management System	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
EMS 5k-40ksqft	0.74	0.98	ls_126_Electric
EMS 40k-80ksqft	0.74	0.98	ls_126_Electric
EMS 80k-200ksqft	0.74	0.98	ls_126_Electric
	0.74	0.98	

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
EMS 5k-40ksqft				$0.121			
EMS 40k-80ksqft				$0.121			
EMS 80k-200ksqft				$0.121			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Energy Management System	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
EMS 5k-40ksqft	$1.08 / kWh	$0.62 / kWh
EMS 40k-80ksqft	$1.08 / kWh	$0.57 / kWh
EMS 80k-200ksqft	$1.08 / kWh	$0.52 / kWh

Energy management system, custom

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Custom

Measure Category: Whole Building

Measure Type: Controls

Measure Sub Type: Energy Management System

Program: Large C&I Retrofit

Measure Description

The measure is the installation of a new building energy management system (EMS) or the expansion of an existing energy management system for control of non-lighting electric and gas end-uses in an existing building on existing equipment.

Baseline Description

The baseline case is the existing equipment and systems without the implemented controls.

Measures

Measure Name	Unique Identifier
Energy management system, custom	Electric Commercial & Industrial Large C&I Retrofit Energy management system, custom

Savings Principle

The high efficiency case is the installation of a new EMS or the expansion of an existing EMS to control additional non-lighting electric and/or gas equipment. The EMS must be installed in an existing building on existing equipment.

Savings Method

Calculated using site-specific inputs

Unit

Upgrade to existing energy management system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Energy management system, custom	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Energy management system, custom	5,10,15

Measure	ISR	RRe Gas	RRe Electric
Energy management system, custom	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Energy management system, custom	0.74	0.98	ls_130_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Energy management system, custom				$0.044			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Energy management system, custom	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Energy management system, custom	$0.54 / kWh	Incentive: $0.43 / kWh

Food Service

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Food Service **Measure Type:** Food Service **Measure Sub Type:** Food Service

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Food Service	Electric Commercial & Industrial Large C&I Retrofit Food Service

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Food Service	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Food Service	multi

Measure	ISR	RRe Gas	RRe Electric
Food Service	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Food Service	0.74	0.98	ls_257_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Food Service							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Food Service	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Food Service	$1.04 / kWh	Incentive: $0.37 / kWh

Fuel Cell

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Other | **Measure Type:** | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Fuel Cell	Electric Commercial & Industrial Large C&I Retrofit Fuel Cell

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Fuel Cell	Calc	Calc	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Fuel Cell	multi

Measure	ISR	RRe Gas	RRe Electric
Fuel Cell	1.00	1.00	0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Fuel Cell	0.74	0.98	ls_257_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Fuel Cell							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Fuel Cell	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Fuel Cell	$0.10 / kWh	Incentive: $0.10 / kWh

Glass front refrigerated coolers

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Refrigeration | **Measure Type:** Controls | **Measure Sub Type:** Vending Miser

Program: Large C&I Retrofit

Measure Description

Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintaina cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.

Baseline Description

The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Measures

Measure Name	Unique Identifier
Glass front refrigerated coolers	Electric Commercial & Industrial Large C&I Retrofit Glass front refrigerated coolers

Savings Principle

The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Savings Method

Deemed

Unit

Installed vending miser.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Glass front refrigerated coolers	1208.00	0.138					

Electric kWh Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Electric kW Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Energy Impact Factors

Measure	Measure Life
Glass front refrigerated coolers	5

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Glass front refrigerated coolers	1.00		1.04

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Glass front refrigerated coolers	1.03	1.03	ls_126_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Glass front refrigerated coolers				$0.116			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Glass front refrigerated coolers	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Glass front refrigerated coolers		

Heating Hot Water Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Heating Hot Water Pump	Electric Commercial & Industrial Large C&I Retrofit Heating Hot Water Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Heating Hot Water Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Heating Hot Water Pump	13

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Heating Hot Water Pump	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Heating Hot Water Pump	0.74	0.98	ls_110_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Heating Hot Water Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating Hot Water Pump	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating Hot Water Pump	$0.50 / kWh	Incentive: $0.43 / kWh

HVAC Fan

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** HVAC **Measure Sub Type:** Fan

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
HVAC Fan - Return	Electric Commercial & Industrial Large C&I Retrofit HVAC Fan - Return
HVAC Fan - Supply	Electric Commercial & Industrial Large C&I Retrofit HVAC Fan - Supply

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc					
HVAC Fan - Return	Calc						
HVAC Fan - Supply	Calc						
	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
HVAC Fan - Return	15
HVAC Fan - Supply	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
HVAC Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
HVAC Fan - Return	0.99	0.99	ls_110_Electric
HVAC Fan - Supply	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
HVAC Fan - Return				$0.003			
HVAC Fan - Supply				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC Fan - Return	$0.50 / kWh	$0.43 / kWh
HVAC Fan - Supply	$0.50 / kWh	$0.43 / kWh

HVAC Fan

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** HVAC **Measure Sub Type:** Fan

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
HVAC Fan - Return	Electric Commercial & Industrial Large C&I Retrofit HVAC Fan - Return
HVAC Fan - Supply	Electric Commercial & Industrial Large C&I Retrofit HVAC Fan - Supply

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc					
HVAC Fan - Return	Calc						
HVAC Fan - Supply	Calc						
	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
HVAC Fan - Return	15
HVAC Fan - Supply	15

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
HVAC Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
HVAC Fan - Return	0.99	0.99	ls_110_Electric
HVAC Fan - Supply	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
HVAC Fan - Return				$0.003			
HVAC Fan - Supply				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC Fan - Return	$0.50 / kWh	$0.43 / kWh
HVAC Fan - Supply	$0.50 / kWh	$0.43 / kWh

LEDS

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Lighting **Measure Type:** LEDS **Measure Sub Type:** LEDS

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
LEDS	Electric Commercial & Industrial Large C&I Retrofit LEDS

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
LEDS	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
LEDS	3

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
LEDS	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
LEDS	0.94	0.75	ls_131_Electric

RRsp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

RRwp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
LEDS				$0.065			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
LEDS	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
LEDS	$0.83 / kWh	Incentive: $0.34 / kWh

Lighting Controls

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Lighting | **Measure Type:** Controls | **Measure Sub Type:** Controls

Program: Large C&I Retrofit

Measure Description

This measure promotes the installation of lighting controls in retrofit applications. Promoted technologies include occupancy sensors, daylight dimming controls, and integrated controls.

Baseline Description

The baseline efficiency case assumes no controls.

Measures

Measure Name	Unique Identifier
Lighting Controls - Dimming Lighting Controls - Integrated Lighting Controls - Sensor Lighting Controls - Exterior Lighting Controls - Street Light Exterior	Electric Commercial & Industrial Large C&I Retrofit Lighting Controls - Dimming Electric Commercial & Industrial Large C&I Retrofit Lighting Controls - Integrated Electric Commercial & Industrial Large C&I Retrofit Lighting Controls - Sensor Electric Commercial & Industrial Large C&I Retrofit Lighting Controls - Exterior Electric Commercial & Industrial Large C&I Retrofit Lighting Controls - Street Light Exterior

Savings Principle

The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit hours of operation.

Savings Method

Calc

Unit

Installed lighting controls project.

Savings Equation

Gross kWh = ControlledkW * hours_base * (%Save)

Gross kW = ControlledkW

where:

%Save = Percentage of kWh that is saved by utilized the control maeasure

Savings factors are deemed based on study results. Refer to Table XX in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
					0.00		
Lighting Controls - Dimming	Calc	Calc					
Lighting Controls - Integrated	Calc	Calc					
Lighting Controls - Sensor	Calc	Calc					
Lighting Controls - Exterior	Calc	Calc					
Lighting Controls - Street Light Exterior	Calc	Calc					

Gas Heat MMBtu Source: DNV GL (2018).Impact Evaluation of PY2015 RI C&I Upstream Lighting Initiative. http://rieermc.ri.gov/wp-content/uploads/2019/04/impact_eval_of_ri_upstream_lighting_finalreport.pdf

Energy Impact Factors

Measure	Measure Life
Lighting Controls - Dimming	See Table 12 in Appendix A
Lighting Controls - Integrated	9
Lighting Controls - Sensor	11
Lighting Controls - Exterior	9
Lighting Controls - Street Light Exterior	9
	9

Measure Life Source: Dan Mellinger (2022). Lighting Control Measure Life Memo.

Measure	ISR	RRe Gas	RRe Electric
Lighting Controls	1.00		0.93

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Lighting Controls - Dimming	0.99	0.99	ls_106_Electric
Lighting Controls - Integrated	0.99	0.99	ls_106_Electric
Lighting Controls - Sensor	0.99	0.99	ls_106_Electric
Lighting Controls - Exterior	0.99	0.99	ls_106_Electric
Lighting Controls - Street Light Exterior	0.99	0.99	ls_106_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lighting Controls - Dimming				$0.087			
Lighting Controls - Integrated				$0.087			
Lighting Controls - Sensor				$0.087			
Lighting Controls - Exterior				$0.087			
Lighting Controls - Street Light Exterior				$0.087			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lighting Controls	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lighting Controls - Dimming		
Lighting Controls - Integrated		
Lighting Controls - Sensor		
Lighting Controls - Exterior		
Lighting Controls - Street Light Exterior		

Lighting Controls, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** Lighting Controls | **Measure Sub Type:** Lighting Controls

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Lighting Controls, Custom	Electric Commercial & Industrial Large C&I Retrofit Lighting Controls, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Lighting Controls, Custom	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Lighting Controls, Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Lighting Controls, Custom	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Lighting Controls, Custom	0.94	0.75	ls_131_Electric

RRsp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

RRwp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lighting Controls, Custom				$0.105			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lighting Controls, Custom	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lighting Controls, Custom	$0.83 / kWh	Incentive: $0.59 / kWh

Lighting Systems, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** Interior | **Measure Sub Type:** Efficient Lighting

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Lighting Systems, Custom	Electric Commercial & Industrial Large C&I Retrofit Lighting Systems, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Lighting Systems, Custom	Calc	Calc	Calc		Calc		

Energy Impact Factors

Measure	Measure Life
Lighting Systems, Custom	multi

Measure Life Note: Consistent with MA TRM

Measure	ISR	RRe Gas	RRe Electric
Lighting Systems, Custom	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Lighting Systems, Custom	0.94	0.75	ls_131_Electric

RRsp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

RRwp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Lighting Systems, Custom				$0.065			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Lighting Systems, Custom	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Lighting Systems, Custom	$0.83 / kWh	Incentive: $0.37 / kWh

Load Comp, 75HP

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Compressor

Measure Sub Type: Load / no-load compressor up to 75 HP

Program: Large C&I Retrofit

Measure Description

The installation of oil flooded, rotary screw compressors with Load/No Load capacity control scheme to improve compression efficiencies at partial loads, including a properly sized air receiver.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Load Comp, 75HP	Electric Commercial & Industrial Large C&I Retrofit Load Comp, 75HP

Savings Principle

The high efficiency case is an oil-flooded, rotary screw compressor with Load/No Load capacity control with a properly sized air receiver.

Savings Method

Calculated using site-specific inputs

Unit

Total horsepower (hp) of installed air compressor capacity.

Savings Equation

Gross kWh = HP_compressor × deltakW/HP × Hours

Gross kW = HP_compressor × deltakW/HP

Where:

HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific

Hours = Annual operating hours of the air compressor: site-specific

deltakW/HP = Air compressor kW reduction per HP

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Load Comp, 75HP	Calc	Calc					

Electric kWh Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Electric kW Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Energy Impact Factors

Measure	Measure Life
Load Comp, 75HP	13

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Load Comp, 75HP	1.00		1.44

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
Load Comp, 75HP	1.00	1.00	ls_259_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Load Comp, 75HP				$0.058			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Load Comp, 75HP	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Load Comp, 75HP		

Low pressure drop filter

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Filter

Measure Sub Type: Low pressure drop filter

Program: Large C&I Retrofit

Measure Description

Filters remove solids and aerosols from compressed air systems. Low pressure drop filters have longer lives and lower pressure drops than traditional coalescing filters resulting in higher efficiencies.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Low pressure drop filter	Electric Commercial & Industrial Large C&I Retrofit Low pressure drop filter

Savings Principle

The high efficiency case is a low pressure drop filter with initial drop not exceeding 1 psi when new and 3 psi at element change. Filters must be deep-bed, “mist eliminator” style and installed on a single operating compressor rated 15 – 75 HP.

Savings Method

Calculated using site-specific inputs

Unit

Installed filter.

Savings Equation

GrosskWh = [(HPcomp) x (0.7457) / eff] x [((Existing P) - (Adjusted P)) / (2x100)] x (Hours)

GrosskW = [(HPcomp) x (0.7457) / eff] x [((Existing P) - (Adjusted P)) / (2x100)]

Where:

HPCOMP = Average compressor load. Site specific.

0.7457 = Conversionfrom HP to kW.

eff = Full Load NEMA Premium Motor Efficiency, see table 15 in Appendix A

2 x 100 = % Savings calculated with the assumption that for every 2 psi increase in discharge pressure, energy consumption will increase by approximately 1%

Hours = Annual operating hours of the lower pressure drop filter. Site specific.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Low pressure drop filter	Calc	Calc					

Electric kWh Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Electric kW Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Energy Impact Factors

Measure	Measure Life
Low pressure drop filter	5

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure Life Note: Assumes 1/3 of the savings of compressed air

Measure	ISR	RRe Gas	RRe Electric
Low pressure drop filter	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.

Measure	RR sp	RR wp	Loadshape ID
Low pressure drop filter	1.00	1.00	ls_259_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Low pressure drop filter				$0.058			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low pressure drop filter	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low pressure drop filter		

Make Up Air Fan

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Make Up Air Fan	Electric Commercial & Industrial Large C&I Retrofit Make Up Air Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Make Up Air Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Make Up Air Fan	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Make Up Air Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Make Up Air Fan	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Make Up Air Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Make Up Air Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Make Up Air Fan	$0.50 / kWh	Incentive: $0.43 / kWh

Motor VFD

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** VFD **Measure Sub Type:** Motor

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
MTVFD-BLDG EXHST FAN MTVFD-BOIL DRAFT FAN MTVFD-BOIL FWTR PUMP MTVFD-CHIL WATER PMP MTVFD-CT FAN MTVFD-HEAT HW PUMP MTVFD-HVAC RET FAN MTVFD-HVAC SUP FAN MTVFD-MK UP AIR FAN MTVFD-PROC COOL PUMP MTVFD-WATER/WST PUMP MTVFD-WSHP PUMP	Electric Commercial & Industrial Large C&I Retrofit MTVFD-BLDG EXHST FAN Electric Commercial & Industrial Large C&I Retrofit MTVFD-BOIL DRAFT FAN Electric Commercial & Industrial Large C&I Retrofit MTVFD-BOIL FWTR PUMP Electric Commercial & Industrial Large C&I Retrofit MTVFD-CHIL WATER PMP Electric Commercial & Industrial Large C&I Retrofit MTVFD-CT FAN Electric Commercial & Industrial Large C&I Retrofit MTVFD-HEAT HW PUMP Electric Commercial & Industrial Large C&I Retrofit MTVFD-HVAC RET FAN Electric Commercial & Industrial Large C&I Retrofit MTVFD-HVAC SUP FAN Electric Commercial & Industrial Large C&I Retrofit MTVFD-MK UP AIR FAN Electric Commercial & Industrial Large C&I Retrofit MTVFD-PROC COOL PUMP Electric Commercial & Industrial Large C&I Retrofit MTVFD-WATER/WST PUMP Electric Commercial & Industrial Large C&I Retrofit MTVFD-WSHP PUMP

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
MTVFD-BLDG EXHST FAN	Calc	Calc					
MTVFD-BOIL DRAFT FAN	Calc	Calc					
MTVFD-BOIL FWTR PUMP	Calc	Calc					
MTVFD-CHIL WATER PMP	Calc	Calc					
MTVFD-CT FAN	Calc	Calc					
MTVFD-HEAT HW PUMP	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
MTVFD-BLDG EXHST FAN	15
MTVFD-BOIL DRAFT FAN	
MTVFD-BOIL FWTR PUMP	
MTVFD-CHIL WATER PMP	
MTVFD-CT FAN	
MTVFD-HEAT HW PUMP	
MTVFD-HVAC RET FAN	
MTVFD-HVAC SUP FAN	
MTVFD-MK UP AIR FAN	
MTVFD-PROC COOL PUMP	
MTVFD-WATER/WST PUMP	
MTVFD-WSHP PUMP	

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Motor VFD	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
MTVFD-BLDG EXHST FAN	0.99	0.99	ls_110_Electric
MTVFD-BOIL DRAFT FAN	0.99	0.99	ls_110_Electric
MTVFD-BOIL FWTR PUMP	0.99	0.99	ls_110_Electric
MTVFD-CHIL WATER PMP	0.99	0.99	ls_110_Electric
MTVFD-CT FAN	0.99	0.99	ls_110_Electric
MTVFD-HEAT HW PUMP	0.99	0.99	ls_110_Electric
MTVFD-HVAC RET FAN	0.99	0.99	ls_110_Electric
MTVFD-HVAC SUP FAN	0.99	0.99	ls_110_Electric
MTVFD-MK UP AIR FAN	0.99	0.99	ls_110_Electric
MTVFD-PROC COOL PUMP	0.99	0.99	ls_110_Electric
MTVFD-WATER/WST PUMP	0.99	0.99	ls_110_Electric
MTVFD-WSHP PUMP	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
MTVFD-BLDG EXHST FAN				$0.003			
MTVFD-BOIL DRAFT FAN				$0.003			
MTVFD-BOIL FWTR PUMP				$0.003			
MTVFD-CHIL WATER PMP				$0.003			
MTVFD-CT FAN				$0.003			
MTVFD-HEAT HW PUMP				$0.003			
MTVFD-HVAC RET FAN				$0.003			
MTVFD-HVAC SUP FAN				$0.003			
MTVFD-MK UP AIR FAN				$0.003			
MTVFD-PROC COOL PUMP				$0.003			
MTVFD-WATER/WST PUMP				$0.003			
MTVFD-WSHP PUMP				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Motor VFD	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MTVFD-BLDG EXHST FAN	$0.50 / kWh	$0.43 / kWh
MTVFD-BOIL DRAFT FAN	$0.50 / kWh	$0.43 / kWh
MTVFD-BOIL FWTR PUMP	$0.50 / kWh	$0.43 / kWh
MTVFD-CHIL WATER PMP	$0.50 / kWh	$0.43 / kWh
MTVFD-CT FAN	$0.50 / kWh	$0.43 / kWh
MTVFD-HEAT HW PUMP	$0.50 / kWh	$0.43 / kWh
MTVFD-HVAC RET FAN	$0.50 / kWh	$0.43 / kWh
MTVFD-HVAC SUP FAN	$0.50 / kWh	$0.43 / kWh
MTVFD-MK UP AIR FAN	$0.50 / kWh	$0.43 / kWh
MTVFD-PROC COOL PUMP	$0.50 / kWh	$0.43 / kWh
MTVFD-WATER/WST PUMP	$0.50 / kWh	$0.43 / kWh
MTVFD-WSHP PUMP	$0.50 / kWh	$0.43 / kWh

Motor VFD Secondary

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Motor VFD Secondary	Electric Commercial & Industrial Large C&I Retrofit Motor VFD Secondary

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Motor VFD Secondary	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Motor VFD Secondary	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Motor VFD Secondary	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Motor VFD Secondary	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Motor VFD Secondary				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Motor VFD Secondary	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Motor VFD Secondary	$0.50 / kWh	Incentive: $0.43 / kWh

Non-refrigerated snack vending machine

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Refrigeration | **Measure Type:** Controls | **Measure Sub Type:** Vending Miser

Program: Large C&I Retrofit

Measure Description

Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintaina cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.

Baseline Description

The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Measures

Measure Name	Unique Identifier
Non-refrigerated snack vending machine	Electric Commercial & Industrial Large C&I Retrofit Non-refrigerated snack vending machine

Savings Principle

The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Savings Method

Deemed

Unit

Installed vending miser.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Non-refrigerated snack vending machine	343.00	0.039					

Electric kWh Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Electric kW Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Energy Impact Factors

Measure	Measure Life
Non-refrigerated snack vending machine	5

Measure Life Source: DNV GL (2018) ERS Portfolio Model Methods and Assumptions - Electric and Natural Gas Memo.

Measure	ISR	RRe Gas	RRe Electric
Non-refrigerated snack vending machine	1.00		1.04

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Non-refrigerated snack vending machine	1.03	1.03	ls_126_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Non-refrigerated snack vending machine				$0.116			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Non-refrigerated snack vending machine	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Non-refrigerated snack vending machine	$0.90 / kWh	Incentive: $0.50 / kWh

O & M

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Process **Measure Type:** O & M **Measure Sub Type:** O & M

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
O & M	Electric Commercial & Industrial Large C&I Retrofit O & M

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
O & M	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
O & M	2,5

Measure	ISR	RRe Gas	RRe Electric
O & M	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
O & M	0.74	0.98	ls_260_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
O & M							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
O & M	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
O & M	$0.34 / kWh	Incentive: $0.21 / kWh

Packaged Terminal Heat Pumps (PTHP)

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Heat Pumps

Measure Sub Type: Heat Pump, Packaged Terminal

Program: Large C&I Retrofit

Measure Description

Installation of a high efficiency PTHP to replace an existing PTAC.

Baseline Description

The baseline is an existing PTAC.

Measures

Measure Name	Unique Identifier
Packaged Terminal Heat Pumps (PTHP)	Electric Commercial & Industrial Large C&I Retrofit Packaged Terminal Heat Pumps (PTHP)

Savings Principle

The high efficiency case is a high efficiency PTHP

Savings Method

Deemed

Unit

Per PTHP

Savings Equation

Gross kWh = Qty × deltakW × Hours

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

DeltakW = Deemed average kW reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Packaged Terminal Heat Pumps (PTHP)	1.00						

Electric kWh Note: Based on energy modeling of PNNL prototype buildings of small hotel, large hotel, and multifamily mid-rise

Electric kW Note: The peak demand occurs in the winter at low ambient temps when supplemental elec resistance heat is operational. As a result, there is no max kW demand reduction going from PTAC to high efficiency PTHP (existing buildings) or code level PTHP to high effic

Energy Impact Factors

Measure	Measure Life
Packaged Terminal Heat Pumps (PTHP)	8

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Packaged Terminal Heat Pumps (PTHP)	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization Rate is assumed 100%.

Measure	RR sp	RR wp	Loadshape ID
Packaged Terminal Heat Pumps (PTHP)	1.00	1.00	ls_273_Electric

RRwp Note: Realization Rate is assumed 100%.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Packaged Terminal Heat Pumps (PTHP)							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Packaged Terminal Heat Pumps (PTHP)	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Packaged Terminal Heat Pumps (PTHP)	$0.39 / kWh	Incentive: $0.17 / kWh

Performance Lighting

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Lighting

Measure Type: Prescriptive Lighting

Measure Sub Type: Performance Lighting

Program: Large C&I Retrofit

Measure Description

The installation of lighting systems that achieve lighting power densities below those required by RI building code.

Baseline Description

The baseline efficiency assumes compliance with lighting power density requirements as mandated by Rhode Island State Building Code, which currently reflects IECC 2024. IECC 2024 offers two compliance paths, the Building Area Method and Space-by-Space Method.

Measures

Measure Name	Unique Identifier
Performance Lighting - Tier 1 Exterior	Electric Commercial & Industrial Large C&I Retrofit Performance Lighting - Tier 1 Exterior
Performance Lighting - Tier 1 Interior	Electric Commercial & Industrial Large C&I Retrofit Performance Lighting - Tier 1 Interior
Performance Lighting Tier 2 & 3 Exterior	Electric Commercial & Industrial Large C&I Retrofit Performance Lighting Tier 2 & 3 Exterior
Performance Lighting Tier 2 & 3 Interior	Electric Commercial & Industrial Large C&I Retrofit Performance Lighting Tier 2 & 3 Interior

Savings Principle

The high efficiency scenario assumes lighting systems that achieve lighting power densities below those required by RI State Building Code. Actual site lighting power densities should be determined on a case-by-case basis. Please refer to the current yearapplication form for minimum percentage better than code efficiency requirements.

Savings Method

Calculated

Unit

Per Lighting Performance Project

Savings Equation

Gross kWh = [SUM(LPD_base,i - LPD_proposed,i + LPD_proposed,i * controlled * %sav)* Area_i ×*Hours_i * 1/1000)]

Gross kW_fixture = [SUM(LPD_base_i - LPD_proposed,i)* Area_i* 1/1000

Gross kW_controlled = [SUM(LPD_proposed,i * Controlled) * Area_i * 1/1000

Where:

n = total number of spaces or 1 for building area method

Area_i = Floor area of location i (SQFT)

LPD_proposed,i = Proposed lighting power density for building or space type i (Watts/SQFT)

Controlled = % of controlled lighting above required amounts for each tier

Hours_j = Lighting annual hours of operation: site-specific.

1,000 Watts per kW = Conversion factor

%sav = Percentage of kWh that is saved by utilizing the control measure. Refer to Table XX in Appendix A for the savings control factors.

Note on Performance Lighting tiers: Performance Lighting has three tiers, for New Buildings & Major Renovations the min percentage of controlled lighting above required amounts at 0% for tier 1, 20% for tier 2, and 30% for tier 3. All other Performance Lighting programs have min percentage of controlled lighting above required amounts of 15% for tier 1, 35% for tier 2, and 45% for tier 3.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
					Calc		
Performance Lighting - Tier 1 Exterior	Calc	Calc	Calc				
Performance Lighting - Tier 1 Interior	Calc	Calc	Calc				
Performance Lighting Tier 2 & 3 Exterior	Calc	Calc	Calc				
Performance Lighting Tier 2 & 3 Interior	Calc	Calc	Calc				

Energy Impact Factors

Measure	Measure Life
Performance Lighting - Tier 1 Exterior	See Table 12 in Appendix A
Performance Lighting - Tier 1 Interior	5
Performance Lighting Tier 2 & 3 Exterior	3
Performance Lighting Tier 2 & 3 Interior	5
	3

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Performance Lighting	1.00		0.93

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Performance Lighting - Tier 1 Exterior	0.99	0.99	ls_106_Electric
Performance Lighting - Tier 1 Interior	0.99	0.99	ls_106_Electric
Performance Lighting Tier 2 & 3 Exterior	0.99	0.99	ls_106_Electric
Performance Lighting Tier 2 & 3 Interior	0.99	0.99	ls_106_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Performance Lighting - Tier 1 Exterior				$0.030			
Performance Lighting - Tier 1 Interior				$0.030			
Performance Lighting Tier 2 & 3 Exterior				$0.030			
Performance Lighting Tier 2 & 3 Interior				$0.030			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Performance Lighting	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Performance Lighting - Tier 1 Exterior		
Performance Lighting - Tier 1 Interior		
Performance Lighting Tier 2 & 3 Exterior		
Performance Lighting Tier 2 & 3 Interior		

Prescriptive Lighting

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Lighting | **Measure Type:** Prescriptive Lighting | **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

This measure promotes the installation of lighting fixtures in retrofit applications.

Baseline Description

The baseline efficiency case is project-specific and is determined using actual fixture counts from the existing space.

Measures

Measure Name	Unique Identifier
Prescriptive Lighting - 24/7 Prescriptive Lighting - DuskDawn Prescriptive Lighting - Compact Prescriptive Lighting - Linear LED - Downstream Prescriptive Lighting - Fluorescent Prescriptive Lighting - LED Case Ref Prescriptive Lighting - LED - Downstream Prescriptive Lighting - LED General Prescriptive Lighting - LED Replacement	Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - 24/7 Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - DuskDawn Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - Compact Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - Linear LED - Downstream Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - Fluorescent Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - LED Case Ref Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - LED - Downstream Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - LED General Electric Commercial & Industrial Large C&I Retrofit Prescriptive Lighting - LED Replacement

Savings Principle

The high efficiency case is project-specific and is determined using actual fixture counts for the project and the wattage tables in Appendix A.

Savings Method

Unit

Installed high-efficiency lighting project.

Savings Equation

Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours

Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)

Where:

QTY_base_i = Quantity of baseline fixtures in location i

Watts_base_i = Connected wattage of baseline fixtures in location i

QTY_ee_j = Quantity of efficient fixtures in location j

Watts_ee_j = Connected wattage of efficient fixtures in location j

1,000 Watts per kW = Conversion factor

Hours = Lighting annual hours of operation: site-specific.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
					0.00		
Prescriptive Lighting - 24/7	Calc	Calc					
Prescriptive Lighting - DuskDawn	Calc	Calc					
Prescriptive Lighting - Compact	Calc	Calc					
Prescriptive Lighting - Linear LED - Downstream	Calc	Calc					
Prescriptive Lighting - Fluorescent	Calc	Calc					
Prescriptive Lighting - LED Case Ref	Calc	Calc					

Gas Heat MMBtu Source: DNV GL (2018).Impact Evaluation of PY2015 RI C&I Upstream Lighting Initiative. http://rieermc.ri.gov/wp-content/uploads/2019/04/impact_eval_of_ri_upstream_lighting_finalreport.pdf

Energy Impact Factors

Measure	Measure Life
Prescriptive Lighting - 24/7	See Table 12 in Appendix A
Prescriptive Lighting - DuskDawn	5
Prescriptive Lighting - Compact	5
Prescriptive Lighting - Linear LED - Downstream	1
Prescriptive Lighting - Fluorescent	3
Prescriptive Lighting - LED Case Ref	3
Prescriptive Lighting - LED - Downstream	3
Prescriptive Lighting - LED General	3
Prescriptive Lighting - LED Replacement	3
	3

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Prescriptive Lighting	1.00		0.93

Measure	RR sp	RR wp	Loadshape ID
Prescriptive Lighting - 24/7	0.99	0.99	ls_106_Electric
Prescriptive Lighting - DuskDawn	0.99	0.99	ls_106_Electric
Prescriptive Lighting - Compact	0.99	0.99	ls_106_Electric
Prescriptive Lighting - Linear LED - Downstream	0.99	0.99	ls_106_Electric
Prescriptive Lighting - Fluorescent	0.99	0.99	ls_106_Electric
Prescriptive Lighting - LED Case Ref	0.99	0.99	ls_106_Electric
Prescriptive Lighting - LED - Downstream	0.99	0.99	ls_106_Electric
Prescriptive Lighting - LED General	0.99	0.99	ls_106_Electric
Prescriptive Lighting - LED Replacement			

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Prescriptive Lighting - 24/7				$0.030			
Prescriptive Lighting - DuskDawn				$0.030			
Prescriptive Lighting - Compact				$0.030			
Prescriptive Lighting - Linear LED - Downstream				$0.030			
Prescriptive Lighting - Fluorescent				$0.030			
Prescriptive Lighting - LED Case Ref				$0.030			
Prescriptive Lighting - LED - Downstream				$0.030			
Prescriptive Lighting - LED General				$0.030			
Prescriptive Lighting - LED Replacement							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Prescriptive Lighting	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Prescriptive Lighting - 24/7	$0.83 / kWh	$0.34 / kWh
Prescriptive Lighting - DuskDawn	$0.83 / kWh	$0.34 / kWh
Prescriptive Lighting - Compact	$0.83 / kWh	$0.34 / kWh
Prescriptive Lighting - Linear LED - Downstream		
Prescriptive Lighting - Fluorescent		
Prescriptive Lighting - LED Case Ref		
Prescriptive Lighting - LED - Downstream		
Prescriptive Lighting - LED General		
Prescriptive Lighting - LED Replacement		

Process Cooling

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Process **Measure Type:** Process Cooling **Measure Sub Type:** Process Cooling

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Process Cooling	Electric Commercial & Industrial Large C&I Retrofit Process Cooling

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process Cooling	Calc	Calc	Calc	Calc			

Energy Impact Factors

Measure	Measure Life
Process Cooling	multi

Measure	ISR	RRe Gas	RRe Electric
Process Cooling	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Process Cooling	0.74	0.98	ls_133_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process Cooling				$0.102			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process Cooling	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process Cooling	$0.34 / kWh	Incentive: $0.27 / kWh

Process, Cool Pump

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Pump

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Process, Cool Pump	Electric Commercial & Industrial Large C&I Retrofit Process, Cool Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process, Cool Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Process, Cool Pump	13

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Process, Cool Pump	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Process, Cool Pump	0.74	0.98	ls_110_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process, Cool Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process, Cool Pump	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process, Cool Pump	$0.50 / kWh	Incentive: $0.43 / kWh

Process, Exhaust Fan

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Motors/Drives | **Measure Type:** Variable Speed Drive | **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Process, Exhaust Fan	Electric Commercial & Industrial Large C&I Retrofit Process, Exhaust Fan

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process, Exhaust Fan	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Process, Exhaust Fan	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Process, Exhaust Fan	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Process, Exhaust Fan	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process, Exhaust Fan				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process, Exhaust Fan	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process, Exhaust Fan	$0.50 / kWh	Incentive: $0.43 / kWh

Refrigerated beverage vending machine

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Refrigeration | **Measure Type:** Controls | **Measure Sub Type:** Vending Miser

Program: Large C&I Retrofit

Measure Description

Controls can significantly reduce the energy consumption of vending machine lighting and refrigeration systems. Qualifying controls must power down these systems during periods of inactivity but, in the case of refrigerated machines, must always maintaina cool product that meets customer expectations. This measure applies to refrigerated beverage vending machines, non-refrigerated snack vending machines, and glass front refrigerated coolers. This measure should not be applied to ENERGY STAR® qualified vending machines, as they already have built-in controls.

Baseline Description

The baseline efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Measures

Measure Name	Unique Identifier
Refrigerated beverage vending machine	Electric Commercial & Industrial Large C&I Retrofit Refrigerated beverage vending machine

Savings Principle

The high efficiency case is a standard efficiency refrigerated beverage vending machine, non-refrigerated snack vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Savings Method

Deemed

Unit

Installed vending miser.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerated beverage vending machine	1612.00	0.184					

Electric kWh Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Electric kW Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Energy Impact Factors

Measure	Measure Life
Refrigerated beverage vending machine	5

Measure Life Source: California Public Utilities Commission (2014). Energy Division, DEER EUL Table Update.

Measure	ISR	RRe Gas	RRe Electric
Refrigerated beverage vending machine	1.00		1.04

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Refrigerated beverage vending machine	1.03	1.03	ls_126_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerated beverage vending machine				$0.116			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerated beverage vending machine	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerated beverage vending machine	$0.90 / kWh	Incentive: $0.50 / kWh

Sensors

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Controls

Measure Sub Type: Occupancy Sensor

Program: Large C&I Retrofit

Measure Description

The measure is to the installation of hotel occupancy sensors (HOS) to control packaged terminal AC units (PTACs) with electric heat, heat pump units and/or fan coil units in hotels that operate all 12 months of the year.

Baseline Description

The baseline efficiency case assumes the equipment has no occupancy based controls.

Measures

Measure Name	Unique Identifier
Sensors	Electric Commercial & Industrial Large C&I Retrofit Sensors

Savings Principle

The high efficiency case is the installation of controls that include (a) occupancy sensors, (b) window/door switches for rooms that have operable window or patio doors, and (c) set back to 65 degrees Fahrenheit in the heating mode and set forward to 78 Fin the cooling mode when occupancy detector is in the unoccupied mode. Sensors controlled by a front desk system are not eligible.

Savings Method

Deemed

Unit

Installed hotel occupancy sensor.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Sensors	438.00	0.090					

Electric kWh Source: National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors.

Electric kW Source: National Grid and NSTAR (2010). Energy Analysis: Hotel Guest Occupancy Sensors.

Energy Impact Factors

Measure	Measure Life
Sensors	10

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Sensors	1.00		1.04

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Sensors	1.03	1.03	ls_126_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Sensors				$0.116			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Sensors	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Sensors		

Street Lighting

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Lighting **Measure Type:** Street Lights **Measure Sub Type:** Street lighting

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Street Lighting - Lighting	Electric Commercial & Industrial Large C&I Retrofit Street Lighting - Lighting
Street lighting - Lighting w/ Controls	Electric Commercial & Industrial Large C&I Retrofit Street lighting - Lighting w/ Controls

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
		Calc	Calc		Calc		
Street Lighting - Lighting	Calc						
Street lighting - Lighting w/ Controls	Calc						

Energy Impact Factors

Measure	Measure Life
Street Lighting - Lighting	See Table 12 in Appendix A
Street lighting - Lighting w/ Controls	5 6

Measure Life Source: DNV (2022). RI C&I Lighting Market Characterization and Adjusted Measure Life Study. http://rieermc.ri.gov/wp-content/uploads/2022/11/rhode-island_ci-lighting-market-characterization-and-adjusted-measure-life-report_final.pdf

Measure	ISR	RRe Gas	RRe Electric
Street Lighting	1.00		0.95

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
Street Lighting - Lighting	0.94	0.75	ls_127_Electric
Street lighting - Lighting w/ Controls	0.94	0.75	ls_127_Electric

RRsp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

RRwp Source: DNV (2022). RI PY2018 & PY2019 Custom Electric Installations. http://rieermc.ri.gov/wp-content/uploads/2023/01/rice2018-19-program-report_final.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Street Lighting - Lighting				$0.065			
Street lighting - Lighting w/ Controls				$0.105			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Street Lighting	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Street Lighting - Lighting	$0.83 / kWh	$0.24 / kWh
Street lighting - Lighting w/ Controls	$0.83 / kWh	$0.34 / kWh

Transformers

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Custom | **Measure Type:** Transformers | **Measure Sub Type:** Transformers

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Transformers	Electric Commercial & Industrial Large C&I Retrofit Transformers

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Transformers	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Transformers	multi

Measure	ISR	RRe Gas	RRe Electric
Transformers	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Transformers	0.74	0.98	ls_196_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Transformers							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Transformers	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Transformers	$1.04 / kWh	Incentive: $0.35 / kWh

Upstream Lighting

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Lighting **Measure Type:** Prescriptive **Measure Sub Type:** Upstream

Program: Large C&I Retrofit

Measure Description

The installation of efficient lighting discounted at the distribution level.

Baseline Description

The baseline case is a mix of fluorescent and halogen fixtures for LEDs and low efficiency fluorescents for high efficiency fluorescents.

Measures

Measure Name	Unique Identifier
UPSTR Lighting - LED Controls UPSTR Lighting - High/Low Bay Controls UPSTR Lighting - LED UPSTR Lighting - LED Exterior UPSTR Lighting - LED High/Low Bay UPSTR Lighting - LED Stairwell UPSTR Lighting - Linear LED UPSTR Lighting - General UPSTR Lighting - LED Outdoor Control	Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - LED Controls Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - High/Low Bay Controls Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - LED Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - LED Exterior Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - LED High/Low Bay Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - LED Stairwell Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - Linear LED Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - General Electric Commercial & Industrial Large C&I Retrofit UPSTR Lighting - LED Outdoor Control

Savings Principle

The high efficiency case is high efficiency LED. Please refer to Table 6 in Appendix A for wattage details.

Savings Method

Deemed

Unit

Installed high-efficiency lighting project.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Hours Note: The annual hours of operation are application specific and can be seen in Table 6: Upstream Lighting.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Table 6	Table 6					
UPSTR Lighting - LED Controls	Table 6						
UPSTR Lighting - High/Low Bay Controls	Table 6						
UPSTR Lighting - LED	Table 6						
UPSTR Lighting - LED Exterior	Table 6						
UPSTR Lighting - LED High/Low Bay	Table 6						
UPSTR Lighting - LED Stairwell	Table 6						

Gas Heat MMBtu Source: DNV GL (2018).Impact Evaluation of PY2015 RI C&I Upstream Lighting Initiative. http://rieermc.ri.gov/wp-content/uploads/2019/04/impact_eval_of_ri_upstream_lighting_finalreport.pdf

Gas Heat MMBtu Note: NEI per kWh

Energy Impact Factors

Measure	Measure Life
UPSTR Lighting - LED Controls	See Table 12 in Appendix A
UPSTR Lighting - High/Low Bay Controls	7
UPSTR Lighting - LED	8
UPSTR Lighting - LED Exterior	2
UPSTR Lighting - LED High/Low Bay	5
UPSTR Lighting - LED Stairwell	3
UPSTR Lighting - Linear LED	2
UPSTR Lighting - General	2
UPSTR Lighting - LED Outdoor Control	2
	6

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Upstream Lighting	1.00		0.95

RRe Source: DNV GL (2019).C&I Upstream Lighting Evaluation Final Report. https://ma-eeac.org/wp-content/uploads/Project-81-Final-Final-Report-clean.pdf

Measure	RR sp	RR wp	Loadshape ID
UPSTR Lighting - LED Controls	1.12	0.96	ls_106_Electric
UPSTR Lighting - High/Low Bay Controls	1.05	0.90	ls_106_Electric
UPSTR Lighting - LED	0.90	0.72	ls_261_Electric
UPSTR Lighting - LED Exterior	0.95	0.95	ls_105_Electric
UPSTR Lighting - LED High/Low Bay	1.05	0.90	ls_106_Electric
UPSTR Lighting - LED Stairwell	0.86	0.86	ls_106_Electric
UPSTR Lighting - Linear LED	1.10	0.95	ls_106_Electric
UPSTR Lighting - General	1.00	1.00	ls_262_Electric
UPSTR Lighting - LED Outdoor Control	0.95	0.95	ls_105_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
UPSTR Lighting - LED Controls				$0.087			
UPSTR Lighting - High/Low Bay Controls				$0.087			
UPSTR Lighting - LED				$0.030			
UPSTR Lighting - LED Exterior				$0.030			
UPSTR Lighting - LED High/Low Bay				$0.030			
UPSTR Lighting - LED Stairwell				$0.030			
UPSTR Lighting - Linear LED				$0.030			
UPSTR Lighting - General				$0.030			
UPSTR Lighting - LED Outdoor Control				$0.087			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Upstream Lighting	0.28	0.02	0.02	0.76

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
UPSTR Lighting - LED Controls	$0.83 / kWh	$0.45 / kWh
UPSTR Lighting - High/Low Bay Controls	$0.83 / kWh	$0.45 / kWh
UPSTR Lighting - LED	$0.29 / kWh	$0.10 / kWh
UPSTR Lighting - LED Exterior	$0.43 / kWh	$0.15 / kWh
UPSTR Lighting - LED High/Low Bay	$0.66 / kWh	$0.33 / kWh
UPSTR Lighting - LED Stairwell	$0.40 / kWh	$0.08 / kWh
UPSTR Lighting - Linear LED	$0.43 / kWh	$0.17 / kWh
UPSTR Lighting - General		
UPSTR Lighting - LED Outdoor Control		

VARICOMP

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Compressor

Measure Sub Type: Variable compressor up to 75 HP

Program: Large C&I Retrofit

Measure Description

The installation of oil flooded, rotary screw compressors with Variable Displacement capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
VARICOMP - 25 HP	Electric Commercial & Industrial Large C&I Retrofit VARICOMP - 25 HP
VARICOMP - 75 HP	Electric Commercial & Industrial Large C&I Retrofit VARICOMP - 75 HP

Savings Principle

The high efficiency case is an oil-flooded, rotary screw compressor with Variable Displacement capacity control with a properly sized air receiver.

Savings Method

Calculated using site-specific inputs

Unit

kW saved per horsepower (hp) of installed air compressor capacity.

Savings Equation

Gross kWh = HP_compressor × deltakW/HP × Hours

Gross kW = HP_compressor × deltakW/HP

Where:

HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific

Hours = Annual operating hours of the air compressor: site-specific

deltakW/HP = Air compressor kW reduction per HP

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis; RR adjusts for evaluation results.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VARICOMP - 25 HP	Calc	Calc					
VARICOMP - 75 HP	Calc	Calc					

Electric kWh Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Electric kW Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Energy Impact Factors

Measure	Measure Life
VARICOMP - 25 HP VARICOMP - 75 HP	13

Measure Life Source: DOE (2016). Technical Support Document: Air Compressors. EERE-2013-BT-STD-0040-0082. https://www.regulations.gov/document/EERE-2013-BT-STD-0040-0082

Measure	ISR	RRe Gas	RRe Electric
VARICOMP	1.00		1.41

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
VARICOMP - 25 HP	1.00	1.00	ls_258_Electric
VARICOMP - 75 HP	1.00	1.00	ls_258_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VARICOMP - 25 HP				$0.058			
VARICOMP - 75 HP				$0.058			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VARICOMP	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VARICOMP - 25 HP	$0.10 / kWh	$0.09 / kWh
VARICOMP - 75 HP	$0.10 / kWh	$0.09 / kWh

VFD Secondary

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
VFD Secondary	Electric Commercial & Industrial Large C&I Retrofit VFD Secondary

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VFD Secondary	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
VFD Secondary	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
VFD Secondary	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
VFD Secondary	0.74	0.98	ls_110_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VFD Secondary				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VFD Secondary	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VFD Secondary	$0.50 / kWh	Incentive: $0.43 / kWh

VSD

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** VSD **Measure Sub Type:** HVAC

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
VSD-HVAC	Electric Commercial & Industrial Large C&I Retrofit VSD-HVAC
VSD-Non HVAC	Electric Commercial & Industrial Large C&I Retrofit VSD-Non HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
			Calc	Calc	Calc		
VSD-HVAC	Calc	Calc					
VSD-Non HVAC	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
VSD-HVAC	10,15
VSD-Non HVAC	

Measure	ISR	RRe Gas	RRe Electric
VSD	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
VSD-HVAC	0.74	0.98	ls_132_Electric
VSD-Non HVAC	0.74	0.98	ls_132_Electric
	0.74	0.98	

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VSD-HVAC				$0.019			
VSD-Non HVAC				$0.019			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VSD	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VSD-HVAC	$0.42 / kWh	$0.36 / kWh
VSD-Non HVAC	$0.42 / kWh	$0.36 / kWh

VSD compressor up to 75 HP

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Compressed Air

Measure Type: Compressor

Measure Sub Type: VSD compressor up to 75 HP

Program: Large C&I Retrofit

Measure Description

The installation of oil flooded, rotary screw compressors with Variable Speed Drive capacity control schemes to improve compression efficiencies at partial loads, including a properly sized air receiver.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
VSD compressor up to 75 HP	Electric Commercial & Industrial Large C&I Retrofit VSD compressor up to 75 HP

Savings Principle

The high efficiency case is an oil-flooded, rotary screw compressor with Variable Speed Drive capacity control with a properly sized air receiver.

Savings Method

Calculated using site-specific inputs

Unit

kW saved per horsepower (hp) of installed air compressor capacity.

Savings Equation

Gross kWh = HP_compressor × deltakW/HP × Hours

Gross kW = HP_compressor × deltakW/HP

Where:

HP_compressor = Nominal rated horsepower of high efficiency air compressor: site-specific

Hours = Annual operating hours of the air compressor: site-specific

deltakW/HP = Air compressor kW reduction per HP

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis; RR adjusts for evaluation results.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VSD compressor up to 75 HP	Calc	Calc					

Electric kWh Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Electric kW Note: Algorithm Input kwh/horsepower based on NSTAR metering analysis and supported by multiple 3rd part impact evaluations

Energy Impact Factors

Measure	Measure Life
VSD compressor up to 75 HP	13

Measure Life Source: DOE (2016). Technical Support Document: Air Compressors. EERE-2013-BT-STD-0040-0082. https://www.regulations.gov/document/EERE-2013-BT-STD-0040-0082

Measure	ISR	RRe Gas	RRe Electric
VSD compressor up to 75 HP	1.00		1.41

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Measure	RR sp	RR wp	Loadshape ID
VSD compressor up to 75 HP	1.00	1.00	ls_258_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VSD compressor up to 75 HP				$0.058			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VSD compressor up to 75 HP	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VSD compressor up to 75 HP		

Water Source Heat Pump

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Pump

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Water Source Heat Pump	Electric Commercial & Industrial Large C&I Retrofit Water Source Heat Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Water Source Heat Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Water Source Heat Pump	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Water Source Heat Pump	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Electric Installations.

Measure	RR sp	RR wp	Loadshape ID
Water Source Heat Pump	0.74	0.98	ls_110_Electric

RRsp Source: DNV (2024). RI PY2022 Custom Electric Installations.

RRwp Source: DNV (2024). RI PY2022 Custom Electric Installations.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Water Source Heat Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Water Source Heat Pump	0.36	0.01	0.01	0.65

NTG Source: Tetra Tech (2021). PY2019 C&I Free Ridership/Spillover study. http://rieermc.ri.gov/wp-content/uploads/2021/01/national-grid-rhode-island-2020-ci-fr-so-report_final.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Water Source Heat Pump	$0.50 / kWh	Incentive: $0.43 / kWh

Water/Waste Pump

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Pump

Program: Large C&I Retrofit

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Water/Waste Pump	Electric Commercial & Industrial Large C&I Retrofit Water/Waste Pump

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Water/Waste Pump	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Water/Waste Pump	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Water/Waste Pump	1.00		0.94

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA, Inc. and DMI, Inc. (2013). 2011-2012 Massachusetts Prescriptive VSD Impact Evaluation. Prepared for the Massahusetts Program Administrators and the Massachusetts Energy Efficiency Advisory Council

Measure	RR sp	RR wp	Loadshape ID
Water/Waste Pump	0.99	0.99	ls_110_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Water/Waste Pump				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Water/Waste Pump	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Water/Waste Pump	$0.50 / kWh	Incentive: $0.43 / kWh

Zero Loss Drain

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Compressed Air **Measure Type:** Drain **Measure Sub Type:** Zero Loss Drain

Program: Large C&I Retrofit

Measure Description

Drains remove water from a compressed air system. Zero loss condensate drains remove water from a compressed air system without venting any air, resulting in less air demand and consequently greater efficiency.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Zero Loss Drain	Electric Commercial & Industrial Large C&I Retrofit Zero Loss Drain

Savings Principle

The high efficiency case is the installation of a zero loss condensate drain on a single operating compressor rated <= 75 HP.

Savings Method

Calculated using site-specific inputs

Unit

Installed drain.

Savings Equation

Gross kWh = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM × Hours

Gross kW = CFM_pipe × deltaCFM/CFM_pipe × deltakW/CFM

Where:

CFM_pipe = CFM capacity of piping: site-specific

0.049 deltaCFM/CFM_pipe = Average CFM saved per CFM of piping capacity

0.24386 deltakW/CFM = Average demand savings per CFM; Based on regional analysis assuming a typical timed drain settings discharge scenario.

Hours = Annual operating hours of the zero loss condensate drain: site-specific

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Zero Loss Drain	Calc	Calc					

Electric kWh Source: KEMA (2016). Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations. http://rieermc.ri.gov/wp-content/uploads/2017/08/20160715_py2014_pres_cair_finalreport.pdf

Energy Impact Factors

Measure	Measure Life
Zero Loss Drain	13

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Zero Loss Drain	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DMI (2006). Impact Evaluation of 2004 Compressed Air Prescriptive Rebates. Prepared for National Grid. Results analyzed in RLW Analytics (2006). Sample Design and Impact Evaluation.

Measure	RR sp	RR wp	Loadshape ID
Zero Loss Drain	1.00	1.00	ls_259_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Zero Loss Drain				$0.058			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Zero Loss Drain	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Zero Loss Drain		

Small Business Direct Install, Electric

Advanced Power Strips

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The measure switches off plug load using current sensors and switching devices which turn off plug load when electrical current drops below threshold low levels.

Baseline Description

The baseline efficiency case is the absence power strip and leaving peripheral devices plugged in or using a power surge protector and leaving peripheral devices on.

Measures

Measure Name	Unique Identifier
Advanced Power Strips	Electric Commercial & Industrial Small Business Direct Install Advanced Power Strips

Savings Principle

The high efficiency case is the use of a tier 1 advanced power strip.

Savings Method

Deemed

Unit

Rebated smart strip.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: Since the power strip is assumed to be plugged in all year, the savings are based on 8,760 operational hours per year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Advanced Power Strips	105.00	0.010					

Electric kWh Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Electric kW Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Energy Impact Factors

Measure	Measure Life
Advanced Power Strips	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Advanced Power Strips	0.89		0.92

ISR Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRe Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Measure	RR sp	RR wp	Loadshape ID
Advanced Power Strips	0.92	0.92	ls_06_Electric

RRsp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

RRwp Source: NMR (2019). RLPNC 17-3: Advanced Power Strip Metering Study (Revised). https://ma-eeac.org/wp-content/uploads/RLPNC_173_APSMeteringReport_Revised_18March2019.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Advanced Power Strips							

NTG Note: Realization rate is assumed 100% because energy savings are custom calculated.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Advanced Power Strips	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: Realization rate is assumed 100% because energy savings are custom calculated.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Advanced Power Strips	$0.27 / kWh	Incentive: $0.27 / kWh

Aerator

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: DHW Controls

Measure Sub Type: Electric DHW Controls

Program: Small Business Direct Install

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by electricity.

Baseline Description

The baseline efficiency case is a 2.2 GPM faucet.

Measures

Measure Name	Unique Identifier
Aerator	Electric Commercial & Industrial Small Business Direct Install Aerator

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less aerator installed.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Aerator	348.00	0.080					

Energy Impact Factors

Measure	Measure Life
Aerator	3

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Aerator	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Aerator	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Aerator							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Aerator	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Aerator		

Attic Air Sealing

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Building Shell | **Measure Type:** Weatherization | **Measure Sub Type:** Air Sealing

Program: Small Business Direct Install

Measure Description

Installation of attic air sealing.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model, and an assumed heating degree day value of 5485, based on a TMY meteorological data population-weighted average.

Measures

Measure Name	Unique Identifier
Attic Air Sealing, Electric Attic Air Sealing, Oil Attic Air Sealing Propane	Electric Commercial & Industrial Small Business Direct Install Attic Air Sealing, Electric Electric Commercial & Industrial Small Business Direct Install Attic Air Sealing, Oil Electric Commercial & Industrial Small Business Direct Install Attic Air Sealing Propane

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the previously mentioned heating system efficiencies and heating degree day values, and by an improved cubic feet per minute (CFM) infiltration rate, based on the amount of air sealing work-hours associated with the project. An assumed pressurized infiltration rate of 62.5 CFM50 saved per hour of air sealing is adjusted using an LBNL infiltration model that assumes a two story building with average wind shielding in order to calculate a natural infiltration rate savings value.

Savings Method

Deemed

Unit

Per hour of air sealing work

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Attic Air Sealing, Electric	175.95	0.128					
Attic Air Sealing, Oil			0.78				
Attic Air Sealing Propane				0.71			

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Attic Air Sealing, Electric Attic Air Sealing, Oil Attic Air Sealing Propane	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Attic Air Sealing	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Attic Air Sealing, Electric	1.00	1.00	ls_208_Electric
Attic Air Sealing, Oil	N/A	N/A	ls_00_Electric
Attic Air Sealing Propane	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Attic Air Sealing, Electric							
Attic Air Sealing, Oil							
Attic Air Sealing Propane							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Attic Air Sealing	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Attic Air Sealing, Electric	$1.42 / kWh	$0.65 / kWh
Attic Air Sealing, Oil	$31.92 / therm	$14.74 / therm
Attic Air Sealing Propane	$35.07 / therm	$16.28 / therm

Attic Insulation

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Weatherization **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

Installation of attic insulation at 2021 code-level insulation R-value or above.

Baseline Description

The baseline efficiency case is the existing building before the insulation measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model developed in MA. It is also characterized by an assumed baseline insulation R-value, which is determined from population weighted average R-values drawn from the EIA's Commercial Building Energy Consumption Survey (CBECS) and historic MA insulation code requirements. These baseline insulation values are R-9.66 for exterior walls and R-21.24 for attics. The baseline building is also characterized by an assumed heating degree day value and cooling degree hours, based on a TMY meteorological data population-weighted average and assumed set points. These values are 5485 and 5841, respectively.

Measures

Measure Name	Unique Identifier
Attic Insulation, Electric Attic Insulation, Oil Attic Insulation, Propane	Electric Commercial & Industrial Small Business Direct Install Attic Insulation, Electric Electric Commercial & Industrial Small Business Direct Install Attic Insulation, Oil Electric Commercial & Industrial Small Business Direct Install Attic Insulation, Propane

Savings Principle

The high efficiency case is the existing building after the insulation measure is implemented. The high efficiency case is characterized by the previously mentioned baseline heating system efficiencies, heating degree day values, and cooling degree hours.It is also characterized by an assumed 2021 code-level insulation R-value, which is R-20 for exterior walls, and R-38 for attics.

Savings Method

Deemed

Unit

Per square foot

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Attic Insulation, Electric	1.30	0.001					
Attic Insulation, Oil	0.50	0.000	0.00				
Attic Insulation, Propane	0.50	0.000		0.00			

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Attic Insulation, Electric Attic Insulation, Oil Attic Insulation, Propane	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Attic Insulation	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Attic Insulation, Electric	1.00	1.00	ls_238_Electric
Attic Insulation, Oil	N/A	N/A	ls_00_Electric
Attic Insulation, Propane	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Attic Insulation, Electric							
Attic Insulation, Oil							
Attic Insulation, Propane							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Attic Insulation	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Attic Insulation, Electric	$1.32 / kWh	$0.08 / kWh
Attic Insulation, Oil	$3.44 / kWh	$0.20 / kWh
Attic Insulation, Propane	$3.44 / kWh	$0.20 / kWh

Basement Insulation

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Weatherization **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

Installation of basement insulation at 2021 code-level insulation R-value or above.

Baseline Description

The baseline efficiency case is the existing building before the insulation measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model developed in MA. It is also characterized by an assumed baseline insulation R-value, which is determined from population weighted average R-values drawn from the EIA's Commercial Building Energy Consumption Survey (CBECS) and historic MA insulation code requirements. These baseline insulation values are R-9.66 for exterior walls and R-21.24 for attics. The baseline building is also characterized by an assumed heating degree day value and cooling degree hours, based on a TMY meteorological data population-weighted average and assumed set points. These values are 5485 and 5841, respectively.

Measures

Measure Name	Unique Identifier
Basement Insulation, Electric Basement Insulation, Oil Basement Insulation, Propane	Electric Commercial & Industrial Small Business Direct Install Basement Insulation, Electric Electric Commercial & Industrial Small Business Direct Install Basement Insulation, Oil Electric Commercial & Industrial Small Business Direct Install Basement Insulation, Propane

Savings Principle

The high efficiency case is the existing building after the insulation measure is implemented. The high efficiency case is characterized by the previously mentioned baseline heating system efficiencies, heating degree day values, and cooling degree hours.It is also characterized by an assumed 2021 code-level insulation R-value, which is R-20 for exterior walls, and R-38 for attics.

Savings Method

Deemed

Unit

Per square foot

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Basement Insulation, Electric	8.59	0.006					
Basement Insulation, Oil	3.29	0.002	0.02				
Basement Insulation, Propane	3.29	0.002		0.02			

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Basement Insulation, Electric Basement Insulation, Oil Basement Insulation, Propane	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Basement Insulation	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Basement Insulation, Electric	1.00	1.00	ls_238_Electric
Basement Insulation, Oil	N/A	N/A	ls_00_Electric
Basement Insulation, Propane	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Basement Insulation, Electric							
Basement Insulation, Oil							
Basement Insulation, Propane							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Basement Insulation	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Basement Insulation, Electric	$0.20 / kWh	$0.02 / kWh
Basement Insulation, Oil	$0.52 / kWh	$0.05 / kWh
Basement Insulation, Propane	$0.52 / kWh	$0.05 / kWh

Compressed Air, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Compressed Air | **Measure Type:** Compressed air | **Measure Sub Type:** CAIR

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Compressed Air, Custom	Electric Commercial & Industrial Small Business Direct Install Compressed Air, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Compressed Air, Custom	Calc	Calc		Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Compressed Air, Custom	multi

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Compressed Air, Custom	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Compressed Air, Custom	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Compressed Air, Custom							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Compressed Air, Custom	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Compressed Air, Custom		

CUSTOM LIGHTING

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** Lighting | **Measure Sub Type:** Lighting

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
CUSTOM LIGHTING	Electric Commercial & Industrial Small Business Direct Install CUSTOM LIGHTING

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CUSTOM LIGHTING	Calc	Calc			Calc		

Energy Impact Factors

Measure	Measure Life
CUSTOM LIGHTING	multi

Measure	ISR	RRe Gas	RRe Electric
CUSTOM LIGHTING	1.00		1.04

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Measure	RR sp	RR wp	Loadshape ID
CUSTOM LIGHTING	1.00	1.00	ls_106_Electric

RRsp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

RRwp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
CUSTOM LIGHTING							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CUSTOM LIGHTING	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CUSTOM LIGHTING	$0.90 / kWh	Incentive: $0.63 / kWh

Custom Motors/Drives, HVAC

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Motors/Drives **Measure Sub Type:** HVAC

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Custom Motors/Drives, HVAC	Electric Commercial & Industrial Small Business Direct Install Custom Motors/Drives, HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom Motors/Drives, HVAC	Calc	Calc		Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Custom Motors/Drives, HVAC	multi

Measure	ISR	RRe Gas	RRe Electric
Custom Motors/Drives, HVAC	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Motors/Drives, HVAC	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom Motors/Drives, HVAC				$0.019			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Motors/Drives, HVAC	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Motors/Drives, HVAC	$1.10 / kWh	Incentive: $0.72 / kWh

Custom Motors/Drives, Non-HVAC

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Motors/Drives | **Measure Type:** Motors/Drives | **Measure Sub Type:** Non-HVAC

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Custom Motors/Drives, Non-HVAC	Electric Commercial & Industrial Small Business Direct Install Custom Motors/Drives, Non-HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Custom Motors/Drives, Non-HVAC	Calc	Calc		Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Custom Motors/Drives, Non-HVAC	multi

Measure	ISR	RRe Gas	RRe Electric
Custom Motors/Drives, Non-HVAC	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Motors/Drives, Non-HVAC	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Custom Motors/Drives, Non-HVAC				$0.019			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Motors/Drives, Non-HVAC	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Motors/Drives, Non-HVAC	$1.10 / kWh	Incentive: $0.72 / kWh

CUSTOM REFRIGERATION

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Refrigeration **Measure Type:** Refrigeration **Measure Sub Type:** Refrigeration

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
CUSTOM REFRIGERATION	Electric Commercial & Industrial Small Business Direct Install CUSTOM REFRIGERATION

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom energy-efficiency project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
CUSTOM REFRIGERATION	Calc	Calc			Calc		

Energy Impact Factors

Measure	Measure Life
CUSTOM REFRIGERATION	multi

Measure	ISR	RRe Gas	RRe Electric
CUSTOM REFRIGERATION	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
CUSTOM REFRIGERATION	1.00	1.00	ls_138_Electric

RRsp Source: RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.

RRwp Source: RLW Analytics (2007). Small Business Services Custom Measure Impact Evaluation. Prepared for National Grid.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
CUSTOM REFRIGERATION							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CUSTOM REFRIGERATION	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CUSTOM REFRIGERATION		

Dehumidifier Recycling

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

Recycling of old dehumidifiers

Baseline Description

Operating inefficient unit.

Measures

Measure Name	Unique Identifier
Dehumidifier Recycling	Electric Commercial & Industrial Small Business Direct Install Dehumidifier Recycling

Savings Principle

Recycling of inefficient unit.

Savings Method

Deemed

Unit

Per dehumidifier

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Dehumidifier Recycling	407.10	0.035					

Electric kWh Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Dehumidifier Recycling	4

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Dehumidifier Recycling	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Dehumidifier Recycling	1.00	1.00	ls_79_Electric

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Dehumidifier Recycling							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Dehumidifier Recycling	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Dehumidifier Recycling	$0.16 / kWh	Incentive: $0.07 / kWh

Door heater control

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Custom

Measure Category: Refrigeration

Measure Type: Controls

Measure Sub Type: Door Heater Control

Program: Small Business Direct Install

Measure Description

The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating also results in a reduced cooling load.

Baseline Description

The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls.

Measures

Measure Name	Unique Identifier
Door heater control	Electric Commercial & Industrial Small Business Direct Install Door heater control

Savings Principle

The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by calculating the dew point of the store, and controlling the anti-sweat heater based on specific algorithms for freezer andcooler doors.

Savings Method

Calculated using site-specific inputs

Unit

Installed door heater controls on existing cooler/freezer.

Savings Equation

Gross kWh = kW_DoorHeater × %OFF × Hours

Gross kW = kW_DoorHeater × %OFF

Where:

kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific

%OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters

Hours = Door heater annual run hours before controls

Hours: N/A

Hours Note: Pre-retrofit hours are 8,760 hours per year. After controls are installed, the door heaters in freezers are on for an average 4,730.4 hours/year (46% off time) and the door heaters for coolers are on for an average 2,277.6 hours/year (74% off time) basedon National Resource Management field experience.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Door heater control	Calc	Calc					

Electric kWh Note: Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Spreadsheet

Electric kW Note: Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Spreadsheet

Energy Impact Factors

Measure	Measure Life
Door heater control	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Door heater control	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
Door heater control	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

RRwp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Door heater control							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Door heater control	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Door heater control		

Fan Control

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Refrigeration | **Measure Type:** Controls | **Measure Sub Type:** Fan Control

Program: Small Business Direct Install

Measure Description

Installation of controls to modulate the evaporator fans based on temperature control. Energy savings include: fan energy savings from reduced fan operating hours, refrigeration energy savings from reduced waste heat, and compressor energy savings resulting from the electronic temperature control.

Baseline Description

The baseline efficiency case assumes evaporator fans that run 8760 annual hours with no temperature control.

Measures

Measure Name	Unique Identifier
Fan Control	Electric Commercial & Industrial Small Business Direct Install Fan Control

Savings Principle

The high efficiency case is the use of an energy management system to control evaporator fan operation based on temperature.

Savings Method

Calculated using site-specific inputs

Unit

Installed controls on evaporator fans in existing cooler/freezer.

Savings Equation

Gross kWh = kWh_fan + kWh_heatfreezer + kWh_control

Gross kWh = kWh_fan + kWh_heatrefrigerator + kWh_control

kWh_fan= kW_fan * 8760 * %OFF

kWh_heatfreezer = kWh_defrost * 0.28* Eff_freezer

kWh_heatrefrigerator = kWhdefrost*0.28*Eff_refrigerator

Gross kW= Gross kWh / Hours

Where:

Eff_Freezer = Efficiency of typical freezer system: 1.87 kW/ton (1)

Eff_Refrigerator = Efficiency of typical refrigerator system: 1.05 kW/ton4 (1)

%OFF = Percent of annual hours that the evaporator is turned off: 33.5% (2)

(1)DNV (2022). X1931-5 PSD Commercial Refrigeration Efficiency Update Study

(2)The Cadmus Group, Inc. (2015), Commercial Refrigeration Loadshape Project Final Report. Section 1.4.2 ECM Retrofits, pg. 13.

Hours: 4072

Hours Note: The average annual operating hours are 4072 hours/year, based on National Resource Management field experience.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Fan Control	Calc	Calc					

Electric kWh Note: Calculation assumptions based off of NRM field experience and data

Electric kW Note: Calculation assumptions based off of NRM field experience and data

Energy Impact Factors

Measure	Measure Life
Fan Control	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Fan Control	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
Fan Control	1.00	1.00	ls_138_Electric

RRsp Source: HEC, Inc. (1996). Analysis of Savings from Walkii-n Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco.

RRwp Source: HEC, Inc. (1996). Analysis of Savings from Walkii-n Cooler Air Economizers and Evaporator Fan Controls. Prepared for NEPSco.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Fan Control				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Fan Control	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Fan Control		

Freezer Door Heater Controls

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Custom

Measure Category: Refrigeration

Measure Type: Controls

Measure Sub Type: Door Heater Control

Program: Small Business Direct Install

Measure Description

The Installation of controls to reduce the run time of door and frame heaters for freezers and walk-in or reach-in coolers. The reduced heating also results in a reduced cooling load.

Baseline Description

The baseline efficiency case is a cooler or freezer door heater that operates 8,760 hours per year without any controls.

Measures

Measure Name	Unique Identifier
Freezer Door Heater Controls	Electric Commercial & Industrial Small Business Direct Install Freezer Door Heater Controls

Savings Principle

The high efficiency case is a cooler or freezer door heater connected to a heater control system, which controls the door heaters by calculating the dew point of the store, and controlling the anti-sweat heater based on specific algorithms for freezer andcooler doors.

Savings Method

Calculated using site-specific inputs

Unit

Installed door heater controls on existing cooler/freezer.

Savings Equation

Gross kWh = kW_DoorHeater × %OFF × Hours

Gross kW = kW_DoorHeater × %OFF

Where:

kW_DoorHeater = Total demand of the door heater, calculated as Volts * Amps / 1000: site-specific

%OFF = Door heater Off time: 46% for freezer door heaters or 74% for cooler door heaters

Hours = Door heater annual run hours before controls

Hours: N/A

Hours Note: Pre-retrofit hours are 8,760 hours per year. After controls are installed, the door heaters in freezers are on for an average 4,730.4 hours/year (46% off time) and the door heaters for coolers are on for an average 2,277.6 hours/year (74% off time) basedon National Resource Management field experience.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Freezer Door Heater Controls	Calc	Calc					

Electric kWh Note: Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Spreadsheet

Electric kW Note: Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Spreadsheet

Energy Impact Factors

Measure	Measure Life
Freezer Door Heater Controls	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Freezer Door Heater Controls	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
Freezer Door Heater Controls	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

RRwp Note: Realization rate is assumed 100% because savings are based on researched assumptions.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Freezer Door Heater Controls							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Freezer Door Heater Controls	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Freezer Door Heater Controls		

Freezer Recycling

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Appliances **Measure Type:** Recycling **Measure Sub Type:** Freezer Recycling

Program: Small Business Direct Install

Measure Description

The retirement of old, inefficient secondary refrigerators and freezers.

Baseline Description

The baseline efficiency case is an old, inefficient secondary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use.

Measures

Measure Name	Unique Identifier
Freezer Recycling	Electric Commercial & Industrial Small Business Direct Install Freezer Recycling

Savings Principle

The high efficiency case assumes no replacement of secondary unit.

Savings Method

Deemed

Unit

Removal of existing refrigerator or freezer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Freezer Recycling	754.00	0.082					

Electric kWh Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Electric kW Source: Cadmus Demand Impact Model (2012). Estimated using the demand allocation methodology, Prepared for the Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Freezer Recycling	8

Measure Life Source: EPA Research (2014), Energy Star Commercial Equipment Calculator, Freezer Calcs, https://www.energystar.gov/sites/default/files/asset/document/commercial_kitchen_equipment_calculator.xlsx. Assume 2/3rd of measure life for recycling - MA Common assumption

Measure	ISR	RRe Gas	RRe Electric
Freezer Recycling	1.00		0.83

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Measure	RR sp	RR wp	Loadshape ID
Freezer Recycling	1.00	1.00	ls_138_Electric

RRsp Note: National Grid assumption based on regional PA working groups.

RRwp Note: National Grid assumption based on regional PA working groups.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Freezer Recycling							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Freezer Recycling	0.50	0.00	0.00	0.50

NTG Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Freezer Recycling	$0.47 / kWh	Incentive: $0.30 / kWh

Hand Dryer

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Other | **Measure Type:** | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

This measure consists of installing efficient hand dryers that save energy by drying with air movement, using motion sensors, and reducing drying time. Energy efficient hand dryers use less energy per dry than standard hand dryers. Hand dryers are applicable in retail, commercial, and industrial settings.

Baseline Description

The baseline equipment for this measure is a push-button operated hand dryer with connected load in excess of 1,500 Watts.

Measures

Measure Name	Unique Identifier
Hand Dryer	Electric Commercial & Industrial Small Business Direct Install Hand Dryer

Savings Principle

To qualify for this measure, , a hand dryer must be motion operated with rated load of 1,500 W or less.

Savings Method

Calculated using site specific inputs

Unit

Per hand dryer

Savings Equation

Gross kWh = CPD * DPY * ((Watts_Base * CycleTime_Base - Watts_EE * CycleTime_EE)/(3600 sec/hr * 1000 Watts/kW))

Where:

CPD = Number of cycles per day (if unknown, use assumption in Table 18a of Appendix A)

DPY = Number of days facility operates per year.(if unknown, use assumption in Table 18a of Appendix A)

Watts = Unit Wattage

Cycle Time = Actuals (if unknown, use assumption in Table 18b in Appendix A)

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Hand Dryer	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Hand Dryer	10

Measure	ISR	RRe Gas	RRe Electric
Hand Dryer	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Hand Dryer	1.00	1.00	ls_133_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Hand Dryer							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hand Dryer	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hand Dryer		

High Intensity Discharge, Exterior

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Lighting | **Measure Type:** Exterior | **Measure Sub Type:** Fixture

Program: Small Business Direct Install

Measure Description

The installation of a high intensity discharge exterior light.

Baseline Description

For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices.

Measures

Measure Name	Unique Identifier
High Intensity Discharge, Exterior	Electric Commercial & Industrial Small Business Direct Install High Intensity Discharge, Exterior

Savings Principle

Savings Method

Calculated using site-specific inputs

Unit

Installed high-efficiency lighting project.

Savings Equation

Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours

Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)

Where:

QTY_base_i = Quantity of baseline fixtures in location i

Watts_base_i = Connected wattage of baseline fixtures in location i

QTY_ee_j = Quantity of efficient fixtures in location j

Watts_ee_j = Connected wattage of efficient fixtures in location j

1,000 Watts per kW = Conversion factor

Hours = Lighting annual hours of operation: site-specific.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
High Intensity Discharge, Exterior	Calc	Calc			Calc		

Energy Impact Factors

Measure	Measure Life
High Intensity Discharge, Exterior	5

Measure Life Source: DNV (2022). RI C&I Lighting Market Characterization and Adjusted Measure Life Study. http://rieermc.ri.gov/wp-content/uploads/2022/11/rhode-island_ci-lighting-market-characterization-and-adjusted-measure-life-report_final.pdf

Measure	ISR	RRe Gas	RRe Electric
High Intensity Discharge, Exterior	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
High Intensity Discharge, Exterior	1.00	1.00	ls_106_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
High Intensity Discharge, Exterior							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
High Intensity Discharge, Exterior	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
High Intensity Discharge, Exterior		

Hot Water, Custom

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Hot Water **Measure Type:** **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Hot Water, Custom	Electric Commercial & Industrial Small Business Direct Install Hot Water, Custom

Savings Principle

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Hot Water, Custom	Calc	Calc				Calc	

Energy Impact Factors

Measure	Measure Life
Hot Water, Custom	5,10,13,15

Measure	ISR	RRe Gas	RRe Electric
Hot Water, Custom	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Hot Water, Custom	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Hot Water, Custom							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hot Water, Custom	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hot Water, Custom	$1.10 / kWh	Incentive: $0.72 / kWh

HVAC, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
HVAC, Custom	Electric Commercial & Industrial Small Business Direct Install HVAC, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
HVAC, Custom	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
HVAC, Custom	multi

Measure	ISR	RRe Gas	RRe Electric
HVAC, Custom	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
HVAC, Custom	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
HVAC, Custom							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC, Custom	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC, Custom	$1.15 / kWh	Incentive: $0.76 / kWh

LED

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** LED Fixture | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The installation of hardwired ENERGY STAR® LED outdoor fixtures with pin-based bulbs, LED indoor fixtures with pin-based bulbs, and LED indoor screw in fixtures . Savings for this measure are attributable to high efficiency outdoor lighting fixtures and high efficiency indoor lighting fixtures.

Baseline Description

The baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. Existing fixture wattages are provided in the Table 4 of Appendix A.

Measures

Measure Name	Unique Identifier
LED - Exterior HW LED - Interior HW LED - Interior SI	Electric Commercial & Industrial Small Business Direct Install LED - Exterior HW Electric Commercial & Industrial Small Business Direct Install LED - Interior HW Electric Commercial & Industrial Small Business Direct Install LED - Interior SI

Savings Principle

The high efficiency case is the installation of LED lighting fixtures.

Savings Method

Calculated using deemed inputs

Unit

Installed LED fixtures

Savings Equation

Gross kWh = Qty × deltakW × Hours

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

DeltakW = Deemed average kW reduction per unit.

Hours = Deemed average annual operating hours.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
	Calc	Calc					
LED - Exterior HW							
LED - Interior HW			Calc		Calc		
LED - Interior SI			Calc		Calc		

Energy Impact Factors

Measure	Measure Life
LED - Exterior HW	See Table 12 in Appendix A
LED - Interior HW	6
LED - Interior SI	3
	3

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
LED	1.00		1.03

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Measure	RR sp	RR wp	Loadshape ID
LED - Exterior HW	0.91	0.81	ls_106_Electric
LED - Interior HW	0.91	0.81	ls_106_Electric
LED - Interior SI	0.91	0.81	ls_106_Electric

RRsp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
LED - Exterior HW							
LED - Interior HW							
LED - Interior SI							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
LED	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
LED - Exterior HW	$0.86 / kWh	$0.63 / kWh
LED - Interior HW	$0.97 / kWh	$0.63 / kWh
LED - Interior SI	$0.92 / kWh	$0.59 / kWh

LED Exit Signs

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Lighting | **Measure Type:** Signage | **Measure Sub Type:** Exit Sign LED

Program: Small Business Direct Install

Measure Description

The installation of an LED exit sign

Baseline Description

For retrofit installations, the baseline efficiency case is project-specific and is determined using actual fixture types and counts from the existing space. For lost opportunity installations, the baseline case is based on comparable code-compliant installations and standard practices.

Measures

Measure Name	Unique Identifier
LED Exit Signs	Electric Commercial & Industrial Small Business Direct Install LED Exit Signs

Savings Principle

The high efficiency case is the installation of LED exit signs.

Savings Method

Calculated using site-specific inputs

Unit

Installed high-efficiency lighting project.

Savings Equation

Gross kWh = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW) × Hours

Gross kW = [SUM(QTY_base_i × Watts_base_i) - SUM(QTY_ee_j × Watts_ee_j)] / (Watts per kW)

Where:

QTY_base_i = Quantity of baseline fixtures in location i

Watts_base_i = Connected wattage of baseline fixtures in location i

QTY_ee_j = Quantity of efficient fixtures in location j

Watts_ee_j = Connected wattage of efficient fixtures in location j

1,000 Watts per kW = Conversion factor

Hours = Lighting annual hours of operation: site-specific.

deltaMMBtu_Gas/kWh = Gross natural gas MMBtu reduction per gross kWh saved.

deltaMMBtu_Oil/kWh = Gross heating oil MMBtu reduction per gross kWh saved.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
LED Exit Signs	Calc	Calc			Calc		

Energy Impact Factors

Measure	Measure Life
LED Exit Signs	3

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
LED Exit Signs	1.00		1.03

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Measure	RR sp	RR wp	Loadshape ID
LED Exit Signs	0.91	0.81	ls_106_Electric

RRsp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

RRwp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
LED Exit Signs							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
LED Exit Signs	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
LED Exit Signs		

Motor/Drives, Non-HVAC

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Small Business Direct Install

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
Motor/Drives, Non-HVAC	Electric Commercial & Industrial Small Business Direct Install Motor/Drives, Non-HVAC

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Motor/Drives, Non-HVAC	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Motor/Drives, Non-HVAC	13

Measure	ISR	RRe Gas	RRe Electric
Motor/Drives, Non-HVAC	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Motor/Drives, Non-HVAC	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Motor/Drives, Non-HVAC				$0.003			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Motor/Drives, Non-HVAC	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Motor/Drives, Non-HVAC		

Novelty cooler shutoff

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Custom

Measure Category: Refrigeration

Measure Type: Controls

Measure Sub Type: Novelty Cooler Control

Program: Small Business Direct Install

Measure Description

Installation of controls to shut off a facility's novelty coolers for non-perishable goods based on pre-programmed store hours. Energy savings occur as coolers cycle off during facility unoccupied hours.

Baseline Description

The baseline efficiency case is the novelty coolers operating 8,760 hours per year.

Measures

Measure Name	Unique Identifier
Novelty cooler shutoff	Electric Commercial & Industrial Small Business Direct Install Novelty cooler shutoff

Savings Principle

The high efficiency case is the novelty coolers operating fewer than 8,760 hours per year since they are controlled to cycle each night based on pre-programmed facility unoccupied hours.

Savings Method

Calculated using site-specific inputs

Unit

Installed controls on existing cooler/freezer.

Savings Equation

Gross kWh = kW_nc × DC_nc × HoursOff

Gross kW = 0

Where:

kW_nc = Power demand of novelty cooler calculated from equipment nameplate data and estimated 0.85 power factor.

DC_nc = Weighted average annual duty cycle; Estimate based on NRM field experience.

HoursOff = Potential hours off every night per year, estimated as one less than the number of hours the store is closed per day: site-specific.

Hours: N/A

Hours Note: Energy and demand savings are based on the reduced operation hours of the cooler equipment. Hours reduced per day are estimated on a case-by-case basis, and are typically calculated as one less than the number of hours per day that the facility is closed;the baseline assumes equipment operated 24/7/365.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Novelty cooler shutoff	Calc	Calc					

Electric kWh Note: Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Spreadsheet

Electric kW Note: Algorith Inputs are based field experience and evaluation from National Resource Management. Supported by Select Energy (2004). Cooler Control Spreadsheet

Energy Impact Factors

Measure	Measure Life
Novelty cooler shutoff	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Novelty cooler shutoff	1.00		1.05

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
Novelty cooler shutoff	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Novelty cooler shutoff							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Novelty cooler shutoff	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Novelty cooler shutoff		

OCCUPANCY SENSORS

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Custom

Measure Category: Lighting

Measure Type: Controls

Measure Sub Type: Occupancy Sensor

Program: Small Business Direct Install

Measure Description

This measure promotes the installation of lighting controls in both lost-opportunity and retrofit applications. Promoted technologies include occupancy sensors and daylight dimming controls.

Baseline Description

The baseline efficiency case assumes no controls (retrofit) or code-compliant controls (new construction).

Measures

Measure Name	Unique Identifier
OCCUPANCY SENSORS	Electric Commercial & Industrial Small Business Direct Install OCCUPANCY SENSORS

Savings Principle

The high efficiency case involves lighting fixtures connected to controls that reduce the pre-retrofit or baseline hours of operation.

Savings Method

Calculated using site-specific inputs

Unit

Installed lighting controls project.

Savings Equation

Gross kWh = ControlledkW * hours_base * (%Save)

Gross kW = ControlledkW

where:

%Save = Percentage of kWh that is saved by utilized the control maeasure

Savings factors are deemed based on study results. Refer to Table XX in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
OCCUPANCY SENSORS	Calc	Calc	Calc		Calc		

Oil MMBtu Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Gas Heat MMBtu Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Energy Impact Factors

Measure	Measure Life
OCCUPANCY SENSORS	9

Measure Life Source: Dan Mellinger (2022). Lighting Control Measure Life Memo.

Measure	ISR	RRe Gas	RRe Electric
OCCUPANCY SENSORS	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

Measure	RR sp	RR wp	Loadshape ID
OCCUPANCY SENSORS	0.94	0.94	ls_106_Electric

RRsp Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

RRwp Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
OCCUPANCY SENSORS				$0.087			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
OCCUPANCY SENSORS	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
OCCUPANCY SENSORS	$0.86 / kWh	Incentive: $0.59 / kWh

PHOTOCELLS

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Lighting **Measure Type:** Controls **Measure Sub Type:** Photocells

Program: Small Business Direct Install

Measure Description

Installing a photocell to control lighting.

Baseline Description

Lighting that runs 24/7.

Measures

Measure Name	Unique Identifier
PHOTOCELLS	Electric Commercial & Industrial Small Business Direct Install PHOTOCELLS

Savings Principle

Installed photocell controls lighting.

Savings Method

Calculated using site-specific inputs

Unit

Installed lighting controls project.

Savings Equation

Gross kWh = ControlledkW * hours_base * (%Save)

Gross kW = ControlledkW

where:

%Save = Percentage of kWh that is saved by utilized the control maeasure

Savings factors are deemed based on study results. Refer to Table XX in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
PHOTOCELLS	Calc	Calc	Calc		Calc		

Oil MMBtu Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Gas Heat MMBtu Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Energy Impact Factors

Measure	Measure Life
PHOTOCELLS	9

Measure Life Source: Dan Mellinger (2022). Lighting Control Measure Life Memo.

Measure	ISR	RRe Gas	RRe Electric
PHOTOCELLS	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

Measure	RR sp	RR wp	Loadshape ID
PHOTOCELLS	0.98	0.98	ls_106_Electric

RRsp Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

RRwp Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
PHOTOCELLS				$0.087			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
PHOTOCELLS	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
PHOTOCELLS		

Process, Custom

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: Process | **Measure Type:** Process | **Measure Sub Type:** Process

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Process, Custom	Electric Commercial & Industrial Small Business Direct Install Process, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Process, Custom	Calc	Calc		Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Process, Custom	13

Measure	ISR	RRe Gas	RRe Electric
Process, Custom	1.00		1.04

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Process, Custom	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Process, Custom							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process, Custom	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process, Custom	$1.05 / kWh	Incentive: $0.68 / kWh

PROGRAMMABLE THERMOSTATS

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Small Business Direct Install

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system providing space heating or cooling without a programmable thermostat.

Measures

Measure Name	Unique Identifier
PROGRAMMABLE THERMOSTATS	Electric Commercial & Industrial Small Business Direct Install PROGRAMMABLE THERMOSTATS

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.

Savings Method

Deemed

Unit

Installed thermostat per square footage

Savings Equation

ΔkWh = SQFT * SAVEkWh

ΔkW = SQFT * SAVEkW

where:

SQFT = square feet of controlled space

SAVEkWh = average annual kWH reduction per SQFT of controlled space

SAVEkW = average annual kW reduction per SQFT of controlled space

Refer to Table 21 in Appendix A

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
PROGRAMMABLE THERMOSTATS	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
PROGRAMMABLE THERMOSTATS	15

Measure Life Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Measure	ISR	RRe Gas	RRe Electric
PROGRAMMABLE THERMOSTATS	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2020). Impact Evaluation of PY 2017 Small Business Initiative Non-lighting Measures (MA19C03-E-SBIMPCT). https://ma-eeac.org/wp-content/uploads/Final-Report-MA19C03-E-SBIMPCT-03202020.pdf

Measure	RR sp	RR wp	Loadshape ID
PROGRAMMABLE THERMOSTATS	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
PROGRAMMABLE THERMOSTATS							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
PROGRAMMABLE THERMOSTATS	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
PROGRAMMABLE THERMOSTATS	$0.86 / kWh	Incentive: $0.54 / kWh

Refrigerated case LED

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Refrigeration

Measure Type: Refrigeration Lighting

Measure Sub Type: Refrigerator Case LED

Program: Small Business Direct Install

Measure Description

Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load.

Baseline Description

The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases.

Measures

Measure Name	Unique Identifier
Refrigerated case LED	Electric Commercial & Industrial Small Business Direct Install Refrigerated case LED

Savings Principle

Savings Method

The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures.

Unit

Completed lighting project.

Savings Equation

Gross kWh = kWh_LED + kWh_heatfreezer

Grosss kWh = kWh_LED + kWh_heatrefrigerator

kWh_heatfeezer = kWh_LED*0.28*Eff_freezer

kWh_heatrefrigerator= kWh_LED*0.28*Eff_refrigerator

where:

Eff_freezer = Efficiency of typical freezer system: 1.87 kW/ton (1)

Eff_refrigerator = Efficiency of typical refrigerator system: 1.50 kW/ton (1)

(1) 1. DNV (2022). X1931-5 PSD Commercial Refrigeration Efficiency Update Study

Hours: 8760

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerated case LED	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Refrigerated case LED	3

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Refrigerated case LED	1.00		1.03

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Measure	RR sp	RR wp	Loadshape ID
Refrigerated case LED	1.01	1.01	ls_106_Electric

RRsp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

RRwp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerated case LED							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerated case LED	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerated case LED	$0.72 / kWh	Incentive: $0.45 / kWh

Refrigerator case LED, Custom

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Lighting **Measure Type:** Lighting **Measure Sub Type:** Refrigeration

Program: Small Business Direct Install

Measure Description

Installation of LED lighting in freezer and/or cooler cases. The LED lighting consumes less energy, and results in less waste heat which reduces the cooling/freezing load.

Baseline Description

The baseline efficiency case is the existing lighting fixtures in the cooler or freezer cases.

Measures

Measure Name	Unique Identifier
Refrigerator case LED, Custom	Electric Commercial & Industrial Small Business Direct Install Refrigerator case LED, Custom

Savings Principle

The high efficiency case is the installation of LED lighting fixtures on the cooler or freezer cases, replacing the existing lighting fixtures.

Savings Method

Calculated using site-specific inputs

Unit

Completed lighting project.

Savings Equation

Gross kWh = kWh_LED + kWh_heatfreezer

Grosss kWh = kWh_LED + kWh_heatrefrigerator

kWh_heatfeezer = kWh_LED*0.28*Eff_freezer

kWh_heatrefrigerator= kWh_LED*0.28*Eff_refrigerator

where:

Eff_freezer = Efficiency of typical freezer system: 1.87 kW/ton (1)

Eff_refrigerator = Efficiency of typical refrigerator system: 1.50 kW/ton (1)

(1) 1. DNV (2022). X1931-5 PSD Commercial Refrigeration Efficiency Update Study

Hours: 8760

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerator case LED, Custom	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Refrigerator case LED, Custom	3

Measure Life Source: DNV (2024). RI_AML_Update_2025

Measure	ISR	RRe Gas	RRe Electric
Refrigerator case LED, Custom	1.00		1.03

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Measure	RR sp	RR wp	Loadshape ID
Refrigerator case LED, Custom	1.00	1.00	ls_106_Electric

RRsp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

RRwp Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerator case LED, Custom							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerator case LED, Custom	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerator case LED, Custom		

Refrigerator Recycling

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Appliances

Measure Type: Recycling

Measure Sub Type: Refrigerator Recycling

Program: Small Business Direct Install

Measure Description

The retirement of old, inefficient secondary refrigerators and freezers.

Baseline Description

The baseline efficiency case is an old, inefficient primary working refrigerator or freezer. Estimated average usage is based on combined weight of freezer energy use and refrigerator energy use.

Measures

Measure Name	Unique Identifier
Refrigerator Recycling	Electric Commercial & Industrial Small Business Direct Install Refrigerator Recycling

Savings Principle

The high efficiency case assumes no replacement of secondary unit.

Savings Method

Deemed

Unit

Removal of existing refrigerator or freezer.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: The average annual operating hours are 8760 hours/year.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Refrigerator Recycling	983.00	0.093					

Electric kWh Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Electric kW Source: Cadmus Demand Impact Model (2012). Estimated using the demand allocation methodology, Prepared for the Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Refrigerator Recycling	4

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Refrigerator Recycling	1.00		0.90

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Measure	RR sp	RR wp	Loadshape ID
Refrigerator Recycling	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Refrigerator Recycling							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Refrigerator Recycling	0.54	0.00	0.00	0.46

NTG Source: NMR Group, Inc. (2021). Rhode Island Appliance Recycling. http://rieermc.ri.gov/wp-content/uploads/2021/12/ng-ri-21-re-appliance-recycling-impact-and-incentives-report_final_23nov2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Refrigerator Recycling		

Salon Nozzle

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: DHW Controls

Measure Sub Type: Electric DHW Controls

Program: Small Business Direct Install

Measure Description

The installation of a high efficiency salon nozzle.

Baseline Description

Standard salon nozzle.

Measures

Measure Name	Unique Identifier
Salon Nozzle	Electric Commercial & Industrial Small Business Direct Install Salon Nozzle

Savings Principle

An efficient salon nozzle.

Savings Method

Deemed

Unit

Installed salon nozzle

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Salon Nozzle	4649.00	0.790					

Energy Impact Factors

Measure	Measure Life
Salon Nozzle	3

Measure Life Source: DNV (2021). Prescriptive Measures NRNC and ISP Results.

Measure	ISR	RRe Gas	RRe Electric
Salon Nozzle	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Salon Nozzle	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Salon Nozzle							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Salon Nozzle	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Salon Nozzle		

Showerhead

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: DHW Controls

Measure Sub Type: Electric DHW Controls

Program: Small Business Direct Install

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by electricity.

Baseline Description

The baseline efficiency case is a 2.5 GPM showerhead.

Measures

Measure Name	Unique Identifier
Showerhead	Electric Commercial & Industrial Small Business Direct Install Showerhead

Savings Principle

The high efficiency case is a 1.5 GPM showerhead.

Savings Method

Deemed

Unit

Installed showerhead.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Showerhead	513.00	0.090					

Energy Impact Factors

Measure	Measure Life
Showerhead	10

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Showerhead	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Showerhead	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Showerhead							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Showerhead	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Showerhead		

Spray Valves

Sector: Commercial & Industrial

Fuel: Electric

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: DHW Controls

Measure Sub Type: Electric DHW Controls

Program: Small Business Direct Install

Measure Description

Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM.

Baseline Description

The baseline efficiency case is a standard efficiency spray valve.

Measures

Measure Name	Unique Identifier
Spray Valves	Electric Commercial & Industrial Small Business Direct Install Spray Valves

Savings Principle

The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.6 GPM.

Savings Method

Deemed

Unit

Installed spray valve.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Spray Valves	1300.00						

Electric kWh Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Electric kW Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Spray Valves	5

Measure Life Source: U.S. Dept of Energy (2015). Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. https://www.regulations.gov/document/EERE-2014-BT-STD-0027-0050

Measure	ISR	RRe Gas	RRe Electric
Spray Valves	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Spray Valves	1.00	1.00	ls_138_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Spray Valves							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Spray Valves	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Spray Valves		

Swarm Logic

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Whole Building **Measure Type:** **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The installation of Swarm Logic software.

Baseline Description

The baseline is a building without Swarm logic installed.

Measures

Measure Name	Unique Identifier
Swarm Logic	Electric Commercial & Industrial Small Business Direct Install Swarm Logic

Savings Principle

The high efficiency case is Swarm Logic software installed on the EMS and/or connected thermostats.

Savings Method

Calculated using site-specific inputs

Unit

Per project

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Swarm Logic	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Swarm Logic	10

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Swarm Logic	1.00		

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Swarm Logic	1.00	1.00	ls_126_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Swarm Logic							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Swarm Logic	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Swarm Logic		

TIMECLOCKS

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Custom

Measure Category: Lighting **Measure Type:** Controls **Measure Sub Type:** Timeclocks

Program: Small Business Direct Install

Measure Description

Installing a timeclock to control lighting.

Baseline Description

Lighting that runs unnecessarily.

Measures

Measure Name	Unique Identifier
TIMECLOCKS	Electric Commercial & Industrial Small Business Direct Install TIMECLOCKS

Savings Principle

Installed timeclock controls lighting.

Savings Method

Calculated using site-specific inputs

Unit

Installed lighting controls project.

Savings Equation

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
TIMECLOCKS	Calc	Calc	Calc		Calc		

Oil MMBtu Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Gas Heat MMBtu Source: DNV GL (2019). PY2016 Rhode Island Commercial and Industrial Small Business Initiative Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/07/py2016-ri-ci-small-business-initiative-impact-evaluation.pdf

Energy Impact Factors

Measure	Measure Life
TIMECLOCKS	9

Measure	ISR	RRe Gas	RRe Electric
TIMECLOCKS	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

Measure	RR sp	RR wp	Loadshape ID
TIMECLOCKS	0.98	0.98	ls_106_Electric

RRsp Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

RRwp Source: KEMA (2013). Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
TIMECLOCKS				$0.087			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
TIMECLOCKS	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
TIMECLOCKS	$0.74 / kWh	Incentive: $0.47 / kWh

Transformers

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Transformers | **Measure Sub Type:** Transformers

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

Defined per project.

Measures

Measure Name	Unique Identifier
Transformers	Electric Commercial & Industrial Small Business Direct Install Transformers

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Transformers	Calc	Calc	Calc	Calc	Calc		

Energy Impact Factors

Measure	Measure Life
Transformers	30

Measure Life Note: US DOE lists lifetime at 32 years. For consistency with efficiency measure evaluated lifetimes, 30 years is the recommended maximum deemed lifetime. US Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Distribution Tran

Measure	ISR	RRe Gas	RRe Electric
Transformers	1.00		0.81

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Transformers	1.00	1.00	ls_196_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Transformers							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Transformers	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Transformers		

VENDING MACHINES

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Refrigeration **Measure Type:** Controls **Measure Sub Type:** Vending Miser

Program: Small Business Direct Install

Measure Description

Controls significantly reduce the energy consumption of vending machines lighting and refrigeration systems by powering down these systems during periods of inactivity. This measure does not apply to ENERGY STAR® qualified vending machines, as they already have built-in controls.

Baseline Description

The baseline efficiency case is a standard efficiency vending machine, or glass front refrigerated cooler without a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Measures

Measure Name	Unique Identifier
VENDING MACHINES	Electric Commercial & Industrial Small Business Direct Install VENDING MACHINES

Savings Principle

The high efficiency case is a standard efficiency vending machine, or glass front refrigerated cooler with a control system capable of powering down lighting and refrigeration systems during periods of inactivity.

Savings Method

Deemed

Unit

Installed vending miser.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: 8760

Hours Note: It is assumed that the connected equipment operates 24 hours per day, 7 days per week for a total annual operating hours of 8,760.

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
VENDING MACHINES	1612.00	0.184					

Electric kWh Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Electric kW Source: USA Technologies Energy Management Product Sheets (2006). Accessed on 09/01/2009.

Energy Impact Factors

Measure	Measure Life
VENDING MACHINES	5

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
VENDING MACHINES	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
VENDING MACHINES	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
VENDING MACHINES							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VENDING MACHINES	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VENDING MACHINES	$0.41 / kWh	Incentive: $0.26 / kWh

Wall Insulation

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Weatherization **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

Installation of wall insulation at 2021 code-level insulation R-value or above.

Baseline Description

The baseline efficiency case is the existing building before the insulation measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model developed in MA. It is also characterized by an assumed baseline insulation R-value, which is determined from population weighted average R-values drawn from the EIA's Commercial Building Energy Consumption Survey (CBECS) and historic MA insulation code requirements. These baseline insulation values are R-9.66 for exterior walls and R-21.24 for attics. The baseline building is also characterized by an assumed heating degree day value and cooling degree hours, based on a TMY meteorological data population-weighted average and assumed set points. These values are 5485 and 5841, respectively.

Measures

Measure Name	Unique Identifier
Wall Insulation, Electric Wall Insulation, Oil Wall Insulation, Propane	Electric Commercial & Industrial Small Business Direct Install Wall Insulation, Electric Electric Commercial & Industrial Small Business Direct Install Wall Insulation, Oil Electric Commercial & Industrial Small Business Direct Install Wall Insulation, Propane

Savings Principle

The high efficiency case is the existing building after the insulation measure is implemented. The high efficiency case is characterized by the previously mentioned baseline heating system efficiencies, heating degree day values, and cooling degree hours.It is also characterized by an assumed 2021 code-level insulation R-value, which is R-20 for exterior walls, and R-38 for attics.

Savings Method

Deemed

Unit

Per square foot

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Wall Insulation, Electric	3.34	0.002					
Wall Insulation, Oil	1.28	0.001	0.01				
Wall Insulation, Propane	1.28	0.001		0.01			

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Wall Insulation, Electric Wall Insulation, Oil Wall Insulation, Propane	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Wall Insulation	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Wall Insulation, Electric	1.00	1.00	ls_238_Electric
Wall Insulation, Oil	N/A	N/A	ls_00_Electric
Wall Insulation, Propane	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Wall Insulation, Electric							
Wall Insulation, Oil							
Wall Insulation, Propane							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Wall Insulation	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Wall Insulation, Electric	$0.47 / kWh	$0.05 / kWh
Wall Insulation, Oil	$1.23 / kWh	$0.13 / kWh
Wall Insulation, Propane	$1.23 / kWh	$0.13 / kWh

Water Heating

Sector: Commercial & Industrial **Fuel:** Electric **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** DHW

Program: Small Business Direct Install

Measure Description

The installation of a high efficiency water heating measures, such as faucet aerators, showerheads, spray valves, and salon nozzles.

Baseline Description

Standard efficiency DHW fixture.

Measures

Measure Name	Unique Identifier
Water Heating	Electric Commercial & Industrial Small Business Direct Install Water Heating

Savings Principle

High efficiency / low flow DHW fixture.

Savings Method

Calc

Unit

Installed fixture.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Where:

Qty = Total number of units.

Delta kWh = Deemed average annual kWh reduction per unit.

Delta kW = Deemed average kW reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Water Heating	Calc	Calc					

Energy Impact Factors

Measure	Measure Life
Water Heating	7

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Water Heating	1.00		1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Water Heating	1.00	1.00	ls_138_Electric

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Water Heating	calc						

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Water Heating	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Water Heating	$0.57 / kWh	Incentive: $0.36 / kWh

Weatherstripping

Sector: Commercial & Industrial | **Fuel:** Electric | **Program Type:** Prescriptive

Measure Category: Building Shell | **Measure Type:** Weatherization | **Measure Sub Type:** Weatherstripping

Program: Small Business Direct Install

Measure Description

Installation of weatherstripping.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model, and an assumed heating degree day value of 5485, based on a TMY meteorological data population-weighted average.

Measures

Measure Name	Unique Identifier
Weatherstripping, Electric Weatherstripping, Oil Weatherstripping, Propane	Electric Commercial & Industrial Small Business Direct Install Weatherstripping, Electric Electric Commercial & Industrial Small Business Direct Install Weatherstripping, Oil Electric Commercial & Industrial Small Business Direct Install Weatherstripping, Propane

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the previously mentioned heating system efficiencies and heating degree day values, and by an improved cubic feet per minute (CFM) infiltration rate, based on the amount of air sealing work-hours associated with the project. An assumed pressurized infiltration rate of 62.5 CFM50 saved per hour of air sealing is adjusted using an LBNL infiltration model that assumes a two story building with average wind shielding in order to calculate a natural infiltration rate savings value.

Savings Method

Deemed

Unit

Per linear feet

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	kWh	kW	Oil MMBtu	Propane MMBtu	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu
Weatherstripping, Electric	70.95	0.002					
Weatherstripping, Oil			0.31				
Weatherstripping, Propane				0.28			

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Weatherstripping, Electric	10
Weatherstripping, Oil	
Weatherstripping, Propane	

Measure Life Note: From IL TRM, assuming lower measure life than residential due to likely signifcantly higher door usage.

Measure	ISR	RRe Gas	RRe Electric
Weatherstripping	1.00		1.00

Measure	RR sp	RR wp	Loadshape ID
Weatherstripping, Electric	1.00	1.00	ls_208_Electric
Weatherstripping, Oil	N/A	N/A	ls_00_Electric
Weatherstripping, Propane	N/A	N/A	ls_00_Electric

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per kWh	One-time $ per kWh	Annual $ per MMBtu	One-time $ per MMBtu
Weatherstripping, Electric							
Weatherstripping, Oil							
Weatherstripping, Propane							

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Weatherstripping	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Weatherstripping, Electric	$0.32 / kWh	$0.15 / kWh
Weatherstripping, Oil	$7.31 / therm	$3.34 / therm
Weatherstripping, Propane	$8.07 / therm	$3.69 / therm

EnergyWise Multifamily, Gas

Air Sealing

Sector: Residential

Fuel: Gas

Program Type: Custom

Measure Category: Building Shell

Measure Type: Air Sealing

Measure Sub Type: Air Sealing/Infiltration

Program: EnergyWise Multifamily

Measure Description

Thermal shell air leaks are sealed through strategic use and location of air-tight materials.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)

Measures

Measure Name	Unique Identifier
Air Sealing	Gas Residential EnergyWise Multifamily Air Sealing

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.

Savings Method

Calculated using site-specific inputs

Unit

Completed air sealing project.

Savings Equation

Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft3-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu)

Where:

CFM50_pre = CFM50 measurement before air sealing

CFM50_post = CFM50 measurement after air sealing (cu.ft./min)

LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol

4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov

24 Hours per Day = Conversion factor

60 Minutes per Hour = Conversion factor

0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F

1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default

0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default

1,000,000 Btuper MMBtu = Conversion factor

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Hours Note: Heating hours are characterized by the heating degree days for the facility, 4644.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Air Sealing	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Air Sealing	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report.
https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Air Sealing	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Air Sealing	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Air Sealing		$23.483	$167.241		

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Air Sealing	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Air Sealing	$100.00 / MMBtu	Incentive: $100.00 / MMBtu

Custom

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Custom **Measure Type:** Custom **Measure Sub Type:** Custom

Program: EnergyWise Multifamily

Measure Description

Vendors install a variety of measures at multifamily facilities. Measures include

Baseline Description

For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the facility.

Measures

Measure Name	Unique Identifier
Custom	Gas Residential EnergyWise Multifamily Custom

Savings Principle

The high efficiency scenario is specific to the facility and may include one or more energy efficiency measures.

Savings Method

Calc

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Custom	Calc	Calc	Calc	Calc	Calc

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Custom	1.00	0.99	0.99

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom		

Demand Circulator

Sector: Residential

Fuel: Gas

Program Type: Custom

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Demand Circulator

Program: EnergyWise Multifamily

Measure Description

Installation of a demand controller on a re-circulation loop.

Baseline Description

Full time operation of re-circ pump.

Measures

Measure Name	Unique Identifier
Demand Circulator	Gas Residential EnergyWise Multifamily Demand Circulator

Savings Principle

The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs.

Savings Method

Calc

Unit

Installed recirc controller

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Demand Circulator	Calc				

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Demand Circulator	multi

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Demand Circulator	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Demand Circulator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Demand Circulator					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Demand Circulator	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Demand Circulator	$3,000.00 / measure	Incentive: $1,800.00 / measure

DHW, MF

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** DHW

Program: EnergyWise Multifamily

Measure Description

The installation of a high efficiency water heating measure, such as faucet aerators, showerheads, spray valves, and salon nozzles.

Baseline Description

Standard efficiency DHW fixture.

Measures

Measure Name	Unique Identifier
DHW, MF	Gas Residential EnergyWise Multifamily DHW, MF

Savings Principle

High efficiency / low flow DHW fixture.

Savings Method

Deemed

Unit

Installed water heating measure

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
DHW, MF		1.30			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
DHW, MF	multi

Measure	ISR	RRe Gas	RRe Electric
DHW, MF	0.90	1.00	

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
DHW, MF	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
DHW, MF	1786	$1.536			

Water Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DHW, MF	0.08	0.01	0.00	0.93

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DHW, MF		

Duct Insulation, MF

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Envelope **Measure Type:** Ducting **Measure Sub Type:** Duct Insulation

Program: EnergyWise Multifamily

Measure Description

For existing ductwork in non-conditioned spaces, insulate ductwork.

Baseline Description

The baseline efficiency case is existing, un-insulated ductwork in unconditioned spaces (e.g. attic or basement).

Measures

Measure Name	Unique Identifier
Duct Insulation, MF	Gas Residential EnergyWise Multifamily Duct Insulation, MF

Savings Principle

The high efficiency condition is insulated ductwork in unconditioned spaces.

Savings Method

Deemed

Unit

Completed duct insulation job.

Savings Equation

MMBTUannual = (((1/Rexist)-(1/Rnew)) x HDD x 24 x Area) / (1,000,000) X Nheat

kWhannual = MMBtuannaul x 293.1

kW = kWhannual x kW/kWhNheating

Where:

Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Area = Square footage of insulated area

ηheat = Efficiency of the heating system (AFUE or COP)

293.1 = Conversion constant (1MMBtu = 293.1 kWh)

24 = Conversion for hours per day

HDD = Heating Degree Days; dependent on location, see table below

1,000,000 = Conversion from Btu to MMBtu

kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Duct Insulation, MF	Calc				

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Duct Insulation, MF	20

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Duct Insulation, MF	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Duct Insulation, MF	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Duct Insulation, MF					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Duct Insulation, MF	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Duct Insulation, MF	$277.00 / MMBtu	Incentive: $207.00 / MMBtu

Duct Sealing

Sector: Residential | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Ducting | **Measure Sub Type:** Duct Sealing

Program: EnergyWise Multifamily

Measure Description

Ducts are sealed by reconnecting disconnected duct joints and sealing gaps or seams with mastic and fiber-mesh tape as appropriate

Baseline Description

The baseline efficiency case is the existing facility or equipment prior to the implementation of duct sealing.

Measures

Measure Name	Unique Identifier
Duct Sealing	Gas Residential EnergyWise Multifamily Duct Sealing

Savings Principle

The baseline efficiency case is the existing facility or equipment after the implementation of duct sealing.

Savings Method

Calc

Unit

Savings Equation

MMBtu = Annualheatingconsumption x %SAVE x (1/1000000)

Where:

AnnualHeatingConsumption = The total annual heating consumption for the facility (Btu)

%SAVE = Average reduction in energy consumption.

1/1,000,000 = Conversion from Btu to MMBtu

Savings Factors for Multifamily Duct Sealing

Measure Type %SAVE158

Savings Factors for Multifamily Duct Sealing

Surface Area < 50 SQFT 7%

Surface Area > 50 SQFT and < 200 SQFT 3%

Surface Area > 200 SQFT 1%

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Duct Sealing	Calc			Calc	Calc

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Duct Sealing	20

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Duct Sealing	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Duct Sealing	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Duct Sealing		$0.283			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Duct Sealing	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Duct Sealing	$310.00 / MMBtu	Incentive: $232.00 / MMBtu

Faucet aerator

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** Faucet Aerator

Program: EnergyWise Multifamily

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.

Baseline Description

The baseline efficiency case is 2.2 GPM or greater faucet.

Measures

Measure Name	Unique Identifier
Faucet aerator	Gas Residential EnergyWise Multifamily Faucet aerator

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less aerator installed.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Faucet aerator		0.20			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Faucet aerator	7

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Faucet aerator	0.90	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Faucet aerator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Faucet aerator	359	$0.714			

Water Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Faucet aerator	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Faucet aerator	$3.00 / measure	Incentive: $3.00 / measure

Heating, Custom

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Heating System **Measure Sub Type:** Heating

Program: EnergyWise Multifamily

Measure Description

Installation of high efficiency heating equipment to replace existing inefficient furnace, hydronic boiler or steam boiler.

Baseline Description

The baseline efficiency case is the existing inefficient heating system.

Measures

Measure Name	Unique Identifier
Heating, Custom	Gas Residential EnergyWise Multifamily Heating, Custom

Savings Principle

The high efficiency case is characterized by the rated efficiency (AFUEEE) of the new high efficiency furnace or boiler.

Savings Method

Calc

Unit

Installed heating system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heating, Custom	Calc			Calc	

Energy Impact Factors

Measure	Measure Life
Heating, Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Heating, Custom	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Heating, Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heating, Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating, Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating, Custom	$286.00 / MMBtu	Incentive: $214.00 / MMBtu

Hot Water, Custom

Sector: Residential | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Water Heating | **Measure Type:** Water Heater | **Measure Sub Type:** Efficient Water Heater

Program: EnergyWise Multifamily

Measure Description

Installation of high efficiency water heating equipment to replace the existing inefficient water heater.

Baseline Description

The baseline efficiency case is a stand-alone tank water heater with an energy factor of 0.575.

Measures

Measure Name	Unique Identifier
Hot Water, Custom	Gas Residential EnergyWise Multifamily Hot Water, Custom

Savings Principle

The high efficiency case includes the new efficient water heater with an Energy Factor > 0.60.

Savings Method

Calc

Unit

Installed water heating system.

Savings Equation

Delta MMBtu = Units x (18 MMBTu/Units) x ((1/EFbase) - (1/EFee)

Unit = Total number of dwelling units utilizing the water heater

18 MMBtu/Unit = Average annual water heating energy demand per dwelling unit401

EFBASE = Energy Factor for the baseline waterheater

EFEE = Energy Factor for the new efficient water heater

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Hot Water, Custom	Calc			Calc	

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Hot Water, Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Hot Water, Custom	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Hot Water, Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Hot Water, Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hot Water, Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hot Water, Custom		

Low Flow Showerhead

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: EnergyWise Multifamily

Measure Description

The installation of a low flow showerhead with a flow rate of 1.5 GPM or less. The installation of TSV is a control that limits flow once water is heated.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead. For the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less.

Measures

Measure Name	Unique Identifier
Low Flow Showerhead - Showerhead	Gas Residential EnergyWise Multifamily Low Flow Showerhead - Showerhead
Low Flow Showerhead - w/TSV	Gas Residential EnergyWise Multifamily Low Flow Showerhead - w/TSV
Thermostatic Shut-Off Valve	Gas Residential EnergyWise Multifamily Thermostatic Shut-Off Valve

Savings Principle

The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low Flow Showerhead - Showerhead		1.30			
Low Flow Showerhead - w/TSV		1.41			
Thermostatic Shut-Off Valve		0.34			

Energy Impact Factors

Measure	Measure Life
Low Flow Showerhead - Showerhead Low Flow Showerhead - w/TSV Thermostatic Shut-Off Valve	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Low Flow Showerhead	1.00	1.00	1.00

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Low Flow Showerhead - Showerhead	N/A	N/A	ls_00_Gas
Low Flow Showerhead - w/TSV	N/A	N/A	ls_00_Gas
Thermostatic Shut-Off Valve	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low Flow Showerhead - Showerhead	1786	$0.714			
Low Flow Showerhead - w/TSV	2130	$0.714			
Thermostatic Shut-Off Valve	558				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low Flow Showerhead	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low Flow Showerhead - Showerhead	$25.00 / measure	$25.00 / measure
Low Flow Showerhead - w/TSV	$40.00 / measure	$40.00 / measure
Thermostatic Shut-Off Valve	$30.00 / measure	$30.00 / measure

MF Shell Insulation

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Building Shell **Measure Type:** Insulation **Measure Sub Type:** Shell

Program: EnergyWise Multifamily

Measure Description

Insulation upgrades are applied in existing multifamily facilities.

Baseline Description

The baseline efficiency case is characterized by the total R-value of the existing attic, basement or sidewall (Resist). This is calculated as the R-value of the existing insulation, estimated by the program contractor, plus the R-value of the ceiling, floor, or wall (for all projects: RCEILING = 3.36; RFLOOR = 6.16; RWALL = 6.65)

Measures

Measure Name	Unique Identifier
MF Shell Insulation	Gas Residential EnergyWise Multifamily MF Shell Insulation

Savings Principle

The high efficiency case is characterized by the total R-value of the attic after the installation of additional attic, basement or sidewall insulation. This is calculated as the sum of the existing R-value (RBASE) plus the R-value of the added insulation(RADD).

Savings Method

Calculated using site-specific inputs

Unit

Completed insulation project.

Savings Equation

MMBTUannual = (((1/Rexist)-(1/Rnew)) x HDD x 24 x Area) / (1,000,000) X Nheat

kWhannual = MMBtuannaul x 293.1

kW = kWhannual x kW/kWhNheating

Where:

Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Area = Square footage of insulated area

ηheat = Efficiency of the heating system (AFUE or COP)

293.1 = Conversion constant (1MMBtu = 293.1 kWh)

24 = Conversion for hours per day

HDD = Heating Degree Days; dependent on location, see table below

1,000,000 = Conversion from Btu to MMBtu

kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Hours Note: Heating hours are characterized by the heating degree days for the facility, 4644.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
MF Shell Insulation	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
MF Shell Insulation	multi

Measure	ISR	RRe Gas	RRe Electric
MF Shell Insulation	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
MF Shell Insulation	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
MF Shell Insulation		$58.251			

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
MF Shell Insulation	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

NTG Note: Net-to-gross is set to 100% since the HER program is implemented as a randomized control trial (RCT). RCT produces net savings accounting for free-ridership.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MF Shell Insulation	$185.00 / MMBtu	Incentive: $138.00 / MMBtu

Pipe Wrap (Water Heating)

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Insulation **Measure Sub Type:** Pipe Insulation

Program: EnergyWise Multifamily

Measure Description

Installation of DHW pipe wraps

Baseline Description

The baseline efficiency case is the existing hot water equipment.

Measures

Measure Name	Unique Identifier
Pipe Wrap (Water Heating)	Gas Residential EnergyWise Multifamily Pipe Wrap (Water Heating)

Savings Principle

The high efficiency case includes pipe wrap.

Savings Method

Deemed

Unit

Installed pipe wrap job

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pipe Wrap (Water Heating)		0.15			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Pipe Wrap (Water Heating)	15

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Pipe Wrap (Water Heating)	0.90	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Pipe Wrap (Water Heating)	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pipe Wrap (Water Heating)					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe Wrap (Water Heating)	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe Wrap (Water Heating)	$3.00 / linear feet	Incentive: $3.00 / linear feet

Programmable thermostat

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: EnergyWise Multifamily

Measure Description

Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

For the installation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the installation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable thermostat	Gas Residential EnergyWise Multifamily Programmable thermostat

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable thermostat	1.50			29.00	0.046

Gas Heat MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kWh Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kW Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Programmable thermostat	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable thermostat	0.95	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable thermostat	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable thermostat		$13.142			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable thermostat	0.48	0.01	0.00	0.53

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable thermostat	$230.00 / measure	Incentive: $125.00 / measure

VFD

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: EnergyWise Multifamily

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
VFD	Gas Residential EnergyWise Multifamily VFD

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calc

Unit

Installed VFD

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N128

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
VFD		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
VFD	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
VFD	1.00	0.99	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). Impact Evaluations of PY2020 Custom Gas Installations in Rhode Island. http://rieermc.ri.gov/wp-content/uploads/2023/01/rhode-island-energy-py2020-custom-gas-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
VFD	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
VFD	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VFD	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VFD		

Wi-Fi programmable thermostat (controls gas heat only)

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: EnergyWise Multifamily

Measure Description

Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

For the installation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the installation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.

Measures

Measure Name	Unique Identifier
Wi-Fi programmable thermostat (controls gas heat only)	Gas Residential EnergyWise Multifamily Wi-Fi programmable thermostat (controls gas heat only)

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Wi-Fi programmable thermostat (controls gas heat only)	2.30			31.00	0.049

Gas Heat MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kWh Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kW Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Wi-Fi programmable thermostat (controls gas heat only)	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
Wi-Fi programmable thermostat (controls gas heat only)	0.95	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Wi-Fi programmable thermostat (controls gas heat only)	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Wi-Fi programmable thermostat (controls gas heat only)		$13.142			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Wi-Fi programmable thermostat (controls gas heat only)	0.48	0.01	0.00	0.53

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Wi-Fi programmable thermostat (controls gas heat only)	$298.00 / measure	Incentive: $223.00 / measure

EnergyWise Single Family, Gas

Aerator

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** Aerator

Program: EnergyWise Single Family

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a residential setting with service water heated by gas.

Baseline Description

The baseline efficiency case is 2.2 GPM or greater flow rate.

Measures

Measure Name	Unique Identifier
Aerator	Gas Residential EnergyWise Single Family Aerator

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less installed.

Savings Method

Deemed

Unit

Installed aerator

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Aerator		0.14			

Gas DHW MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Aerator	7

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Aerator	0.98	1.00	1.00

ISR Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: For mailed-in faucet aerators, ISR is assumed at 59% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Aerator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Aerator	296				

Water Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Aerator	0.27	0.01	0.04	0.78

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Aerator	$7.00 / measure	Incentive: $7.00 / measure

Participants (Unique Account Numbers)

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Participant **Measure Type:** Participant **Measure Sub Type:** Participant

Program: EnergyWise Single Family

Measure Description

This row identifies a participant for tracking and cost purposes.

Baseline Description

N/A

Measures

Measure Name	Unique Identifier
Participants (Unique Account Numbers)	Gas Residential EnergyWise Single Family Participants (Unique Account Numbers)

Savings Principle

N/A

Savings Method

N/A

Unit

N/A

Savings Equation

N/A

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Participants (Unique Account Numbers)					

Energy Impact Factors

Measure	Measure Life
Participants (Unique Account Numbers)	multi

Measure	ISR	RRe Gas	RRe Electric
Participants (Unique Account Numbers)	1.00	1.00	1.00

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Participants (Unique Account Numbers)	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Participants (Unique Account Numbers)					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Participants (Unique Account Numbers)	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Participants (Unique Account Numbers)	$375.00 / measure	Incentive: $375.00 / measure

Pipe Wrap

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Insulation **Measure Sub Type:** Pipe Insulation

Program: EnergyWise Single Family

Measure Description

Installation of insulation to reduce water heating energy.

Baseline Description

The baseline case is uninsulated heated water pipes.

Measures

Measure Name	Unique Identifier
Pipe Wrap	Gas Residential EnergyWise Single Family Pipe Wrap

Savings Principle

The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.

Savings Method

Deemed

Unit

Installed pipe wrap

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pipe Wrap		0.30			

Gas DHW MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Pipe Wrap	7

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Pipe Wrap	0.98	1.00	1.00

ISR Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Pipe Wrap	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pipe Wrap					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe Wrap	0.27	0.01	0.04	0.78

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe Wrap	$7.00 / measure	Incentive: $7.00 / measure

Programmable thermostat

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: EnergyWise Single Family

Measure Description

Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

For the installation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable thermostat	Gas Residential EnergyWise Single Family Programmable thermostat

Savings Principle

The high efficiency case is an HVAC system with a programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable thermostat	2.07			27.00	0.043

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Programmable thermostat	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable thermostat	0.88	1.00	1.00

ISR Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: For mailed-in thermostats, ISR is assumed at 59% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable thermostat	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable thermostat		$4.607			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable thermostat	0.47	0.01	0.04	0.58

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable thermostat	$100.00 / measure	Incentive: $100.00 / measure

Showerhead

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** LF Showerhead

Program: EnergyWise Single Family

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.

Measures

Measure Name	Unique Identifier
Showerhead	Gas Residential EnergyWise Single Family Showerhead

Savings Principle

The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.

Savings Method

Deemed

Unit

Installed showerhead.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Showerhead		1.11			

Gas DHW MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Showerhead	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Showerhead	0.98	1.00	1.00

ISR Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: For mailed-in showerheads, ISR is assumed at 53% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Showerhead	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Showerhead	1565		$0.037		

Water Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Showerhead	0.27	0.01	0.04	0.78

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Showerhead	$30.00 / measure	Incentive: $30.00 / measure

Weatherization

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Whole Home **Measure Type:** Weatherization **Measure Sub Type:** EW SF

Program: EnergyWise Single Family

Measure Description

Installation of weatherization measures such as air sealing and insulation in gas heated homes. Electric savings are achieved from reduced run time of the HVAC system fan(s).

Baseline Description

The baseline efficiency case is the existing home shell.

Measures

Measure Name	Unique Identifier
Weatherization	Gas Residential EnergyWise Single Family Weatherization

Savings Principle

The high efficiency case can be a combination of increased insulation, air sealing, duct sealing, and other improvements to the home shell.

Savings Method

Deemed

Unit

Household with weatherization measures installed

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Weatherization	13.40			70.00	0.037

Gas Heat MMBtu Source: Cadeo (2023). EnergyWise Single Family Weatherization Impact Evaluation.

Electric kWh Source: Cadeo (2023). EnergyWise Single Family Weatherization Impact Evaluation.

Electric kW Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Weatherization	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Weatherization	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Weatherization	1.00	1.00	ls_88_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Weatherization		$73.179			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Weatherization	0.14	0.01	0.04	0.91

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Weatherization	$4,150.00 / home	Incentive: $3,375.00 / home

WiFi thermostat

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: EnergyWise Single Family

Measure Description

Installation of a wifi thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

For the installation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
WiFi thermostat	Gas Residential EnergyWise Single Family WiFi thermostat

Savings Principle

The high efficiency case is an HVAC system with a wi-fi programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of WiFi programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
WiFi thermostat	2.79			27.00	0.043

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
WiFi thermostat	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
WiFi thermostat	0.88	1.00	1.00

ISR Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: For mailed-in thermostats, ISR is assumed at 59% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
WiFi thermostat	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
WiFi thermostat		$4.607			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi thermostat	0.47	0.01	0.04	0.58

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi thermostat	$300.00 / measure	Incentive: $200.00 / measure

Home Energy Reports, Gas

Existing Dual Fuel

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to electric and gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
Existing Dual Fuel	Gas Residential Home Energy Reports Existing Dual Fuel

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Existing Dual Fuel			Calc		

Gas Other MMBtu Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Existing Dual Fuel	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
Existing Dual Fuel	1.00	0.92	

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Existing Dual Fuel	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Existing Dual Fuel					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Existing Dual Fuel	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Existing Dual Fuel		

Existing Gas

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
Existing Gas	Gas Residential Home Energy Reports Existing Gas

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Existing Gas			Calc		

Gas Other MMBtu Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Existing Gas	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
Existing Gas	1.00	0.92	

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
Existing Gas	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Existing Gas					

NTG Note: Massachusetts Common Assumption

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Existing Gas	0.00	0.00	0.00	1.00

NTG Note: Massachusetts Common Assumption

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Existing Gas		

New Movers Dual Fuel

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to electric and gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
New Movers Dual Fuel	Gas Residential Home Energy Reports New Movers Dual Fuel

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
New Movers Dual Fuel			Calc		

Gas Other MMBtu Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
New Movers Dual Fuel	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
New Movers Dual Fuel	1.00	0.50	

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
New Movers Dual Fuel	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
New Movers Dual Fuel					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
New Movers Dual Fuel	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
New Movers Dual Fuel		

New Movers Gas only

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Whole Home

Measure Type: Behavior

Measure Sub Type: Home Energy Reports

Program: Home Energy Reports

Measure Description

A Home Energy report sent to electric and gas customers that displays home energy consumption in comparison with peers and prompts energy conserving behavior.

Baseline Description

No Home Energy Report.

Measures

Measure Name	Unique Identifier
New Movers Gas only	Gas Residential Home Energy Reports New Movers Gas only

Savings Principle

A home that receives Home Energy Reports.

Savings Method

Calculated by comparing consumption of treatment (with reports) and control groups (no reports)

Unit

Per participant

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
New Movers Gas only			Calc		

Gas Other MMBtu Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
New Movers Gas only	1

Measure Life Source: Opinion Dynamics with Navigant Consulting (2012). Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report July 2012. Prepared for Massachusetts EEAC & Behavioral Research Team

Measure	ISR	RRe Gas	RRe Electric
New Movers Gas only	1.00	0.50	

ISR Note: In-service rates are set to 100% because savings represent average for all treatment household (including opt outs)

RRe Source: Cadeo/Illume (2020). 2017-2019 Impact Evaluation of the Home Energy Reports Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ngrid-ri-behavior-evaluation-28aug2020.pdf

Measure	RR sp	RR wp	Loadshape ID
New Movers Gas only	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
New Movers Gas only					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
New Movers Gas only	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
New Movers Gas only		

Residential HVAC, Gas

Combo Furnace

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Furnace

Program: Residential HVAC

Measure Description

This measure promotes the installation of a combined condensing high-efficiency furnace and water heating unit. Combined furnace and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank.

Baseline Description

The baseline efficiency case is an 95% AFUE furnace with a 0.63 EF water heater.

Measures

Measure Name	Unique Identifier
Combo Furnace	Gas Residential Residential HVAC Combo Furnace

Savings Principle

The high efficiency case is an integrated water heater/condensing furnace with a 97% AFUE furnace and a 0.95 EF water heater.

Savings Method

Deemed

Unit

Installation of new high-efficiency integrated furnace/water heater

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Combo Furnace	7.87				

Energy Impact Factors

Measure	Measure Life
Combo Furnace	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Combo Furnace	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Combo Furnace	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Combo Furnace		$101.085			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Combo Furnace	0.36	0.13	0.00	0.76

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Combo Furnace	$995.00 / measure	Incentive: $950.00 / measure

ENERGY STAR COND WATER HEATER 0.80 UEF

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Condensing Water Heater

Program: Residential HVAC

Measure Description

Condensing water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy.

Baseline Description

The baseline efficiency case is a standalone tank water heater with an UEF of 0.58 for medium draw and 0.63 for high draw of 0.61. For

Measures

Measure Name	Unique Identifier
ENERGY STAR COND WATER HEATER 0.80 UEF	Gas Residential Residential HVAC ENERGY STAR COND WATER HEATER 0.80 UEF

Savings Principle

The high efficiency case is a stand-alone storage water heater with a medium draw and UEF >= 0.64 or high draw and UEF >= 0.68, a condensing water heater with an UEF >= 0.80, a tankless water heater with an UEF >= 0.87, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.

Savings Method

Deemed

Unit

Installation of new high-efficiency water heater

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
ENERGY STAR COND WATER HEATER 0.80 UEF		7.00		-43.00	-0.020

Gas DHW MMBtu Source: Water Heater UEF screening_2019-21_revised 2018.09.06

Electric kWh Source: Water Heater UEF screening_2019-21_revised 2018.09.06

Electric kW Source: Water Heater UEF screening_2019-21_revised 2018.09.06

Energy Impact Factors

Measure	Measure Life
ENERGY STAR COND WATER HEATER 0.80 UEF	15

Measure Life Source: DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.

Measure	ISR	RRe Gas	RRe Electric
ENERGY STAR COND WATER HEATER 0.80 UEF	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
ENERGY STAR COND WATER HEATER 0.80 UEF	1.00	1.00	ls_09_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
ENERGY STAR COND WATER HEATER 0.80 UEF		$0.832			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ENERGY STAR COND WATER HEATER 0.80 UEF	0.34	0.12	0.00	0.77

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ENERGY STAR COND WATER HEATER 0.80 UEF	$1,285.00 / measure	Incentive: $500.00 / measure

ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Tankless Water Heater

Program: Residential HVAC

Measure Description

Condensing water tankless water heaters recover energy by using either a larger heat exchanger or a second heat exchanger to reduce the flue-gas temperature to the point that water vapor condenses, thus releasing even more energy and circulating water through a heat exchanger to be heated for immediate use, eliminating the standby heat loss associated with a storage tank.

Baseline Description

The baseline efficiency case is a high draw standalone tank water heater with an UEF of 0.63. For the early retirement portion, the UEF is equal to 0.60.

Measures

Measure Name	Unique Identifier
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF	Gas Residential Residential HVAC ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF

Savings Principle

The high efficiency case is a stand-alone storage water heater with a medium draw and UEF >= 0.64 or high draw and UEF >= 0.68, a condensing water heater with an UEF >= 0.80, a tankless water heater with an UEF >= 0.87, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.

Savings Method

Deemed

Unit

Installed condensing tankless water heater

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF		7.00		-43.00	-0.020

Gas DHW MMBtu Source: Guidehouse (2021). Comprehensive TRM Review/RI_2022 Annual Plan_Gas_HVAC_WH_Calculations_2021-06-10

Electric kWh Source: Water Heater UEF screening_2019-21_revised 2018.09.06

Electric kW Source: Water Heater UEF screening_2019-21_revised 2018.09.06

Energy Impact Factors

Measure	Measure Life
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF	19

Measure Life Source: DOE (2008). ENERGY STAR® Residential Water Heaters: Final Criteria Analysis. Prepared for the DOE.

Measure	ISR	RRe Gas	RRe Electric
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF	1.00	1.00	ls_09_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF		$1.451			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF	0.34	0.12	0.00	0.77

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ENERGY STAR ON DEMAND WATER HEATER 0.87 UEF	$765.00 / measure	Incentive: $600.00 / measure

ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Efficient Standard Tank Water Heater

Program: Residential HVAC

Measure Description

Stand-alone storage water heaters are high efficiency water heaters that are not combined with space heating devices.

Baseline Description

The baseline efficiency case is a standalone tank water heater with a medium draw of a UEF of 0.58 and high draw of 0.63. For the early retirement portion, the medium draw UEF is equal to 0.56 and high draw is equal to 0.60.

Measures

Measure Name	Unique Identifier
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)	Gas Residential Residential HVAC ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)

Savings Principle

The high efficiency case is a stand-alone storage water heater with a medium draw and UEF >= 0.64 or high draw and UEF >= 0.68, a condensing water heater with an UEF >= 0.80, a tankless water heater with an UEF >= 0.87, or an indirect water heater attached to an ENERGY STAR® rated forced hot water gas boiler.

Savings Method

Deemed

Unit

Installation of new high-efficiency water heater

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)		2.50		-43.00	-0.020

Gas DHW MMBtu Source: Guidehouse (2021). Comprehensive TRM Review/RI_2022 Annual Plan_Gas_HVAC_WH_Calculations_2021-06-10

Electric kWh Source: Water Heater UEF screening_2019-21_revised 2018.09.06

Electric kW Source: Water Heater UEF screening_2019-21_revised 2018.09.06

Energy Impact Factors

Measure	Measure Life
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)	9

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review/RI_2022 Annual Plan_Gas_HVAC_WH_Calculations_2021-06-10

Measure Life Note: Baseline update can be found in first source and calculations for savings can be found in second source.

Measure	ISR	RRe Gas	RRe Electric
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)	1.00	1.00	ls_09_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)		$1.536			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)	0.34	0.12	0.00	0.77

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)	$167.00 / measure	Incentive: $70.00 / measure

Forced Hot Water Boiler

Sector: Residential | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Heating | **Measure Sub Type:** Boiler

Program: Residential HVAC

Measure Description

Installation of a new space heating gas-fired condensing boiler.

Baseline Description

The end of life baseline efficiency case is a boiler with a rated AFUE equal to 86.5% and an actual efficiency of 83.7%. For the early retirement portion of the savings, the baseline efficiency is a rated 85.5% AFUE and an actual efficiency of 77.4%.

Measures

Measure Name	Unique Identifier
Forced Hot Water Boiler - >=90% AFUE	Gas Residential Residential HVAC Forced Hot Water Boiler - >=90% AFUE
Forced Hot Water Boiler - >=95% AFUE	Gas Residential Residential HVAC Forced Hot Water Boiler - >=95% AFUE

Savings Principle

The high efficiency case is a boiler with an AFUE greater than or equal to 90% or 95%.

Savings Method

Deemed

Unit

Installation of new high-efficiency boiler

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Forced Hot Water Boiler - >=90% AFUE	8.90				
Forced Hot Water Boiler - >=95% AFUE	10.70				

Gas Heat MMBtu Source: Guidehouse (2021). Comprehensive TRM Review/RI_2022 Annual Plan_Gas_HVAC_WH_Calculations_2021-06-10

Gas Heat MMBtu Note: Baseline update can be found in first source and calculations for savings can be found in second source.

Energy Impact Factors

Measure	Measure Life
Forced Hot Water Boiler - >=90% AFUE Forced Hot Water Boiler - >=95% AFUE	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review/RI_2022 Annual Plan_Gas_HVAC_WH_Calculations_2021-06-10

Measure Life Note: Baseline update can be found in first source and calculations for savings can be found in second source.

Measure	ISR	RRe Gas	RRe Electric
Forced Hot Water Boiler	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
Forced Hot Water Boiler - >=90% AFUE	N/A	N/A	ls_00_Gas
Forced Hot Water Boiler - >=95% AFUE	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Forced Hot Water Boiler - >=90% AFUE		$55.242			
Forced Hot Water Boiler - >=95% AFUE		$97.700			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Forced Hot Water Boiler	0.36	0.13	0.00	0.76

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Forced Hot Water Boiler - >=90% AFUE Forced Hot Water Boiler - >=95% AFUE	$3,711.00 / measure	$775.00 / measure

Furnace w/ECM

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Furnace

Program: Residential HVAC

Measure Description

Installation of a new high efficiency space heating gas-fired furnace with an electronically commutated motor (ECM) for the fan.

Baseline Description

The baseline efficiency in an 95% AFUE furnace.

Measures

Measure Name	Unique Identifier
Furnace w/ ECM - 97% AFUE	Gas Residential Residential HVAC Furnace w/ ECM - 97% AFUE

Savings Principle

The high efficiency case is a new furnace with AFUE >= 97% and an electronically commutated motor.

Savings Method

Deemed

Unit

Installation of new high-efficiency furnace with ECM

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Furnace w/ ECM - 97% AFUE	4.30				

Gas Heat MMBtu Source: Guidehouse (2021). Comprehensive TRM Review/RI_2022 Annual Plan_Gas_HVAC_WH_Calculations_2021-06-10

Gas Heat MMBtu Note: Baseline update can be found in first source and calculations for savings can be found in second source.

Energy Impact Factors

Measure	Measure Life
Furnace w/ ECM - 97% AFUE	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure Life Note: Baseline update can be found in first source and calculations for savings can be found in second source.

Measure	ISR	RRe Gas	RRe Electric
Furnace w/ECM	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Furnace w/ ECM - 97% AFUE	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Furnace w/ ECM - 97% AFUE		$101.085			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Furnace w/ECM	0.36	0.13	0.00	0.76

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Furnace w/ ECM - 97% AFUE	$1,845.00 / measure	Incentive: $525.00 / measure

Low Flow Showerhead

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Low Flow Showerhead

Program: Residential HVAC

Measure Description

1.75 GPD or less

Baseline Description

Standard Showerhead

Measures

Measure Name	Unique Identifier
Low Flow Showerhead	Gas Residential Residential HVAC Low Flow Showerhead

Savings Principle

Savings Method

Deemed

Unit

Per Showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low Flow Showerhead		1.20			

Energy Impact Factors

Measure	Measure Life
Low Flow Showerhead	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Low Flow Showerhead	0.78	1.00	1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Measure	RR sp	RR wp	Loadshape ID
Low Flow Showerhead	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low Flow Showerhead	2401		$0.037		

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low Flow Showerhead	0.03	0.12	0.00	1.09

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low Flow Showerhead	$22.00 / measure	Incentive: $7.00 / measure

Programmable Thermostat

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Residential HVAC

Measure Description

Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

The baseline efficiency case is an HVAC system using natural gas to provide space heating with a manual thermostat.

Measures

Measure Name	Unique Identifier
Programmable Thermostat	Gas Residential Residential HVAC Programmable Thermostat

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat installed.

Savings Method

Deemed

Unit

Installed programmable thermostat.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable Thermostat	2.07				

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
Programmable Thermostat	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable Thermostat	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Programmable Thermostat	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable Thermostat		$4.607			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable Thermostat	0.25	0.12	0.00	0.87

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable Thermostat	$101.00 / measure	Incentive: $25.00 / measure

Thermostatic Shut-Off Valve

Sector: Residential | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Water Heater | **Measure Sub Type:** Low Flow Showerhead

Program: Residential HVAC

Measure Description

A showerhead with a thermostatic shut off valve.

Baseline Description

The baseline efficiency case is an existing standard-flow showerhead (2.5 GPM) with no thermostatic shut-off valve.

Measures

Measure Name	Unique Identifier
Thermostatic Shut-Off Valve	Gas Residential Residential HVAC Thermostatic Shut-Off Valve

Savings Principle

Savings Method

Deemed

Unit

Per Showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Thermostatic Shut-Off Valve		0.38			

Energy Impact Factors

Measure	Measure Life
Thermostatic Shut-Off Valve	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Thermostatic Shut-Off Valve	0.78	1.00	1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Measure	RR sp	RR wp	Loadshape ID
Thermostatic Shut-Off Valve	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Thermostatic Shut-Off Valve	621				

Water Source: National Grid (2014). Review of ShowerStart evolve.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Thermostatic Shut-Off Valve	0.03	0.12	0.00	1.09

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Thermostatic Shut-Off Valve	$23.00 / measure	Incentive: $11.00 / measure

Triple Pane Windows

Sector: Residential | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Building Shell | **Measure Type:** Windows | **Measure Sub Type:** Windows, triple pane

Program: Residential HVAC

Measure Description

Early replacement of a single pane window either with or without a storm with a triple pane window.

Baseline Description

The baseline efficiency case is a single pane window with or without a storm.

Measures

Measure Name	Unique Identifier
Triple Pane Windows	Gas Residential Residential HVAC Triple Pane Windows

Savings Principle

The high efficiency case is an Energy Star qualified triple pane window.

Savings Method

Deemed

Unit

Replacement of window with single pane either with or without a storm with a triple pane window.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Triple Pane Windows	0.60	N13		7.00	0.010

Electric kWh Note: Massachusetts Common Assumption

Energy Impact Factors

Measure	Measure Life
Triple Pane Windows	17

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Triple Pane Windows	1.00	1.00	1.00

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Triple Pane Windows	1.00	1.00	ls_118_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Triple Pane Windows		$8.274			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Triple Pane Windows	0.04	0.00	0.00	0.96

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Triple Pane Windows	$251.00 / measure	Incentive: $75.00 / measure

TSV Showerhead

Sector: Residential

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Low Flow Showerhead

Program: Residential HVAC

Measure Description

TSV + 1.75 GPD or less

Baseline Description

Standard Showerhead

Measures

Measure Name	Unique Identifier
TSV Showerhead	Gas Residential Residential HVAC TSV Showerhead

Savings Principle

Savings Method

Deemed

Unit

Per Showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
TSV Showerhead		1.22			

Gas DHW MMBtu Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Energy Impact Factors

Measure	Measure Life
TSV Showerhead	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
TSV Showerhead	0.78	1.00	1.00

ISR Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Measure	RR sp	RR wp	Loadshape ID
TSV Showerhead	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
TSV Showerhead	3022		$0.037		

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
TSV Showerhead	0.03	0.12	0.00	1.09

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
TSV Showerhead	$35.00 / measure	Incentive: $15.00 / measure

Wi-Fi Thermostat, Gas

Sector: Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Residential HVAC

Measure Description

Installation of a WiFi thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

The baseline efficiency case is an HVAC system using natural gas to provide space heating with a manual or programmable thermostat.

Measures

Measure Name	Unique Identifier
WiFi Thermostat, Gas - Heat Only WiFi Thermostat, Gas - Cooling and Heating	Gas Residential Residential HVAC WiFi Thermostat, Gas - Heat Only Gas Residential Residential HVAC WiFi Thermostat, Gas - Cooling and Heating

Savings Principle

The high efficiency case is an HVAC system that has a wi-fi thermostat installed.

Savings Method

Deemed

Unit

Installation of wi-fi thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
WiFi Thermostat, Gas - Heat Only	2.79				
WiFi Thermostat, Gas - Cooling and Heating	2.79			18.00	0.030

Energy Impact Factors

Measure	Measure Life
WiFi Thermostat, Gas - Heat Only	11
WiFi Thermostat, Gas - Cooling and Heating	11
	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
Wi-Fi Thermostat, Gas	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
WiFi Thermostat, Gas - Heat Only	N/A	N/A	ls_00_Gas
WiFi Thermostat, Gas - Cooling and Heating	1.00	1	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
WiFi Thermostat, Gas - Heat Only		$4.607			
WiFi Thermostat, Gas - Cooling and Heating		$4.607			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Wi-Fi Thermostat, Gas	0.25	0.12	0.00	0.87

NTG Source: Guidehouse (2021). MA Residential Programs Net-to-Gross Research of RCD and Selected Products Measures (MA20R28-B-RCD). https://ma-eeac.org/wp-content/uploads/MA20R28-B-NTGRCDP_Final-Report_08Oct2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi Thermostat, Gas - Heat Only	$295.00 / measure	$75.00 / measure
WiFi Thermostat, Gas - Cooling and Heating	$295.00 / measure	$75.00 / measure

Residential New Construction, Gas

Codes and Standards

Sector: Residential

Fuel: Gas

Program Type: Custom

Measure Category: Whole Home

Measure Type: Codes and Standards

Measure Sub Type: Codes and Standards

Program: Residential New Construction

Measure Description

Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island.

Baseline Description

Un-influenced adoption curve of federal minimum codes and standards.

Measures

Measure Name	Unique Identifier
Codes and Standards	Gas Residential Residential New Construction Codes and Standards

Savings Principle

Accelerated adoption of advancing energy codes and equipment standards.

Savings Method

Calculated based on attribution study

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Codes and Standards	Calc			Calc	

Gas Heat MMBtu Source: NMR (2017). Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study. http://rieermc.ri.gov/wp-content/uploads/2018/03/ri-ccei-attribution-and-savings-final-report-12-12-17-clean.pdf

Energy Impact Factors

Measure	Measure Life
Codes and Standards	20

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Codes and Standards	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Codes and Standards	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Codes and Standards					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Codes and Standards	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Codes and Standards		

Cooling

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Insulation **Measure Sub Type:** Efficient Cooling

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
Cooling - Tier 1	Gas Residential Residential New Construction Cooling - Tier 1
Cooling - Tier 2	Gas Residential Residential New Construction Cooling - Tier 2
Cooling - Tier 3	Gas Residential Residential New Construction Cooling - Tier 3

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				
Cooling - Tier 1				Calc	Calc
Cooling - Tier 2				Calc	Calc
Cooling - Tier 3				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
Cooling - Tier 1	25
Cooling - Tier 2	
Cooling - Tier 3	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Cooling	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Cooling - Tier 1	1.00	1	ls_112_Gas
Cooling - Tier 2	1.00	1	ls_112_Gas
Cooling - Tier 3	1.00	1	ls_112_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Cooling - Tier 1					
Cooling - Tier 2					
Cooling - Tier 3					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Cooling	0.25	0.00	0.00	0.75

NTG Source: NMR Group, Inc (2021). Low Rise Residential New Construction NTG Study (MA20X05-B-RNCNTG). https://ma-eeac.org/wp-content/uploads/MA20X05-B-RNCNTG_Low-rise-RNC-NTG_FinalDraft-07272021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Cooling - Tier 1		
Cooling - Tier 2		
Cooling - Tier 3		

CP

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** CP

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
CP - Heating	Gas Residential Residential New Construction CP - Heating
CP - DHW	Gas Residential Residential New Construction CP - DHW
CP - Cooling	Gas Residential Residential New Construction CP - Cooling

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				
CP - Heating				Calc	Calc
CP - DHW				Calc	Calc
CP - Cooling				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
CP - Heating	25
CP - DHW	15
CP - Cooling	25

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
CP	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
CP - Heating	1.00	1	ls_113_Gas
CP - DHW	N/A	N/A	ls_00_Gas
CP - Cooling	1.00	1	ls_112_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
CP - Heating		$148.164			
CP - DHW					
CP - Cooling					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
CP	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
CP - Heating	$1,229.00 / home	$310.00 / home
CP - DHW	$458.00 / home	$50.00 / home
CP - Cooling		

DHW

Sector: Residential

Fuel: Gas

Program Type: Custom

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Flow Control Measures

Program: Residential New Construction

Measure Description

DHW measures including high-efficiency low-flow showerheads and faucet aerators save water and water heating energy.

Baseline Description

The baseline efficiency case is the existing domestic hot water equipment.

Measures

Measure Name	Unique Identifier
DHW- Tier 1	Gas Residential Residential New Construction DHW- Tier 1
DHW - Tier 2	Gas Residential Residential New Construction DHW - Tier 2
DHW - Tier 3	Gas Residential Residential New Construction DHW - Tier 3

Savings Principle

The high efficiency case is the installation of high-efficiency domestic hot water equipment such as low-flow showerheads and faucet aerators.

Savings Method

Calc

Unit

Installed DHW efficiency measure.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
		Calc			
DHW- Tier 1				Calc	Calc
DHW - Tier 2				Calc	Calc
DHW - Tier 3				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
DHW- Tier 1	15
DHW - Tier 2	
DHW - Tier 3	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
DHW	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
DHW- Tier 1	N/A	N/A	ls_00_Gas
DHW - Tier 2	N/A	N/A	ls_00_Gas
DHW - Tier 3	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
DHW- Tier 1					
DHW - Tier 2					
DHW - Tier 3					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DHW	0.25	0.00	0.00	0.75

NTG Source: NMR Group, Inc (2021). Low Rise Residential New Construction NTG Study (MA20X05-B-RNCNTG). https://ma-eeac.org/wp-content/uploads/MA20X05-B-RNCNTG_Low-rise-RNC-NTG_FinalDraft-07272021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DHW- Tier 1	$458.00 / home	$50.00 / home
DHW - Tier 2	$458.00 / home	$150.00 / home
DHW - Tier 3	$458.00 / home	$150.00 / home

Heating

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Efficient Heating

Program: Residential New Construction

Measure Description

This measure involves the installation of a high-efficiency natural gas heating system.

Baseline Description

The baseline efficiency case is a standard efficiency natural gas heating system.

Measures

Measure Name	Unique Identifier
Heating - Tier 1	Gas Residential Residential New Construction Heating - Tier 1
Heating - Tier 2	Gas Residential Residential New Construction Heating - Tier 2
Heating - Tier 3	Gas Residential Residential New Construction Heating - Tier 3

Savings Principle

The high efficiency case is the installation of a high-efficiency natural gas heating system.

Savings Method

Deemed

Unit

Installed high-efficiency natural gas heating system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
		Calc			
Heating - Tier 1				Calc	Calc
Heating - Tier 2				Calc	Calc
Heating - Tier 3				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
Heating - Tier 1	25
Heating - Tier 2	
Heating - Tier 3	

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Heating	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Heating - Tier 1	1.00	1	ls_113_Gas
Heating - Tier 2	1.00	1	ls_113_Gas
Heating - Tier 3	1.00	1	ls_113_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heating - Tier 1		$148.164			
Heating - Tier 2		$148.164			
Heating - Tier 3		$148.164			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating	0.25	0.00	0.00	0.75

NTG Source: NMR Group, Inc (2021). Low Rise Residential New Construction NTG Study (MA20X05-B-RNCNTG). https://ma-eeac.org/wp-content/uploads/MA20X05-B-RNCNTG_Low-rise-RNC-NTG_FinalDraft-07272021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating - Tier 1	$1,865.00 / home	$1,050.00 / home
Heating - Tier 2	$5,560.00 / home	$1,975.00 / home
Heating - Tier 3	$8,795.00 / home	$2,300.00 / home

MFHR, Gas

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Adaptive Reuse

Program: Residential New Construction

Measure Description

To capture lost opportunities, encourage the construction of energy-efficient homes, and drive the market to one in which new homes are moving towards net-zero energy.

Baseline Description

The User Defined Reference Home was revised in 2023 as a result of a baseline study.

Measures

Measure Name	Unique Identifier
MFHR - Cooling MFHR - Heating MFHR - Water Heating	Gas Residential Residential New Construction MFHR - Cooling Gas Residential Residential New Construction MFHR - Heating Gas Residential Residential New Construction MFHR - Water Heating

Savings Principle

The high efficiency case is represented by the specific energy characteristics of each “as-built” home completed through the program.

Savings Method

Calculated using site-specific inputs

Unit

Completed ESH heating, cooling, or DHW project.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc	Calc	Calc		
MFHR - Cooling				Calc	Calc
MFHR - Heating				Calc	Calc
MFHR - Water Heating				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
MFHR - Cooling	25
MFHR - Heating	25
MFHR - Water Heating	15

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
MFHR, Gas	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
MFHR - Cooling	N/A	N/A	ls_00_Gas
MFHR - Heating	N/A	N/A	ls_00_Gas
MFHR - Water Heating	N/A	N/A	ls_00_Gas
	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
MFHR - Cooling					
MFHR - Heating		$7.203			
MFHR - Water Heating					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
MFHR, Gas	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MFHR - Cooling	$1,295.00 / home	$700.00 / home
MFHR - Heating	$1,295.00 / home	$700.00 / home
MFHR - Water Heating		

Renovation Rehab Cooling, Gas

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Gas Cooling

Program: Residential New Construction

Measure Description

The gas cooling savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab - Cooling Tier 1, Gas	Gas Residential Residential New Construction Renovation Rehab - Cooling Tier 1, Gas
Renovation Rehab - Cooling Tier 2, Gas	Gas Residential Residential New Construction Renovation Rehab - Cooling Tier 2, Gas
Renovation Rehab - Cooling Tier 3, Gas	Gas Residential Residential New Construction Renovation Rehab - Cooling Tier 3, Gas

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				
Renovation Rehab - Cooling Tier 1, Gas				Calc	Calc
Renovation Rehab - Cooling Tier 2, Gas				Calc	Calc
Renovation Rehab - Cooling Tier 3, Gas				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
Renovation Rehab - Cooling Tier 1, Gas Renovation Rehab - Cooling Tier 2, Gas Renovation Rehab - Cooling Tier 3, Gas	25

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Cooling, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab - Cooling Tier 1, Gas	1.00	1	ls_114_Gas
Renovation Rehab - Cooling Tier 2, Gas	1.00	1	ls_114_Gas
Renovation Rehab - Cooling Tier 3, Gas	1.00	1	ls_115_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab - Cooling Tier 1, Gas Renovation Rehab - Cooling Tier 2, Gas Renovation Rehab - Cooling Tier 3, Gas					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Cooling, Gas	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab - Cooling Tier 1, Gas		
Renovation Rehab - Cooling Tier 2, Gas		
Renovation Rehab - Cooling Tier 3, Gas		

Renovation Rehab CP, Gas

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** CP

Program: Residential New Construction

Measure Description

The heating, cooling, and DHW savings resulting from CP Renovation Rehab projects. The cooling and heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation. The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab CP - Heating, Gas	Gas Residential Residential New Construction Renovation Rehab CP - Heating, Gas
Renovation Rehab CP - Cooling, Gas	Gas Residential Residential New Construction Renovation Rehab CP - Cooling, Gas
Renovation Rehab CP - DHW, Gas	Gas Residential Residential New Construction Renovation Rehab CP - DHW, Gas

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				
Renovation Rehab CP - Heating, Gas				Calc	Calc
Renovation Rehab CP - Cooling, Gas				Calc	Calc
Renovation Rehab CP - DHW, Gas				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
Renovation Rehab CP - Heating, Gas	multi
Renovation Rehab CP - Cooling, Gas	25
Renovation Rehab CP - DHW, Gas	25
	15

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab CP, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab CP - Heating, Gas	1.00	1	ls_114_Gas
Renovation Rehab CP - Cooling, Gas	1.00	1	ls_114_Gas
Renovation Rehab CP - DHW, Gas	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab CP - Heating, Gas		$148.164			
Renovation Rehab CP - Cooling, Gas					
Renovation Rehab CP - DHW, Gas					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab CP, Gas	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab CP - Heating, Gas	$900.00 / home	$310.00 / home
Renovation Rehab CP - Cooling, Gas	$458.00 / home	$50.00 / home
Renovation Rehab CP - DHW, Gas		

Renovation Rehab DHW, Gas

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** DHW

Program: Residential New Construction

Measure Description

The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab - DHW Tier 1, Gas	Gas Residential Residential New Construction Renovation Rehab - DHW Tier 1, Gas
Renovation Rehab - DHW Tier 2, Gas	Gas Residential Residential New Construction Renovation Rehab - DHW Tier 2, Gas
Renovation Rehab - DHW Tier 3, Gas	Gas Residential Residential New Construction Renovation Rehab - DHW Tier 3, Gas

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				
Renovation Rehab - DHW Tier 1, Gas				Calc	Calc
Renovation Rehab - DHW Tier 2, Gas				Calc	Calc
Renovation Rehab - DHW Tier 3, Gas				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Note: Supplied by vendor

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Renovation Rehab - DHW Tier 1, Gas Renovation Rehab - DHW Tier 2, Gas Renovation Rehab - DHW Tier 3, Gas	15

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab DHW, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab - DHW Tier 1, Gas	N/A	N/A	ls_00_Gas
Renovation Rehab - DHW Tier 2, Gas	N/A	N/A	ls_00_Gas
Renovation Rehab - DHW Tier 3, Gas	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab - DHW Tier 1, Gas Renovation Rehab - DHW Tier 2, Gas Renovation Rehab - DHW Tier 3, Gas					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab DHW, Gas	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab - DHW Tier 1, Gas	$458.00 / home	$50.00 / home
Renovation Rehab - DHW Tier 2, Gas	$458.00 / home	$150.00 / home
Renovation Rehab - DHW Tier 3, Gas	$458.00 / home	$150.00 / home

Renovation Rehab Heating, Gas

Sector: Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Heating

Program: Residential New Construction

Measure Description

The heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab - Heating Tier 1, Gas Renovation Rehab - Heating Tier 2, Gas Renovation Rehab - Heating Tier 3, Gas	Gas Residential Residential New Construction Renovation Rehab - Heating Tier 1, Gas Gas Residential Residential New Construction Renovation Rehab - Heating Tier 2, Gas Gas Residential Residential New Construction Renovation Rehab - Heating Tier 3, Gas

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				
Renovation Rehab - Heating Tier 1, Gas				Calc	Calc
Renovation Rehab - Heating Tier 2, Gas				Calc	Calc
Renovation Rehab - Heating Tier 3, Gas				Calc	Calc

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Note: Calculated, per 100ft2

Energy Impact Factors

Measure	Measure Life
Renovation Rehab - Heating Tier 1, Gas Renovation Rehab - Heating Tier 2, Gas Renovation Rehab - Heating Tier 3, Gas	25

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Heating, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab - Heating Tier 1, Gas	N/A	N/A	ls_00_Gas
Renovation Rehab - Heating Tier 2, Gas	N/A	N/A	ls_00_Gas
Renovation Rehab - Heating Tier 3, Gas	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab - Heating Tier 1, Gas		$148.164			
Renovation Rehab - Heating Tier 2, Gas		$148.164			
Renovation Rehab - Heating Tier 3, Gas		$148.164			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Heating, Gas	0.22	0.02	0.12	0.92

NTG Source: NMR Group, Inc (2021). Renovations and Additions Net-to-Gross Study (MA20X06-B-RENOADDNTG) Final Report. https://ma-eeac.org/wp-content/uploads/MA20X06-B-RENOADDNTG_FINAL_2021.06.29_clean.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab - Heating Tier 1, Gas	$2,103.00 / home	$1,050.00 / home
Renovation Rehab - Heating Tier 2, Gas	$3,165.00 / home	$1,450.00 / home
Renovation Rehab - Heating Tier 3, Gas	$10,674.00 / home	$2,535.00 / home

Showerhead

Sector: Residential | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Flow Control | **Measure Sub Type:** Low Flow Showerhead

Program: Residential New Construction

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less.

Baseline Description

The baseline efficiency case is a showerhead with a flow of 2.5 gpm. For home audit applications, the baseline is the existing showerhead.

Measures

Measure Name	Unique Identifier
Showerhead	Gas Residential Residential New Construction Showerhead

Savings Principle

The high efficiency is a low-flow showerhead with a flow of 1.5 gpm or less.

Savings Method

Deemed

Unit

Installed showerhead.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Showerhead		0.47			

Gas DHW MMBtu Source: DOE (2015). Technical Support Document: Commercial Warm Air Furnaces. EERE-2013-BT-STD-0021-0050. https://www.regulations.gov/document/EERE-2013-BT-STD-0021-0050

Energy Impact Factors

Measure	Measure Life
Showerhead	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Showerhead	0.98	1.00	1.00

ISR Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: For mailed-in showerheads, ISR is assumed at 53% based on MA VHEA Study (MA20R26-B-VHEA)

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Showerhead	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Showerhead	1565				

Water Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Showerhead	0.27	0.01	0.04	0.78

NTG Source: Guidehouse. (2021). MA Residential Coordinated Delivery Virtual Home Energy Assessment Study (MA20R26-B-VHEA). https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Showerhead	$23.00 / measure	Incentive: $0.00 / measure

Income Eligible Multifamily, Gas

Air Sealing

Sector: Income Eligible Residential | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** Air Sealing | **Measure Sub Type:** Air Sealing/Infiltration

Program: Income Eligible Multifamily

Measure Description

Thermal shell air leaks are sealed through strategic use and location of air-tight materials.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)

Measures

Measure Name	Unique Identifier
Air Sealing	Gas Income Eligible Residential Income Eligible Multifamily Air Sealing

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.

Savings Method

Calculated using site-specific inputs

Unit

Completed air sealing project.

Savings Equation

Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft3-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu)

Where:

CFM50_pre = CFM50 measurement before air sealing

CFM50_post = CFM50 measurement after air sealing (cu.ft./min)

LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol

4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov

24 Hours per Day = Conversion factor

60 Minutes per Hour = Conversion factor

0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F

1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default

0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default

1,000,000 Btuper MMBtu = Conversion factor

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Hours Note: Heating hours are characterized by the heating degree days for the facility, 4644.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Air Sealing	Calc				

Energy Impact Factors

Measure	Measure Life
Air Sealing	multi

Measure	ISR	RRe Gas	RRe Electric
Air Sealing	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Air Sealing	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Air Sealing		$405.379			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Air Sealing	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Air Sealing	$100.00 / MMBtu	Incentive: $100.00 / MMBtu

Custom

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Custom **Measure Type:** Custom **Measure Sub Type:** Custom

Program: Income Eligible Multifamily

Measure Description

Vendors install a variety of measures at multifamily facilities. Measures include

Baseline Description

For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the facility.

Measures

Measure Name	Unique Identifier
Custom	Gas Income Eligible Residential Income Eligible Multifamily Custom

Savings Principle

The high efficiency scenario is specific to the facility and may include one or more energy efficiency measures.

Savings Method

Calc

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Custom	Calc	Calc	Calc		Calc

Energy Impact Factors

Measure	Measure Life
Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Custom	1.00	0.99	0.99

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Custom		$878.321			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom	$15,900.00 / project	Incentive: $15,900.00 / project

Duct Insulation_LI

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Envelope **Measure Type:** Ducting **Measure Sub Type:** Duct Insulation

Program: Income Eligible Multifamily

Measure Description

For existing ductwork in non-conditioned spaces, insulate ductwork.

Baseline Description

The baseline efficiency case is existing, un-insulated ductwork in unconditioned spaces (e.g. attic or basement).

Measures

Measure Name	Unique Identifier
Duct Insulation_LI	Gas Income Eligible Residential Income Eligible Multifamily Duct Insulation_LI

Savings Principle

The high efficiency condition is insulated ductwork in unconditioned spaces.

Savings Method

Deemed

Unit

Completed duct insulation job.

Savings Equation

MMBTUannual = (((1/Rexist)-(1/Rnew)) x HDD x 24 x Area) / (1,000,000) X Nheat

kWhannual = MMBtuannaul x 293.1

kW = kWhannual x kW/kWhNheating

Where:

Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Area = Square footage of insulated area

ηheat = Efficiency of the heating system (AFUE or COP)

293.1 = Conversion constant (1MMBtu = 293.1 kWh)

24 = Conversion for hours per day

HDD = Heating Degree Days; dependent on location, see table below

1,000,000 = Conversion from Btu to MMBtu

kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Duct Insulation_LI	Calc				

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Duct Insulation_LI	20

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Duct Insulation_LI	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Duct Insulation_LI	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Duct Insulation_LI					

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Duct Insulation_LI	0.00	0.00	0.00	1.00

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Duct Insulation_LI	$277.00 / measure	Incentive: $277.00 / measure

Duct Sealing

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Ducting **Measure Sub Type:** Duct Sealing

Program: Income Eligible Multifamily

Measure Description

Ducts are sealed by reconnecting disconnected duct joints and sealing gaps or seams with mastic and fiber-mesh tape as appropriate

Baseline Description

The baseline efficiency case is the existing facility or equipment prior to the implementation of duct sealing.

Measures

Measure Name	Unique Identifier
Duct Sealing	Gas Income Eligible Residential Income Eligible Multifamily Duct Sealing

Savings Principle

The baseline efficiency case is the existing facility or equipment after the implementation of duct sealing.

Savings Method

Calc

Unit

Savings Equation

MMBtu = Annualheatingconsumption x %SAVE x (1/1000000)

Where:

AnnualHeatingConsumption = The total annual heating consumption for the facility (Btu)

%SAVE = Average reduction in energy consumption.

1/1,000,000 = Conversion from Btu to MMBtu

Savings Factors for Multifamily Duct Sealing

Measure Type %SAVE158

Savings Factors for Multifamily Duct Sealing

Surface Area < 50 SQFT 7%

Surface Area > 50 SQFT and < 200 SQFT 3%

Surface Area > 200 SQFT 1%

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Duct Sealing	Calc				

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Duct Sealing	multi

Measure	ISR	RRe Gas	RRe Electric
Duct Sealing	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Duct Sealing	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Duct Sealing		$1.281			

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Duct Sealing	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Duct Sealing	$310.00 / MMBtu	Incentive: $310.00 / MMBtu

Faucet aerator

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** Faucet Aerator

Program: Income Eligible Multifamily

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow.

Baseline Description

The baseline efficiency case is an existing faucet with a high flow.

Measures

Measure Name	Unique Identifier
Faucet aerator	Gas Income Eligible Residential Income Eligible Multifamily Faucet aerator

Savings Principle

The high efficiency is a low-flow faucet aerator.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Faucet aerator		0.20			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Faucet aerator	multi

Measure	ISR	RRe Gas	RRe Electric
Faucet aerator	0.90	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Faucet aerator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Faucet aerator	359	$0.714			

Water Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Faucet aerator	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Faucet aerator	$5.00 / measure	Incentive: $5.00 / measure

HEATING _Custom_LI

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Heating System **Measure Sub Type:** Heating

Program: Income Eligible Multifamily

Measure Description

Installation of high efficiency heating equipment to replace existing inefficient furnace, hydronic boiler or steam boiler.

Baseline Description

The baseline efficiency case is the existing inefficient heating system.

Measures

Measure Name	Unique Identifier
HEATING _Custom_LI	Gas Income Eligible Residential Income Eligible Multifamily HEATING _Custom_LI

Savings Principle

The high efficiency case is characterized by the rated efficiency (AFUEEE) of the new high efficiency furnace or boiler.

Savings Method

Calc

Unit

Installed heating system.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
HEATING _Custom_LI	Calc			Calc	

Energy Impact Factors

Measure	Measure Life
HEATING _Custom_LI	multi

Measure	ISR	RRe Gas	RRe Electric
HEATING _Custom_LI	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
HEATING _Custom_LI	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
HEATING _Custom_LI					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HEATING _Custom_LI	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HEATING _Custom_LI	$225.00 / MMBtu	Incentive: $225.00 / MMBtu

HEATPUMP_LI

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Heat Pumps **Measure Sub Type:** Heat Pump

Program: Income Eligible Multifamily

Measure Description

Installation of a heat pump to displace electric, oil, or propane heat.

Baseline Description

The baseline efficiency case is existing site conditions.

Measures

Measure Name	Unique Identifier
HEATPUMP_LI	Gas Income Eligible Residential Income Eligible Multifamily HEATPUMP_LI

Savings Principle

The high efficiency case varies depending on the equipment installed.

Savings Method

Calc

Unit

Installed heat pump.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
HEATPUMP_LI	Calc			Calc	

Energy Impact Factors

Measure	Measure Life
HEATPUMP_LI	multi

Measure	ISR	RRe Gas	RRe Electric
HEATPUMP_LI	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
HEATPUMP_LI	1.00	1.00	ls_13_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
HEATPUMP_LI		$878.321			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HEATPUMP_LI	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HEATPUMP_LI		

Hot Water - Custom

Sector: Income Eligible Residential

Fuel: Gas

Program Type: Custom

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Efficient Water Heater

Program: Income Eligible Multifamily

Measure Description

Installation of high efficiency water heating equipment to replace the existing inefficient water heater.

Baseline Description

The baseline efficiency case is a stand-alone tank water heater with an energy factor of 0.575.

Measures

Measure Name	Unique Identifier
Hot Water - Custom	Gas Income Eligible Residential Income Eligible Multifamily Hot Water - Custom

Savings Principle

The high efficiency case includes the new efficient water heater with an Energy Factor > 0.60.

Savings Method

Calc

Unit

Installed water heating system.

Savings Equation

Delta MMBtu = Units x (18 MMBTu/Units) x ((1/EFbase) - (1/EFee)

Unit = Total number of dwelling units utilizing the water heater

18 MMBtu/Unit = Average annual water heating energy demand per dwelling unit401

EFBASE = Energy Factor for the baseline waterheater

EFEE = Energy Factor for the new efficient water heater

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Hot Water - Custom	Calc			Calc	

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Hot Water - Custom	multi

Measure	ISR	RRe Gas	RRe Electric
Hot Water - Custom	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Hot Water - Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Hot Water - Custom					

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hot Water - Custom	0.00	0.00	0.00	1.00

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hot Water - Custom	$271.00 / MMBtu	Incentive: $271.00 / MMBtu

Insulation

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Building Shell **Measure Type:** Insulation **Measure Sub Type:** Shell

Program: Income Eligible Multifamily

Measure Description

Insulation upgrades are applied in existing multifamily facilities.

Baseline Description

The baseline efficiency case is characterized by the total R-value of the existing attic, basement or sidewall (Resist). This is calculated as the R-value of the existing insulation, estimated by the program contractor, plus the R-value of the ceiling, floor, or wall (for all projects: RCEILING = 3.36; RFLOOR = 6.16; RWALL = 6.65)

Measures

Measure Name	Unique Identifier
Insulation	Gas Income Eligible Residential Income Eligible Multifamily Insulation

Savings Principle

The high efficiency case is characterized by the total R-value of the attic after the installation of additional attic, basement or sidewall insulation. This is calculated as the sum of the existing R-value (RBASE) plus the R-value of the added insulation(RADD).

Savings Method

Calculated using site-specific inputs

Unit

Completed insulation project.

Savings Equation

MMBTUannual = (((1/Rexist)-(1/Rnew)) x HDD x 24 x Area) / (1,000,000) X Nheat

kWhannual = MMBtuannaul x 293.1

kW = kWhannual x kW/kWhNheating

Where:

Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Area = Square footage of insulated area

ηheat = Efficiency of the heating system (AFUE or COP)

293.1 = Conversion constant (1MMBtu = 293.1 kWh)

24 = Conversion for hours per day

HDD = Heating Degree Days; dependent on location, see table below

1,000,000 = Conversion from Btu to MMBtu

kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Hours Note: Heating hours are characterized by the heating degree days for the facility, 4644.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Insulation	Calc				

Energy Impact Factors

Measure	Measure Life
Insulation	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Insulation	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Insulation	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Insulation		$405.379			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Insulation	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Insulation	$180.00 / MMBtu	Incentive: $180.00 / MMBtu

Pipe Wrap (Water Heating)

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Insulation **Measure Sub Type:** Pipe Insulation

Program: Income Eligible Multifamily

Measure Description

Installation of DHW pipe wraps

Baseline Description

The baseline efficiency case is the existing hot water equipment.

Measures

Measure Name	Unique Identifier
Pipe Wrap (Water Heating)	Gas Income Eligible Residential Income Eligible Multifamily Pipe Wrap (Water Heating)

Savings Principle

The high efficiency case includes pipe wrap.

Savings Method

Deemed

Unit

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pipe Wrap (Water Heating)		0.15			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Pipe Wrap (Water Heating)	15

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Pipe Wrap (Water Heating)	0.90	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Pipe Wrap (Water Heating)	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pipe Wrap (Water Heating)		$8.139			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe Wrap (Water Heating)	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe Wrap (Water Heating)	$3.00 / linear feet	Incentive: $3.00 / linear feet

Programmable thermostat

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Income Eligible Multifamily

Measure Description

Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

For the installation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the installation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable thermostat	Gas Income Eligible Residential Income Eligible Multifamily Programmable thermostat

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable thermostat	1.50			29.00	0.046

Gas Heat MMBtu Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kWh Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Programmable thermostat	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable thermostat	0.95	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable thermostat	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable thermostat		$15.208			

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable thermostat	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable thermostat	$125.00 / measure	Incentive: $125.00 / measure

VFD_LI

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Income Eligible Multifamily

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
VFD_LI	Gas Income Eligible Residential Income Eligible Multifamily VFD_LI

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calc

Unit

Installed VFD

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N128

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
VFD_LI		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
VFD_LI	multi

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
VFD_LI	1.00	0.99	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2022). Impact Evaluations of PY2020 Custom Gas Installations in Rhode Island. http://rieermc.ri.gov/wp-content/uploads/2023/01/rhode-island-energy-py2020-custom-gas-program-report_final.pdf

Measure	RR sp	RR wp	Loadshape ID
VFD_LI	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
VFD_LI	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VFD_LI	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VFD_LI		

Income Eligible Single Family, Gas

Boiler

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating System **Measure Sub Type:** Boiler

Program: Income Eligible Single Family

Measure Description

The installation of high efficiency boiler.

Baseline Description

The baseline is an existing inefficient boiler.

Measures

Measure Name	Unique Identifier
Boiler	Gas Income Eligible Residential Income Eligible Single Family Boiler

Savings Principle

The high efficiency case is a high efficiency boiler.

Savings Method

Deemed

Unit

Installed Boiler.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Boiler	7.90			16.00	

Gas Heat MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Boiler	23

Measure Life Source: Environmental Protection Agency (2009). Life Cycle Cost Estimate for ENERGY STAR Qualified Boiler.

Measure	ISR	RRe Gas	RRe Electric
Boiler	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Boiler	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Boiler		$342.690			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler	$6,311.00 / measure	Incentive: $6,311.00 / measure

Furnace

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating System **Measure Sub Type:** Furnace

Program: Income Eligible Single Family

Measure Description

The installation of high efficiency furnace.

Baseline Description

The baseline is an existing inefficient furnace.

Measures

Measure Name	Unique Identifier
Furnace	Gas Income Eligible Residential Income Eligible Single Family Furnace

Savings Principle

The high efficiency case is a high efficiency furnace.

Savings Method

Deemed

Unit

Installed Furnace.

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Furnace	7.90			16.00	

Gas Heat MMBtu Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Energy Impact Factors

Measure	Measure Life
Furnace	17

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Furnace	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Furnace	1.00	1.00	ls_116_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Furnace		$342.690			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Furnace	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Furnace	$6,311.00 / measure	Incentive: $6,311.00 / measure

Participants

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Participant **Measure Type:** Participant **Measure Sub Type:** Participant

Program: Income Eligible Single Family

Measure Description

This row identifies a participant for tracking and cost purposes.

Baseline Description

N/A

Measures

Measure Name	Unique Identifier
Participants	Gas Income Eligible Residential Income Eligible Single Family Participants

Savings Principle

N/A

Savings Method

N/A

Unit

N/A

Savings Equation

N/A

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Participants					

Energy Impact Factors

Measure	Measure Life
Participants	5

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Participants	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Participants	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Participants		$9.481			

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Participants	0.00	0.00	0.00	1.00

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Participants		

Programmable Thermostat, Gas

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Income Eligible Single Family

Measure Description

Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

The baseline efficiency case is an HVAC system without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable Thermostat, Gas	Gas Income Eligible Residential Income Eligible Single Family Programmable Thermostat, Gas

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable Thermostat, Gas	2.07			27.00	0.040

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Electric kWh Source: Cadeo/Illume (2020). 2017-2018 Impact Evaluation of EnergyWise Single Family Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-ewsf-impact-and-process-comprehensive-report_final_04sept2020.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Programmable Thermostat, Gas	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable Thermostat, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable Thermostat, Gas	1.00	1.00	ls_11_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable Thermostat, Gas		$50.544			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable Thermostat, Gas	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable Thermostat, Gas		

Triple Pane Windows

Sector: Income Eligible Residential | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Building Shell | **Measure Type:** Windows | **Measure Sub Type:** Windows, triple pane

Program: Income Eligible Single Family

Measure Description

Early replacement of a single pane window either with or without a storm with a triple pane window.

Baseline Description

The baseline efficiency case is a single pane window with or without a storm.

Measures

Measure Name	Unique Identifier
Triple Pane Windows	Gas Income Eligible Residential Income Eligible Single Family Triple Pane Windows

Savings Principle

The high efficiency case is an Energy Star qualified triple pane window.

Savings Method

Deemed

Unit

Replacement of window with single pane either with or without a storm with a triple pane window.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Triple Pane Windows	1.27			7.00	0.010

Gas Heat MMBtu Note: Massachusetts Common Assumption

Electric kWh Note: Massachusetts Common Assumption

Electric kW Note: Massachusetts Common Assumption

Energy Impact Factors

Measure	Measure Life
Triple Pane Windows	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Triple Pane Windows	1.00	1.00	1.00

Measure	RR sp	RR wp	Loadshape ID
Triple Pane Windows	1.00	1.00	ls_118_Gas

RRsp Note: Massachusetts Common Assumption

RRwp Note: Massachusetts Common Assumption

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Triple Pane Windows		$8.274			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Triple Pane Windows	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Triple Pane Windows		

Weatherization

Sector: Income Eligible Residential | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Building Shell | **Measure Type:** Insulation & Air sealing | **Measure Sub Type:** Weatherization

Program: Income Eligible Single Family

Measure Description

Installation of weatherization measures such as air sealing and insulation in gas heated homes. Electric savings are achieved from reduced run time of the HVAC system fan(s).

Baseline Description

The baseline efficiency case is any existing home shell measures.

Measures

Measure Name	Unique Identifier
Weatherization	Gas Income Eligible Residential Income Eligible Single Family Weatherization

Savings Principle

The high efficiency case can be a combination of increased insulation, air sealing, duct sealing, and other improvements to the home shell.

Savings Method

Deemed

Unit

Household with weatherization measures installed

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Weatherization	12.40			93.00	0.070

Gas Heat MMBtu Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kWh Source: Cadeo (2018). Rhode Island Income Eligible Services Single Family Impact Evaluation. http://rieermc.ri.gov/wp-content/uploads/2019/04/ng-ri-ies-impact-evaluation-report_final_30aug2018.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Weatherization	20

Measure	ISR	RRe Gas	RRe Electric
Weatherization	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Weatherization	1.00	1.00	ls_88_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Weatherization		$613.442			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Weatherization	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Weatherization	$6,311.00 / home	Incentive: $6,311.00 / home

Wi-Fi Thermostat, Gas

Sector: Income Eligible Residential **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** WiFi T-stat

Program: Income Eligible Single Family

Measure Description

A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and cooling systems Primary Energy Impact: Natural Gas

Baseline Description

The baseline efficiency case is an HVAC system without a wifi thermostat.

Measures

Measure Name	Unique Identifier
Wi-Fi Thermostat, Gas	Gas Income Eligible Residential Income Eligible Single Family Wi-Fi Thermostat, Gas

Savings Principle

The high efficiency case is an HVAC system that has a wifi thermostat installed.

Savings Method

Deemed

Unit

Installation of WiFi programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Wi-Fi Thermostat, Gas	2.79				

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Electric kW Source: Navigant Consulting (2018). Baseline Loadshape Study

Energy Impact Factors

Measure	Measure Life
Wi-Fi Thermostat, Gas	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
Wi-Fi Thermostat, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Wi-Fi Thermostat, Gas	1.00	1.00	ls_11_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Wi-Fi Thermostat, Gas		$50.544			

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Wi-Fi Thermostat, Gas	0.00	0.00	0.00	1.00

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Wi-Fi Thermostat, Gas	$273.00 / measure	Incentive: $273.00 / measure

C&I Multifamily, Gas

Air Sealing

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Custom

Measure Category: Building Shell

Measure Type: Air Sealing

Measure Sub Type: Air Sealing/Infiltration

Program: C&I Multifamily

Measure Description

Thermal shell air leaks are sealed through strategic use and location of air-tight materials.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by the existing CFM50 measurement (CFM50PRE) for single family homes, or the existing air changes per hour (ACHPRE)

Measures

Measure Name	Unique Identifier
Air Sealing	Gas Commercial & Industrial C&I Multifamily Air Sealing

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the new CFM50 measurement for single family homes (CFM50POST), or the new air changes per hour (ACHPOST) for multi-family facilities, which is measured after the air sealing measure is implemented.

Savings Method

Calculated using site-specific inputs

Unit

Completed air sealing project.

Savings Equation

Gross MMBtu Gas = (CFM50_pre - CFM50_post) / LBL × HDD × (Hours per Day) × (Minutes per Hour) × (Btu/ft3-°F) × CorrectionFactor / SeasonalEff / (Btu per MMBtu)

Where:

CFM50_pre = CFM50 measurement before air sealing

CFM50_post = CFM50 measurement after air sealing (cu.ft./min)

LBL = LBL factor - This factor is determined as the product of the N-factor and a Height Correction Factor according to BPI Protocol

4644 HDD = Heating degree days (deg. F-day); This value is an average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data. http://www.ncdc.noaa.gov

24 Hours per Day = Conversion factor

60 Minutes per Hour = Conversion factor

0.018 Btu/ft3-°F = Heat capacity of 1 cubic foot of air at 70 °F

1 CorrectionFactor = Correction factor determined by auditor (e.g. for seasonal homes): Default

0.7 SeasonalEff = Heating system seasonal efficiency factor determined by auditor for homes heated with natural gas: Default

1,000,000 Btuper MMBtu = Conversion factor

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Hours Note: Heating hours are characterized by the heating degree days for the facility, 4644.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Air Sealing	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Air Sealing	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Air Sealing	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Energy realization rate is 100% because deemed savings are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Air Sealing	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Air Sealing		$23.483	$167.241		

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Air Sealing	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Air Sealing	$100.00 / therm	Incentive: $100.00 / therm

Demand Circulator

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Custom

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Demand Circulator

Program: C&I Multifamily

Measure Description

Installation of a demand controller on a re-circulation loop.

Baseline Description

Full time operation of re-circ pump.

Measures

Measure Name	Unique Identifier
Demand Circulator	Gas Commercial & Industrial C&I Multifamily Demand Circulator

Savings Principle

The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs.

Savings Method

Calc

Unit

Installed recirc controller

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Demand Circulator	Calc				

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Demand Circulator	Multi

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
Demand Circulator	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Demand Circulator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Demand Circulator					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Demand Circulator	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Demand Circulator	$3,500.00 / project	Incentive: $2,100.00 / project

Duct Insulation_MF

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Envelope **Measure Type:** Ducting **Measure Sub Type:** Duct Insulation

Program: C&I Multifamily

Measure Description

For existing ductwork in non-conditioned spaces, seal and insulate ductwork. This could include replacing un-insulated flexible duct with rigid insulated ductwork or sealing leaky fixed ductwork with mastic or aerosol and installing 1" – 2" of duct-wrap insulation.

Baseline Description

The baseline efficiency case is existing, uninsulated ductwork in unconditioned spaces (e.g. attic or basement).

Measures

Measure Name	Unique Identifier
Duct Insulation_MF	Gas Commercial & Industrial C&I Multifamily Duct Insulation_MF

Savings Principle

The high efficiency condition is insulated ductwork in unconditioned spaces.

Savings Method

Calculated using site-specific inputs

Unit

Square Foot

Savings Equation

MMBTUannual = (((1/Rexist)-(1/Rnew)) x HDD x 24 x Area) / (1,000,000) X Nheat

kWhannual = MMBtuannaul x 293.1

kW = kWhannual x kW/kWhNheating

Where:

Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Area = Square footage of insulated area

ηheat = Efficiency of the heating system (AFUE or COP)

293.1 = Conversion constant (1MMBtu = 293.1 kWh)

24 = Conversion for hours per day

HDD = Heating Degree Days; dependent on location, see table below

1,000,000 = Conversion from Btu to MMBtu

kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Duct Insulation_MF	Calc				

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Duct Insulation_MF	20

Measure Life Source: National Grid Staff Calculations (2010). Pipe insulation for SBS DI measures 2010 Workbook.

Measure	ISR	RRe Gas	RRe Electric
Duct Insulation_MF	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Duct Insulation_MF	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Duct Insulation_MF					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Duct Insulation_MF	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Duct Insulation_MF		

Duct Sealing

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Ducting | **Measure Sub Type:** Duct Sealing

Program: C&I Multifamily

Measure Description

Ducts are sealed by reconnecting disconnected duct joints and sealing gaps or seams with mastic and fiber-mesh tape as appropriate

Baseline Description

The baseline efficiency case is the existing facility or equipment prior to the implementation of duct sealing.

Measures

Measure Name	Unique Identifier
Duct Sealing	Gas Commercial & Industrial C&I Multifamily Duct Sealing

Savings Principle

The baseline efficiency case is the existing facility or equipment after the implementation of duct sealing.

Savings Method

Calc

Unit

Savings Equation

MMBtu = Annualheatingconsumption x %SAVE x (1/1000000)

Where:

AnnualHeatingConsumption = The total annual heating consumption for the facility (Btu)

%SAVE = Average reduction in energy consumption.

1/1,000,000 = Conversion from Btu to MMBtu

Savings Factors for Multifamily Duct Sealing

Measure Type %SAVE158

Savings Factors for Multifamily Duct Sealing

Surface Area < 50 SQFT 7%

Surface Area > 50 SQFT and < 200 SQFT 3%

Surface Area > 200 SQFT 1%

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Duct Sealing	Calc			Calc	Calc

Gas Heat MMBtu Source: Calculated by RISE Engineering according to algorithms found in The Cadmus Group (2012). Massachusetts 2011 Residential Retrofit Multifamily Program Impact Analysis. Prepared for Massachusetts Program Administrators.

Energy Impact Factors

Measure	Measure Life
Duct Sealing	Multi

Measure	ISR	RRe Gas	RRe Electric
Duct Sealing	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Duct Sealing	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Duct Sealing		$0.283			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Duct Sealing	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Duct Sealing		

Faucet aerator

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** Faucet Aerator

Program: C&I Multifamily

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.

Baseline Description

The baseline efficiency case is a 2.2 GPM faucet.

Measures

Measure Name	Unique Identifier
Faucet aerator	Gas Commercial & Industrial C&I Multifamily Faucet aerator

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less aerator installed.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Faucet aerator		0.20			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Faucet aerator	3

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Faucet aerator	0.90	1.00	

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Faucet aerator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Faucet aerator	359	$0.714			

Water Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Faucet aerator	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Faucet aerator	$5.00 / measure	Incentive: $5.00 / measure

Heating, Custom

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Heating | **Measure Sub Type:**

Program: C&I Multifamily

Measure Description

Vendors install a variety of gas measures at multifamily facilities. The measure is associated with commercial gas meters. This measure includes heating equipment and measures.

Baseline Description

For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the facility.

Measures

Measure Name	Unique Identifier
Heating, Custom	Gas Commercial & Industrial C&I Multifamily Heating, Custom

Savings Principle

The high efficiency scenario is specific to the facility and may include one or more energy efficiency measures.

Savings Method

Calc

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heating, Custom		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Heating, Custom	Multi

Measure	ISR	RRe Gas	RRe Electric
Heating, Custom	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Heating, Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heating, Custom	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heating, Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heating, Custom	$273.00 / therm	Incentive: $163.00 / therm

Hot Water, Custom

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Hot Water **Measure Type:** **Measure Sub Type:**

Program: C&I Multifamily

Measure Description

Vendors install a variety of gas measures at multifamily facilities. The measure is associated with commercial gas meters. This measure includes domestic hot water equipment and measures.

Baseline Description

For retrofit projects, the baseline efficiency case is the same as the existing, or pre-retrofit, case for the facility.

Measures

Measure Name	Unique Identifier
Hot Water, Custom	Gas Commercial & Industrial C&I Multifamily Hot Water, Custom

Savings Principle

The high efficiency scenario is specific to the facility and may include one or more energy efficiency measures.

Savings Method

Calc

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Hot Water, Custom		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Hot Water, Custom	Multi

Measure	ISR	RRe Gas	RRe Electric
Hot Water, Custom	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Hot Water, Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Hot Water, Custom	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Hot Water, Custom	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Hot Water, Custom	$235.00 / therm	Incentive: $176.00 / therm

Low Flow Showerhead

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: C&I Multifamily

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas.

Baseline Description

The baseline efficiency case is a 2.5 GPM showerhead.

Measures

Measure Name	Unique Identifier
Low Flow Showerhead	Gas Commercial & Industrial C&I Multifamily Low Flow Showerhead

Savings Principle

The high efficiency case is a 1.5 GPM showerhead.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low Flow Showerhead		1.30			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Low Flow Showerhead	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Low Flow Showerhead	0.90	1.00	

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Low Flow Showerhead	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low Flow Showerhead	1786	$0.714			

Water Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low Flow Showerhead	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low Flow Showerhead	$25.00 / measure	Incentive: $25.00 / measure

Low Flow Showerhead w/ Thermostatic Valve

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: C&I Multifamily

Measure Description

A showerhead with a control that limits flow once water is heated.

Baseline Description

The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less.

Measures

Measure Name	Unique Identifier
Low Flow Showerhead w/ Thermostatic Valve	Gas Commercial & Industrial C&I Multifamily Low Flow Showerhead w/ Thermostatic Valve

Savings Principle

The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low Flow Showerhead w/ Thermostatic Valve		1.41			

Gas DHW MMBtu Source: Guidehouse (2020). Massachusetts Residential Baseline Study. https://ma-eeac.org/wp-content/uploads/RES-1-Residential-Baseline-Study-Ph4-Comprehensive-Report-2020-04-02.pdf

Energy Impact Factors

Measure	Measure Life
Low Flow Showerhead w/ Thermostatic Valve	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Low Flow Showerhead w/ Thermostatic Valve	0.90	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Low Flow Showerhead w/ Thermostatic Valve	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low Flow Showerhead w/ Thermostatic Valve	1786	$0.714			

Water Source: Cadeo/Illume (2020). Impact Evaluation of Income Eligible Multifamily Program. http://rieermc.ri.gov/wp-content/uploads/2020/10/ng-ri-mf-impact-and-process-comprehensive-report_final_04sept2020.pdf

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low Flow Showerhead w/ Thermostatic Valve	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low Flow Showerhead w/ Thermostatic Valve	$40.00 / measure	Incentive: $40.00 / measure

MF Shell Insulation

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Building Shell **Measure Type:** Insulation **Measure Sub Type:** Shell

Program: C&I Multifamily

Measure Description

Insulation upgrades are applied in existing multifamily facilities.

Baseline Description

The baseline efficiency case is characterized by the total R-value of the existing attic, basement or sidewall (Resist). This is calculated as the R-value of the existing insulation, estimated by the program contractor, plus the R-value of the ceiling, floor, or wall (for all projects: RCEILING = 3.36; RFLOOR = 6.16; RWALL = 6.65)

Measures

Measure Name	Unique Identifier
MF Shell Insulation	Gas Commercial & Industrial C&I Multifamily MF Shell Insulation

Savings Principle

The high efficiency case is characterized by the total R-value of the attic after the installation of additional attic, basement or sidewall insulation. This is calculated as the sum of the existing R-value (RBASE) plus the R-value of the added insulation(RADD).

Savings Method

Calculated using site-specific inputs

Unit

Completed insulation project.

Savings Equation

MMBTUannual = (((1/Rexist)-(1/Rnew)) x HDD x 24 x Area) / (1,000,000) X Nheat

kWhannual = MMBtuannaul x 293.1

kW = kWhannual x kW/kWhNheating

Where:

Rexist = Existing effective R-value (R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Rnew = New total effective R-value (R-ProposedMeasure + R-ExistingInsulation + R-Assembly), ft2-°F/Btuh

Area = Square footage of insulated area

ηheat = Efficiency of the heating system (AFUE or COP)

293.1 = Conversion constant (1MMBtu = 293.1 kWh)

24 = Conversion for hours per day

HDD = Heating Degree Days; dependent on location, see table below

1,000,000 = Conversion from Btu to MMBtu

kW/kWh heating = Average annual kW reduction per kWh reduction: 0.00050 kW/kWh

Hours: 4644

Hours Source: NOAA Weather data: An average BASE 60 Annual Heating Degree Day value for weather stations in Rhode Island and southeastern Massachusetts based on NOAA 30-year data.

Hours Note: Heating hours are characterized by the heating degree days for the facility, 4644.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
MF Shell Insulation	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
MF Shell Insulation	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
MF Shell Insulation	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
MF Shell Insulation	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
MF Shell Insulation		$58.251			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
MF Shell Insulation	0.33	0.01	0.00	0.68

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
MF Shell Insulation	$186.00 / measure	Incentive: $140.00 / measure

Pipe Wrap (Water Heating)

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Insulation **Measure Sub Type:** Pipe Insulation

Program: C&I Multifamily

Measure Description

Installation of DHW pipe wraps

Baseline Description

The baseline efficiency case is the existing hot water equipment.

Measures

Measure Name	Unique Identifier
Pipe Wrap (Water Heating)	Gas Commercial & Industrial C&I Multifamily Pipe Wrap (Water Heating)

Savings Principle

The high efficiency case includes pipe wrap.

Savings Method

Deemed

Unit

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pipe Wrap (Water Heating)		0.15			

Gas DHW MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Pipe Wrap (Water Heating)	13

Measure Life Source: GDS Associates, Inc. and Summit Blue Consulting (2009), Natural Gas Energy Efficiency Potential in Massachusetts, Appendix B-2,

Measure	ISR	RRe Gas	RRe Electric
Pipe Wrap (Water Heating)	0.90	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Pipe Wrap (Water Heating)	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pipe Wrap (Water Heating)					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe Wrap (Water Heating)	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe Wrap (Water Heating)	$3.00 / linear feet	Incentive: $3.00 / linear feet

Programmable thermostat

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: C&I Multifamily

Measure Description

Installation of a programmable thermostat which gives the ability to adjust heating or air-conditioning operating times according to a pre-set schedule.

Baseline Description

For the installation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the installation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable thermostat	Gas Commercial & Industrial C&I Multifamily Programmable thermostat

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable thermostat	1.50			29.00	0.046

Gas Heat MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kWh Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kW Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Programmable thermostat	19

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable thermostat	0.95	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable thermostat	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable thermostat		$13.142			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable thermostat	0.48	0.01	0.00	0.53

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable thermostat	$125.00 / measure	Incentive: $125.00 / measure

Thermostatic Shut-off Valve

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Flow Control | **Measure Sub Type:** Low Flow Showerhead

Program: C&I Multifamily

Measure Description

A showerhead with a control that limits flow once water is heated.

Baseline Description

The baseline case is a showerhead with a flow of 2.5 gallons per minute, or for the case of the adapter, a low flow showerhead with flow of 1.5 gpm or less.

Measures

Measure Name	Unique Identifier
Thermostatic Shut-off Valve	Gas Commercial & Industrial C&I Multifamily Thermostatic Shut-off Valve

Savings Principle

The high efficiency is a low-flow showerhead with a control that limits flow once the water is heated.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Thermostatic Shut-off Valve		0.34			

Gas DHW MMBtu Source: National Grid (2014). Review of ShowerStart evolve.

Energy Impact Factors

Measure	Measure Life
Thermostatic Shut-off Valve	15

Measure Life Source: Guidehouse (2021). Comprehensive TRM Review (MA19R17-B-TRM). https://ma-eeac.org/wp-content/uploads/MA19R17-B-TRM_Final_Report_2021-04-12_clean.pdf

Measure	ISR	RRe Gas	RRe Electric
Thermostatic Shut-off Valve	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Thermostatic Shut-off Valve	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Thermostatic Shut-off Valve	558				

Water Source: National Grid (2014). Review of ShowerStart evolve.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Thermostatic Shut-off Valve	0.08	0.01	0.00	0.93

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Thermostatic Shut-off Valve		

VFD

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: C&I Multifamily

Measure Description

This measure covers the installation of variable speed drives for multiple end uses and building types.

Baseline Description

The baseline efficiency case for this measure varies with the equipment type. All baselines assume either a constant speed motor or 2-speed motor. In the baselines, air or water volume/temperature is controlled using valves, dampers, and/or reheats.

Measures

Measure Name	Unique Identifier
VFD	Gas Commercial & Industrial C&I Multifamily VFD

Savings Principle

In the high efficiency case, pump flow or fan air volume is directly controlled using downstream information. The pump or fan will automatically adjust its speed based on inputted set points and the downstream feedback it receives.

Savings Method

Calculated using site-specific inputs

Unit

Installed variable speed drive on existing motor or with new NEMA premium efficiency motor.

Savings Equation

Gross kWh = HP_motor × 1/MotorEff × deltakWh/HP

Gross Summer kW = HP_motor × 1/MotorEff × deltakW_SP/HP

Gross Winter kW = HP_motor × 1/MotorEff × deltakW_WP/HP

Where:

HP_motor = Total horsepower of controlled motor: site-specific.

MotorEff = Motor efficiency: site-specific.

deltakWh/HP = Average annual kWh reduction per horsepower based on building and equipment type

HP_motor = Total horsepower of controlled motor: site-specific.

deltakW_SP/HP = Average summer peak reduction per horsepower based on building and equipment type

deltakW_WP/HP = Average winter peak reduction per horsepower based on building and equipment type

Refer to Table 17 in Appendix A.

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
VFD	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
VFD	Multi

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
VFD	1.00	0.99	0.99

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
VFD	0.99	0.99	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
VFD					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VFD	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VFD		

Wi-Fi programmable thermostat (controls gas heat only)

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: C&I Multifamily

Measure Description

A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and cooling systems Primary Energy Impact: Natural Gas

Baseline Description

For the installation of a programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat. For the installation of a wi-fi programmable thermostat, the baseline efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat.

Measures

Measure Name	Unique Identifier
Wi-Fi programmable thermostat (controls gas heat only)	Gas Commercial & Industrial C&I Multifamily Wi-Fi programmable thermostat (controls gas heat only)

Savings Principle

The high efficiency case is an HVAC system that has a programmable thermostat or wi-fi programmable thermostat installed.

Savings Method

Deemed

Unit

Installation of WiFi programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Wi-Fi programmable thermostat (controls gas heat only)	2.30			31.00	0.049

Gas Heat MMBtu Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kWh Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Electric kW Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Energy Impact Factors

Measure	Measure Life
Wi-Fi programmable thermostat (controls gas heat only)	11

Measure Life Source: SCE and Nest for SCE (2017). Residential Smart Thermostat Workpaper (Work Paper SCE17HC054, Revision #0)

Measure	ISR	RRe Gas	RRe Electric
Wi-Fi programmable thermostat (controls gas heat only)	0.95	1.00	1.00

ISR Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Wi-Fi programmable thermostat (controls gas heat only)	1.00	1.00	ls_11_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Wi-Fi programmable thermostat (controls gas heat only)		$13.142			

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Wi-Fi programmable thermostat (controls gas heat only)	0.48	0.01	0.00	0.53

NTG Source: Cadeo/Illume (2020). Impact & Process Evaluation of EnergyWise Multifamily Program.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Wi-Fi programmable thermostat (controls gas heat only)	$350.00 / measure	Incentive: $300.00 / measure

Large C&I New Construction, Gas

Boiler

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Boiler

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensingboilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)

Baseline Description

The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2024. Table 11 in Appendix A details the specific efficiency requirements by equipment type and capacity.

Measures

Measure Name	Unique Identifier
Boiler - 96% AFUE	Gas Commercial & Industrial Large C&I New Construction Boiler - 96% AFUE
Boiler - 95% AFUE < 300 MBU	Gas Commercial & Industrial Large C&I New Construction Boiler - 95% AFUE < 300 MBU

Savings Principle

The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.

Savings Method

Deemed

Unit

Installed high-efficiency condensing boiler

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Boiler - 96% AFUE	13.80				
Boiler - 95% AFUE < 300 MBU	13.80				

Gas Heat MMBtu Source: DNV (2021). Prescriptive Measures NRNC and ISP Results.

Energy Impact Factors

Measure	Measure Life
Boiler - 96% AFUE Boiler - 95% AFUE < 300 MBU	20

Measure Life Source: MA19C02-B-EUL - C&I Measure Life Report. https://ma-eeac.org/wp-content/uploads/MA19C02_B_EUL-final-report-03_31_20-v2.pdf

Measure	ISR	RRe Gas	RRe Electric
Boiler	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Energy realization rate is 100% because deemed savings are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Boiler - 96% AFUE	N/A	N/A	ls_00_Gas
Boiler - 95% AFUE < 300 MBU	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Boiler - 96% AFUE				$-0.950	
Boiler - 95% AFUE < 300 MBU				$-0.950	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler - 96% AFUE	$40.00 / therm	$30.00 / therm
Boiler - 95% AFUE < 300 MBU	$48.00 / therm	$30.00 / therm

BOILER RESET 1 STAGE

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Boiler Control

Program: Large C&I New Construction

Measure Description

Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand.

Baseline Description

The baseline efficiency case is a boiler without reset or load controls.

Measures

Measure Name	Unique Identifier
BOILER RESET 1 STAGE	Gas Commercial & Industrial Large C&I New Construction BOILER RESET 1 STAGE

Savings Principle

The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load.

Savings Method

Deemed

Unit

Installation of boiler reset control on existing boiler

Savings Equation

Gross Gas MMBtu = units * (kBTU/h_in/1,000) * EFLH_heating *ESF

Gross Gas MMBtu = 1 * (533 kBTU/h_in/1,000)* 1400 hrs * 5% = 37.3

Where:

Units = Number of measures installed under the program

kBTU/h_in = Fuel input rating (kBTU/h) of the controlled boiler, 533 kBTU/h (1)

EFLH_heating = Heating equivalent full-load hours, 1,400 hours (2)

ESF = Energy Savings Factor, 5% (3)

1,000 = Conversion factor, one MMBtu equals 1,000 kBTU

(1) MA Assumption of weighted boiler input capacity based on Eversource programdata

(2) KEMA (2012). Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Progam Administrators; page 1-2.

(3) GDS Associates, Inc. (2009). Natural Gas Energy Efficiency Potential In Massachustts. Study Assumes5% savings factor.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
BOILER RESET 1 STAGE	37.30				

Gas Heat MMBtu Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
BOILER RESET 1 STAGE	20

Measure Life Source: MA19C02-B-EUL - C&I Measure Life Report. https://ma-eeac.org/wp-content/uploads/MA19C02_B_EUL-final-report-03_31_20-v2.pdf

Measure	ISR	RRe Gas	RRe Electric
BOILER RESET 1 STAGE	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
BOILER RESET 1 STAGE	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
BOILER RESET 1 STAGE				$-0.950	

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
BOILER RESET 1 STAGE	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
BOILER RESET 1 STAGE	$48.00 / therm	Incentive: $30.00 / therm

Building Shell

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** Whole Building | **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Building Shell	Gas Commercial & Industrial Large C&I New Construction Building Shell

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Building Shell	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Building Shell	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Building Shell	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Building Shell	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Building Shell	Calc			$3.352	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building Shell	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building Shell		

Codes and Standards

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Custom

Measure Category: Codes and Standards

Measure Type: Codes and Standards

Measure Sub Type: Codes and Standards

Program: Large C&I New Construction

Measure Description

Energy efficiency code trainings and advocacy work to improve energy efficiency of buildings and equipment within Rhode Island.

Baseline Description

Un-influenced adoption curve of federal minimum codes and standards.

Measures

Measure Name	Unique Identifier
Codes and Standards	Gas Commercial & Industrial Large C&I New Construction Codes and Standards

Savings Principle

Accelerated adoption of advancing energy codes and equipment standards.

Savings Method

Calculated based on attribution study

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Codes and Standards	Calc			Calc	

Gas Heat MMBtu Source: NMR (2017). Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study. http://rieermc.ri.gov/wp-content/uploads/2018/03/ri-ccei-attribution-and-savings-final-report-12-12-17-clean.pdf

Electric kWh Source: NMR (2017). Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study. http://rieermc.ri.gov/wp-content/uploads/2018/03/ri-ccei-attribution-and-savings-final-report-12-12-17-clean.pdf

Energy Impact Factors

Measure	Measure Life
Codes and Standards	20

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Codes and Standards	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
Codes and Standards	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Codes and Standards					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Codes and Standards	0.00	0.00	0.00	1.00

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Codes and Standards		

COMBO COND FURN/WTR HTR

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Furnace

Program: Large C&I New Construction

Measure Description

Installation of a combination furnace/water heater.

Baseline Description

It is assumed that the baseline is an 85% AFUE furnace and a separate high draw gas fired storage water heater with an efficiency rating of 0.63 UEF.

Measures

Measure Name	Unique Identifier
COMBO COND FURN/WTR HTR	Gas Commercial & Industrial Large C&I New Construction COMBO COND FURN/WTR HTR

Savings Principle

A new combination 97% AFUE furnace and 0.90 tankless water heater.

Savings Method

Deemed

Unit

Installed high-efficiency combination condensing furnace/DHW heater

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COMBO COND FURN/WTR HTR			14.30		

Energy Impact Factors

Measure	Measure Life
COMBO COND FURN/WTR HTR	18

Measure Life Source: Ecotope, Inc. (2003). Natural Gas Efficiency and Conservation Measure Resource Assessment for the Residential and Commercial Sectors. Prepared for the Energy Trust of Oregon. https://ecotope-publications-database.ecotope.com/2003_007_NaturalGasEfficiency.pdf

Measure	ISR	RRe Gas	RRe Electric
COMBO COND FURN/WTR HTR	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
COMBO COND FURN/WTR HTR	1.00	1.00	ls_73_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COMBO COND FURN/WTR HTR				$0.600	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COMBO COND FURN/WTR HTR	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COMBO COND FURN/WTR HTR		

Combo Condensing Boiler/ Water Heater

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Boiler | **Measure Sub Type:** Combo Condensing

Program: Large C&I New Construction

Measure Description

This measure promotes the installation of a combined high-efficiency boiler and water heating unit. Combined boiler and water heating systems are more efficient than separate systems because they eliminate the standby heat losses of an additional tank.

Baseline Description

The baseline efficiency case is an 85% AFUE boiler with a 0.80 Et water heater.

Measures

Measure Name	Unique Identifier
Combo Condensing Boiler/ Water Heater - 95% AFUE	Gas Commercial & Industrial Large C&I New Construction Combo Condensing Boiler/ Water Heater - 95% AFUE
Combo Condensing Boiler/ Water Heater - 90% AFUE	Gas Commercial & Industrial Large C&I New Construction Combo Condensing Boiler/ Water Heater - 90% AFUE

Savings Principle

The high efficiency case is a condensing, integrated water heater/boiler with an AFUE >= 95%.

Savings Method

Deemed based on algorithm

Unit

Installed high-efficiency condensing combination DHW heater / boiler

Savings Equation

Gross Gas MMBtu = deltaMMBtu_sh + deltaMMBtu_dhw

deltaMMBtu_sh = units * kBtu/h_in/unit * ((Eff_ee/Eff_baseline -1) *(EFLH_heating/1,000)

deltaMMBtu_dhw = units *[(GPD * 365 * 8.33 * (T_set - T_main)/1,000,000)*(1/E_t,baseline - 1/E_t,ee) + UA_baseline/E_t,baseline*((T_set - T_amb)/1,000,000) *8,760]

Where:

deltaMMBtu_sh = Annual space heating savings associated with installation of a high efficeincy combi-boiler

deltaMMBtu_dhw = Annual domestic hot water savings associated with installation of a high effiency combi-boiler

units = number of units installed under the program

kBTU/h_in = Space heating fuel input rating, 150 kBTU/h_in (1)

Eff_baseline = Boiler space heating baseline condition, 85% AFUE(2)

Eff_ee = Boiler space heating energy efficiency condition, 95% AFUE

E_t,baseline = Water heating baseline thermal efficiency, 80% Et(3)

E_t,ee = Water heating efficient equipment thermal efficiency, 94% Et

EFLH_heating = Heating equivalent full-load hours, 1,400 hrs (4)

GPD = Gallons per day, 154 GPD (5)

T_main = Average temperature of supply water temperature in water main, 55.7°F(6)

T_amb = Average surrounding ambient air temperature, 70°F

T_set = Average water heater set point temperature, 140°F (7)

UA_baseline = Overall heat loss coefficient (BTU/h-°F) baseline, 15.3 Btu/h-°F (8)

8.33 = Energy required (BTU) to heat one gallon of water by one-degree Fahrenheit

365 = Days in one year

1,000 = Conversion factor, one MMBtu equals 1,000 kBTU

8,760 = Hours per year

1,000,000 = Conversion factor, one MMBtu equals 1,000,000 Btu

(1) MA assumption: Weighted boiler input capacity based on Eversource program data.

(2) DNVGL,NMR Group, 2017, Gas Boiler Market Characterization.

(3) Title 10, Code of Federal Regulations, Part 430 - Energy Conservation Program forConsumer Products, Subpart C - Energy and Water Conservation Standards and Their Effective Dates. January 1, 2010; Energy Conservation standards for Residential Water Heaters, Direct Heating Equipment, and Pool Heaters: Final Rule, Federal Register, 75 FR20112, April 16, 2010.

(4) KEMA (2012), Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Program Administrators; page 1-2.

(5) DNV GL, Inc (2019) Impact Evaluation of Commercial Water Heaters: Baseline Adjustment Memo Including Consumption Estimates. Table 3. Weighted using 2018 Commercial Buildings Energy Consumption Survey.

(6) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial andIndustrial Equipment: Commercial Prerinse Spray Valves. Table 7.4.1 Weighted Average Annual Main Water Temperature by Census Division and Building Type (Non-education Buildings in New England.) https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf

(7) OSHA notes that water heater temperatures below 140° F may lead to Legionella bacterial growth (https://www.osha.gov/legionnaires-disease/control-prevention)

(8) AHRI Commercial Water Heaters – Average stand by loss for 80 gallon take at 70 degrees ambient temperature.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Combo Condensing Boiler/ Water Heater - 95% AFUE Combo Condensing Boiler/ Water Heater - 90% AFUE	43.80				

Energy Impact Factors

Measure	Measure Life
Combo Condensing Boiler/ Water Heater - 95% AFUE Combo Condensing Boiler/ Water Heater - 90% AFUE	20

Measure Life Source: MA19C02-B-EUL - C&I Measure Life Report. https://ma-eeac.org/wp-content/uploads/MA19C02_B_EUL-final-report-03_31_20-v2.pdf

Measure	ISR	RRe Gas	RRe Electric
Combo Condensing Boiler/ Water Heater	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Combo Condensing Boiler/ Water Heater - 95% AFUE	N/A	N/A	ls_00_Gas
Combo Condensing Boiler/ Water Heater - 90% AFUE	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Combo Condensing Boiler/ Water Heater - 95% AFUE				$-0.950	
Combo Condensing Boiler/ Water Heater - 90% AFUE				$-0.950	

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Combo Condensing Boiler/ Water Heater	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Combo Condensing Boiler/ Water Heater - 95% AFUE Combo Condensing Boiler/ Water Heater - 90% AFUE	$32.00 / therm	$20.00 / therm

Comprehensive Design

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Whole Building | **Measure Type:** Whole Building | **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Comprehensive Design	Gas Commercial & Industrial Large C&I New Construction Comprehensive Design

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Comprehensive Design	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Comprehensive Design	multi

Measure	ISR	RRe Gas	RRe Electric
Comprehensive Design	1.00	0.97	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Comprehensive Design	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Comprehensive Design	Calc			$-0.045	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Comprehensive Design	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Comprehensive Design	$64.00 / therm	Incentive: $40.00 / therm

Comprehensive Design Assessment

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Whole Building | **Measure Type:** Whole Building | **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Comprehensive Design Assessment	Gas Commercial & Industrial Large C&I New Construction Comprehensive Design Assessment

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Comprehensive Design Assessment	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Comprehensive Design Assessment	multi

Measure	ISR	RRe Gas	RRe Electric
Comprehensive Design Assessment	1.00	0.97	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Comprehensive Design Assessment	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Comprehensive Design Assessment	Calc			$-0.045	

NTG Note: Net-to-gross negotiated with C-Team based on MA results

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Comprehensive Design Assessment	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: Net-to-gross negotiated with C-Team based on MA results

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Comprehensive Design Assessment		

COND UNIT HEATER 151-400 MBH

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Unit Heater

Program: Large C&I New Construction

Measure Description

The baseline efficiency case is a standard efficiency gas fired unit heater with minimum combustion efficiency of 80%, interrupted or intermittent ignition device (IID), and either power venting or an automatic flue damper.

Baseline Description

The baseline efficiency case is a standard efficiency unit heater.

Measures

Measure Name	Unique Identifier
COND UNIT HEATER 151-400 MBH	Gas Commercial & Industrial Large C&I New Construction COND UNIT HEATER 151-400 MBH

Savings Principle

The high efficiency case is a condensing gas unit heater with 90% AFUE or greater.

Savings Method

Deemed

Unit

Installed condensing unit heater.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COND UNIT HEATER 151-400 MBH	40.90				

Gas Heat MMBtu Source: NYSERDA Deemed Savings Database (Rev 11); Measure Name: A.UNIT-HEATER-COND.<300000.CI.).).N. The database provides savings of 204.6 MMBtu per million BTU/hr of heater input capacity. Assume average unit size of 200,000 BTU capacity.

Energy Impact Factors

Measure	Measure Life
COND UNIT HEATER 151-400 MBH	18

Measure Life Source: Ecotope, Inc. (2003). Natural Gas Efficiency and Conservation Measure Resource Assessment for the Residential and Commercial Sectors. Prepared for the Energy Trust of Oregon. https://ecotope-publications-database.ecotope.com/2003_007_NaturalGasEfficiency.pdf

Measure	ISR	RRe Gas	RRe Electric
COND UNIT HEATER 151-400 MBH	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
COND UNIT HEATER 151-400 MBH	1.00	1.00	ls_73_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COND UNIT HEATER 151-400 MBH				$0.600	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COND UNIT HEATER 151-400 MBH	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COND UNIT HEATER 151-400 MBH		

Condensing Boiler

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Boiler

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensingboilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)

Baseline Description

The baseline efficiency is an 85% AFUE Boiler. Table 11 in Appendix A details the specific efficiency requirements by equipment type and capacity.

Measures

Measure Name	Unique Identifier
Condensing Boiler - <= 300 mbh	Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - <= 300 mbh
Condensing Boiler - 1701+ mbh	Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 1701+ mbh
Condensing Boiler - 300-499 mbh	Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 300-499 mbh
Condensing Boiler - 500-999 mbh	Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 500-999 mbh
Condensing Boiler - 1000-1700 mbh	Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 1000-1700 mbh

Savings Principle

The high efficiency case assumes a gas-fired boiler of the specified size that is >= 90% AFUE.

Savings Method

Deemed

Unit

Installed high-efficiency condensing boiler with 90%+ AFUE or 95%+ AFUE.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Condensing Boiler - <= 300 mbh	14.70				
Condensing Boiler - 1701+ mbh	165.30				
Condensing Boiler - 300-499 mbh	28.00				
Condensing Boiler - 500-999 mbh	51.40				
Condensing Boiler - 1000-1700 mbh	94.50				

Gas Heat MMBtu Source: DNV (2021). Memo for Application of MA NRNC Study.

Energy Impact Factors

Measure	Measure Life
Condensing Boiler - <= 300 mbh	20
Condensing Boiler - 1701+ mbh	
Condensing Boiler - 300-499 mbh	
Condensing Boiler - 500-999 mbh	
Condensing Boiler - 1000-1700 mbh	

Measure Life Source: MA19C02-B-EUL - C&I Measure Life Report. https://ma-eeac.org/wp-content/uploads/MA19C02_B_EUL-final-report-03_31_20-v2.pdf

Measure	ISR	RRe Gas	RRe Electric
Condensing Boiler	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Energy realization rate is 100% because deemed savings are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Condensing Boiler - <= 300 mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 1701+ mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 300-499 mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 500-999 mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 1000-1700 mbh	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Condensing Boiler - <= 300 mbh				$-0.950	
Condensing Boiler - 1701+ mbh				$-0.950	
Condensing Boiler - 300-499 mbh				$-0.950	
Condensing Boiler - 500-999 mbh				$-0.950	
Condensing Boiler - 1000-1700 mbh				$-0.950	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Condensing Boiler	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Condensing Boiler - <= 300 mbh	$40.00 / therm	$30.00 / therm
Condensing Boiler - 1701+ mbh	$48.00 / therm	$30.00 / therm
Condensing Boiler - 300-499 mbh	$48.00 / therm	$30.00 / therm
Condensing Boiler - 500-999 mbh	$48.00 / therm	$30.00 / therm
Condensing Boiler - 1000-1700 mbh	$48.00 / therm	$30.00 / therm

Condensing Boiler

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Boiler | **Measure Sub Type:** Condensing

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Condensing Boiler - <= 300 mbh Condensing Boiler - 1701+ mbh Condensing Boiler - 300-499 mbh Condensing Boiler - 500-999 mbh Condensing Boiler - 1000-1700 mbh	Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - <= 300 mbh Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 1701+ mbh Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 300-499 mbh Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 500-999 mbh Gas Commercial & Industrial Large C&I New Construction Condensing Boiler - 1000-1700 mbh

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Condensing Boiler - <= 300 mbh	14.70				
Condensing Boiler - 1701+ mbh	165.30				
Condensing Boiler - 300-499 mbh	28.00				
Condensing Boiler - 500-999 mbh	51.40				
Condensing Boiler - 1000-1700 mbh	94.50				

Energy Impact Factors

Measure	Measure Life
Condensing Boiler - <= 300 mbh	20
Condensing Boiler - 1701+ mbh	
Condensing Boiler - 300-499 mbh	
Condensing Boiler - 500-999 mbh	
Condensing Boiler - 1000-1700 mbh	

Measure	ISR	RRe Gas	RRe Electric
Condensing Boiler	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Condensing Boiler - <= 300 mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 1701+ mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 300-499 mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 500-999 mbh	N/A	N/A	ls_00_Gas
Condensing Boiler - 1000-1700 mbh	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Condensing Boiler - <= 300 mbh				$-0.068	
Condensing Boiler - 1701+ mbh				$38.453	
Condensing Boiler - 300-499 mbh				$-0.950	
Condensing Boiler - 500-999 mbh				$-0.950	
Condensing Boiler - 1000-1700 mbh				$-0.950	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Condensing Boiler	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Condensing Boiler - <= 300 mbh	$40.00 / therm	$30.00 / therm
Condensing Boiler - 1701+ mbh	$48.00 / therm	$30.00 / therm
Condensing Boiler - 300-499 mbh	$48.00 / therm	$30.00 / therm
Condensing Boiler - 500-999 mbh	$48.00 / therm	$30.00 / therm
Condensing Boiler - 1000-1700 mbh	$48.00 / therm	$30.00 / therm

Condensing Storage Water Heater, 94%MIN 75-300

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Condensing Water Heater

Program: Large C&I New Construction

Measure Description

The installation of a high-efficiency condensing water heater over 94% and between 75-300 kBtuh.

Baseline Description

The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. For condensing stand-alone water heaters, the baseline is a stand-alone tank water heater with a thermal efficiency of 80%.

Measures

Measure Name	Unique Identifier
Condensing Storage Water Heater, 94%MIN 75-300	Gas Commercial & Industrial Large C&I New Construction Condensing Storage Water Heater, 94%MIN 75-300

Savings Principle

The high efficiency case is a condensing stand-alone commercial water heater with a thermal efficiency of 95% or greater and a capacity between 75,000 Btu and 300,000 Btu.

Savings Method

Deemed

Unit

Installed high-efficiency water heater.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Condensing Storage Water Heater, 94%MIN 75-300		31.80			

Energy Impact Factors

Measure	Measure Life
Condensing Storage Water Heater, 94%MIN 75-300	18

Measure Life Source: Ecotope, Inc. (2003). Natural Gas Efficiency and Conservation Measure Resource Assessment for the Residential and Commercial Sectors. Prepared for the Energy Trust of Oregon. https://ecotope-publications-database.ecotope.com/2003_007_NaturalGasEfficiency.pdf

Measure	ISR	RRe Gas	RRe Electric
Condensing Storage Water Heater, 94%MIN 75-300	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Condensing Storage Water Heater, 94%MIN 75-300	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Condensing Storage Water Heater, 94%MIN 75-300				$-0.950	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Condensing Storage Water Heater, 94%MIN 75-300	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Condensing Storage Water Heater, 94%MIN 75-300		

Condensing Water Heater, 90%MIN 75-800

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: DHW

Measure Sub Type: Condensing Water Heater

Program: Large C&I New Construction

Measure Description

The installation of a high-efficiency condensing water heater over 90% and between 75-800 kBtuh.

Baseline Description

The baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code. For condensing stand-alone water heaters, the baseline is a stand-alone tank water heater with a thermal efficiency of 80%.

Measures

Measure Name	Unique Identifier
Condensing Water Heater, 90%MIN 75-800	Gas Commercial & Industrial Large C&I New Construction Condensing Water Heater, 90%MIN 75-800

Savings Principle

The high efficiency case is a condensing stand-alone commercial water heater with a thermal efficiency of 95% or greater and a capacity between 75,000 Btu and 300,000 Btu.

Savings Method

Deemed

Unit

Installed high-efficiency DHW tank

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Condensing Water Heater, 90%MIN 75-800		23.05			

Energy Impact Factors

Measure	Measure Life
Condensing Water Heater, 90%MIN 75-800	15

Measure Life Source: GDS Associates, Inc. and Summit Blue Consulting (2009), Natural Gas Energy Efficiency Potential in Massachusetts, Appendix B-2,

Measure	ISR	RRe Gas	RRe Electric
Condensing Water Heater, 90%MIN 75-800	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Condensing Water Heater, 90%MIN 75-800	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Condensing Water Heater, 90%MIN 75-800				$-0.950	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Condensing Water Heater, 90%MIN 75-800	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Condensing Water Heater, 90%MIN 75-800	$46.00 / therm	Incentive: $29.01 / therm

Conveyor Broiler Upstream

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Upstream Cooking Equipment

Measure Sub Type: Conveyor Broiler

Program: Large C&I New Construction

Measure Description

Installation of an energy efficient underfired broiler to replace a conventional automatic constant input rate conveyor broiler. This measure has both electric and gas savings.

Baseline Description

Baseline broiler must be an automatic conveyor broiler capable of maintaining a temperature above 600 F with a tested idle rate greater than 60 kBtu/h for size 22-28" wide, greater than 70 kBtu/h for >28" wide, and greater than 40 kBtu/h for <22" wide.

Measures

Measure Name	Unique Identifier
Conveyor Broiler Upstream - <22 Conveyor Broiler Upstream - <28 Conveyor Broiler Upstream - 22-28	Gas Commercial & Industrial Large C&I New Construction Conveyor Broiler Upstream - <22 Gas Commercial & Industrial Large C&I New Construction Conveyor Broiler Upstream - <28 Gas Commercial & Industrial Large C&I New Construction Conveyor Broiler Upstream - 22-28

Savings Principle

The high efficiency case for a conveyor broiler must have a catalyst and an input rate less than 80 kBtu/h or a dual stage or modulating gas valve with a capability of throttling the input rate below 80 kBtu/h. Baseline broiler must be replaced by a broiler similar in size or smaller. Must be installed under a Type II Hood.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired conveyor broiler

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Conveyor Broiler Upstream - <22	114.50				
Conveyor Broiler Upstream - <28	193.30				
Conveyor Broiler Upstream - 22-28	316.10				

Gas Heat MMBtu Source: SoCalGas. (2019). Commercial Conveyor Broilers workpaper WPSCGNRCC171226A11. http://deeresources.net/workpapers

Energy Impact Factors

Measure	Measure Life
Conveyor Broiler Upstream - <22 Conveyor Broiler Upstream - <28 Conveyor Broiler Upstream - 22-28	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Conveyor Broiler Upstream	1.00	1.00	

ISR Note: In-service rates are set to 100% based on the assumption that all purchased units are installed.

RRe Note: Realization rates are 100% since savings estimates are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Conveyor Broiler Upstream - <22	N/A	N/A	ls_00_Gas
Conveyor Broiler Upstream - <28	N/A	N/A	ls_00_Gas
Conveyor Broiler Upstream - 22-28	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Conveyor Broiler Upstream - <22				$38.453	
Conveyor Broiler Upstream - <28				$38.453	
Conveyor Broiler Upstream - 22-28				$38.453	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Conveyor Broiler Upstream	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Conveyor Broiler Upstream - <22		
Conveyor Broiler Upstream - <28		
Conveyor Broiler Upstream - 22-28		

COOKING-COMBO OVEN 1

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Oven

Program: Large C&I New Construction

Measure Description

Installation of high efficiency gas-fired ovens.

Baseline Description

The baseline efficiency case is a standard efficiency oven (35% convection mode; 20% steam mode).

Measures

Measure Name	Unique Identifier
COOKING-COMBO OVEN 1	Gas Commercial & Industrial Large C&I New Construction COOKING-COMBO OVEN 1

Savings Principle

The high efficiency case is an oven that meets or exceeds 44% efficiency convection mode, 38% steam mode.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired oven.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COOKING-COMBO OVEN 1			121.10		

Gas Other MMBtu Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
COOKING-COMBO OVEN 1	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
COOKING-COMBO OVEN 1	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
COOKING-COMBO OVEN 1	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COOKING-COMBO OVEN 1	65700				

Water Source: Pacific Gas and Electric Company (2013). Work Paper PGECOFST100 Commercial Combination Oven. http://www.deeresources.net/workpapers

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COOKING-COMBO OVEN 1	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COOKING-COMBO OVEN 1		

COOKING-CONVECTION OVEN 1

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Oven

Program: Large C&I New Construction

Measure Description

Installation of high efficiency gas-fired ovens.

Baseline Description

The baseline efficiency case is a standard efficiency oven (30%).

Measures

Measure Name	Unique Identifier
COOKING-CONVECTION OVEN 1	Gas Commercial & Industrial Large C&I New Construction COOKING-CONVECTION OVEN 1

Savings Principle

The high efficiency case is an oven that meets or exceeds 49% efficiency.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired oven.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COOKING-CONVECTION OVEN 1			42.50		

Gas Other MMBtu Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
COOKING-CONVECTION OVEN 1	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
COOKING-CONVECTION OVEN 1	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
COOKING-CONVECTION OVEN 1	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COOKING-CONVECTION OVEN 1					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COOKING-CONVECTION OVEN 1	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COOKING-CONVECTION OVEN 1		

COOKING-CONVEYOR OVEN 1

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Oven

Program: Large C&I New Construction

Measure Description

Installation of high efficiency gas-fired ovens.

Baseline Description

The baseline efficiency case is a standard efficiency oven (20%).

Measures

Measure Name	Unique Identifier
COOKING-CONVEYOR OVEN 1	Gas Commercial & Industrial Large C&I New Construction COOKING-CONVEYOR OVEN 1

Savings Principle

The high efficiency case is an oven that meets or exceeds 42% efficiency.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired oven.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COOKING-CONVEYOR OVEN 1			88.40		

Gas Other MMBtu Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
COOKING-CONVEYOR OVEN 1	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
COOKING-CONVEYOR OVEN 1	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
COOKING-CONVEYOR OVEN 1	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COOKING-CONVEYOR OVEN 1					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COOKING-CONVEYOR OVEN 1	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COOKING-CONVEYOR OVEN 1		

COOKING-FRYER-1000

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Fryer

Program: Large C&I New Construction

Measure Description

The installation of a natural-gas fired fryer that is either ENERGY Star rated or has a heavy-load cooking efficiency of at least 50%. Qualified fryers use advanced burner and heat exchanger designs to use fuel more efficiently, as well as increased insulation to reduce standby heat loss.

Baseline Description

The baseline efficiency case is a non-Energy Star qualified fryer.

Measures

Measure Name	Unique Identifier
COOKING-FRYER-1000	Gas Commercial & Industrial Large C&I New Construction COOKING-FRYER-1000

Savings Principle

The high efficiency case is an Energy Star qualified fryer.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired fryer.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COOKING-FRYER-1000			19.00		

Gas Other MMBtu Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
COOKING-FRYER-1000	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
COOKING-FRYER-1000	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
COOKING-FRYER-1000	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COOKING-FRYER-1000					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COOKING-FRYER-1000	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COOKING-FRYER-1000		

COOKING-GRIDDLE 1

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Griddle

Program: Large C&I New Construction

Measure Description

Installation of a high efficiency gas griddle that meets ENERGY STAR® specifications or have a tested heavy load cooking efficiency of at least 38% and an idle energy rate <= 2,650 Btu/h per square foot of cooking surface utilizing ASTM Standard F1275.

Baseline Description

The baseline efficiency case is a non-ENERGY STAR® qualified gas griddle.

Measures

Measure Name	Unique Identifier
COOKING-GRIDDLE 1	Gas Commercial & Industrial Large C&I New Construction COOKING-GRIDDLE 1

Savings Principle

The high efficiency case is an ENERGY STAR® qualified gas griddle.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired griddle

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COOKING-GRIDDLE 1			15.30		

Gas Other MMBtu Source: Energy Star (2021). Energy Star Calculator - Blended Baseline, Increased MQE

Energy Impact Factors

Measure	Measure Life
COOKING-GRIDDLE 1	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
COOKING-GRIDDLE 1	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
COOKING-GRIDDLE 1	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COOKING-GRIDDLE 1					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COOKING-GRIDDLE 1	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COOKING-GRIDDLE 1		

COOKING-RACK OVEN 1

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Oven

Program: Large C&I New Construction

Measure Description

Installation of high efficiency gas-fired ovens.

Baseline Description

The baseline efficiency case is a standard efficiency oven (30%).

Measures

Measure Name	Unique Identifier
COOKING-RACK OVEN 1	Gas Commercial & Industrial Large C&I New Construction COOKING-RACK OVEN 1

Savings Principle

The high efficiency case is an oven that meets or exceeds 50% efficiency.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired oven.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COOKING-RACK OVEN 1			211.30		

Gas Other MMBtu Source: Unit savings are deemed based on the FSTC Commercial Kitchen Equipment Savings Calculator. https://caenergywise.com/calculators/

Energy Impact Factors

Measure	Measure Life
COOKING-RACK OVEN 1	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
COOKING-RACK OVEN 1	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
COOKING-RACK OVEN 1	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COOKING-RACK OVEN 1					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COOKING-RACK OVEN 1	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COOKING-RACK OVEN 1		

COOKING-STEAMER-1000

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** Cooking Equipment **Measure Sub Type:** Steamer

Program: Large C&I New Construction

Measure Description

The installation of an ENERGY STAR® rated natural-gas fired steamer, either connectionless or steam-generator design, with heavy-load cooking efficiency of at least 38%. Qualified steamers reduce heat loss due to better insulation, improved heat exchange, and more efficient steam delivery systems.

Baseline Description

The baseline efficiency case is a steamer with a 15% cooking efficiency. These performance parameters are drawn from a sample of economy grade equipment tested by the Food Service Technology Center based on ASTM F1484.

Measures

Measure Name	Unique Identifier
COOKING-STEAMER-1000	Gas Commercial & Industrial Large C&I New Construction COOKING-STEAMER-1000

Savings Principle

The high efficiency case is an ENERGY STAR® rated natural-gas fired steamer, with a tested heavy-load cooking efficiency of at least 38% utilizing ASTM F1484.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired steamer.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: 4380

Hours Source: Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011.

Hours Note: The deemed savings assumes 4,380 annual operating hours (12 hours a day * 365 days/year).

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
COOKING-STEAMER-1000			24.00		

Gas Other MMBtu Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
COOKING-STEAMER-1000	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
COOKING-STEAMER-1000	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
COOKING-STEAMER-1000	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
COOKING-STEAMER-1000	103563				

Water Source: Energy Star Calculator - New Baselines and Efficiencies 082721.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
COOKING-STEAMER-1000	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
COOKING-STEAMER-1000		

DIRECT FIRE HEATER

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Furnace

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency natural gas warm air furnace with an electronically commutated motor (ECM) for the fan. High efficiency furnaces are better at converting fuel into direct heat and better insulated to reduce heat loss. ECM fan motorssignificantly reduce fan motor electric consumption as compared to both shaped-pole and permanent split capacitor motors.

Baseline Description

The baseline efficiency case is a 85% AFUE furnace in the <150 kBTuh size category.

Measures

Measure Name	Unique Identifier
DIRECT FIRE HEATER	Gas Commercial & Industrial Large C&I New Construction DIRECT FIRE HEATER

Savings Principle

The high efficiency case is a new furnace with AFUE >= 96% and an electronically commutated motor.

Savings Method

Deemed

Unit

Installed high-efficiency warm air furnace with ECM fan motor

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
DIRECT FIRE HEATER	45.20				

Energy Impact Factors

Measure	Measure Life
DIRECT FIRE HEATER	18

Measure Life Source: ASHRAE Applications Handbook (2003); Page 36.3, assumes combined boiler and water heating systems have a measure life similar to a typical boiler.

Measure	ISR	RRe Gas	RRe Electric
DIRECT FIRE HEATER	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
DIRECT FIRE HEATER	1.00	1.00	ls_73_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
DIRECT FIRE HEATER				$0.600	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DIRECT FIRE HEATER	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DIRECT FIRE HEATER		

Domestic Hot Water

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Hot Water **Measure Type:** DHW **Measure Sub Type:** Year round

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Domestic Hot Water	Gas Commercial & Industrial Large C&I New Construction Domestic Hot Water

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Domestic Hot Water		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Domestic Hot Water	5,10,15

Measure	ISR	RRe Gas	RRe Electric
Domestic Hot Water	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Domestic Hot Water	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Domestic Hot Water	Calc			$3.633	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Domestic Hot Water	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Domestic Hot Water		

ERV

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Upstream

Measure Sub Type: Energy Recovery Ventilator

Program: Large C&I New Construction

Measure Description

Installation of a gas fired heated air system with ERV ≥60% total effectiveness.

Baseline Description

The baseline is a gas fired heating system without ERV.

Measures

Measure Name	Unique Identifier
ERV - Rotary Wheel UPSTR	Gas Commercial & Industrial Large C&I New Construction ERV - Rotary Wheel UPSTR
ERV - Fixed Plate UPSTR	Gas Commercial & Industrial Large C&I New Construction ERV - Fixed Plate UPSTR

Savings Principle

The high efficiency case is a gas fired heated air system with ERV ≥60% total effectiveness.

Savings Method

Calc

Unit

Installed gas fired heating system with ERV.

Savings Equation

Unit Peak kWh Savings =((4.5*CFM*deltah_cooling)*(1/EER*ERV_E)/1000 - (CFM*PD/6356/Eff_Motor/Eff_fan*0.746*2)*CF

Unit Dth Savings per Year = (4.5*CFM*deltah_heating)/η*((HDD65*24)/(T_indoor-T_design))*(Hours/24))/1,000,000*ERV_E*0.75

Where:

CF = Coincidence Factor = 0.9

CFM=Outside Air Flow in cubic feet per minute

EER = Provided by customer. If SEER provided, SEER*0.875. If value, not provided use default values in Table 4.

Eff_Fan = Efficiency of fan. Provided by customer. If value not provided assume 0.705.

Eff_Motor = Efficiency of motor. Provided by customer. If value not provided assume 0.855.

ERV_E = Total Energy Effectiveness of ERV. Provided by manufacturer/customer. If values not provided, fixedplate - sensible heat only = 0.355, fixed plate - sensible&latent heat =0.577, fixedplate - unk = 0.466, rotarywheel = 0.647, heatpipe = 0.31.

Hours = Hours of operation, per day. Provided by customer. If none provided, assume 12.

HDD65 = Heating Degree Days see table 1 (ref3)

PD = Additional pressure drop through heat exchanger, inches of water column. Provided by customer. If value is not provided, fixedplate - sensible heat only = 0.00035, fixedplate-sensible&latentheat = 0.00074, fixedplate-unk = 0.00055, rotarywheel = 0.00012, heatpipe=0.00011.

T_indoor = Customer provided indoor heating conditioned space temperature in degreesF

η= Efficiency of heating equipment. Assume r0.8 unless different efficiency is provided by customer.

deltah_cooling = difference in enthalpies (btu/lb) between the design day cooling enthalpy and exhaust air heat exchanger inlet enthalpy.

deltah_heating = difference in enthalpies (btu/lb) between the exhaust air heat exchanger inlet enthalpy and design day heating enthalpy.

1,000 = conversion factor of watts per kWh

1,000,000 = conversion factor for BTU to Dth

0.75 = factor to account for prevention of freezing of condensate. Control strategies incorporate full air flow by-pass or other strategies that reduce the number of hours of operation at lower temperatures,multiply ERE_E by 0.75 if not adjusted by manufacturer or customer.

See MN TRM 3.1 for more detail.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				Calc
ERV - Rotary Wheel UPSTR					
ERV - Fixed Plate UPSTR					

Electric kWh Note: It is assumed cooling savings are equal to the increased fan energy usage.

Energy Impact Factors

Measure	Measure Life
ERV - Rotary Wheel UPSTR	15
ERV - Fixed Plate UPSTR	

Measure Life Source: FEMP (2004). Demand-Control Ventilation Using CO2 Sensors. https://p2infohouse.org/ref/43/42844.pdf

Measure	ISR	RRe Gas	RRe Electric
ERV	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
ERV - Rotary Wheel UPSTR	1.00	1	ls_119_Gas
ERV - Fixed Plate UPSTR	1.00	1	ls_119_Gas

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
ERV - Rotary Wheel UPSTR					
ERV - Fixed Plate UPSTR					

NTG Note: Massachusetts Common Assumption

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ERV	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: Massachusetts Common Assumption

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ERV - Rotary Wheel UPSTR	$97.00 / therm	$16.55 / therm
ERV - Fixed Plate UPSTR	$83.00 / therm	$19.31 / therm

Food Service

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Food Service | **Measure Type:** Food Service | **Measure Sub Type:** Year round

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Food Service	Gas Commercial & Industrial Large C&I New Construction Food Service

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Food Service		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Food Service	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure Life Note: Assume 1/3 of measure life

Measure	ISR	RRe Gas	RRe Electric
Food Service	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Food Service	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Food Service	Calc			$38.453	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Food Service	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Food Service		

Fryer, Upstream

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Food Service | **Measure Type:** Upstream Cooking Equipment | **Measure Sub Type:** Fryer

Program: Large C&I New Construction

Measure Description

The installation of a natural-gas fired fryer that is either ENERGY Star rated or has a heavy-load cooking efficiency of at least 50%. Qualified fryers use advanced burner and heat exchanger designs to use fuel more efficiently, as well as increased insulation to reduce standby heat loss.

Baseline Description

The baseline efficiency case is a non-Energy Star qualified fryer.

Measures

Measure Name	Unique Identifier
Fryer, Upstream	Gas Commercial & Industrial Large C&I New Construction Fryer, Upstream

Savings Principle

The high efficiency case is an Energy Star qualified fryer.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired fryer.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Fryer, Upstream			19.00		

Gas Other MMBtu Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Fryer, Upstream	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Fryer, Upstream	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Fryer, Upstream	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Fryer, Upstream				$38.453	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Fryer, Upstream	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Fryer, Upstream	$27.00 / therm	Incentive: $16.60 / therm

Furnace w/ECM

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Furnace

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency natural gas warm air furnace with an electronically commutated motor (ECM) for the fan. High efficiency furnaces are better at converting fuel into direct heat and better insulated to reduce heat loss. ECM fan motorssignificantly reduce fan motor electric consumption as compared to both shaped-pole and permanent split capacitor motors.

Baseline Description

The baseline efficiency case is a 85% AFUE furnace in the <150 kBTuh size category.

Measures

Measure Name	Unique Identifier
	Gas Commercial & Industrial Large C&I New Construction Furnace w/ECM - 96% AFUE
Furnace w/ECM - 96% AFUE	Gas Commercial & Industrial Large C&I New Construction Furnace w/ECM - 95% AFUE
Furnace w/ECM - 95% AFUE	Gas Commercial & Industrial Large C&I New Construction Furnace w/ECM - 97% AFUE
Furnace w/ECM - 97% AFUE	Gas Commercial & Industrial Large C&I New Construction Furnace w/ ECM - 92% AFUE
Furnace w/ ECM - 92% AFUE	

Savings Principle

The high efficiency case is a new furnace with the appropriate AFUE and an electronically commutated motor.

Savings Method

Deemed

Unit

Installed high-efficiency warm air furnace with ECM fan motor

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
				168.00	0.124
Furnace w/ECM - 96% AFUE	6.20			168.00	
Furnace w/ECM - 95% AFUE	5.70			168.00	
Furnace w/ECM - 97% AFUE	6.70			168.00	
Furnace w/ ECM - 92% AFUE	4.30			168.00	

Gas Heat MMBtu Source: DNV (2021). Prescriptive Measures NRNC and ISP Results.

Electric kWh Source: Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.

Electric kW Source: Energy & Resource Solutions (2011). BFM Impact Evaluation Report. Prepared for the Electric and Gas Program Administrators of Massachusetts.

Energy Impact Factors

Measure	Measure Life
Furnace w/ECM - 96% AFUE	23
Furnace w/ECM - 95% AFUE	
Furnace w/ECM - 97% AFUE	
Furnace w/ ECM - 92% AFUE	

Measure Life Source: DOE (2015). Technical Support Document: Commercial Warm Air Furnaces. EERE-2013-BT-STD-0021-0050. https://www.regulations.gov/document/EERE-2013-BT-STD-0021-0050

Measure	ISR	RRe Gas	RRe Electric
Furnace w/ECM	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Furnace w/ECM - 96% AFUE	1.00	1	ls_73_Gas
Furnace w/ECM - 95% AFUE	1.00	1	ls_73_Gas
Furnace w/ECM - 97% AFUE	1.00	1	ls_73_Gas
Furnace w/ ECM - 92% AFUE	1.00	1	ls_73_Gas

RRsp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

RRwp Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Furnace w/ECM - 96% AFUE				$0.600	
Furnace w/ECM - 95% AFUE				$0.600	
Furnace w/ECM - 97% AFUE				$0.600	
Furnace w/ ECM - 92% AFUE				$0.600	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Furnace w/ECM	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Furnace w/ECM - 96% AFUE		
Furnace w/ECM - 95% AFUE		
Furnace w/ECM - 97% AFUE		
Furnace w/ ECM - 92% AFUE		

Gas driven cooling

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Cooling | **Measure Sub Type:** Year round

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Gas driven cooling	Gas Commercial & Industrial Large C&I New Construction Gas driven cooling

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Gas driven cooling		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Gas driven cooling	multi

Measure	ISR	RRe Gas	RRe Electric
Gas driven cooling	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Gas driven cooling	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Gas driven cooling	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Gas driven cooling	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Gas driven cooling	$26.00 / therm	Incentive: $16.00 / therm

Gas Oven Upstream

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Upstream Cooking Equipment

Measure Sub Type: Oven

Program: Large C&I New Construction

Measure Description

Installation of high efficiency gas-fired ovens.

Baseline Description

The baseline efficiency is a standard efficiency oven with the following baseline efficiencies: convection oven (44% cooking efficiency), combination oven (38% cooking efficiency for steam and 53% cooking equipment for convection), conveyor oven (20% cooking efficiency) and rack oven (30% cooking efficiency).

Measures

Measure Name	Unique Identifier
Gas Oven Upstream- Combination Oven	Gas Commercial & Industrial Large C&I New Construction Gas Oven Upstream- Combination Oven
Gas Oven Upstream - Convection Oven	Gas Commercial & Industrial Large C&I New Construction Gas Oven Upstream - Convection Oven
Gas Oven Upstream - Conveyor Oven	Gas Commercial & Industrial Large C&I New Construction Gas Oven Upstream - Conveyor Oven
Gas Oven Upstream - Rack Oven	Gas Commercial & Industrial Large C&I New Construction Gas Oven Upstream - Rack Oven

Savings Principle

The high efficiency case is an oven that meets or exceeds the following high efficiency ratings per oven type: combination oven (58% efficiency convection mode, 48% steam mode), convection oven (51% efficiency), rack oven (52% efficiency), and conveyor oven (50% efficiency)

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired oven.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Gas Oven Upstream- Combination Oven			30.00		
Gas Oven Upstream - Convection Oven			23.00		
Gas Oven Upstream - Conveyor Oven			88.40		
Gas Oven Upstream - Rack Oven			33.00		

Energy Impact Factors

Measure	Measure Life
Gas Oven Upstream- Combination Oven Gas Oven Upstream - Convection Oven Gas Oven Upstream - Conveyor Oven Gas Oven Upstream - Rack Oven	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Gas Oven Upstream	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Gas Oven Upstream- Combination Oven	N/A	N/A	ls_00_Gas
Gas Oven Upstream - Convection Oven	N/A	N/A	ls_00_Gas
Gas Oven Upstream - Conveyor Oven	N/A	N/A	ls_00_Gas
Gas Oven Upstream - Rack Oven	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Gas Oven Upstream- Combination Oven	65700			$38.453	
Gas Oven Upstream - Convection Oven				$38.453	
Gas Oven Upstream - Conveyor Oven				$38.453	
Gas Oven Upstream - Rack Oven				$38.453	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Gas Oven Upstream	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Gas Oven Upstream- Combination Oven	$19.00 / therm	$11.79 / therm
Gas Oven Upstream - Convection Oven	$49.00 / therm	$30.81 / therm
Gas Oven Upstream - Conveyor Oven	$19.90 / therm	$12.44 / therm
Gas Oven Upstream - Rack Oven	$8.00 / therm	$4.97 / therm

Griddle, Upstream

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Food Service | **Measure Type:** Upstream Cooking Equipment | **Measure Sub Type:** Griddle

Program: Large C&I New Construction

Measure Description

Installation of a high efficiency gas griddle that meets ENERGY STAR® specifications or have a tested heavy load cooking efficiency of at least 38% and an idle energy rate <= 2,650 Btu/h per square foot of cooking surface utilizing ASTM Standard F1275.

Baseline Description

The baseline efficiency case is a non-ENERGY STAR® qualified gas griddle.

Measures

Measure Name	Unique Identifier
Griddle, Upstream	Gas Commercial & Industrial Large C&I New Construction Griddle, Upstream

Savings Principle

The high efficiency case is an ENERGY STAR® qualified gas griddle.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired griddle

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Griddle, Upstream			15.30		

Gas Other MMBtu Source: Energy Star (2021). Energy Star Calculator - Blended Baseline, Increased MQE

Energy Impact Factors

Measure	Measure Life
Griddle, Upstream	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Griddle, Upstream	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Griddle, Upstream	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Griddle, Upstream				$38.453	

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Griddle, Upstream	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Griddle, Upstream	$23.22 / therm	Incentive: $14.51 / therm

Heat Pump

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Heat Pump **Measure Sub Type:** Year round

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Heat Pump	Gas Commercial & Industrial Large C&I New Construction Heat Pump

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heat Pump		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Heat Pump	multi

Measure	ISR	RRe Gas	RRe Electric
Heat Pump	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Heat Pump	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heat Pump	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Pump	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Pump		

Heat Recovery

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Heat Recovery | **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Heat Recovery - Seasonal Heat Recovery - Year Round Heat Recovery - All	Gas Commercial & Industrial Large C&I New Construction Heat Recovery - Seasonal Gas Commercial & Industrial Large C&I New Construction Heat Recovery - Year Round Gas Commercial & Industrial Large C&I New Construction Heat Recovery - All

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heat Recovery - Seasonal	Calc			Calc	Calc
Heat Recovery - Year Round		Calc		Calc	Calc
Heat Recovery - All			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Heat Recovery - Seasonal	10,15,20
Heat Recovery - Year Round	
Heat Recovery - All	

Measure Life Note: Consistent with MA TRM

Measure	ISR	RRe Gas	RRe Electric
Heat Recovery	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Heat Recovery - Seasonal	N/A	N/A	ls_00_Gas
Heat Recovery - Year Round	N/A	N/A	ls_00_Gas
Heat Recovery - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heat Recovery - Seasonal	Calc			$-0.697	
Heat Recovery - Year Round	Calc			$3.633	
Heat Recovery - All	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Recovery	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Recovery - Seasonal	$26.00 / therm	$16.00 / therm
Heat Recovery - Year Round	$26.00 / therm	$16.00 / therm
Heat Recovery - All	$26.00 / therm	$16.00 / therm

High Speed Clothes Washer

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency clothes washer with extraction speed >200G.

Baseline Description

The baseline is a clothes washer with extraction speed <100G.

Measures

Measure Name	Unique Identifier
High Speed Clothes Washer	Gas Commercial & Industrial Large C&I New Construction High Speed Clothes Washer

Savings Principle

The high efficiency case is a clothes washer with extraction speed >200G.

Savings Method

Calculated using deemed inputs

Unit

Per lb

Savings Equation

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
High Speed Clothes Washer			0.47		

Energy Impact Factors

Measure	Measure Life
High Speed Clothes Washer	7

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group.
https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
High Speed Clothes Washer	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
High Speed Clothes Washer	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
High Speed Clothes Washer					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
High Speed Clothes Washer	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
High Speed Clothes Washer		

HVAC

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** HVAC **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
HVAC - Controls and EMS	Gas Commercial & Industrial Large C&I New Construction HVAC - Controls and EMS
HVAC - Equipment	Gas Commercial & Industrial Large C&I New Construction HVAC - Equipment

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
		Calc		Calc	Calc
HVAC - Controls and EMS					
HVAC - Equipment					

Electric kW Source: 0.000

Energy Impact Factors

Measure	Measure Life
HVAC - Controls and EMS	5,10,15
HVAC - Equipment	

Measure	ISR	RRe Gas	RRe Electric
HVAC	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
HVAC - Controls and EMS	N/A	N/A	ls_00_Gas
HVAC - Equipment	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
HVAC - Controls and EMS	Calc			$0.385	
HVAC - Equipment	Calc			$-0.068	

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: The Net-to-Gross ratio is assumed to be 100%.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC - Controls and EMS		
HVAC - Equipment		

INFRARED HEATER - LOW INT

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Infrared Heater

Program: Large C&I New Construction

Measure Description

The installation of a gas-fired low intensity infrared heating system in place of a unit heater, furnace, or other standard efficiency equipment. Infrared heating uses radiant heat as opposed to warm air to heat buildings. In commercial environments withhigh air exchange rates, heat loss is minimal because the space's heat comes from surfaces rather than air.

Baseline Description

The baseline efficiency case is a standard efficiency gas-fired unit heater with combustion efficiency of 80%.

Measures

Measure Name	Unique Identifier
INFRARED HEATER - LOW INT	Gas Commercial & Industrial Large C&I New Construction INFRARED HEATER - LOW INT

Savings Principle

The high efficiency case is a gas-fired low-intensity infrared heating unit.

Savings Method

Deemed

Unit

Installed infrared heater

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
INFRARED HEATER - LOW INT	12.00				

Gas Heat MMBtu Source: KEMA (2013). Project 25 Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Program Administrators; Page 1-5

Energy Impact Factors

Measure	Measure Life
INFRARED HEATER - LOW INT	17

Measure Life Source: GDS Associates (2016). Natural Gas Efficiency Potential Study. https://www.michigan.gov/-/media/Project/Websites/mpsc/regulatory/reports/3rdparty/DTE_2016_NG_ee_potential_study_w_appendices_vFINAL.pdf?rev=3950a130b5ee4620b2f5faf46f7554b4

Measure	ISR	RRe Gas	RRe Electric
INFRARED HEATER - LOW INT	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
INFRARED HEATER - LOW INT	1.00	1.00	ls_73_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
INFRARED HEATER - LOW INT				$0.600	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
INFRARED HEATER - LOW INT	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
INFRARED HEATER - LOW INT	$26.00 / therm	Incentive: $19.20 / therm

Low Flow Cooking Spray Nozzle, Upstream

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Food Service **Measure Type:** **Measure Sub Type:**

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency low flow cooking spray nozzle.

Baseline Description

The baseline efficiency case is a standard efficiency cooking spray valve.

Measures

Measure Name	Unique Identifier
Low Flow Cooking Spray Nozzle, Upstream	Gas Commercial & Industrial Large C&I New Construction Low Flow Cooking Spray Nozzle, Upstream

Savings Principle

The high efficiency case is a low flow pre-rinse spray valve for cooking equipment with an average flow rate of 1.6 GPM.

Savings Method

Deemed

Unit

Installed cooking low flow pre-rinse spray valve.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low Flow Cooking Spray Nozzle, Upstream		11.40			

Gas DHW MMBtu Source: DNV GL (2014)Impact Evaluation of Massachusetts Prescriptive Gas Pre-Rinse Spray Valve Measure

Energy Impact Factors

Measure	Measure Life
Low Flow Cooking Spray Nozzle, Upstream	8

Measure Life Source: DNV GL (2014)Impact Evaluation of Massachusetts Prescriptive Gas Pre-Rinse Spray Valve Measure

Measure	ISR	RRe Gas	RRe Electric
Low Flow Cooking Spray Nozzle, Upstream	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Low Flow Cooking Spray Nozzle, Upstream	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low Flow Cooking Spray Nozzle, Upstream	6410			$38.453	

Water Source: DNV GL (2014)Impact Evaluation of Massachusetts Prescriptive Gas Pre-Rinse Spray Valve Measure

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low Flow Cooking Spray Nozzle, Upstream	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low Flow Cooking Spray Nozzle, Upstream	$10.53 / therm	Incentive: $6.58 / therm

Non-Condensing Boiler

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Boiler | **Measure Sub Type:** Blend

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Non-Condensing Boiler - All Non-Condensing Boiler - Seasonal Non-Condensing Boiler - Year Round	Gas Commercial & Industrial Large C&I New Construction Non-Condensing Boiler - All Gas Commercial & Industrial Large C&I New Construction Non-Condensing Boiler - Seasonal Gas Commercial & Industrial Large C&I New Construction Non-Condensing Boiler - Year Round

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Non-Condensing Boiler - All	Calc			Calc	Calc
Non-Condensing Boiler - Seasonal		Calc		Calc	Calc
Non-Condensing Boiler - Year Round			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Non-Condensing Boiler - All	5,10,15,20,25
Non-Condensing Boiler - Seasonal	
Non-Condensing Boiler - Year Round	

Measure Life Note: Assume 1/3 of measure life

Measure	ISR	RRe Gas	RRe Electric
Non-Condensing Boiler	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Non-Condensing Boiler - All	N/A	N/A	ls_00_Gas
Non-Condensing Boiler - Seasonal	N/A	N/A	ls_00_Gas
Non-Condensing Boiler - Year Round	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Non-Condensing Boiler - All	Calc			$-0.068	
Non-Condensing Boiler - Seasonal				$38.453	
Non-Condensing Boiler - Year Round				$-0.950	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Non-Condensing Boiler	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Non-Condensing Boiler - All		
Non-Condensing Boiler - Seasonal		
Non-Condensing Boiler - Year Round		

Other Gas

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Other | **Measure Type:** Other | **Measure Sub Type:** HVAC

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Other Gas - Seasonal	Gas Commercial & Industrial Large C&I New Construction Other Gas - Seasonal
Other Gas - Year Round	Gas Commercial & Industrial Large C&I New Construction Other Gas - Year Round
Other Gas - All	Gas Commercial & Industrial Large C&I New Construction Other Gas - All

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Other Gas - Seasonal			Calc	Calc	Calc
Other Gas - Year Round	Calc			Calc	Calc
Other Gas - All		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Other Gas - Seasonal Other Gas - Year Round Other Gas - All	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Other Gas	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Other Gas - Seasonal	N/A	N/A	ls_00_Gas
Other Gas - Year Round	N/A	N/A	ls_00_Gas
Other Gas - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Other Gas - Seasonal	Calc			$-0.697	
Other Gas - Year Round	Calc			$3.633	
Other Gas - All	Calc			$-0.531	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Other Gas	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Other Gas - Seasonal	$26.00 / therm	$16.00 / therm
Other Gas - Year Round	$26.00 / therm	$16.00 / therm
Other Gas - All	$26.00 / therm	$16.00 / therm

Pasta Cooker, Upstream

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Upstream Cooking Equipment

Measure Sub Type: Pasta Cooker

Program: Large C&I New Construction

Measure Description

The installation of an energy efficient pasta cooker.

Baseline Description

Baseline case is the standard natural gas stove with stock pot with 27.5% standard efficiency.

Measures

Measure Name	Unique Identifier
Pasta Cooker, Upstream	Gas Commercial & Industrial Large C&I New Construction Pasta Cooker, Upstream

Savings Principle

A dedicated natural high efficiency gas-fueled pasta cooker(equivalent to 50% efficiency) with a removable strainer

Savings Method

Deemed

Unit

Per Pasta Cooker

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pasta Cooker, Upstream			140.20		

Gas Other MMBtu Note: Deemed savings are based on Arkansas Technical Reference Manual V4.0 Volume 2.

Energy Impact Factors

Measure	Measure Life
Pasta Cooker, Upstream	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Pasta Cooker, Upstream	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Pasta Cooker, Upstream	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pasta Cooker, Upstream				$38.453	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pasta Cooker, Upstream	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pasta Cooker, Upstream	$25.68 / therm	Incentive: $16.05 / therm

Pool Heater

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Water Heater **Measure Sub Type:** Pool Heater

Program: Large C&I New Construction

Measure Description

Installation of a gas-fired pool heater with thermal efficiency >= 84%.

Baseline Description

The baseline is 82% thermal efficiency gas-fired pool heater.

Measures

Measure Name	Unique Identifier
Pool Heater	Gas Commercial & Industrial Large C&I New Construction Pool Heater

Savings Principle

The high efficiency case is a gas-fired pool heater with thermal efficiency >= 84%.

Savings Method

Calculated using deemed inputs

Unit

Per Mbtuh

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pool Heater					

Energy Impact Factors

Measure	Measure Life
Pool Heater	5

Measure	ISR	RRe Gas	RRe Electric
Pool Heater	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
Pool Heater	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pool Heater					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pool Heater	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pool Heater		

Process

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Process | **Measure Type:** Process | **Measure Sub Type:** Year round

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Process	Gas Commercial & Industrial Large C&I New Construction Process

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Process		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Process	5,10

Measure	ISR	RRe Gas	RRe Electric
Process	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Process	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Process	Calc			$0.079	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process		

Renovation Rehab Multifamily High Rise Cooling, Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Gas Cooling

Program: Large C&I New Construction

Measure Description

The gas cooling savings resulting from MFHR Renovation Rehab projects that include the installation of roof, wall, and basement insulation.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab MFHR -Gas Cooling Tier 1 Renovation Rehab MFHR - Gas Cooling Tier 2 Renovation Rehab MFHR - Gas Cooling Tier 3	Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR -Gas Cooling Tier 1 Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - Gas Cooling Tier 2 Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - Gas Cooling Tier 3

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc			Calc	Calc
Renovation Rehab MFHR -Gas Cooling Tier 1 Renovation Rehab MFHR - Gas Cooling Tier 2 Renovation Rehab MFHR - Gas Cooling Tier 3					

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
Renovation Rehab MFHR -Gas Cooling Tier 1 Renovation Rehab MFHR - Gas Cooling Tier 2 Renovation Rehab MFHR - Gas Cooling Tier 3	25

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Multifamily High Rise Cooling, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab MFHR -Gas Cooling Tier 1	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - Gas Cooling Tier 2	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - Gas Cooling Tier 3	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab MFHR -Gas Cooling Tier 1					
Renovation Rehab MFHR - Gas Cooling Tier 2					
Renovation Rehab MFHR - Gas Cooling Tier 3					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Multifamily High Rise Cooling, Gas	0.48	0.02	0.03	0.58

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab MFHR -Gas Cooling Tier 1		
Renovation Rehab MFHR - Gas Cooling Tier 2		
Renovation Rehab MFHR - Gas Cooling Tier 3		

Renovation Rehab Multifamily High Rise CP, Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** CP

Program: Large C&I New Construction

Measure Description

The heating, cooling, and DHW savings resulting from CP Renovation Rehab projects. The cooling and heating savings resulting from Renovation Rehab projects that include the installation of roof, wall, and basement insulation. The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab MFHR - Gas Cooling CP Renovation Rehab MFHR - Heating CP Renovation Rehab MFHR - DHW CP	Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - Gas Cooling CP Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - Heating CP Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - DHW CP

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc			Calc	Calc
Renovation Rehab MFHR - Gas Cooling CP					
Renovation Rehab MFHR - Heating CP					
Renovation Rehab MFHR - DHW CP					

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Energy Impact Factors

Measure	Measure Life
Renovation Rehab MFHR - Gas Cooling CP	multi
Renovation Rehab MFHR - Heating CP	25
Renovation Rehab MFHR - DHW CP	25
	15

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Multifamily High Rise CP, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab MFHR - Gas Cooling CP	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - Heating CP	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - DHW CP	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab MFHR - Gas Cooling CP					
Renovation Rehab MFHR - Heating CP					
Renovation Rehab MFHR - DHW CP					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Multifamily High Rise CP, Gas	0.48	0.02	0.03	0.58

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab MFHR - Gas Cooling CP		
Renovation Rehab MFHR - Heating CP		
Renovation Rehab MFHR - DHW CP		

Renovation Rehab Multifamily High Rise DHW, Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** DHW

Program: Large C&I New Construction

Measure Description

The DHW savings resulting from Renovation Rehab projects that include more efficient water heating systems.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab MFHR - Heating Tier 1 Renovation Rehab MFHR - Heating Tier 2 Renovation Rehab MFHR - Heating Tier 3	Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - Heating Tier 1 Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - Heating Tier 2 Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - Heating Tier 3

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc			Calc	Calc
Renovation Rehab MFHR - Heating Tier 1					
Renovation Rehab MFHR - Heating Tier 2					
Renovation Rehab MFHR - Heating Tier 3					

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Note: Supplied by vendor

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Note: Supplied by vendor

Energy Impact Factors

Measure	Measure Life
Renovation Rehab MFHR - Heating Tier 1 Renovation Rehab MFHR - Heating Tier 2 Renovation Rehab MFHR - Heating Tier 3	25

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Multifamily High Rise DHW, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab MFHR - Heating Tier 1	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - Heating Tier 2	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - Heating Tier 3	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab MFHR - Heating Tier 1					
Renovation Rehab MFHR - Heating Tier 2					
Renovation Rehab MFHR - Heating Tier 3					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Multifamily High Rise DHW, Gas	0.48	0.02	0.03	0.58

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab MFHR - Heating Tier 1		
Renovation Rehab MFHR - Heating Tier 2		
Renovation Rehab MFHR - Heating Tier 3		

Renovation Rehab Multifamily High Rise Heating, Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The heating savings resulting from MFHR Renovation Rehab projects that include the installation of roof, wall, and basement insulation.

Baseline Description

The baseline case is the current version of the RI energy code and/or UDRH performance.

Measures

Measure Name	Unique Identifier
Renovation Rehab MFHR - DHW Tier 1 Renovation Rehab MFHR - DHW Tier 2 Renovation Rehab MFHR - DHW Tier 3	Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - DHW Tier 1 Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - DHW Tier 2 Gas Commercial & Industrial Large C&I New Construction Renovation Rehab MFHR - DHW Tier 3

Savings Principle

The efficient case is the post-retrofit performance of a house participating the program

Savings Method

Calculated using site-specific inputs

Unit

Complete Renovation Rehab project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc			Calc	Calc
Renovation Rehab MFHR - DHW Tier 1					
Renovation Rehab MFHR - DHW Tier 2					
Renovation Rehab MFHR - DHW Tier 3					

Gas Heat MMBtu Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kWh Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Source: NMR Group (2023). Residential New Construction Baseline Study.

Electric kW Note: Calculated, per 100ft2

Energy Impact Factors

Measure	Measure Life
Renovation Rehab MFHR - DHW Tier 1 Renovation Rehab MFHR - DHW Tier 2 Renovation Rehab MFHR - DHW Tier 3	15

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Renovation Rehab Multifamily High Rise Heating, Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Renovation Rehab MFHR - DHW Tier 1	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - DHW Tier 2	N/A	N/A	ls_00_Gas
Renovation Rehab MFHR - DHW Tier 3	N/A	N/A	ls_00_Gas

RRsp Note: Realization rate is 100% since gross savings values are based on evaluation results.

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Renovation Rehab MFHR - DHW Tier 1 Renovation Rehab MFHR - DHW Tier 2 Renovation Rehab MFHR - DHW Tier 3					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Renovation Rehab Multifamily High Rise Heating, Gas	0.48	0.02	0.03	0.58

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Renovation Rehab MFHR - DHW Tier 1		
Renovation Rehab MFHR - DHW Tier 2		
Renovation Rehab MFHR - DHW Tier 3		

Steam boiler

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Boiler **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Steam boiler	Gas Commercial & Industrial Large C&I New Construction Steam boiler

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Steam boiler	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Steam boiler	multi

Measure	ISR	RRe Gas	RRe Electric
Steam boiler	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Steam boiler	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Steam boiler	Calc			$-0.068	

NTG Note: Massachusetts Common Assumption

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Steam boiler	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

NTG Note: Massachusetts Common Assumption

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Steam boiler	$40.00 / therm	Incentive: $25.00 / therm

Steam Trap

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Hot Water | **Measure Type:** Steam Traps | **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Steam Trap	Gas Commercial & Industrial Large C&I New Construction Steam Trap

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Steam Trap	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Steam Trap	3

Measure Life Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Measure	ISR	RRe Gas	RRe Electric
Steam Trap	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Steam Trap	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Steam Trap	Calc			$-0.531	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Steam Trap	0.00	0.00	0.00	1.00

NTG Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Steam Trap		

Steamer, Upstream

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Food Service

Measure Type: Upstream Cooking Equipment

Measure Sub Type: Steamer

Program: Large C&I New Construction

Measure Description

The installation of an ENERGY STAR® rated natural-gas fired steamer, either connectionless or steam-generator design, with heavy-load cooking efficiency of at least 38%. Qualified steamers reduce heat loss due to better insulation, improved heat exchange, and more efficient steam delivery systems.

Baseline Description

The baseline efficiency case is a steamer with a 15% cooking efficiency. These performance parameters are drawn from a sample of economy grade equipment tested by the Food Service Technology Center based on ASTM F1484.

Measures

Measure Name	Unique Identifier
Steamer, Upstream	Gas Commercial & Industrial Large C&I New Construction Steamer, Upstream

Savings Principle

The high efficiency case is an ENERGY STAR® rated natural-gas fired steamer, with a tested heavy-load cooking efficiency of at least 38% utilizing ASTM F1484.

Savings Method

Deemed

Unit

Installed high-efficiency gas-fired steamer.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: 4380

Hours Source: Environmental Protection Agency (2011). Savings Calculator for ENERGY Star Qualified Commercial Kitchen Equipment: Steam Cooker Calcs. Accessed on 10/12/2011.

Hours Note: The deemed savings assumes 4,380 annual operating hours (12 hours a day * 365 days/year).

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Steamer, Upstream			24.00		

Gas Other MMBtu Source: DNV (2023). Kitchen Equipment ISP Study.

Energy Impact Factors

Measure	Measure Life
Steamer, Upstream	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure	ISR	RRe Gas	RRe Electric
Steamer, Upstream	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: 100% realization rates are assumed because savings are based on researched assumptions by FSTC.

Measure	RR sp	RR wp	Loadshape ID
Steamer, Upstream	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Steamer, Upstream	103563			$38.453	

Water Source: Energy Star Calculator - New Baselines and Efficiencies 082721.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Steamer, Upstream	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Steamer, Upstream	$8.00 / therm	Incentive: $4.86 / therm

Ventilation Reduction

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Building Shell **Measure Type:** Ventilation **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Ventilation Reduction	Gas Commercial & Industrial Large C&I New Construction Ventilation Reduction

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Ventilation Reduction	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Ventilation Reduction	multi

Measure	ISR	RRe Gas	RRe Electric
Ventilation Reduction	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Ventilation Reduction	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Ventilation Reduction	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Ventilation Reduction	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Ventilation Reduction		

VSDs

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** VSD **Measure Sub Type:** Heating

Program: Large C&I New Construction

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
VSDs - Non-HVAC	Gas Commercial & Industrial Large C&I New Construction VSDs - Non-HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
VSDs - Non-HVAC	Calc	Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
VSDs - Non-HVAC	multi

Measure	ISR	RRe Gas	RRe Electric
VSDs	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
VSDs - Non-HVAC	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
VSDs - Non-HVAC	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VSDs	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VSDs - Non-HVAC		

WATER HEATER - INDIRECT

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Water Heater

Measure Sub Type: Indirect Water Heater

Program: Large C&I New Construction

Measure Description

The installation of a an indirect water heater that uses a storage tank that is heated by the main boiler. The energy stored by the water tank allows the boiler to turn off and on less often. This measure applies to small commercial indirect systems comprising a boiler with input heating capacity less than 300,000 Btu/h and greater than or equal to 4,000 Btu/h per gallon of stored water.

Baseline Description

The baseline efficiency case assumes space heating boiler operating at 85% AFUE.A baseline storage water heater was assumed for purposed of estimating standby losses.

Measures

Measure Name	Unique Identifier
WATER HEATER - INDIRECT	Gas Commercial & Industrial Large C&I New Construction WATER HEATER - INDIRECT

Savings Principle

The high efficiency case assumes space heating boiler operating at 90% AFUE.

Savings Method

Deemed based on algorithm

Unit

Installed high-efficiency water heater.

Savings Equation

ΔMMBtu = units * [(GPD*365*8.33*(T_set-T_main)/1,000,000)*(1/Eff_baseline - 1/Eff_ee)+ (UA_baseline/Eff_baseline - UA_ee/Eff_ee)*(T_set-T_amb)/1,000,000)*8,760]

Where:

ΔMMBtu = Annual fossil fuel energy savings

Units = number of measures installed underthe program

GPD = Gallons per day, 154 (1)

Tmain = Average temperature of supply water temperature in water main, 55.7°F (2)

Tamb = Average surrounding ambient air temperature, 70°F

Tset = Average water heater set point temperature, 140°F (3)

Eff baseline = Boiler space heating baseline condition, 85% AFUE (4)

Eff ee = Boiler space heating energy efficiency condition, 90% AFUE (5)

UAbaseline = Overall heat loss coefficient (BTU/h-°F), 15 (6)

365 = Days in one year

8.33 = Energy required (BTU) to heat onegallon of water by one-degree Fahrenheit

1,000,000 = Conversion factor, on MMBtu equals 1,000,000 Btu

8,760 = Hours per year

(1)DNV GL, Inc (2019) Impact Evaluation of Commercial Water Heaters: Baseline Adjustment Memo Including Consumption Estimates. Table 3. Weighted using 2018 Commercial Buildings Energy Consumption Survey

(2) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Table 7.4.1 Weighted Average Annual Main Water Temperature by Census Division and Building Type (Non-education Buildings in New England.)https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf

(3) OSHA notes that water heatertemperatures below 140° F may lead to Legionella bacterial growth (https://www.osha.gov/legionnaires-disease/control-prevention)

(4) DNVGL,NMR Group, 2017, Gas Boiler Market Characterization

(5) Average value based on AHRI Indirect Water Heater data.

(6)Average value based on AHRI Indirect Water Heater data.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
WATER HEATER - INDIRECT		10.00			

Gas DHW MMBtu Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
WATER HEATER - INDIRECT	15

Measure Life Source: GDS Associates, Inc. and Summit Blue Consulting (2009), Natural Gas Energy Efficiency Potential in Massachusetts, Appendix B-2,

Measure	ISR	RRe Gas	RRe Electric
WATER HEATER - INDIRECT	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
WATER HEATER - INDIRECT	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
WATER HEATER - INDIRECT				$0.822	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WATER HEATER - INDIRECT	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WATER HEATER - INDIRECT	$33.65 / therm	Incentive: $21.03 / therm

Water Heating Boiler

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** DHW **Measure Sub Type:** Hot water boiler

Program: Large C&I New Construction

Measure Description

The installation of a high efficiency natural gas fired DHW boilers. High efficiency boilers take advantage of improved design to achieve improved efficiency.

Baseline Description

The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2024. Table 11 in Appendix A details the specific efficiency requirements by equipment type and capacity.

Measures

Measure Name	Unique Identifier
Water Heating Boiler - 85% TE Water Heating Boiler - 92% TE Water Heating Boiler - 94% TE	Gas Commercial & Industrial Large C&I New Construction Water Heating Boiler - 85% TE Gas Commercial & Industrial Large C&I New Construction Water Heating Boiler - 92% TE Gas Commercial & Industrial Large C&I New Construction Water Heating Boiler - 94% TE

Savings Principle

The high efficiency case assumes a gas-fired boiler that meets or exceeds 85% efficiency, 92% efficiency, and 94% efficiency, respectively.

Savings Method

Deemed

Unit

Installed high-efficiency DHW boiler

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Water Heating Boiler - 85% TE		0.19			
Water Heating Boiler - 92% TE		0.47			
Water Heating Boiler - 94% TE		0.61			

Energy Impact Factors

Measure	Measure Life
Water Heating Boiler - 85% TE Water Heating Boiler - 92% TE Water Heating Boiler - 94% TE	20

Measure Life Source: MA19C02-B-EUL - C&I Measure Life Report. https://ma-eeac.org/wp-content/uploads/MA19C02_B_EUL-final-report-03_31_20-v2.pdf

Measure	ISR	RRe Gas	RRe Electric
Water Heating Boiler	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Water Heating Boiler - 85% TE	N/A	N/A	ls_00_Gas
Water Heating Boiler - 92% TE	N/A	N/A	ls_00_Gas
Water Heating Boiler - 94% TE	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Water Heating Boiler - 85% TE				$-0.950	
Water Heating Boiler - 92% TE				$-0.950	
Water Heating Boiler - 94% TE				$-0.950	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Water Heating Boiler	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Water Heating Boiler - 85% TE Water Heating Boiler - 92% TE Water Heating Boiler - 94% TE	$17.00 / therm	$10.81 / therm

Large C&I Retrofit, Gas

Boiler Reset

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Boiler Control

Program: Large C&I Retrofit

Measure Description

Boiler reset controls are devices that improve the efficiency of an existing boiler system by modulating the hot water temperature set point. Reset controls automatically control boiler water temperature based on outdoor temperature using a software program; load controls sense the thermal demand of the heating system and resets the water temperature based on the demand.

Baseline Description

The baseline efficiency case is a boiler without reset or load controls.

Measures

Measure Name	Unique Identifier
Boiler Reset - Multi-Stage	Gas Commercial & Industrial Large C&I Retrofit Boiler Reset - Multi-Stage
Boiler Reset - One-Stage	Gas Commercial & Industrial Large C&I Retrofit Boiler Reset - One-Stage

Savings Principle

The efficient case is a boiler with reset or load controls, which reset the supply water temperature based on outdoor temperatures and/or building load.

Savings Method

Deemed

Unit

Installation of boiler reset control on existing boiler.

Savings Equation

Gross Gas MMBtu = units * (kBTU/h_in/1,000) * EFLH_heating *ESF

Gross Gas MMBtu = 1 * (533 kBTU/h_in/1,000)* 1400 hrs * 5% = 37.3

Where:

Units = Number of measures installed under the program

kBTU/h_in = Fuel input rating (kBTU/h) of the controlled boiler, 533 kBTU/h (1)

EFLH_heating = Heating equivalent full-load hours, 1,400 hours (2)

ESF = Energy Savings Factor, 5% (3)

1,000 = Conversion factor, one MMBtu equals 1,000 kBTU

(1) MA Assumption of weighted boiler input capacity based on Eversource programdata

(2) KEMA (2012). Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Progam Administrators; page 1-2.

(3) GDS Associates, Inc. (2009). Natural Gas Energy Efficiency Potential In Massachustts. Study Assumes5% savings factor.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	37.30				
Boiler Reset - Multi-Stage					
Boiler Reset - One-Stage					

Gas Heat MMBtu Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Boiler Reset - Multi-Stage	15
Boiler Reset - One-Stage	

Measure Life Source: ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.https://www.aceee.org/files/pdf/2006_BoilerControls.pdf

Measure	ISR	RRe Gas	RRe Electric
Boiler Reset	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Boiler Reset - Multi-Stage	N/A	N/A	ls_00_Gas
Boiler Reset - One-Stage	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Boiler Reset - Multi-Stage				$6.163	
Boiler Reset - One-Stage				$6.163	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler Reset	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler Reset - Multi-Stage		
Boiler Reset - One-Stage		

Boiler, 95% AFUE < 300 MBU

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Heating **Measure Sub Type:** Boiler

Program: Large C&I Retrofit

Measure Description

The installation of a high efficiency natural gas fired condensing boilers. High efficiency boilers take advantage of improved design, sealed combustion and condensing flue gases in a second heat exchanger to achieve improved efficiency. (Only condensingboilers are offered as prescriptive measures. Program incentives for other boiler types are offered through the custom program.)

Baseline Description

The baseline efficiency assumes compliance with the International Energy Conservation Code (IECC) 2024. Table 11 in Appendix A details the specific efficiency requirements by equipment type and capacity.

Measures

Measure Name	Unique Identifier
Boiler, 95% AFUE < 300 MBU	Gas Commercial & Industrial Large C&I Retrofit Boiler, 95% AFUE < 300 MBU

Savings Principle

The high efficiency case assumes a gas-fired boiler that exceeds the efficiency levels required by Rhode Island State Building Code. Actual site efficiencies should be determined on a case-by-case basis.

Savings Method

Deemed

Unit

Installed high-efficiency condensing boiler

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Boiler, 95% AFUE < 300 MBU	27.20				

Energy Impact Factors

Measure	Measure Life
Boiler, 95% AFUE < 300 MBU	20

Measure Life Source: MA19C02-B-EUL - C&I Measure Life Report. https://ma-eeac.org/wp-content/uploads/MA19C02_B_EUL-final-report-03_31_20-v2.pdf

Measure	ISR	RRe Gas	RRe Electric
Boiler, 95% AFUE < 300 MBU	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Boiler, 95% AFUE < 300 MBU	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Boiler, 95% AFUE < 300 MBU				$6.163	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler, 95% AFUE < 300 MBU	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler, 95% AFUE < 300 MBU		

Building operator certification

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Whole Building **Measure Type:** BOC Training **Measure Sub Type:** Certification

Program: Large C&I Retrofit

Measure Description

The Building Operator Certification (BOC) class improves operators' ability to optimize / minimize gas and electricity use in buildings.

Baseline Description

The base case is a building operator without specific training on efficient use of gas and electricity in buildings.

Measures

Measure Name	Unique Identifier
Building operator certification	Gas Commercial & Industrial Large C&I Retrofit Building operator certification

Savings Principle

The high efficiency case is a building operator attending a class on improving the efficiency of gas and electricity use in buildings.

Savings Method

Deemed

Unit

MMBTU /SF/BOC completion

Savings Equation

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Building operator certification	0.00				

Gas Heat MMBtu Source: Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts PAs and EEAC

Energy Impact Factors

Measure	Measure Life
Building operator certification	5

Measure Life Source: Navigant Consulting (2015). Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on Building Operator Certification. Prepared for the Massachusetts PAs and EEAC

Measure	ISR	RRe Gas	RRe Electric
Building operator certification	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Building operator certification	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Building operator certification					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building operator certification	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building operator certification		

Building Shell

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Building Shell **Measure Type:** Whole Building **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Building Shell	Gas Commercial & Industrial Large C&I Retrofit Building Shell

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Building Shell	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Building Shell	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Building Shell	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Building Shell	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Building Shell	Calc			$3.352	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building Shell	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building Shell		

Comprehensive Design

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Whole Building | **Measure Type:** Whole Building | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Comprehensive Design - CD	Gas Commercial & Industrial Large C&I Retrofit Comprehensive Design - CD
Comprehensive Design - CDA	Gas Commercial & Industrial Large C&I Retrofit Comprehensive Design - CDA

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc	Calc	Calc	Calc	
Comprehensive Design - CD					Calc
Comprehensive Design - CDA					Calc

Energy Impact Factors

Measure	Measure Life
Comprehensive Design - CD	multi
Comprehensive Design - CDA	

Measure	ISR	RRe Gas	RRe Electric
Comprehensive Design	1.00	0.97	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Comprehensive Design - CD	N/A	N/A	ls_00_Gas
Comprehensive Design - CDA	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
	Calc				
Comprehensive Design - CD					
Comprehensive Design - CDA					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Comprehensive Design	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Comprehensive Design - CD		
Comprehensive Design - CDA		

Comprehensive Retrofit

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Whole Building | **Measure Type:** Whole Building | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Comprehensive Retrofit	Gas Commercial & Industrial Large C&I Retrofit Comprehensive Retrofit

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Comprehensive Retrofit	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Comprehensive Retrofit	multi

Measure	ISR	RRe Gas	RRe Electric
Comprehensive Retrofit	1.00	0.97	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: National Grid assumption based on regional PA working groups.

Measure	RR sp	RR wp	Loadshape ID
Comprehensive Retrofit	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Comprehensive Retrofit	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Comprehensive Retrofit	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Comprehensive Retrofit		

Condensing Boiler

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Boiler | **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Condensing Boiler - All Condensing Boiler - Seasonal Condensing Boiler - Year Round	Gas Commercial & Industrial Large C&I Retrofit Condensing Boiler - All Gas Commercial & Industrial Large C&I Retrofit Condensing Boiler - Seasonal Gas Commercial & Industrial Large C&I Retrofit Condensing Boiler - Year Round

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc	Calc	Calc	Calc	
Condensing Boiler - All					Calc
Condensing Boiler - Seasonal					Calc
Condensing Boiler - Year Round					Calc

Energy Impact Factors

Measure	Measure Life
Condensing Boiler - All Condensing Boiler - Seasonal Condensing Boiler - Year Round	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Condensing Boiler	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Condensing Boiler - All	N/A	N/A	ls_00_Gas
Condensing Boiler - Seasonal	N/A	N/A	ls_00_Gas
Condensing Boiler - Year Round	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
	Calc				
Condensing Boiler - All				$-0.468	
Condensing Boiler - Seasonal				$-0.697	
Condensing Boiler - Year Round				$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Condensing Boiler	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Condensing Boiler - All		
Condensing Boiler - Seasonal		
Condensing Boiler - Year Round		

Custom Other

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Other | **Measure Type:** Whole Building | **Measure Sub Type:** Whole Building

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Custom Other	Gas Commercial & Industrial Large C&I Retrofit Custom Other

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Custom Other	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Custom Other	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Custom Other	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Other	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Custom Other	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Other	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Other	$50.00 / therm	Incentive: $25.00 / therm

Custom Weatherization

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Whole Building | **Measure Type:** Weatherization | **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Custom Weatherization	Gas Commercial & Industrial Large C&I Retrofit Custom Weatherization

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Custom Weatherization		Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Custom Weatherization	10,15,20

Measure	ISR	RRe Gas	RRe Electric
Custom Weatherization	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Custom Weatherization	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Custom Weatherization	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Custom Weatherization	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Custom Weatherization		

Domestic Hot Water

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Hot Water | **Measure Type:** DHW | **Measure Sub Type:** Year round

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Domestic Hot Water	Gas Commercial & Industrial Large C&I Retrofit Domestic Hot Water

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Domestic Hot Water	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Domestic Hot Water	5,10,15

Measure	ISR	RRe Gas	RRe Electric
Domestic Hot Water	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Domestic Hot Water	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Domestic Hot Water	Calc			$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Domestic Hot Water	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Domestic Hot Water		

ERV

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: HVAC

Measure Type: Upstream

Measure Sub Type: Energy Recovery Ventilator

Program: Large C&I Retrofit

Measure Description

Installation of a gas fired heated air system with ERV ≥60% total effectiveness.

Baseline Description

The baseline is a gas fired heating system without ERV.

Measures

Measure Name	Unique Identifier
ERV - Rotary Wheel UPSTR	Gas Commercial & Industrial Large C&I Retrofit ERV - Rotary Wheel UPSTR
ERV - Fixed Plate UPSTR	Gas Commercial & Industrial Large C&I Retrofit ERV - Fixed Plate UPSTR

Savings Principle

The high efficiency case is a gas fired heated air system with ERV ≥60% total effectiveness.

Savings Method

Calc

Unit

Installed gas fired heating system with ERV.

Savings Equation

Unit Peak kWh Savings =((4.5*CFM*deltah_cooling)*(1/EER*ERV_E)/1000 - (CFM*PD/6356/Eff_Motor/Eff_fan*0.746*2)*CF

Unit Dth Savings per Year = (4.5*CFM*deltah_heating)/η*((HDD65*24)/(T_indoor-T_design))*(Hours/24))/1,000,000*ERV_E*0.75

Where:

CF = Coincidence Factor = 0.9

CFM=Outside Air Flow in cubic feet per minute

EER = Provided by customer. If SEER provided, SEER*0.875. If value, not provided use default values in Table 4.

Eff_Fan = Efficiency of fan. Provided by customer. If value not provided assume 0.705.

Eff_Motor = Efficiency of motor. Provided by customer. If value not provided assume 0.855.

ERV_E = Total Energy Effectiveness of ERV. Provided by manufacturer/customer. If values not provided, fixedplate - sensible heat only = 0.355, fixed plate - sensible&latent heat =0.577, fixedplate - unk = 0.466, rotarywheel = 0.647, heatpipe = 0.31.

Hours = Hours of operation, per day. Provided by customer. If none provided, assume 12.

HDD65 = Heating Degree Days see table 1 (ref3)

PD = Additional pressure drop through heat exchanger, inches of water column. Provided by customer. If value is not provided, fixedplate - sensible heat only = 0.00035, fixedplate-sensible&latentheat = 0.00074, fixedplate-unk = 0.00055, rotarywheel = 0.00012, heatpipe=0.00011.

T_indoor = Customer provided indoor heating conditioned space temperature in degreesF

η= Efficiency of heating equipment. Assume r0.8 unless different efficiency is provided by customer.

deltah_cooling = difference in enthalpies (btu/lb) between the design day cooling enthalpy and exhaust air heat exchanger inlet enthalpy.

deltah_heating = difference in enthalpies (btu/lb) between the exhaust air heat exchanger inlet enthalpy and design day heating enthalpy.

1,000 = conversion factor of watts per kWh

1,000,000 = conversion factor for BTU to Dth

0.75 = factor to account for prevention of freezing of condensate. Control strategies incorporate full air flow by-pass or other strategies that reduce the number of hours of operation at lower temperatures,multiply ERE_E by 0.75 if not adjusted by manufacturer or customer.

See MN TRM 3.1 for more detail.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc				Calc
ERV - Rotary Wheel UPSTR					
ERV - Fixed Plate UPSTR					

Electric kWh Note: It is assumed cooling savings are equal to the increased fan energy usage.

Energy Impact Factors

Measure	Measure Life
ERV - Rotary Wheel UPSTR	15
ERV - Fixed Plate UPSTR	

Measure Life Source: FEMP (2004). Demand-Control Ventilation Using CO2 Sensors. https://p2infohouse.org/ref/43/42844.pdf

Measure	ISR	RRe Gas	RRe Electric
ERV	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
ERV - Rotary Wheel UPSTR	1.00	1	ls_119_Gas
ERV - Fixed Plate UPSTR	1.00	1	ls_119_Gas

RRwp Note: Realization rate is 100% since gross savings values are based on evaluation results.

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
ERV - Rotary Wheel UPSTR					
ERV - Fixed Plate UPSTR					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
ERV	0.33	0.08	0.00	0.75

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
ERV - Rotary Wheel UPSTR		
ERV - Fixed Plate UPSTR		

Faucet aerator

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** Faucet Aerator

Program: Large C&I Retrofit

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.

Baseline Description

The baseline efficiency case is a 2.2 GPM faucet.

Measures

Measure Name	Unique Identifier
Faucet aerator	Gas Commercial & Industrial Large C&I Retrofit Faucet aerator

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less aerator installed.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Faucet aerator		1.70			

Gas DHW MMBtu Source: GDS Associates, Inc. and Summit Blue Consulting (2009), Natural Gas Energy Efficiency Potential in Massachusetts, Appendix B-2,

Energy Impact Factors

Measure	Measure Life
Faucet aerator	3

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Faucet aerator	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Faucet aerator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Faucet aerator	5460			$0.833	

Water Source: Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Faucet aerator	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Faucet aerator		

Food Service

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Food Service | **Measure Type:** Food Service | **Measure Sub Type:** Year round

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Food Service	Gas Commercial & Industrial Large C&I Retrofit Food Service

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Food Service	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Food Service	12

Measure Life Source: Robert Mowris & Associates (2005). Ninth Year Retention Study of the 1995 Southern California Gas Company Commercial New Construction Program. https://www.caetrm.com/media/reference-documents/Ninth_Year_Retention_Study_No_718A_for_1995_SCG_CNC_Program.pdf

Measure Life Note: Assume 1/3 of measure life

Measure	ISR	RRe Gas	RRe Electric
Food Service	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Food Service	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Food Service	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Food Service	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Food Service		

Furnace

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Furnace | **Measure Sub Type:** Blend

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Furnace - All Furnace - Seasonal Furnace - Year Round	Gas Commercial & Industrial Large C&I Retrofit Furnace - All Gas Commercial & Industrial Large C&I Retrofit Furnace - Seasonal Gas Commercial & Industrial Large C&I Retrofit Furnace - Year Round

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Furnace - All	Calc			Calc	Calc
Furnace - Seasonal		Calc		Calc	Calc
Furnace - Year Round			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Furnace - All Furnace - Seasonal Furnace - Year Round	multi

Measure	ISR	RRe Gas	RRe Electric
Furnace	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Furnace - All	N/A	N/A	ls_00_Gas
Furnace - Seasonal	N/A	N/A	ls_00_Gas
Furnace - Year Round	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Furnace - All	Calc			$-0.468	
Furnace - Seasonal	Calc			$-0.697	
Furnace - Year Round	Calc			$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Furnace	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Furnace - All		
Furnace - Seasonal		
Furnace - Year Round		

Heat Pump

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Heat pump | **Measure Sub Type:** Blend

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Heat Pump	Gas Commercial & Industrial Large C&I Retrofit Heat Pump

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heat Pump	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Heat Pump	multi

Measure	ISR	RRe Gas	RRe Electric
Heat Pump	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Heat Pump	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heat Pump	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Pump	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Pump		

Heat Recovery

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Heat Recovery | **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Heat Recovery - Seasonal	Gas Commercial & Industrial Large C&I Retrofit Heat Recovery - Seasonal
Heat Recovery - Year Round	Gas Commercial & Industrial Large C&I Retrofit Heat Recovery - Year Round
Heat Recovery - All	Gas Commercial & Industrial Large C&I Retrofit Heat Recovery - All

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heat Recovery - Seasonal	Calc			Calc	Calc
Heat Recovery - Year Round		Calc		Calc	Calc
Heat Recovery - All			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Heat Recovery - Seasonal	10,15,20
Heat Recovery - Year Round	
Heat Recovery - All	

Measure	ISR	RRe Gas	RRe Electric
Heat Recovery	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Heat Recovery - Seasonal	N/A	N/A	ls_00_Gas
Heat Recovery - Year Round	N/A	N/A	ls_00_Gas
Heat Recovery - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heat Recovery - Seasonal	Calc			$-0.697	
Heat Recovery - Year Round	Calc			$3.643	
Heat Recovery - All	Calc			$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Recovery	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Recovery - Seasonal	$60.00 / therm	$29.00 / therm
Heat Recovery - Year Round	$60.00 / therm	$29.00 / therm
Heat Recovery - All	$60.00 / therm	$29.00 / therm

HVAC

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** HVAC | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
HVAC - Controls and EMS	Gas Commercial & Industrial Large C&I Retrofit HVAC - Controls and EMS
HVAC - Equipment	Gas Commercial & Industrial Large C&I Retrofit HVAC - Equipment

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
		Calc	Calc	Calc	
HVAC - Controls and EMS					Calc
HVAC - Equipment					Calc

Energy Impact Factors

Measure	Measure Life
HVAC - Controls and EMS	10,15
HVAC - Equipment	10 15

Measure	ISR	RRe Gas	RRe Electric
HVAC	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
HVAC - Controls and EMS	N/A	N/A	ls_00_Gas
HVAC - Equipment	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
HVAC - Controls and EMS	Calc			$0.427	
HVAC - Equipment	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC - Controls and EMS	$60.00 / therm	$30.00 / therm
HVAC - Equipment	$60.00 / therm	$30.00 / therm

HVAC insulation

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** HVAC | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
HVAC insulation	Gas Commercial & Industrial Large C&I Retrofit HVAC insulation

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
HVAC insulation		Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
HVAC insulation	10,15,20

Measure	ISR	RRe Gas	RRe Electric
HVAC insulation	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
HVAC insulation	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
HVAC insulation	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC insulation	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC insulation		

Low Flow Cooking Spray Nozzle

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Food Service **Measure Type:** **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.6 GPM.

Baseline Description

The baseline efficiency case is a standard efficiency cooking spray valve.

Measures

Measure Name	Unique Identifier
Low Flow Cooking Spray Nozzle	Gas Commercial & Industrial Large C&I Retrofit Low Flow Cooking Spray Nozzle

Savings Principle

The high efficiency case is a low flow pre-rinse spray valve for cooking equipment with an average flow rate of 1.6 GPM.

Savings Method

Deemed

Unit

Installed cooking low flow pre-rinse spray valve.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low Flow Cooking Spray Nozzle		11.40			

Gas DHW MMBtu Source: DNV GL (2014)Impact Evaluation of Massachusetts Prescriptive Gas Pre-Rinse Spray Valve Measure

Energy Impact Factors

Measure	Measure Life
Low Flow Cooking Spray Nozzle	3

Measure Life Note: Based on MA EUL assumptions

Measure	ISR	RRe Gas	RRe Electric
Low Flow Cooking Spray Nozzle	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Low Flow Cooking Spray Nozzle	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low Flow Cooking Spray Nozzle	6410				

Water Source: DNV GL (2014)Impact Evaluation of Massachusetts Prescriptive Gas Pre-Rinse Spray Valve Measure

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low Flow Cooking Spray Nozzle	0.07	0.00	0.16	1.09

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low Flow Cooking Spray Nozzle		

Low-Flow Showerhead

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Showerhead

Program: Large C&I Retrofit

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas.

Baseline Description

The baseline efficiency case is a 2.5 GPM showerhead.

Measures

Measure Name	Unique Identifier
Low-Flow Showerhead	Gas Commercial & Industrial Large C&I Retrofit Low-Flow Showerhead

Savings Principle

The high efficiency case is a 1.5 GPM showerhead.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low-Flow Showerhead		2.65			

Energy Impact Factors

Measure	Measure Life
Low-Flow Showerhead	10

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Low-Flow Showerhead	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Low-Flow Showerhead	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low-Flow Showerhead	7300			$0.833	

Water Source: Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low-Flow Showerhead	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low-Flow Showerhead		

Non-Condensing Boiler

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Boiler | **Measure Sub Type:** Blend

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Non-Condensing Boiler - Seasonal	Gas Commercial & Industrial Large C&I Retrofit Non-Condensing Boiler - Seasonal
Non-Condensing Boiler - All	Gas Commercial & Industrial Large C&I Retrofit Non-Condensing Boiler - All
Non-Condensing Boiler - Year Round	Gas Commercial & Industrial Large C&I Retrofit Non-Condensing Boiler - Year Round

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Non-Condensing Boiler - Seasonal	Calc			Calc	Calc
Non-Condensing Boiler - All		Calc		Calc	Calc
Non-Condensing Boiler - Year Round			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Non-Condensing Boiler - Seasonal	5,10,15,20,25
Non-Condensing Boiler - All	
Non-Condensing Boiler - Year Round	

Measure	ISR	RRe Gas	RRe Electric
Non-Condensing Boiler	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Non-Condensing Boiler - Seasonal	N/A	N/A	ls_00_Gas
Non-Condensing Boiler - All	N/A	N/A	ls_00_Gas
Non-Condensing Boiler - Year Round	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Non-Condensing Boiler - Seasonal	Calc			$-0.697	
Non-Condensing Boiler - All	Calc			$-0.468	
Non-Condensing Boiler - Year Round	Calc			$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Non-Condensing Boiler	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Non-Condensing Boiler - Seasonal		
Non-Condensing Boiler - All		
Non-Condensing Boiler - Year Round		

Operation & Maintenance

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Process | **Measure Type:** O&M | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Operation & Maintenance	Gas Commercial & Industrial Large C&I Retrofit Operation & Maintenance

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Operation & Maintenance	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Operation & Maintenance	1,2,3,4,5

Measure	ISR	RRe Gas	RRe Electric
Operation & Maintenance	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Operation & Maintenance	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Operation & Maintenance	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Operation & Maintenance	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Operation & Maintenance	$25.00 / therm	Incentive: $11.50 / therm

Other Gas

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Other | **Measure Type:** Other | **Measure Sub Type:**

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Other Gas - Seasonal	Gas Commercial & Industrial Large C&I Retrofit Other Gas - Seasonal
Other Gas - Year Round	Gas Commercial & Industrial Large C&I Retrofit Other Gas - Year Round
Other Gas - All	Gas Commercial & Industrial Large C&I Retrofit Other Gas - All

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Other Gas - Seasonal	Calc			Calc	Calc
Other Gas - Year Round		Calc		Calc	Calc
Other Gas - All			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Other Gas - Seasonal Other Gas - Year Round Other Gas - All	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Other Gas	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Other Gas - Seasonal	N/A	N/A	ls_00_Gas
Other Gas - Year Round	N/A	N/A	ls_00_Gas
Other Gas - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Other Gas - Seasonal	Calc			$-0.697	
Other Gas - Year Round	Calc			$3.643	
Other Gas - All	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Other Gas	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Other Gas - Seasonal	$68.00 / therm	$32.00 / therm
Other Gas - Year Round		
Other Gas - All		

Pre-rinse spray valve

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Flow Control | **Measure Sub Type:** Low Flow Spray Valve

Program: Large C&I Retrofit

Measure Description

Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.1 GPM.

Baseline Description

The baseline efficiency case is a 1.6 GPM spray valve.

Measures

Measure Name	Unique Identifier
Pre-rinse spray valve	Gas Commercial & Industrial Large C&I Retrofit Pre-rinse spray valve

Savings Principle

The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.1 GPM.

Savings Method

Deemed based on algorithm

Unit

Installed pre-rinse spray valve.

Savings Equation

ΔkWh = units * [(GPM_baseline - GPM_ee) *Hrs * 60* (T_PRSV- T_main)*8.33/(3,412 BTU/kWh* Eff_gas)]

ΔMMBtu = units * [(GPM_baseline - GPM_ee) *Hrs * 60* (T_PRSV- T_main)*8.33/(1,000,000 BTU/MMBtu * Eff_gas)]

Where:

Units = number of measures installed under the program

GPM_baseline = Flow rate of existing PRSV, default 1.6 GPM (1)

GPM_ee = Flow rate of high efficiency installed PRSV, default 1.1 GPM (2)

Eff_gas = Water heater efficiency (natural gas), default 80% Et (3)

Eff_elec = Water heater efficiency (electric), default 98% Et (3)

T_PRSV = Average end-use temperature (°F), default 108°F (4)

T_main = Supply water temperature in water main (°F), default 55.7°F (5)

Hrs = Annual operating hours of PRSV, default 333 hrs (6)

60 = minutes per hour

8.33= Energy required (BTU) to heat one gallon of water by one-degree Fahrenheit

365 = Days in one year

1,000,000 = Conversion factor, on MMBtu equals 1,000,000 BTU

(1) Federal Standard – PRSV manufactured on or after January 1, 2006, and before January 28,2019, shall have a flow rate of not more than 1.6 gallons per minute; https://www.epa.gov/watersense/pre-rinse-spray-valves

(2) Based on program maximum flow rate.

(3) 2022-05 Final Determination Technical Support Document Energy Conservation Program forConsumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Page 7-8. https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf

(4) 2022-05 Final Determination Technical Support Document Energy Conservation Program for

Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse

Spray Valves. Page 7-7 (based on 5 field studies) https://downloads.regulations.gov/EERE-2019-

BT-STD-0034-0020/content.pdf

(5) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Table 7.4.1 Weighted Average Annual Main Water Temperature by Census Division and Building Type (Non-education Buildings in New England.) https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf Based on Burch, J., and C. Christensen. Towards Development of an Algorithm for Mains Water Temperature. 2007. Proceedings of the2007 ASES Annual Conference: Cleveland, OH.

(6) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Table 7.2.3 Weighted Average Annual CPSV Operating Time (Weighted Average Operating Time Across Building Types) https://downloads.regulations.gov/EERE-2019-BT-STD 0034-0020/content.pdf

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pre-rinse spray valve		5.00			

Gas DHW MMBtu Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Pre-rinse spray valve	5

Measure Life Source: U.S. Dept of Energy (2015). Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. https://www.regulations.gov/document/EERE-2014-BT-STD-0027-0050

Measure	ISR	RRe Gas	RRe Electric
Pre-rinse spray valve	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Pre-rinse spray valve	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pre-rinse spray valve	6410			$0.833	

Water Source: DNV GL (2014)Impact Evaluation of Massachusetts Prescriptive Gas Pre-Rinse Spray Valve Measure

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pre-rinse spray valve	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pre-rinse spray valve		

Process

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Process | **Measure Type:** Process | **Measure Sub Type:** Year round

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Process	Gas Commercial & Industrial Large C&I Retrofit Process

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Process	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Process	5,10

Measure	ISR	RRe Gas	RRe Electric
Process	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Process	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Process	Calc			$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process		

Programmable thermostat

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** Thermostat

Program: Large C&I Retrofit

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable thermostat	Gas Commercial & Industrial Large C&I Retrofit Programmable thermostat

Savings Principle

The high efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat installed.

Savings Method

Deemed

Unit

Installed programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable thermostat	3.20				

Gas Heat MMBtu Source: DNV-GL (2017). MA45 Prescriptive Programmable Thermostats. http://rieermc.ri.gov/wp-content/uploads/2018/03/ma45-phase-2-programmable-thermostat-final-memo_170317.pdf

Energy Impact Factors

Measure	Measure Life
Programmable thermostat	15

Measure Life Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable thermostat	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable thermostat	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable thermostat				$6.163	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable thermostat	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable thermostat	$44.00 / therm	Incentive: $20.00 / therm

Programmable Thermostat, Custom

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Large C&I Retrofit

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable Thermostat, Custom	Gas Commercial & Industrial Large C&I Retrofit Programmable Thermostat, Custom

Savings Principle

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable Thermostat, Custom	3.20				

Gas Heat MMBtu Source: DNV-GL (2017). MA45 Prescriptive Programmable Thermostats. http://rieermc.ri.gov/wp-content/uploads/2018/03/ma45-phase-2-programmable-thermostat-final-memo_170317.pdf

Energy Impact Factors

Measure	Measure Life
Programmable Thermostat, Custom	15

Measure Life Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable Thermostat, Custom	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Programmable Thermostat, Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable Thermostat, Custom				$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable Thermostat, Custom	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable Thermostat, Custom		

Steam Trap HVAC

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Steam Traps **Measure Sub Type:** Steam Trap

Program: Large C&I Retrofit

Measure Description

The repair or replacement of malfunctioning steam traps in systems with an operating pressure greater than 15 psig.

Baseline Description

The baseline efficiency case is a failed steam trap.

Measures

Measure Name	Unique Identifier
Steam Trap HVAC - High Pressure	Gas Commercial & Industrial Large C&I Retrofit Steam Trap HVAC - High Pressure
Steam Trap HVAC - Low Pressure	Gas Commercial & Industrial Large C&I Retrofit Steam Trap HVAC - Low Pressure

Savings Principle

The high efficiency case is a repaired or replaced steam trap.

Savings Method

Deemed

Unit

Repaired or replaced steam trap.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Steam Trap HVAC - High Pressure		35.60			
Steam Trap HVAC - Low Pressure	8.40				

Energy Impact Factors

Measure	Measure Life
Steam Trap HVAC - High Pressure	3
Steam Trap HVAC - Low Pressure	

Measure Life Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Measure	ISR	RRe Gas	RRe Electric
Steam Trap HVAC	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Steam Trap HVAC - High Pressure	N/A	N/A	ls_00_Gas
Steam Trap HVAC - Low Pressure	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Steam Trap HVAC - High Pressure					
Steam Trap HVAC - Low Pressure				$0.833	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Steam Trap HVAC	0.00	0.00	0.00	1.00

NTG Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Steam Trap HVAC - High Pressure	$44.00 / therm	$22.00 / therm
Steam Trap HVAC - Low Pressure	$44.00 / therm	$22.00 / therm

Steam Trap, Custom

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Hot Water | **Measure Type:** Steam Traps | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Steam Trap, Custom - Low Pressure	Gas Commercial & Industrial Large C&I Retrofit Steam Trap, Custom - Low Pressure
Steam Trap, Custom - Repair and Replace	Gas Commercial & Industrial Large C&I Retrofit Steam Trap, Custom - Repair and Replace

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc	Calc	Calc	Calc	
Steam Trap, Custom - Low Pressure					Calc
Steam Trap, Custom - Repair and Replace					Calc

Energy Impact Factors

Measure	Measure Life
Steam Trap, Custom - Low Pressure	3
Steam Trap, Custom - Repair and Replace	

Measure Life Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Measure	ISR	RRe Gas	RRe Electric
Steam Trap, Custom	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Steam Trap, Custom - Low Pressure	N/A	N/A	ls_00_Gas
Steam Trap, Custom - Repair and Replace	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
	Calc				
Steam Trap, Custom - Low Pressure				$3.643	
Steam Trap, Custom - Repair and Replace				$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Steam Trap, Custom	0.00	0.00	0.00	1.00

NTG Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Steam Trap, Custom - Low Pressure Steam Trap, Custom - Repair and Replace	$35.00 / therm	$12.00 / therm

Ventilation Reduction

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Building Shell | **Measure Type:** Ventilation | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Ventilation Reduction	Gas Commercial & Industrial Large C&I Retrofit Ventilation Reduction

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Ventilation Reduction	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Ventilation Reduction	multi

Measure	ISR	RRe Gas	RRe Electric
Ventilation Reduction	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Ventilation Reduction	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Ventilation Reduction	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Ventilation Reduction	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Ventilation Reduction	$44.00 / therm	Incentive: $22.00 / therm

Verified savings

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Custom | **Measure Type:** Verified savings | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Verified savings	Gas Commercial & Industrial Large C&I Retrofit Verified savings

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Verified savings	Calc	Calc	Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Verified savings	multi

Measure	ISR	RRe Gas	RRe Electric
Verified savings	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Verified savings	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Verified savings	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Verified savings	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Verified savings	$44.00 / therm	Incentive: $22.00 / therm

VSDs

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Motors/Drives | **Measure Type:** VSD | **Measure Sub Type:** Heating

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
VSDs - HVAC	Gas Commercial & Industrial Large C&I Retrofit VSDs - HVAC
VSDs - Non-HVAC	Gas Commercial & Industrial Large C&I Retrofit VSDs - Non-HVAC

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
	Calc	Calc	Calc	Calc	
VSDs - HVAC					Calc
VSDs - Non-HVAC					Calc

Energy Impact Factors

Measure	Measure Life
VSDs - HVAC	multi
VSDs - Non-HVAC	

Measure	ISR	RRe Gas	RRe Electric
VSDs	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
VSDs - HVAC	N/A	N/A	ls_00_Gas
VSDs - Non-HVAC	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
	Calc				
VSDs - HVAC					
VSDs - Non-HVAC					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
VSDs	0.19	0.08	0.00	0.89

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
VSDs - HVAC	$60.00 / therm	$30.00 / therm
VSDs - Non-HVAC	$60.00 / therm	$30.00 / therm

WiFi Thermostat - Heat Only, Custom

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Controls | **Measure Sub Type:** WiFi T-stat

Program: Large C&I Retrofit

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
WiFi Thermostat - Heat Only, Custom	Gas Commercial & Industrial Large C&I Retrofit WiFi Thermostat - Heat Only, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Deemed

Unit

Per thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
WiFi Thermostat - Heat Only, Custom	2.79				

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
WiFi Thermostat - Heat Only, Custom	15

Measure Life Source: Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats.https://www.energystar.gov/ia/partners/promotions/cool_change/downloads/CalculatorProgrammableThermostat.xls

Measure	ISR	RRe Gas	RRe Electric
WiFi Thermostat - Heat Only, Custom	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
WiFi Thermostat - Heat Only, Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
WiFi Thermostat - Heat Only, Custom				$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi Thermostat - Heat Only, Custom	0.07	0.00	0.16	1.09

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi Thermostat - Heat Only, Custom	$50.00 / therm	Incentive: $23.00 / therm

WiFi Thermostat Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** WiFi T-stat

Program: Large C&I Retrofit

Measure Description

A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and/or cooling systems. Primary Energy Impact: Natural Gas.

Baseline Description

The baseline efficiency case is an HVAC system with either a manual or a programmable thermostat.

Measures

Measure Name	Unique Identifier
WiFi Thermostat Gas - Cooling and Heating	Gas Commercial & Industrial Large C&I Retrofit WiFi Thermostat Gas - Cooling and Heating
WiFi Thermostat Gas - Heating	Gas Commercial & Industrial Large C&I Retrofit WiFi Thermostat Gas - Heating

Savings Principle

The high efficiency case is an HVAC system that has a Wi-Fi thermostat installed.

Savings Method

Deemed

Unit

Installation of WiFi programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
WiFi Thermostat Gas - Cooling and Heating WiFi Thermostat Gas - Heating	2.79				

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
WiFi Thermostat Gas - Cooling and Heating	15
WiFi Thermostat Gas - Heating	

Measure Life Source: Environmental Protection Agency (2010). Life Cycle Cost Estimate for Programmable Thermostats.https://www.energystar.gov/ia/partners/promotions/cool_change/downloads/CalculatorProgrammableThermostat.xls

Measure	ISR	RRe Gas	RRe Electric
WiFi Thermostat Gas	1.00	1.00	1.00

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
WiFi Thermostat Gas - Cooling and Heating	N/A	N/A	ls_00_Gas
WiFi Thermostat Gas - Heating	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
WiFi Thermostat Gas - Cooling and Heating				$6.163	
WiFi Thermostat Gas - Heating				$6.163	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi Thermostat Gas	0.17	0.04	0.03	0.90

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi Thermostat Gas - Cooling and Heating	$50.00 / therm	$23.00 / therm
WiFi Thermostat Gas - Heating	$50.00 / therm	$23.00 / therm

Small Business Direct Install, Gas

Attic Air Sealing, Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Weatherization **Measure Sub Type:** Air Sealing

Program: Small Business Direct Install

Measure Description

Installation of attic air sealing.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model, and an assumed heating degree day value of 5485, based on a TMY meteorological data population-weighted average.

Measures

Measure Name	Unique Identifier
Attic Air Sealing, Gas	Gas Commercial & Industrial Small Business Direct Install Attic Air Sealing, Gas

Savings Principle

The high efficiency case is the existing building after the insulation measure is implemented. The high efficiency case is characterized by the previously mentioned baseline heating system efficiencies, heating degree day values, and cooling degree hours.It is also characterized by an assumed 2021 code-level insulation R-value, which is R-20 for exterior walls, and R-38 for attics.

Savings Method

Deemed

Unit

Per hour of air sealing work

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Attic Air Sealing, Gas	0.71				

Gas Heat MMBtu Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Attic Air Sealing, Gas	20

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Attic Air Sealing, Gas	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
Attic Air Sealing, Gas	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Attic Air Sealing, Gas					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Attic Air Sealing, Gas	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Attic Air Sealing, Gas	$35.27 / therm	Incentive: $16.28 / therm

Attic Insulation,Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Weatherization **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

Installation of attic insulation at 2021 code-level insulation R-value or above.

Baseline Description

The baseline efficiency case is the existing building before the insulation measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model developed in MA. It is also characterized by an assumed baseline insulation R-value, which is determined from population weighted average R-values drawn from the EIA's Commercial Building Energy Consumption Survey (CBECS) and historic MA insulation code requirements. These baseline insulation values are R-9.66 for exterior walls and R-21.24 for attics. The baseline building is also characterized by an assumed heating degree day value and cooling degree hours, based on a TMY meteorological data population-weighted average and assumed set points. These values are 5485 and 5841, respectively.

Measures

Measure Name	Unique Identifier
Attic Insulation,Gas	Gas Commercial & Industrial Small Business Direct Install Attic Insulation,Gas

Savings Principle

The high efficiency case is the existing building after the insulation measure is implemented. The high efficiency case is characterized by the previously mentioned baseline heating system efficiencies, heating degree day values, and cooling degree hours.It is also characterized by an assumed 2021 code-level insulation R-value, which is R-20 for exterior walls, and R-38 for attics.

Savings Method

Deemed

Unit

Per square foot

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Attic Insulation,Gas	0.00			0.50	0.000

Gas Heat MMBtu Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Attic Insulation,Gas	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Attic Insulation,Gas	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
Attic Insulation,Gas	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Attic Insulation,Gas					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Attic Insulation,Gas	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Attic Insulation,Gas	$53.42 / therm	Incentive: $3.11 / therm

Basement Insulation, Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Weatherization **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

Installation of basement insulation at 2021 code-level insulation R-value or above.

Baseline Description

The baseline efficiency case is the existing building before the insulation measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model developed in MA. It is also characterized by an assumed baseline insulation R-value, which is determined from population weighted average R-values drawn from the EIA's Commercial Building Energy Consumption Survey (CBECS) and historic MA insulation code requirements. These baseline insulation values are R-9.66 for exterior walls and R-21.24 for attics. The baseline building is also characterized by an assumed heating degree day value and cooling degree hours, based on a TMY meteorological data population-weighted average and assumed set points. These values are 5485 and 5841, respectively.

Measures

Measure Name	Unique Identifier
Basement Insulation, Gas	Gas Commercial & Industrial Small Business Direct Install Basement Insulation, Gas

Savings Principle

The high efficiency case is the existing building after the insulation measure is implemented. The high efficiency case is characterized by the previously mentioned baseline heating system efficiencies, heating degree day values, and cooling degree hours.It is also characterized by an assumed 2021 code-level insulation R-value, which is R-20 for exterior walls, and R-38 for attics.

Savings Method

Deemed

Unit

Per square foot

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Basement Insulation, Gas	0.02			0.33	0.002

Gas Heat MMBtu Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Basement Insulation, Gas	25

Measure Life Source: GDS Associates, Inc. (2007). Measure Life Report: Residential and Commercial/Industrial Lighting and HVAC Measures. Prepared for The New England State Program Working Group. https://library.cee1.org/sites/default/files/library/8842/CEE_Eval_MeasureLifeStudyLights&HVACGDS_1Jun2007.pdf

Measure	ISR	RRe Gas	RRe Electric
Basement Insulation, Gas	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
Basement Insulation, Gas	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Basement Insulation, Gas					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Basement Insulation, Gas	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Basement Insulation, Gas	$8.09 / therm	Incentive: $0.80 / therm

Boiler Reset Control

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Boiler Control

Program: Small Business Direct Install

Measure Description

Boiler reset controls are devices that automatically control boiler water temperature based on outdoor temperature using a software program.

Baseline Description

Fixed boiler water temperature.

Measures

Measure Name	Unique Identifier
Boiler Reset Control	Gas Commercial & Industrial Small Business Direct Install Boiler Reset Control

Savings Principle

The high efficiency case is a boiler with reset controls.

Savings Method

Deemed

Unit

Installed boiler reset control

Savings Equation

Gross Gas MMBtu = units * (kBTU/h_in/1,000) * EFLH_heating *ESF

Gross Gas MMBtu = 1 * (533 kBTU/h_in/1,000)* 1400 hrs * 5% = 37.3

Where:

Units = Number of measures installed under the program

kBTU/h_in = Fuel input rating (kBTU/h) of the controlled boiler, 533 kBTU/h (1)

EFLH_heating = Heating equivalent full-load hours, 1,400 hours (2)

ESF = Energy Savings Factor, 5% (3)

1,000 = Conversion factor, one MMBtu equals 1,000 kBTU

(1) MA Assumption of weighted boiler input capacity based on Eversource programdata

(2) KEMA (2012). Prescriptive Gas Program Final Evaluation Report. Prepared for Massachusetts Energy Efficiency Progam Administrators; page 1-2.

(3) GDS Associates, Inc. (2009). Natural Gas Energy Efficiency Potential In Massachustts. Study Assumes5% savings factor.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Boiler Reset Control	37.30				

Gas Heat MMBtu Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Boiler Reset Control	15

Measure Life Source: ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.https://www.aceee.org/files/pdf/2006_BoilerControls.pdf

Measure	ISR	RRe Gas	RRe Electric
Boiler Reset Control	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Boiler Reset Control	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Boiler Reset Control					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Boiler Reset Control	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Boiler Reset Control		

Building Shell

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Building Shell **Measure Type:** Whole Building **Measure Sub Type:** Heating

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Building Shell	Gas Commercial & Industrial Small Business Direct Install Building Shell

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Building Shell	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Building Shell	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Building Shell	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Building Shell	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Building Shell	Calc			$3.352	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Building Shell	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Building Shell	$90.00 / therm	Incentive: $63.75 / therm

Comprehensive Retrofit

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Building **Measure Type:** Whole Building **Measure Sub Type:** Heating

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Comprehensive Retrofit	Gas Commercial & Industrial Small Business Direct Install Comprehensive Retrofit

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Comprehensive Retrofit	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Comprehensive Retrofit	multi

Measure	ISR	RRe Gas	RRe Electric
Comprehensive Retrofit	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Comprehensive Retrofit	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Comprehensive Retrofit					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Comprehensive Retrofit	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Comprehensive Retrofit		

Condensing Boiler

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Boiler | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Condensing Boiler - All Condensing Boiler - Seasonal Condensing Boiler - Year Round	Gas Commercial & Industrial Small Business Direct Install Condensing Boiler - All Gas Commercial & Industrial Small Business Direct Install Condensing Boiler - Seasonal Gas Commercial & Industrial Small Business Direct Install Condensing Boiler - Year Round

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
			Calc	Calc	Calc
Condensing Boiler - All					
Condensing Boiler - Seasonal					
Condensing Boiler - Year Round					

Energy Impact Factors

Measure	Measure Life
Condensing Boiler - All	5,10,15,20,25
Condensing Boiler - Seasonal	
Condensing Boiler - Year Round	

Measure	ISR	RRe Gas	RRe Electric
Condensing Boiler	1.00	0.89	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Condensing Boiler - All	N/A	N/A	ls_00_Gas
Condensing Boiler - Seasonal	N/A	N/A	ls_00_Gas
Condensing Boiler - Year Round	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
	Calc				
Condensing Boiler - All				$-0.468	
Condensing Boiler - Seasonal				$-0.697	
Condensing Boiler - Year Round				$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Condensing Boiler	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Condensing Boiler - All	$53.57 / therm	$37.50 / therm
Condensing Boiler - Seasonal	$53.57 / therm	$37.50 / therm
Condensing Boiler - Year Round	$53.57 / therm	$37.50 / therm

Cooling (CP)

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Whole Home **Measure Type:** Custom **Measure Sub Type:** Cooling

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Cooling (CP)	Gas Commercial & Industrial Small Business Direct Install Cooling (CP)

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Cooling (CP)		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Cooling (CP)	multi

Measure	ISR	RRe Gas	RRe Electric
Cooling (CP)	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Cooling (CP)	1.00	1.00	ls_114_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Cooling (CP)	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Cooling (CP)	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Cooling (CP)		

DEMAND CIRCULATOR

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Controls **Measure Sub Type:** Recirc

Program: Small Business Direct Install

Measure Description

Installation of a demand controller on a re-circulation loop.

Baseline Description

Full time operation of re-circ pump.

Measures

Measure Name	Unique Identifier
DEMAND CIRCULATOR	Gas Commercial & Industrial Small Business Direct Install DEMAND CIRCULATOR

Savings Principle

The re-circulation pump is controlled by a demand signal or timer to reduce operating hours when no hot water usage occurs.

Savings Method

Deemed

Unit

Installed recirc controller

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
DEMAND CIRCULATOR		195.00		96.00	0.160

Energy Impact Factors

Measure	Measure Life
DEMAND CIRCULATOR	15

Measure Life Source: DEER 2023 EUL. https://www.caetrm.com/cpuc/table/effusefullife/

Measure	ISR	RRe Gas	RRe Electric
DEMAND CIRCULATOR	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
DEMAND CIRCULATOR	1.00	1.00	ls_117_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
DEMAND CIRCULATOR				$0.833	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DEMAND CIRCULATOR	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DEMAND CIRCULATOR	$32.15 / therm	Incentive: $22.50 / therm

DHW

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Hot Water | **Measure Type:** DHW | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
DHW	Gas Commercial & Industrial Small Business Direct Install DHW

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Installed custom efficiency application.

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
DHW	Calc	Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
DHW	5,10,13,15

Measure	ISR	RRe Gas	RRe Electric
DHW	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
DHW	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
DHW	Calc			$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
DHW	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
DHW	$32.15 / therm	Incentive: $22.50 / therm

Drives on HVAC Systems

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Drives on HVAC Systems	Gas Commercial & Industrial Small Business Direct Install Drives on HVAC Systems

Savings Principle

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Drives on HVAC Systems	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Drives on HVAC Systems	15

Measure Life Source: ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.https://www.aceee.org/files/pdf/2006_BoilerControls.pdf

Measure	ISR	RRe Gas	RRe Electric
Drives on HVAC Systems	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Drives on HVAC Systems	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Drives on HVAC Systems					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Drives on HVAC Systems	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Drives on HVAC Systems	$26.78 / therm	Incentive: $18.75 / therm

Drives on non-HVAC Systems

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Motors/Drives **Measure Type:** Variable Speed Drive **Measure Sub Type:** Motors/Drives

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Drives on non-HVAC Systems	Gas Commercial & Industrial Small Business Direct Install Drives on non-HVAC Systems

Savings Principle

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Drives on non-HVAC Systems	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Drives on non-HVAC Systems	15

Measure Life Source: ACEEE (2006). Emerging Technologies Report: Advanced Boiler Controls. Prepared for ACEEE.https://www.aceee.org/files/pdf/2006_BoilerControls.pdf

Measure	ISR	RRe Gas	RRe Electric
Drives on non-HVAC Systems	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Drives on non-HVAC Systems	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Drives on non-HVAC Systems					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Drives on non-HVAC Systems	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Drives on non-HVAC Systems	$26.78 / therm	Incentive: $18.75 / therm

Duct Insulation

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Insulation **Measure Sub Type:** Duct

Program: Small Business Direct Install

Measure Description

The installation of duct insulation and air sealing.

Baseline Description

Un-insulated ductwork with air leaks

Measures

Measure Name	Unique Identifier
Duct Insulation	Gas Commercial & Industrial Small Business Direct Install Duct Insulation

Savings Principle

Insulating and air sealing ductwork reduces heat loss / gain, thereby saving energy.

Savings Method

Deemed

Unit

SF of installed insulation

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Duct Insulation	0.13			Calc	Calc

Gas Heat MMBtu Note: National Grid Staff Estimate (2010) MA SBS-DI Duct Sealing and Insulation Scenario and Deemed Savings.

Energy Impact Factors

Measure	Measure Life
Duct Insulation	20

Measure Life Source: National Grid Staff Calculations (2010). Pipe insulation for SBS DI measures 2010 Workbook.

Measure	ISR	RRe Gas	RRe Electric
Duct Insulation	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Duct Insulation	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Duct Insulation					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Duct Insulation	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Duct Insulation	$96.43 / therm	Incentive: $67.50 / therm

Faucet aerator

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Water Heating **Measure Type:** Flow Control **Measure Sub Type:** Faucet Aerator

Program: Small Business Direct Install

Measure Description

Installation of a faucet aerator with a flow rate of 1.5 GPM or less on an existing faucet with high flow in a commercial setting with service water heated by natural gas.

Baseline Description

The baseline efficiency case is a 2.2 GPM faucet.

Measures

Measure Name	Unique Identifier
Faucet aerator	Gas Commercial & Industrial Small Business Direct Install Faucet aerator

Savings Principle

The high efficiency case is a faucet with 1.5 GPM or less aerator installed.

Savings Method

Deemed

Unit

Installed faucet aerator.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Faucet aerator		1.70			

Gas DHW MMBtu Source: GDS Associates, Inc. and Summit Blue Consulting (2009), Natural Gas Energy Efficiency Potential in Massachusetts, Appendix B-2,

Energy Impact Factors

Measure	Measure Life
Faucet aerator	3

Measure Life Note: Massachusetts Common Assumption

Measure	ISR	RRe Gas	RRe Electric
Faucet aerator	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Faucet aerator	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Faucet aerator	5460			$0.833	

Water Source: Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Faucet aerator	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Faucet aerator	$32.15 / therm	Incentive: $22.50 / therm

Food Service

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Food Service | **Measure Type:** Food Service | **Measure Sub Type:** Food Service

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Food Service	Gas Commercial & Industrial Small Business Direct Install Food Service

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Food Service		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Food Service	12

Measure	ISR	RRe Gas	RRe Electric
Food Service	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Food Service	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Food Service					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Food Service	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Food Service		

Furnace

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Furnace | **Measure Sub Type:** Blend

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Furnace - All Furnace - Seasonal Furnace - Year Round	Gas Commercial & Industrial Small Business Direct Install Furnace - All Gas Commercial & Industrial Small Business Direct Install Furnace - Seasonal Gas Commercial & Industrial Small Business Direct Install Furnace - Year Round

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Furnace - All	Calc			Calc	Calc
Furnace - Seasonal		Calc		Calc	Calc
Furnace - Year Round			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Furnace - All Furnace - Seasonal Furnace - Year Round	multi

Measure	ISR	RRe Gas	RRe Electric
Furnace	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Furnace - All	N/A	N/A	ls_00_Gas
Furnace - Seasonal	N/A	N/A	ls_00_Gas
Furnace - Year Round	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Furnace - All	Calc			$-0.468	
Furnace - Seasonal	Calc			$-0.697	
Furnace - Year Round	Calc			$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Furnace	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Furnace - All		
Furnace - Seasonal		
Furnace - Year Round		

Heat Pump

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Heat Pump | **Measure Sub Type:** Heat Pump

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Heat Pump	Gas Commercial & Industrial Small Business Direct Install Heat Pump

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heat Pump			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Heat Pump	multi

Measure	ISR	RRe Gas	RRe Electric
Heat Pump	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Heat Pump	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heat Pump				$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Pump	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Pump		

Heat Recovery

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Heat Recovery | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Heat Recovery - Seasonal	Gas Commercial & Industrial Small Business Direct Install Heat Recovery - Seasonal
Heat Recovery - Year Round	Gas Commercial & Industrial Small Business Direct Install Heat Recovery - Year Round
Heat Recovery - All	Gas Commercial & Industrial Small Business Direct Install Heat Recovery - All

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Heat Recovery - Seasonal	Calc			Calc	Calc
Heat Recovery - Year Round		Calc		Calc	Calc
Heat Recovery - All			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Heat Recovery - Seasonal	10,15,20
Heat Recovery - Year Round	
Heat Recovery - All	

Measure	ISR	RRe Gas	RRe Electric
Heat Recovery	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Heat Recovery - Seasonal	N/A	N/A	ls_00_Gas
Heat Recovery - Year Round	N/A	N/A	ls_00_Gas
Heat Recovery - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Heat Recovery - Seasonal	Calc			$-0.697	
Heat Recovery - Year Round	Calc			$3.643	
Heat Recovery - All	Calc			$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Heat Recovery	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Heat Recovery - Seasonal	$26.78 / therm	$18.75 / therm
Heat Recovery - Year Round	$26.78 / therm	$18.75 / therm
Heat Recovery - All	$26.78 / therm	$18.75 / therm

HVAC

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** HVAC **Measure Sub Type:** Heating

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
HVAC - Controls and EMS	Gas Commercial & Industrial Small Business Direct Install HVAC - Controls and EMS
HVAC - Equipment	Gas Commercial & Industrial Small Business Direct Install HVAC - Equipment

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
		Calc	Calc	Calc	Calc
HVAC - Controls and EMS					
HVAC - Equipment					

Energy Impact Factors

Measure	Measure Life
HVAC - Controls and EMS	10,15,20
HVAC - Equipment	

Measure	ISR	RRe Gas	RRe Electric
HVAC	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
HVAC - Controls and EMS	N/A	N/A	ls_00_Gas
HVAC - Equipment	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
HVAC - Controls and EMS	Calc			$0.427	
HVAC - Equipment	Calc			$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
HVAC	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
HVAC - Controls and EMS	$26.78 / therm	$18.75 / therm
HVAC - Equipment	$26.78 / therm	$18.75 / therm

Insulation Pipe H2O

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Water Heater Insulation | **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

Install insulation on hot water piping located in non-conditioned spaces.

Baseline Description

Existing uninsulated pipe.

Measures

Measure Name	Unique Identifier
Insulation Pipe H2O - Diameter 1.5in	Gas Commercial & Industrial Small Business Direct Install Insulation Pipe H2O - Diameter 1.5in
Insulation Pipe H2O - Diameter 2in	Gas Commercial & Industrial Small Business Direct Install Insulation Pipe H2O - Diameter 2in

Savings Principle

The high efficiency condition is hot water piping in unconditional space with insulation installed.

Savings Method

Deemed

Unit

Installed LF of pipe insulation

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Insulation Pipe H2O - Diameter 1.5in	0.21				
Insulation Pipe H2O - Diameter 2in	0.36				

Gas Heat MMBtu Source: National Grid Staff Calculations (2010). Pipe insulation for SBS DI measures 2010 Workbook.

Energy Impact Factors

Measure	Measure Life
Insulation Pipe H2O - Diameter 1.5in	15
Insulation Pipe H2O - Diameter 2in	

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Insulation Pipe H2O	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Insulation Pipe H2O - Diameter 1.5in	N/A	N/A	ls_00_Gas
Insulation Pipe H2O - Diameter 2in	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Insulation Pipe H2O - Diameter 1.5in					
Insulation Pipe H2O - Diameter 2in					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Insulation Pipe H2O	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Insulation Pipe H2O - Diameter 1.5in	$32.15 / therm	$22.50 / therm
Insulation Pipe H2O - Diameter 2in	$32.15 / therm	$22.50 / therm

Insulation Pipe Steam

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Water Heater Insulation | **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

Install insulation on steam piping located in non-conditioned spaces.

Baseline Description

Existing uninsulated pipe.

Measures

Measure Name	Unique Identifier
Insulation Pipe Steam - Diameter 1.5in	Gas Commercial & Industrial Small Business Direct Install Insulation Pipe Steam - Diameter 1.5in
Insulation Pipe Steam - Diameter 2in	Gas Commercial & Industrial Small Business Direct Install Insulation Pipe Steam - Diameter 2in

Savings Principle

The high efficiency condition is steam piping in unconditional space with insulation installed.

Savings Method

Deemed

Unit

Installed LF of pipe insulation

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Insulation Pipe Steam - Diameter 1.5in	0.21				
Insulation Pipe Steam - Diameter 2in	0.37				

Gas Heat MMBtu Source: National Grid Staff Calculations (2010). Pipe insulation for SBS DI measures 2010 Workbook.

Energy Impact Factors

Measure	Measure Life
Insulation Pipe Steam - Diameter 1.5in	15
Insulation Pipe Steam - Diameter 2in	

Measure Life Source: Energy & Resource Solutions (2005), Measure Life Study. Prepared for The Massachusetts Joint Utilities, https://www.ers-inc.com/wp-content/uploads/2018/04/Measure-Life-Study_MA-Joint-Utilities_ERS.pdf

Measure	ISR	RRe Gas	RRe Electric
Insulation Pipe Steam	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Insulation Pipe Steam - Diameter 1.5in	N/A	N/A	ls_00_Gas
Insulation Pipe Steam - Diameter 2in	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Insulation Pipe Steam - Diameter 1.5in					
Insulation Pipe Steam - Diameter 2in					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Insulation Pipe Steam	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Insulation Pipe Steam - Diameter 1.5in	$32.15 / therm	$22.50 / therm
Insulation Pipe Steam - Diameter 2in	$32.15 / therm	$22.50 / therm

Low-flow showerhead

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Flow Control | **Measure Sub Type:** Low Flow Showerhead

Program: Small Business Direct Install

Measure Description

Installation of a low flow showerhead with a flow rate of 1.5 GPM or less in a commercial setting with service water heated by natural gas.

Baseline Description

The baseline efficiency case is a 2.5 GPM showerhead.

Measures

Measure Name	Unique Identifier
Low-flow showerhead	Gas Commercial & Industrial Small Business Direct Install Low-flow showerhead

Savings Principle

The high efficiency case is a 1.5 GPM showerhead.

Savings Method

Deemed

Unit

Installed low-flow showerhead

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low-flow showerhead		2.65			

Energy Impact Factors

Measure	Measure Life
Low-flow showerhead	10

Measure Life Source: Guidehouse (2018). ComEd Effective Useful Life Research Report. https://www.icc.illinois.gov/docket/P2017-0312/documents/287811/files/501915.pdf

Measure	ISR	RRe Gas	RRe Electric
Low-flow showerhead	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Low-flow showerhead	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low-flow showerhead	7300			$0.833	

Water Source: Federal Energy Management Program (2010). Energy Cost Calculator for Faucets and Showerheads. Accessed on 10/12/2011.

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low-flow showerhead	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low-flow showerhead	$26.78 / therm	Incentive: $18.75 / therm

Low-Pressure Steam Trap

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Hot Water **Measure Type:** Steam Traps **Measure Sub Type:** Steam Trap

Program: Small Business Direct Install

Measure Description

The repair or replacement of malfunctioning steam traps in systems with an operating pressure less than or equal to 15 psig.

Baseline Description

The baseline efficiency case is a failed steam trap.

Measures

Measure Name	Unique Identifier
Low-Pressure Steam Trap	Gas Commercial & Industrial Small Business Direct Install Low-Pressure Steam Trap

Savings Principle

The high efficiency case is a repaired or replaced steam trap.

Savings Method

Deemed

Unit

Repaired or replaced steam trap.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Low-Pressure Steam Trap	8.40				

Gas Heat MMBtu Source: ERS (2018). Two-Tier Steam Trap Savings Study. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Two-Tier-Steam-Traps-Memo-FINAL.pdf

Energy Impact Factors

Measure	Measure Life
Low-Pressure Steam Trap	3

Measure Life Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Measure	ISR	RRe Gas	RRe Electric
Low-Pressure Steam Trap	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Low-Pressure Steam Trap	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Low-Pressure Steam Trap				$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Low-Pressure Steam Trap	0.00	0.00	0.00	1.00

NTG Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Low-Pressure Steam Trap		

Non-Condensing Boiler

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: HVAC | **Measure Type:** Boiler | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Non-Condensing Boiler - Seasonal	Gas Commercial & Industrial Small Business Direct Install Non-Condensing Boiler - Seasonal
Non-Condensing Boiler - Year Round	Gas Commercial & Industrial Small Business Direct Install Non-Condensing Boiler - Year Round
Non-Condensing Boiler - All	Gas Commercial & Industrial Small Business Direct Install Non-Condensing Boiler - All

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Non-Condensing Boiler - Seasonal	Calc			Calc	Calc
Non-Condensing Boiler - Year Round		Calc		Calc	Calc
Non-Condensing Boiler - All			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Non-Condensing Boiler - Seasonal Non-Condensing Boiler - Year Round Non-Condensing Boiler - All	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Non-Condensing Boiler	1.00	0.89	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

Measure	RR sp	RR wp	Loadshape ID
Non-Condensing Boiler - Seasonal	N/A	N/A	ls_00_Gas
Non-Condensing Boiler - Year Round	N/A	N/A	ls_00_Gas
Non-Condensing Boiler - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Non-Condensing Boiler - Seasonal	Calc			$-0.697	
Non-Condensing Boiler - Year Round	Calc			$3.643	
Non-Condensing Boiler - All	Calc			$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Non-Condensing Boiler	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Non-Condensing Boiler - Seasonal	$53.57 / therm	$37.50 / therm
Non-Condensing Boiler - Year Round	$53.57 / therm	$37.50 / therm
Non-Condensing Boiler - All	$53.57 / therm	$37.50 / therm

Operation & Maintenance

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Other | **Measure Type:** Other | **Measure Sub Type:** O&M

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Operation & Maintenance	Gas Commercial & Industrial Small Business Direct Install Operation & Maintenance

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Operation & Maintenance		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Operation & Maintenance	1,2,3,4,5

Measure	ISR	RRe Gas	RRe Electric
Operation & Maintenance	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Operation & Maintenance	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Operation & Maintenance					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Operation & Maintenance	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Operation & Maintenance	$16.07 / therm	Incentive: $11.25 / therm

Other Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Other **Measure Type:** Other **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Other Gas - Seasonal	Gas Commercial & Industrial Small Business Direct Install Other Gas - Seasonal
Other Gas - Year Round	Gas Commercial & Industrial Small Business Direct Install Other Gas - Year Round
Other Gas - All	Gas Commercial & Industrial Small Business Direct Install Other Gas - All

Savings Principle

Savings Method

Unit

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Other Gas - Seasonal	Calc			Calc	Calc
Other Gas - Year Round		Calc		Calc	Calc
Other Gas - All			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Other Gas - Seasonal	5,10,15,20,25
Other Gas - Year Round	
Other Gas - All	

Measure	ISR	RRe Gas	RRe Electric
Other Gas	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Other Gas - Seasonal	N/A	N/A	ls_00_Gas
Other Gas - Year Round	N/A	N/A	ls_00_Gas
Other Gas - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Other Gas - Seasonal	Calc			$-0.697	
Other Gas - Year Round	Calc			$3.643	
Other Gas - All	Calc				

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Other Gas	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Other Gas - Seasonal	$26.78 / therm	$18.75 / therm
Other Gas - Year Round	$26.78 / therm	$18.75 / therm
Other Gas - All	$26.78 / therm	$18.75 / therm

Other, Custom

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Other | **Measure Type:** Other | **Measure Sub Type:**

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Other, Custom	Gas Commercial & Industrial Small Business Direct Install Other, Custom

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Hours Note: The annual hours of operation are site specific and will be determined on a case by case basis.

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Other, Custom	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Other, Custom	5,10,15,20,25

Measure	ISR	RRe Gas	RRe Electric
Other, Custom	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Other, Custom	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Other, Custom					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Other, Custom	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Other, Custom	$85.72 / therm	Incentive: $60.00 / therm

Pipe/Tank/Duct/HVAC Insulation

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: HVAC **Measure Type:** HVAC **Measure Sub Type:** Insulation

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Pipe/Tank/Duct/HVAC Insulation	Gas Commercial & Industrial Small Business Direct Install Pipe/Tank/Duct/HVAC Insulation

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pipe/Tank/Duct/HVAC Insulation	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Pipe/Tank/Duct/HVAC Insulation	10,15,20

Measure	ISR	RRe Gas	RRe Electric
Pipe/Tank/Duct/HVAC Insulation	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Pipe/Tank/Duct/HVAC Insulation	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pipe/Tank/Duct/HVAC Insulation				$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pipe/Tank/Duct/HVAC Insulation	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pipe/Tank/Duct/HVAC Insulation	$32.15 / therm	Incentive: $22.50 / therm

Pre-rinse spray valve

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Prescriptive

Measure Category: Water Heating | **Measure Type:** Flow Control | **Measure Sub Type:** Low Flow Spray Valve

Program: Small Business Direct Install

Measure Description

Retrofitting existing standard spray nozzles in locations where service water is supplied by natural gas fired hot water heater with new low flow pre-rinse spray nozzles with an average flow rate of 1.1 GPM.

Baseline Description

The baseline efficiency case is a 1.6 GPM spray valve.

Measures

Measure Name	Unique Identifier
Pre-rinse spray valve	Gas Commercial & Industrial Small Business Direct Install Pre-rinse spray valve

Savings Principle

The high efficiency case is a low flow pre-rinse spray valve with an average flow rate of 1.1 GPM.

Savings Method

Deemed based on algorithm

Unit

Installed pre-rinse spray valve.

Savings Equation

ΔkWh = units * [(GPM_baseline - GPM_ee) *Hrs * 60* (T_PRSV- T_main)*8.33/(3,412 BTU/kWh* Eff_gas)]

ΔMMBtu = units * [(GPM_baseline - GPM_ee) *Hrs * 60* (T_PRSV- T_main)*8.33/(1,000,000 BTU/MMBtu * Eff_gas)]

Where:

Units = number of measures installed under the program

GPM_baseline = Flow rate of existing PRSV, default 1.6 GPM (1)

GPM_ee = Flow rate of high efficiency installed PRSV, default 1.1 GPM (2)

Eff_gas = Water heater efficiency (natural gas), default 80% Et (3)

Eff_elec = Water heater efficiency (electric), default 98% Et (3)

T_PRSV = Average end-use temperature (°F), default 108°F (4)

T_main = Supply water temperature in water main (°F), default 55.7°F (5)

Hrs = Annual operating hours of PRSV, default 333 hrs (6)

60 = minutes per hour

8.33= Energy required (BTU) to heat one gallon of water by one-degree Fahrenheit

365 = Days in one year

1,000,000 = Conversion factor, on MMBtu equals 1,000,000 BTU

(1) Federal Standard – PRSV manufactured on or after January 1, 2006, and before January 28,2019, shall have a flow rate of not more than 1.6 gallons per minute; https://www.epa.gov/watersense/pre-rinse-spray-valves

(2) Based on program maximum flow rate.

(3) 2022-05 Final Determination Technical Support Document Energy Conservation Program forConsumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Page 7-8. https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf

(4) 2022-05 Final Determination Technical Support Document Energy Conservation Program for

Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse

Spray Valves. Page 7-7 (based on 5 field studies) https://downloads.regulations.gov/EERE-2019-

BT-STD-0034-0020/content.pdf

(5) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Table 7.4.1 Weighted Average Annual Main Water Temperature by Census Division and Building Type (Non-education Buildings in New England.) https://downloads.regulations.gov/EERE-2019-BT-STD-0034-0020/content.pdf Based on Burch, J., and C. Christensen. Towards Development of an Algorithm for Mains Water Temperature. 2007. Proceedings of the2007 ASES Annual Conference: Cleveland, OH.

(6) 2022-05 Final Determination Technical Support Document Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. Table 7.2.3 Weighted Average Annual CPSV Operating Time (Weighted Average Operating Time Across Building Types) https://downloads.regulations.gov/EERE-2019-BT-STD 0034-0020/content.pdf

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Pre-rinse spray valve		5.00			

Gas DHW MMBtu Source: Cadeo; NMR Group, Inc.; DNV. (2022). Non-Residential Technical Reference Manual Review. https://ma-eeac.org/wp-content/uploads/MA22C01-B_TRM-Review_FINAL_31OCT2022.pdf

Energy Impact Factors

Measure	Measure Life
Pre-rinse spray valve	5

Measure Life Source: U.S. Dept of Energy (2015). Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Commercial Prerinse Spray Valves. https://www.regulations.gov/document/EERE-2014-BT-STD-0027-0050

Measure	ISR	RRe Gas	RRe Electric
Pre-rinse spray valve	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Pre-rinse spray valve	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Pre-rinse spray valve	6410			$0.833	

Water Source: DNV GL (2014)Impact Evaluation of Massachusetts Prescriptive Gas Pre-Rinse Spray Valve Measure

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Pre-rinse spray valve	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Pre-rinse spray valve	$26.78 / therm	Incentive: $18.75 / therm

Process Equipment/Controls

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Process **Measure Type:** Process **Measure Sub Type:** Process

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Process Equipment/Controls	Gas Commercial & Industrial Small Business Direct Install Process Equipment/Controls

Savings Principle

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Process Equipment/Controls		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Process Equipment/Controls	5,10

Measure	ISR	RRe Gas	RRe Electric
Process Equipment/Controls	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Process Equipment/Controls	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Process Equipment/Controls				$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Process Equipment/Controls	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Process Equipment/Controls		

Programmable thermostat

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Small Business Direct Install

Measure Description

Installation of programmable thermostats with the ability to adjust heating or air-conditioning operating times according to a pre-set schedule to meet occupancy needs and minimize redundant HVAC operation.

Baseline Description

The baseline efficiency case is an HVAC system using natural gas to provide space heating without a programmable thermostat.

Measures

Measure Name	Unique Identifier
Programmable thermostat	Gas Commercial & Industrial Small Business Direct Install Programmable thermostat

Savings Principle

The high efficiency case is an HVAC system using natural gas to provide space heating with a programmable thermostat installed.

Savings Method

Deemed

Unit

Installed programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Programmable thermostat	3.20				

Gas Heat MMBtu Source: DNV-GL (2017). MA45 Prescriptive Programmable Thermostats. http://rieermc.ri.gov/wp-content/uploads/2018/03/ma45-phase-2-programmable-thermostat-final-memo_170317.pdf

Energy Impact Factors

Measure	Measure Life
Programmable thermostat	15

Measure Life Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Measure	ISR	RRe Gas	RRe Electric
Programmable thermostat	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is 100% since gross savings values are based on evaluation results.

Measure	RR sp	RR wp	Loadshape ID
Programmable thermostat	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Programmable thermostat					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Programmable thermostat	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Programmable thermostat	$42.86 / therm	Incentive: $30.00 / therm

Salon Nozzle

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Prescriptive

Measure Category: Water Heating

Measure Type: Flow Control

Measure Sub Type: Low Flow Spray Valve

Program: Small Business Direct Install

Measure Description

The installation of a high efficiency salon nozzle.

Baseline Description

Standard salon nozzle.

Measures

Measure Name	Unique Identifier
Salon Nozzle	Gas Commercial & Industrial Small Business Direct Install Salon Nozzle

Savings Principle

An efficient salon nozzle.

Savings Method

Deemed

Unit

Installed salon nozzle

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Salon Nozzle		20.40			

Energy Impact Factors

Measure	Measure Life
Salon Nozzle	3

Measure Life Source: DNV (2021). Prescriptive Measures NRNC and ISP Results.

Measure Life Note: Based on MA EUL assumptions

Measure	ISR	RRe Gas	RRe Electric
Salon Nozzle	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Note: Realization rate is assumed to be 100% since evaluation adjusts deemed savings value

Measure	RR sp	RR wp	Loadshape ID
Salon Nozzle	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Salon Nozzle	28639			$0.833	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Salon Nozzle	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Salon Nozzle	$21.43 / therm	Incentive: $15.00 / therm

Solar Thermal - All

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Custom | **Measure Type:** Solar heat | **Measure Sub Type:** All

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Solar Thermal - All	Gas Commercial & Industrial Small Business Direct Install Solar Thermal - All

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Solar Thermal - All			Calc	Calc	Calc

Energy Impact Factors

Measure	Measure Life
Solar Thermal - All	multi

Measure	ISR	RRe Gas	RRe Electric
Solar Thermal - All	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Solar Thermal - All	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Solar Thermal - All				$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Solar Thermal - All	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Solar Thermal - All		

Solar Thermal - Seasonal

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Custom | **Measure Type:** Solar heat | **Measure Sub Type:** Seasonal

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Solar Thermal - Seasonal	Gas Commercial & Industrial Small Business Direct Install Solar Thermal - Seasonal

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Solar Thermal - Seasonal	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Solar Thermal - Seasonal	multi

Measure	ISR	RRe Gas	RRe Electric
Solar Thermal - Seasonal	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Solar Thermal - Seasonal	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Solar Thermal - Seasonal				$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Solar Thermal - Seasonal	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Solar Thermal - Seasonal		

Solar Thermal - Year Round

Sector: Commercial & Industrial | **Fuel:** Gas | **Program Type:** Custom

Measure Category: Custom | **Measure Type:** Solar heat | **Measure Sub Type:** Year round

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Solar Thermal - Year Round	Gas Commercial & Industrial Small Business Direct Install Solar Thermal - Year Round

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Solar Thermal - Year Round		Calc		Calc	Calc

Energy Impact Factors

Measure	Measure Life
Solar Thermal - Year Round	multi

Measure	ISR	RRe Gas	RRe Electric
Solar Thermal - Year Round	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Solar Thermal - Year Round	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Solar Thermal - Year Round				$3.643	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Solar Thermal - Year Round	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Solar Thermal - Year Round		

Steam Trap Repair or Replacement

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Hot Water **Measure Type:** Steam Traps **Measure Sub Type:** Steam Trap

Program: Small Business Direct Install

Measure Description

The repair or replacement of malfunctioning steam traps in systems with an operating pressure greater than 15 psig.

Baseline Description

The baseline efficiency case is a failed steam trap.

Measures

Measure Name	Unique Identifier
Steam Trap Repair or Replacement	Gas Commercial & Industrial Small Business Direct Install Steam Trap Repair or Replacement

Savings Principle

The high efficiency case is a repaired or replaced steam trap.

Savings Method

Deemed

Unit

Repaired or replaced steam trap.

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Steam Trap Repair or Replacement	35.60				

Gas Heat MMBtu Source: ERS (2018). Two-Tier Steam Trap Savings Study. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Two-Tier-Steam-Traps-Memo-FINAL.pdf

Energy Impact Factors

Measure	Measure Life
Steam Trap Repair or Replacement	3

Measure Life Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Measure	ISR	RRe Gas	RRe Electric
Steam Trap Repair or Replacement	1.00	1.00	

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Steam Trap Repair or Replacement	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Steam Trap Repair or Replacement				$-0.468	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Steam Trap Repair or Replacement	0.00	0.00	0.00	1.00

NTG Source: DNV (2020). Steam Trap and Boiler Efficiency Research. https://ma-eeac.org/wp-content/uploads/MA-CIEC-Stage-5-Final-Report-MA20C05-G-STBE-FINAL-20201020.pdf

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Steam Trap Repair or Replacement		

Ventilation reduction

Sector: Commercial & Industrial

Fuel: Gas

Program Type: Custom

Measure Category: HVAC

Measure Type: Ventilation

Measure Sub Type: Ventilation Reduction

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Ventilation reduction	Gas Commercial & Industrial Small Business Direct Install Ventilation reduction

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Ventilation reduction	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Ventilation reduction	multi

Measure	ISR	RRe Gas	RRe Electric
Ventilation reduction	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Ventilation reduction	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Ventilation reduction				$-0.697	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Ventilation reduction	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Ventilation reduction	$30.00 / therm	Incentive: $21.00 / therm

Verified Savings Project

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Custom

Measure Category: Custom **Measure Type:** Verified savings **Measure Sub Type:** Heating

Program: Small Business Direct Install

Measure Description

The Custom project track is offered for energy efficiency projects involving complex site-specific applications that require detailed engineering analysis and/or projects which do not qualify for incentives under any of the prescriptive rebate offering. Projects offered through the custom approach must pass a cost-effectiveness test based on project-specific costs and savings.

Baseline Description

For Lost Opportunity projects, the baseline efficiency case assumes compliance with the efficiency requirements as mandated by Rhode Island State Building Code or industry accepted standard practice. For retrofit projects, the baseline efficiency case isbased on site-specific information.

Measures

Measure Name	Unique Identifier
Verified Savings Project	Gas Commercial & Industrial Small Business Direct Install Verified Savings Project

Savings Principle

The high efficiency case is specific to the custom project and may include one or more energy efficiency measures. Energy and demand savings calculations are based on projected or measured changes in equipment efficiencies and operating characteristics and are determined on a case-by-case basis. The project must be proven cost-effective in order to qualify for energy efficiency incentives.

Savings Method

Custom

Unit

Completed custom project

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross MMBtu Gas = deltaMMBtu_Gas_custom

Gross MMBtu Oil = deltaMMBtu_Oil_custom

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Verified Savings Project	Calc			Calc	Calc

Energy Impact Factors

Measure	Measure Life
Verified Savings Project	10,15

Measure	ISR	RRe Gas	RRe Electric
Verified Savings Project	1.00	0.89	0.89

ISR Note: All installations have 100% in-service rate since programs include verification of equipment installations.

RRe Source: DNV (2024). RI PY2022 Custom Gas Installations.

Measure	RR sp	RR wp	Loadshape ID
Verified Savings Project	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Verified Savings Project					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Verified Savings Project	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Verified Savings Project	$26.78 / therm	Incentive: $18.75 / therm

Weatherstripping, Gas

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: Building Shell **Measure Type:** Weatherization **Measure Sub Type:** Weatherstripping

Program: Small Business Direct Install

Measure Description

Installation of weatherstripping.

Baseline Description

The baseline efficiency case is the existing building before the air sealing measure is implemented. The baseline building is characterized by an assumed baseline heating system efficiency, which is derived from the Guidehouse Energy Optimization model, and an assumed heating degree day value of 5485, based on a TMY meteorological data population-weighted average.

Measures

Measure Name	Unique Identifier
Weatherstripping, Gas	Gas Commercial & Industrial Small Business Direct Install Weatherstripping, Gas

Savings Principle

The high efficiency case is the existing building after the air sealing measure is implemented. The high efficiency building is characterized by the previously mentioned heating system efficiencies and heating degree day values, and by an improved cubic feet per minute (CFM) infiltration rate, based on the amount of air sealing work-hours associated with the project. An assumed pressurized infiltration rate of 62.5 CFM50 saved per hour of air sealing is adjusted using an LBNL infiltration model that assumes a two story building with average wind shielding in order to calculate a natural infiltration rate savings value.

Savings Method

Deemed

Unit

Per linear feet

Savings Equation

Gross kWh = deltakWh_custom

Gross Summer kW = deltakW_sp_custom

Gross Winter kW = deltakW_wp_custom

Gross kWh = Qty × deltakWh

Gross kW = Qty × deltakW

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Gross MMBtu_Oil = Qty × deltaMMBtu_Oil

Gross MMBtu_Propane = Qty× deltaMMBtu_Propane

Where:

Qty = Total number of units.

deltakWh = Average annual kWh reduction per unit.

deltakW = Average kW reduction per unit.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

deltaMMBtu_Oil = Average annual oil reduction per unit

deltaMMBtu_Propane = Average annual propane reduction per unit

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
Weatherstripping, Gas	0.28				

Gas Heat MMBtu Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kWh Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Electric kW Source: Guidehouse (2020). Energy Optimization Model Updates. https://ma-eeac.org/wp-content/uploads/MA19R16-B-EO_Energy-Optimization-Measures-and-Assumptions-Update-Memo_Final_2020-03-02-1.pdf

Energy Impact Factors

Measure	Measure Life
Weatherstripping, Gas	10

Measure Life Note: From IL TRM, assuming lower measure life than residential due to likely signifcantly higher door usage.

Measure	ISR	RRe Gas	RRe Electric
Weatherstripping, Gas	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
Weatherstripping, Gas	N/A	N/A	ls_00_Gas

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
Weatherstripping, Gas					

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
Weatherstripping, Gas	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
Weatherstripping, Gas	$8.07 / therm	Incentive: $3.69 / therm

WiFi Thermostat

Sector: Commercial & Industrial **Fuel:** Gas **Program Type:** Prescriptive

Measure Category: HVAC **Measure Type:** Controls **Measure Sub Type:** Thermostat

Program: Small Business Direct Install

Measure Description

A communicating thermostat which allows remote set point adjustment and control via remote application. System requires an outdoor air temperature algorithm in the control logic to operate heating and cooling systems.

Baseline Description

The baseline efficiency case is an HVAC system with either a manual or a programmable thermostat.

Measures

Measure Name	Unique Identifier
WiFi Thermostat - cooling and htg	Gas Commercial & Industrial Small Business Direct Install WiFi Thermostat - cooling and htg
WiFi Tstat-heat only	Gas Commercial & Industrial Small Business Direct Install WiFi Tstat-heat only

Savings Principle

The high efficiency case is an HVAC system that has a Wi-Fi thermostat installed.

Savings Method

Deemed

Unit

Installation of WiFi programmable thermostat

Savings Equation

Gross MMBtu_Gas = Qty × deltaMMBtu_Gas

Where:

Qty = Total number of units.

deltaMMBtu_Gas = Average annual natural gas reduction per unit.

Hours: N/A

Measure Gross Savings per Unit

Measure	Gas Heat MMBtu	Gas DHW MMBtu	Gas Other MMBtu	kWh	kW
WiFi Thermostat - cooling and htg	2.79				
WiFi Tstat-heat only					

Gas Heat MMBtu Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Energy Impact Factors

Measure	Measure Life
WiFi Thermostat - cooling and htg WiFi Tstat-heat only	15

Measure Life Source: Guidehouse (2021). Residential Wi-Fi and Programmable Thermostats (RES24 Final Report). https://ma-eeac.org/wp-content/uploads/MARES24-Final-Report-2021-09-29.pdf

Measure	ISR	RRe Gas	RRe Electric
WiFi Thermostat	1.00	1.00	

Measure	RR sp	RR wp	Loadshape ID
WiFi Thermostat - cooling and htg	N/A	N/A	
WiFi Tstat-heat only		N/A	

Please refer to Appendix C for loadshape details.

Non-Energy Impact Factors

Measure	Water: Gallons	Annual $ per unit	One-time $ per unit	Annual $ per MMBtu	One-time $ per MMBtu
WiFi Thermostat - cooling and htg				$6.163	
WiFi Tstat-heat only				$6.163	

NEI values are rolled up. Please refer to Appendix B for more details on NEIs.

Net-to-Gross Factors

Measure	FR	Sop	Sonp	NTG
WiFi Thermostat	0.20	0.02	0.01	0.83

NTG Source: Tetra Tech, Inc. (2024). 2022 Commercial and Industrial Programs Free-Ridership and Spillover Study.

Total Resource Cost and Incentive

Measure	Total Resource Cost	Incentive
WiFi Thermostat - cooling and htg	$30.00 / therm	$21.00 / therm
WiFi Tstat-heat only	$30.00 / therm	$21.00 / therm

Appendix A: Tables

Table 1: Lighting Power Densities Using the Building Area Method (WATTSb,i)

Building Area Type	Lighting Power Density (W/ft2) [1]
Automotive Facility	0.73
Convention Center	0.64
Court House	0.75
Dining: Bar Lounge/Leisure	0.74
Dining: Cafeteria/Fast Food	0.70
Dining: Family	0.65
Dormitory	0.52
Exercise Center	0.72
Fire Stations	0.56
Gymnasium	0.75
Healthcare-Clinic	0.77
Hospital	0.92
Hotel/Motel	0.53
Library	0.83
Manufacturing Facility	0.82
Motion Picture Theatre	0.43
Multi-Family	0.46
Museum	0.56
Office	0.62
Parking Garage	0.17
Penitentiary	0.65
Performing Arts Theatre	0.82
Police Station	0.62
Post Office	0.64
Religious Building	0.66
Retail	0.78
School/University	0.7
Sports Arena	0.73
Town Hall	0.67
Transportation	0.56
Warehouse	0.45
Workshop	0.86

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Table 2: Lighting Power Densities Using the Space-by-Space Method (WATTSb,i)

Common Space Types	Lighting Power Density (W/ft^2)
Atrium – Less than 40 feet in Height	0.41
Atrium – Greater than 40 feet in Height	0.51
Audience/seating	
In an Auditorium	0.57
In a Gymnasium	0.23
In a Motion Picture Theater	0.27
In a Penitentiary	0.56
In a Performing Arts Theater	1.09
In a religious building	0.72
In a sports arena	0.27
Otherwise	0.33
Banking Activity Area	0.56
Classroom/lecture/training	
In a penitentiary	0.74
Otherwise	0.72
Computer room, data center	0.75
Conference/meeting/multipurpose	0.88
Copy/print room	0.56
Corridor	
In a facility for the visually impaired (not primarily used by staff)	0.71
In a hospital	0.61
Otherwise	0.44
Courtroom	1.08
Dining Area	
Bar/lounge/leisure dining	0.76
Cafeteria/fast food dining	0.36
Facility for the visually impaired (not primarily used by staff)	1.22
Family dining area	0.52
Penitentiary	0.35
Otherwise	0.42
Electrical/mechanical	0.71
Emergency vehicle garage	0.51
Food preparation	1.19
Guestroom	0.41
Laboratory	
In or as a classroom	1.05
Otherwise	1.21
Laundry/washing area	0.51
Loading dock, interior	0.88
Lobby	
For an elevator	0.64
Facility for the visually impaired (not primarily used by staff)	1.44
In a hotel	0.51

Common Space Types	Lighting Power Density (W/ft^2)
In a motion picture theater	0.2
In a performing arts theater	1.21
Otherwise	0.80
Locker room	0.43
Lounge/Breakroom	
In a healthcare facility	0.77
Mother's wellness room	0.68
Otherwise	0.55
Office - enclosed	0.73
Office – open plan	1.06
Parking area, interior	0.11
Pharmacy Area	1.59
Restroom	0.74
Restroom in a facility for the visually impaired (not primarily used by staff)	0.96
Sales area	0.85
Seating area, general	0.21
Security screening general areas	0.64
Security screening in transportation facilities	0.93
Security screening transportation waiting area	0.56
Stairwell	0.47
Storage	0.35
Vehicular maintenance area	0.59
Workshop	1.17
BUILDING SPECIFIC SPACE-BY-SPACE TYPES	
Automotive – service/repair	0.60
Convention Center – exhibit space	0.50
Dormitory living quarters	0.58
Facility for the visually impaired	
In a chapel	0.58
In a recreation room	1.20
Fire station – sleeping quarters	0.48
Gaming Establishments	
High limits game	1.68
Slots	0.54
Sportsbook	0.82
Table games	1.09
Gymnasium/fitness center	
Exercise area	0.82
Playing area	0.82
Healthcare clinic/hospital	
Imaging room	0.94
Exam/treatment	1.33
Medical Supplies	0.56
Nursery	0.87
Nurse Station	1.07

Common Space Types	Lighting Power Density (W/ft^2)
Operating Room	2.26
Patient room	0.78
Physical therapy room	0.82
Recovery Room	1.18
Telemedicine Room	1.44
Library	
Reading Area	0.86
Stacks	1.18
Manufacturing Facility	
Detailed manufacturing area	0.76
Equipment room	0.73
Extra high-bay area (greater than 50 ft floor to ceiling height)	1.36
High-bay area (25-50 ft floor to ceiling height)	1.24
Low-bay area (less than 25 ft floor to ceiling height)	0.86
Museum	
General exhibition area	0.31
Restoration room	1.24
Performing arts theater - dressing room	0.39
Post office – sorting area	0.71
Religious buildings	
Fellowship hall	0.50
Worship/pulpit/choir area	0.75
Retail	
Dressing/fitting area	0.45
Sports arena – playing area	
Class 1 Facility	2.86
Class 2 Facility	1.98
Class 3 Facility	1.29
Class 4 Facility	0.86
Sports arena – pools	
Class 1 Facility	2.20
Class 2 Facility	1.47
Class 3 Facility	0.99
Class 4 Facility	0.59
Transportation	
Airport Hanger	1.36
Terminal – ticket counter	0.40
Air/train/bus baggage area	0.28
Airport concourse	0.49
Passenger loading area	0.71
Warehouse	
For smaller, hand-carried items	0.33
Medium/bulky material	0.69

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Table 3: New Construction Proposed Lighting Wattage Tables

Device Code	Device Description	Rated Watts
LED Exit Signs		
1E0002	2.0 WATT LED	2
1E0003	3.0 WATT LED	3
1E0005	5.0 WLED	5
1E0005C	0.5 WATT LEC	0.5
1E0008	8.0 WLED	8
1E0015	1.5 WATT LED	1.5
1E0105	10.5 WATT LED	10.5
Compact Fluorescents (CFL's)		
2C0007S	2/7W COMPACT HW	18
1C0005S	5W COMPACT HW	7
1C0007S	7W COMPACT HW	9
1C0009S	9W COMPACT HW	11
1C0011S	11W COMPACT HW	13
1C0013S	13W COMPACT HW	15
1C0018E	18W COMPACT HW ELIG	20
1C0018S	18W COMPACT HW	20
1C0022S	22W COMPACT HW	24
1C0023E	1/23W COMPACT HW ELIG	25
1C0026E	26W COMPACT HW ELIG	28
1C0026S	26W COMPACT HW	28
1C0028S	28W COMPACT HW	30
1C0032E	32W COMPACT HW ELIG	34
1C0032S	32W CIRCLINE HW	34
1C0042E	1/42W COMPACT HW ELIG	48
1C0044S	44W CIRCLINE HW	46
1C0057E	1/57W COMPACT HW ELIG	65
1C2232S	22/32W CIRCLINE HW	58
1C2D10E	10W 2D COMPACT HW ELIG	12
1C2D16E	16W 2D COMPACT HW ELIG	18
1C2D21E	21W 2D COMPACT HW ELIG	22
1C2D28E	28W 2D COMPACT HW ELIG	28
1C2D38E	38W 2D COMP.HW ELIG	36
Compact Fluorescents (CFL's) (cont)		
1C3240S	32/40W CIRCLINE HW	80
Device Code	**Device Description**	**Rated Watts**

2C0005S	2/5W COMPACT HW	14
2C0009S	2/9W COMPACT HW	22
2C0011S	2/11W COMPACT HW	26
2C0013E	2/13W COMPACT HW ELIG	28
2C0013S	2/13W COMPACT HW	30
2C0018E	2/18W COMP. HW ELIG	40
2C0026E	2/26W COMP. HW ELIG	54
2C0032E	2/32W COMPACT HW ELIG	68
2C0042E	2/42W COMPACT HW ELIG	100
3C0009S	3/9W COMPACT HW	33
3C0013S	3/13W COMPACT HW	45
3C0018E	3/18W COMPACT HW ELIG	60
3C0026E	3/26W COMPACT HW ELIG	82
3C0032E	3/32W COMPACT HW ELIG	114
3C0042E	3/42W COMPACT HW ELIG	141
4C0018E	4/18W COMPACT HW ELIG	80
4C0026E	4/26W COMPACT HW ELIG	108
4C0032E	4/32W COMPACT HW ELIG	152
4C0042E	4/42W COMPACT HW ELIG	188
6C0026E	6/26W COMPACT HW ELIG	162
6C0032E	6/32W COMPACT HW ELIG	228
6C0042E	6/42W COMPACT HW ELIG	282
8C0026E	8/26W COMPACT HW ELIG	216
8C0032E	8/32W COMPACT HW ELIG	304
8C0042E	8/42W COMPACT HW ELIG	376
T5 Systems		
1F14SSE	1L2’ 14W T5/ELIG	16
2F14SSE	2L2’ 14W T5/ELIG	32
3F14SSE	3L2’ 14W T5/ELIG	50
4F14SSE	4L2’ 14W T5/ELIG	68
1F24HSE	1L2’ 24W T5HO/ELIG	29
2F24HSE	2L2’ 24W T5HO/ELIG	52
3F24HSE	3L2’ 24W T5HO/ELIG	80
	T5 Systems (cont.)	
1F21SSE	1L3' 21W T5/ELIG	24
2F21SSE	2L3' 21W T5/ELIG	47
1F39HSE	1L3' 39W T5HO/ELIG	42
Device Code	**Device Description**	**Rated Watts**

2F39HSE	2L3' 39W T5HO/ELIG	85
1F28SSE	1L4' 28W T5/ELIG	32
2F28SSE	2L4' 28W T5/ELIG	63
3F28SSE	3L4' 28W T5/ELIG	95
4F28SSE	4L4' 28W T5/ELIG	126
6F28SSE	6L4' 28W T5/ELIG	189
1F47HSE	1L4' 47W T5HO/ELIG	53
2F47HSE	2L4' 47W T5HO/ELIG	103
3F47HSE	3L4' 47W T5HO/ELIG	157
4F47HSE	4L4' 47W T5HO/ELIG	200
5F47HSE	5L4' 47W T5HO/ELIG	260
6F47HSE	6L4' 47W T5HO/ELIG	303
1F50HSE	1L4' 50W T5HO/ELIG	58
2F50HSE	2L4' 50W T5HO/ELIG	110
3F50HSE	3L4' 50W T5HO/ELIG	168
4F50HSE	4L4' 50W T5HO/ELIG	215
5F50HSE	5L4' 50W T5HO/ELIG	278
6F50HSE	6L4' 50W T5HO/ELIG	325
1F54HSE	1L4' 54W T5HO/ELIG	59
2F54HSE	2L4' 54W T5HO/ELIG	117
3F54HSE	3L4' 54W T5HO/ELIG	177
4F54HSE	4L4’ 54W T5HO/ELIG	234
5F54HSE	5L4' 54W T5HO/ELIG	294
6F54HSE	6L4’ 54W T5HO/ELIG	351
8F54HSE	8L4' 54W T5HO/ELIG	468
10F54HSE	10L4’ 54W T5HO/ELIG	585
Two Foot High Efficient T8 Systems		
1F17ESL	1L2' 17W T8EE/ELEE LOW PWR	14
1F17ESN	1L2' 17W T8EE/ELEE	17
1F17ESH	1L2' 17W T8EE/ELEE HIGH PWR	20
1F28BXE	1L2' F28BX/ELIG	32
2F17ESL	2L2' 17W T8EE/ELEE LOW PWR	27
2F17ESN	2L2' 17W T8EE/ELEE	32
2F17ESH	2L2' 17W T8EE/ELEE HIGH PWR	40
2F28BXE	2L2' F28BX/ELIG	63
3F17ESL	3L2' 17W T8EE/ELEE LOW PWR	39
3F17ESN	3L2' 17W T8EE/ELEE	46
Device Code	**Device Description**	**Rated Watts**

3F17ESH	3L2' 17W T8EE/ELEE HIGH PWR	61
3F28BXE	3L2' F28BX/ELIG	94
Three Foot High Efficient T8 Systems		
1F25ESL	1L3' 25W T8EE/ELEE LOW PWR	21
1F25ESN	1L3' 25W T8EE/ELEE	24
1F25ESH	1L3' 25W T8EE/ELEE HIGH PWR	30
2F25ESL	2L3' 25W T8EE/ELEE LOW PWR	40
2F25ESN	2L3' 25W T8EE/ELEE	45
2F25ESH	2L3' 25W T8EE/ELEE HIGH PWR	60
3F25ESL	3L3' 25W T8EE/ELEE LOW PWR	58
3F25ESN	3L3' 25W T8EE/ELEE	67
3F25ESH	3L3' 25W T8EE/ELEE HIGH PWR	90
Four Foot T8 High Efficient / Reduce Wattage Systems		
1F25EEH	1L4' 25W T8EE/ELEE HIGH PWR	30
1F25EEE	1L4' 25W T8EE/ELEE	22
1F25EEL	1L4' 25W T8EE/ELEE LOW PWR	19
2F25EEH	2L4' 25W T8EE/ELEE HIGH PWR	57
2F25EEE	2L4' 25W T8EE/ELEE	43
2F25EEL	2L4' 25W T8EE/ELEE LOW PWR	37
3F25EEH	3L4' 25W T8EE/ELEE HIGH PWR	86
3F25EEE	3L4' 25W T8EE/ELEE	64
3F25EEL	3L4' 25W T8EE/ELEE LOW PWR	57
4F25EEH	4L4' 25W T8EE/ELEE HIGH PWR	111
4F25EEE	4L4' 25W T8EE/ELEE	86
4F25EEL	4L4' 25W T8EE/ELEE LOW PWR	75
1F28EEH	1L4' 28W T8EE/ELEE HIGH PWR	33
1F28EEE	1L4' 28W T8EE/ELEE	24
1F28EEL	1L4' 28W T8EE/ELEE LOW PWR	22
2F28EEH	2L4' 28WT8EE/ELEE HIGH PWR	64
2F28EEE	2L4' 28W T8EE/ELEE	48
2F28EEL	2L4' 28W T8EE/ELEE LOW PWR	42
3F28EEH	3L4' 28W T8EE/ELEE HIGH PWR	96
3F28EEE	3L4' 28W T8EE/ELEE	72
3F28EEL	3L4' 28W T8EE/ELEE LOW PWR	63
4F28EEH	4L4' 28W T8EE/ELEE HIGH PWR	126
4F28EEE	4L4' 28W T8EE/ELEE	94
4F28EEL	4L4' 28W T8EE/ELEE LOW PWR	83
Device Code	**Device Description**	**Rated Watts**

1F30EEH	1L4' 30W T8EE/ELEE HIGH PWR	36
1F30EEE	1L4' 30W T8EE/ELEE	26
1F30EEL	1L4' 30W T8EE/ELEE LOW PWR	24
2F30EEH	2L4' 30WT8EE/ELEE HIGH PWR	69
2F30EEE	2L4' 30W T8EE/ELEE	52
2F30EEL	2L4' 30W T8EE/ELEE LOW PWR	45
3F30EEH	3L4' 30W T8EE/ELEE HIGH PWR	103
3F30EEE	3L4' 30W T8EE/ELEE	77
3F30EEL	3L4' 30W T8EE/ELEE LOW PWR	68
Four Foot T8 High Efficient / Reduce Wattage Systems (cont.)		
4F30EEH	4L4' 30W T8EE/ELEE HIGH PWR	133
4F30EEE	4L4' 30W T8EE/ELEE	101
4F30EEL	4L4' 30W T8EE/ELEE LOW PWR	89
1F32EEH	1L4' 32W T8EE/ELEE HIGH PWR	38
1F32EEE	1L4' 32W T8EE/ELEE	28
1F32EEL	1L4' 32W T8EE/ELEE LOW PWR	25
2F32EEH	2L4' 32W T8EE/ELEE HIGH PWR	73
2F32EEE	2L4' 32W T8EE/ELEE	53
2F32EEL	2L4' 32W T8EE/ELEE LOW PWR	47
3F32EEH	3L4' 32W T8EE/ELEE HIGH PWR	109
3F32EEE	3L4' 32W T8EE/ELEE	82
3F32EEL	3L4' 32W T8EE/ELEE LOW PWR	72
4F32EEH	4L4' 32W T8EE/ELEE HIGH PWR	141
4F32EEE	4L4' 32W T8EE/ELEE	107
4F32EEL	4L4' 32W T8EE/ELEE LOW PWR	95
6F32EEH	6L4' 32W T8EE/ELEE HIGH PWR	218
6F32EEE	6L4' 32W T8EE/ELEE	168
6F32EEL	6L4' 32W T8EE/ELEE LOW PWR	146
Eight Foot T8 Systems		
1F59SSE	1L8' T8/ELIG	60
1F80SSE	1L8' T8 HO/ELIG	85
2F59SSE	2L8' T8/ELIG	109
2F59SSL	2L8' T8/ELIG LOW PWR	100
2F80SSE	2L8' T8 HO/ELIG	160
LED Lighting Fixtures		
1L002	2 WATT LED	2
1L003	3 WATT LED	3
Device Code	**Device Description**	**Rated Watts**

1L004	4 WATT LED	4
1L005	5 WATT LED	5
1L006	6 WATT LED	6
1L007	7 WATT LED	7
1L008	8 WATT LED	8
1L009	9 WATT LED	9
1L010	10 WATT LED	10
1L011	11 WATT LED	11
1L012	12 WATT LED	12
1L013	13 WATT LED	13
1L014	14 WATT LED	14
1L015	15 WATT LED	15
1L016	16 WATT LED	16
1L017	17 WATT LED	17
LED Lighting Fixtures (cont.)		
1L018	18 WATT LED	18
1L019	19 WATT LED	19
1L020	20 WATT LED	20
1L021	21 WATT LED	21
1L022	22 WATT LED	22
1L023	23 WATT LED	23
1L024	24 WATT LED	24
1L025	25 WATT LED	25
1L026	26 WATT LED	26
1L027	27 WATT LED	27
1L028	28 WATT LED	28
1L029	29 WATT LED	29
1L030	30 WATT LED	30
1L031	31 WATT LED	31
1L032	32 WATT LED	32
1L033	33 WATT LED	33
1L034	34 WATT LED	34
1L035	35 WATT LED	35
1L036	36 WATT LED	36
1L037	37 WATT LED	37
1L038	38 WATT LED	38
1L039	39 WATT LED	39
Device Code	**Device Description**	**Rated Watts**

1L040	40 WATT LED	40
1L041	41 WATT LED	41
1L042	42 WATT LED	42
1L043	43 WATT LED	43
1L044	44 WATT LED	44
1L045	45 WATT LED	45
1L046	46 WATT LED	46
1L047	47 WATT LED	47
1L048	48 WATT LED	48
1L049	49 WATT LED	49
1L050	50 WATT LED	50
1L055	55 WATT LED	55
1L060	60 WATT LED	60
1L070	70 WATT LED	70
1L073	73 WATT LED	73
1L075	75 WATT LED	75
1L080	90 WATT LED	90
1L085	85 WATT LED	85
1L090	90 WATT LED	90
LED Lighting Fixtures (cont.)		
1L095	95 WATT LED	95
1L100	100 WATT LED	100
1L106	106 WATT LED	106
1L107	107 WATT LED	107
1L116	116 WATT LED	116
1L120	120 WATT LED	120
1L125	125 WATT LED	125
1L130	130 WATT LED	130
1L135	135 WATT LED	135
1L140	140 WATT LED	140
1L145	145 WATT LED	145
1L150	150 WATT LED	150
1L155	155 WATT LED	155
1L160	160 WATT LED	160
1L165	165 WATT LED	165
1L170	170 WATT LED	170
1L175	175 WATT LED	175
Device Code	**Device Description**	**Rated Watts**

1L180	180 WATT LED	180
1L185	185 WATT LED	185
1L190	190 WATT LED	190
1L200	200 WATT LED	200
1L210	210 WATT LED	210
1L220	220 WATT LED	220
1L240	240 WATT LED	240
Electronic Metal Halide Lamps		
1M0150E	150W METAL HALIDE EB	160
1M0200E	200W METAL HALIDE EB	215
1M0250E	250W METAL HALIDE EB	270
1M0320E	320W METAL HALIDE EB	345
1M0350E	350W METAL HALIDE EB	375
1M0400E	400W METAL HALIDE EB	430
1M0450E	400W METAL HALIDE EB	480
MH Track Lighting		
1M0020E	20W MH SPOT	25
1M0025E	25W MH SPOT	25
1M0035E	35W MH SPOT	44
1M0039E	39W MH SPOT	47
1M0050E	50W MH SPOT	60
1M0070E	70W MH SPOT	80
1M0100E	100W MH SPOT	111
1M0150E	150W MH SPOT	162

Table 4: Retrofit Existing Lighting Wattage Tables

Device Code	Device Description	Rated Watts
Incandescent Lamps		
1I0015	15W INC	15
1I0020	20W INC	20
1I0025	25W INC	25
1I0034	34W INC	34
1I0036	36W INC	36
1I0040	40W INC	40
1I0042	42W INC	42
1I0045	45W INC	45
1I0050	50W INC	50
1I0052	52W INC	52
1I0054	54W INC	54
1I0055	55W INC	55
1I0060	60W INC	60
1I0065	65W INC	65
1I0067	67W INC	67
1I0069	69W INC	69
1I0072	72W INC	72
1I0075	75W INC	75
1I0080	80W INC	80
1I0085	85W INC	85
1I0090	90W INC	90
1I0093	93W INC	93
1I0100	100W INC	100
1I0120	120W INC	120
1I0125	125W INC	125
1I0135	135W INC	135
1I0150	150W INC	150
1I0200	200W INC	200
1I0300	300W INC	300
1I0448	448W INC	448
1I0500	500W INC	500
1I0750	750W INC	750
1I1000	1000W INC	1000
1I1500	1500W INC	1500
Low Voltage Halogen Fixture (includes Transformer)		
1R0020	20W LV HALOGEN FIXT	30
1R0025	25W LV HALOGEN FIXT	35
1R0035	35W LV HALOGEN FIXT	45
Low Voltage Halogen Fixture (includes Transformer) (cont.)		
1R0042	42W LV HALOGEN FIXT	52
1R0050	50W LV HALOGEN FIXT	60
1R0065	65W LV HALOGEN FIXT	75
1R0075	75W LV HALOGEN FIXT	85
Halogen/Quartz Lamps		
1T0035	35W HALOGEN LAMP	35

Device Code	Device Description	Rated Watts
1T0040	40W HALOGEN LAMP	40
1T0042	42W HALOGEN LAMP	42
1T0045	45W HALOGEN LAMP	45
1T0047	47W HALOGEN LAMP	47
1T0050	50W HALOGEN LAMP	50
1T0052	52W HALOGEN LAMP	52
1T0055	55W HALOGEN LAMP	55
1T0060	60W HALOGEN LAMP	60
1T0072	72W HALOGEN LAMP	72
1T0075	75W HALOGEN LAMP	75
1T0090	90W HALOGEN LAMP	90
1T0100	100W HALOGEN LAMP	100
1T0150	150W HALOGEN LAMP	150
1T0200	200W HALOGEN LAMP	200
1T0250	250W HALOGEN LAMP	250
1T0300	300W HALOGEN LAMP	300
1T0350	350W HALOGEN LAMP	350
1T0400	400W HALOGEN LAMP	400
1T0425	425W HALOGEN LAMP	425
1T0500	500W HALOGEN LAMP	500
1T0750	750W HALOGEN LAMP	750
1T0900	900W HALOGEN LAMP	900
1T1000	1000W HALOGEN LAMP	1000
1T1200	1200W HALOGEN LAMP	1200
1T1500	1500W HALOGEN LAMP	1500
Mercury Vapor (MV)		
1V0040S	40W MERCURY	50
1V0050S	50W MERCURY	75
1V0075S	75W MERCURY	95
1V0100S	100W MERCURY	120
1V0175S	175W MERCURY	205
1V0250S	250W MERCURY	290
1V0400S	400W MERCURY	455
Low Pressure Sodium (LPS)		
1V0700S	700W MERCURY	775
1V1000S	1000W MERCURY	1075
2V0400S	2/400W MERCURY	880
1L0035S	35W LPS	60
1L0055S	55W LPS	85
1L0090S	90W LPS	130
1L0135S	135W LPS	180
1L0180S	180W LPS	230
High Pressure Sodium (HPS)		
1H0035S	35W HPS	45
1H0050S	50W HPS	65
1H0070S	70W HPS	90
1H0100S	100W HPS	130

Device Code	Device Description	Rated Watts
1H0150S	150W HPS	190
1H0200S	200W HPS	240
1H0225S	225W HPS	275
1H0250S	250W HPS	295
1H0310S	310W HPS	350
1H0360S	360W HPS	435
1H0400S	400W HPS	460
1H0600S	600W HPS	675
1H0750S	750W HPS	835
1H1000S	1000W HPS	1085
Metal Halide (MH)		
1M0032S	32W METAL HALIDE	40
1M0050S	50W METAL HALIDE	65
1M0070S	70W METAL HALIDE	95
1M0100S	100W METAL HALIDE	120
1M0150S	150W METAL HALIDE	190
1M0175S	175W METAL HALIDE	205
1M0250S	250W METAL HALIDE	295
1M0360S	360W METAL HALIDE	430
1M0400S	400W METAL HALIDE	455
1M0750S	750W METAL HALIDE	825
1M1000S	1000W METAL HALIDE	1075
1M1500S	1500W METAL HALIDE	1615
1M1800S	1800W METAL HALIDE	1875
Pulse Start Metal Halide Lamp/Ballast		
1M0100P	100W MH CWA	128
1M0100R	100W MH LINEAR	118
1M0150P	150W MH CWA	190
1M0150R	150W MH LINEAR	172
1M0175P	175W MH CWA	208
1M0175R	175W MH LINEAR	190
1M0200P	200W MH CWA	232
1M0200R	200W MH LINEAR	218
1M0250P	250W MH CWA	288
1M0250R	250W MH LINEAR	265
1M0300P	300W MH CWA	342
1M0300R	300W MH LINEAR	324
1M0320P	320W MH CWA	365
1M0320R	320W MH LINEAR	345
1M0350P	350W MH CWA	400
1M0350R	350W MH LINEAR	375
1M0400P	400W MH CWA	455
1M0400R	400W MH LINEAR	430
1M0450P	450W MH CWA	508
1M0450R	450W MH LINEAR	480
1M0750P	750W MH CWA	815
1M0750R	750W MH LINEAR	805

Device Code	Device Description	Rated Watts
1M0875P	875W MH CWA	950
1M0875R	875W MH LINEAR	927
1M1000P	1000W MH CWA	1080
Two Foot T8 / T12 Systems		
1F20SSS	F20T12/HPF(1)	32
1F80BXE	1L2' F80BXE/ELIG	90
1F55BXE	1L2' F55BX/ELIG	56
2F17SSE	2L2' 17W T8/ELIG	37
2F17SSL	2L2' 17W T8/ELIG LOW POWER	27
2F17SSM	2L2' 17W T8/EEMAG	45
2F20SSS	F20T12/HPF(2)	56
2F24HSS	2L2' 24 T12HO/STD/STD	85
2F40BXE	2L2' F40BX/ELIG	72
2F50BXE	2L2' F50BX/ELIG	108
2F55BXE	2L2'55BXE/ELIG	112
3F17SSE	3L2' 17W T8/ELIG	53
3F17SSL	3L2' 17W T8/ELIG LOW POWER	39
Two Foot T8 / T12 Systems (cont.)		
3F20SSS	F20T12/HPF(3)	78
3F40BXE	3L2' F40BX/ELIG	102
3F50BXE	3L2' F50BX/ELIG	162
3F55BXE	3L2' F55BX/ELIG	168
4F17SSE	4L2' 17W T8/ELIG	62
4F36BXE	4L2' F36BX/ELIG	148
4F40BXE	4L2' F40BX/ELIG	144
4F40BXH	4L 40W T5 (Std.) HIGH LMN	170
4F50BXE	4L2' F50BX/ELIG	216
4F55BXE	4L2' F55BX/ELIG	224
5F40BXE	5L2' F40BX/ELIG	190
5F50BXE	5L2' F50BX/ELIG	270
5F55BXE	5L2' F55BX/ELIG	280
6F36BXE	6L2' F36BX/ELIG	212
6F40BXE	6L2' F40BX/ELIG	204
6F50BXE	6L2' F50BX/ELIG	324
6F55BXE	6L2' F55BX/ELIG	336
8F36BXE	8L2' F36BX/ELIG	296
8F40BXE	8L2' F40BX/ELIG	288
8F50BXE	8L2' F50BX/ELIG	432
8F55BXE	8L2' F55BX/ELIG	448
9F36BXE	9L2' F36BX/ELIG	318
9F40BXE	9L2' F40BX/ELIG	306
9F50BXE	9L2' F50BX/ELIG	486
9F55BXE	9L2' F55BX/ELIG	504
12F40BE	12L2' F40BX/ELIG	408
12F50BE	12L2' F50BX/ELIG	648
12F55BE	12L2' F55BX/ELIG	672
Three Foot T8 / T12 Systems		

Device Code	Device Description	Rated Watts
1F30SEM	1L3' 30W T12 EE/EEMAG	38
1F30SES	1L3' 30W T12 EE/STD	42
1F30SSS	1L3' 30W T12 STD/STD	46
1F25SSE	1L3' 25W T8/ELIG	24
1F25SSH	1L3' 25W T8/ELIG HIGH LMN	28
2F30SEE	2L3' 30W T12 EE/ELIG	49
2F30SEM	2L3' 30W T12 EE/EEMAG	66
2F30SES	2L3' 30W T12 EE/STD	73
2F30SSS	2L3' 30W T12 STD/STD	80
2F25SSE	2L3' 25W T8/ELIG	47
2F25SSM	2L3' 25W T8/EEMAG	65
Three Foot T8 / T12 Systems		
3F30SSS	3L3' 30W T12 STD/STD	140
3F30SES	3L3' 30W T12 EE/STD	127
3F25SSE	3L3’ 25W T8/ELIG	68
4F25SSE	4L3' 25W T8/ELIG	88
Four Foot F48 T8 Systems		
1F48SES	1L4' F48T12EE/STD	50
1F48SSS	1L4' F48T12/STD	60
2F48SES	2L4' F48T12EE/STD	82
2F48SSS	2L4' F48T12/STD	102
3F48SES	3L4' F48T12EE/STD	132
3F48SSS	3L4' F48T12/STD	162
4F48SES	4L4' F48T12EE/STD	164
4F48SSS	4L4' F48T12/STD	204
1F48HES	1L4' F48HO/EE/STD	80
1F48HSS	1L4' F48H0/STD/STD	85
2F48HES	2L4' F48HO/EE/STD	135
2F48HSS	2L4' F48H0/STD/STD	145
3F48HES	3L4' F48HO/EE/STD	215
3F48HSS	3L4' F48H0/STD/STD	230
4F48HES	4L4' F48HO/EE/STD	270
4F48HSS	4L4' F48H0/STD/STD	290
Four Foot F48VHO T12 Systems		
1F48VES	1L4' F48VHO/EE/STD	123
1F48VSS	1L4' F48VHO/STD/STD	138
2F48VES	2L4' F48VHO/EE/STD	210
2F48VSS	2L4' F48VHO/STD/STD	240
3F48VES	3L4' F48VHO/EE/STD	333
3F48VSS	3L4' F48VHO/STD/STD	378
4F48VES	4L4' F48VHO/EE/STD	420
4F48VSS	4L4' F48VHO/STD/STD	480
Four Foot T12 Systems		
1F40SEE	1L4' EE/ELIG	38
1F40SEM	1L4' EE/EEMAG	40
1F40SES	1L4' EE/STD	50
1F40SSE	1L4' STD/ELIG	46

Device Code	Device Description	Rated Watts
1F40SSM	1L4' STD/EEMAG	50
1F40SSS	1L4' STD/STD	57
1F40HSE	1L4' HO/STD/ELIG	59
Four Foot T12 Systems (cont.)		
2F40SEE	2L4' EE/ELIG	60
2F40SEM	2L4' EE/EEMAG	70
2F40SES	2L4' EE/STD	80
2F40SSE	2L4' STD/ELIG	72
2F40SSM	2L4' STD/EEMAG	86
2F40SSS	2L4' STD/STD	94
3F40SEE	3L4' EE/ELIG	90
3F40SEM	3L4' EE/EEMAG	110
3F40SES	3L4' EE/STD	130
3F40SSE	3L4' STD/ELIG	110
3F40SSM	3L4' STD/EEMAG	136
3F40SSS	3L4' STD/STD	151
4F40SEE	4L4' EE/ELIG	120
4F40SEM	4L4' EE/EEMAG	140
4F40SES	4L4' EE/STD	160
4F40SSE	4L4' STD/ELIG	144
4F40SSM	4L4' STD/EEMAG	172
4F40SSS	4L4' STD/STD	188
6F40SSS	6L4' STD/STD	282
Four Foot T8 Systems		
1F32SSE	1L4' T8/ELIG	30
1F32SSL	1L4’ T8/ELIG LOW POWER	26
1F32SSM	1L4' T8/EEMAG	37
1F32SSH	1L4’ T8/ELIG HIGH LMN	36
2F32SSE	2L4' T8/ELIG	60
2F32SSH	2L4' T8/ELIG HIGH LMN	78
2F32SSL	2L4’ T8/ELIG LOW PWR	52
2F32SSM	2L4' T8/EEMAG	70
3F32SSE	3L4' T8/ELIG	88
3F32SSH	3L4' T8/ELIG HIGH LMN	112
3F32SSL	3L4’ T8/ELIG LOW POWER	76
3F32SSM	3L4' T8/EEMAG	107
4F32SSE	4L4' T8/ELIG	112
4F32SSH	4L4' T8/ELIG HIGH LMN	156
4F32SSL	4L4’ T8/ELIG LOW PWR	98
4F32SSM	4L4' T8/EEMAG	140
5F32SSE	5L4' T8/ELIG	148
5F32SSH	5L4' T8/ELIG HIGH LMN	190
6F32SSE	6L4' T8/ELIG	174
8F32SSH	8L4' T8/ELIG HIGH LMN	312
Five Foot T8 / T12 Systems		
1F60HSM	1L5' HO/STD/EEMAG	90
1F60HSE	1L5' HO/STD/ELIG	70

Device Code	Device Description	Rated Watts
1F60SSM	1L5’/STD/EEMAG	73
1F60TSM	1L5’ T10HO/STD/EEMAG	135
2F40HSE	2L5' HO/STD/ELIG	123
2F40TSE	2L5'T8/ELIG	68
2F60HSM	2L5' HO/STD/EEMAG	178
2F60SSM	2L5’/STD/EEMAG	122
3F40TSE	3L5'T8/ELIG	106
Six Foot T12 & T12HO Systems		
1F72HSE	1L6’ T8HO/ELIG	80
1F72HSS	1L6' F72HO/STD/STD	113
1F72SSM	1L6' STD/EEMAG	80
1F72SSS	1L6' STD/STD	95
2F72HSE	2L6'T8 HO/ELIG	160
2F72HSM	2L6' F72HO/STD/EEMAG	193
2F72HSS	2L6' F72HO/STD	195
2F72SSM	2L6' STD/EEMAG	135
2F72SSS	2L6' STD/STD	173
Eight Foot T12HO Systems		
1F96HES	1L8' HO/EE/STD	125
1F96HSS	1L8' HO/STD/STD	135
2F96HEE	2L8' HO/EE/ELIG	170
2F96HEM	2L8' HO/EE/EEMAG	207
2F96HES	2L8' HO/EE/STD	227
2F96HSE	2L8' HO/STD/ELIG	195
2F96HSM	2L8' HO/STD/EEMAG	237
2F96HSS	2L8' HO/STD/STD	257
3F96HES	3L8' HO/EE/STD	352
3F96HSS	3L8' HO/STD/STD	392
4F96HEE	4L8' HO/EE/ELIG	340
4F96HEM	4L8' HO/EE/EEMAG	414
4F96HES	4L8' HO/EE/STD	454
4F96HSE	4L8' HO/STD/ELIG	390
4F96HSM	4L8' HO/STD/EEMAG	474
4F96HSS	4L8' HO/STD/STD	514
Eight Foot T12VHO Systems		
1F96VES	1L8' VHO/EE/STD	200
1F96VSS	1L8' VHO/STD/STD	230
2F96VES	2L8' VHO/EE/STD	390
2F96VSS	2L8' VHO/STD/STD	450
3F96VES	3L8' VHO/EE/STD	590
3F96VSS	3L8' VHO/STD/STD	680
4F96VES	4L8' VHO/EE/STD	780
4F96VSS	4L8' VHO/STD/STD	900
Eight Foot T8 Systems		
1F59SSE	1L8' T8/ELIG	60
1F80SSE	1L8' T8 HO/ELIG	85
2F59SSE	2L8' T8/ELIG	109

Device Code	Device Description	Rated Watts
2F59SSL	2L8' T8/ELIG LOW PWR	100
2F80SSE	2L8' T8 HO/ELIG	160
Eight Foot T12 Systems		
1F96SEE	1L8' EE/ELIG	60
1F96SES	1L8' EE/STD	83
1F96SSE	1L8' STD/ELIG	70
1F96SSS	1L8' STD/STD	100
2F96SEE	2L8' EE/ELIG	109
2F96SEM	2L8' EE/EEMAG	123
2F96SES	2L8' EE/STD	138
2F96SSE	2L8' STD/ELIG	134
2F96SSM	2L8' STD/EEMAG	158
2F96SSS	2L8' STD/STD	173
3F96SES	3L8' EE/STD	221
3F96SSS	3L8' STD/STD	273
4F96SEE	4L8' EE/ELIG	218
4F96SEM	4L8' EE/EEMAG	246
4F96SES	4L8' EE/STD	276
4F96SSE	4L8' STD/ELIG	268
4F96SSM	4L8' STD/EEMAG	316
4F96SSS	4L8' STD/STD	346
LED Lighting Fixtures		
1L002	2 WATT LED	2
1L003	3 WATT LED	3
1L004	4 WATT LED	4
1L005	5 WATT LED	5
1L006	6 WATT LED	6
1L007	7 WATT LED	7
1L008	8 WATT LED	8
1L009	9 WATT LED	9
1L010	10 WATT LED	10
1L011	11 WATT LED	11
1L012	12 WATT LED	12
1L013	13 WATT LED	13
1L014	14 WATT LED	14
1L015	15 WATT LED	15
1L016	16 WATT LED	16
1L017	17 WATT LED	17
LED Lighting Fixtures (cont.)		
1L018	18 WATT LED	18
1L019	19 WATT LED	19
1L020	20 WATT LED	20

Device Code	Device Description	Rated Watts
1L021	21 WATT LED	21
1L022	22 WATT LED	22
1L023	23 WATT LED	23
1L024	24 WATT LED	24
1L025	25 WATT LED	25
1L026	26 WATT LED	26
1L027	27 WATT LED	27
1L028	28 WATT LED	28
1L029	29 WATT LED	29
1L030	30 WATT LED	30
1L031	31 WATT LED	31
1L032	32 WATT LED	32
1L033	33 WATT LED	33
1L034	34 WATT LED	34
1L035	35 WATT LED	35
1L036	36 WATT LED	36
1L037	37 WATT LED	37
1L038	38 WATT LED	38
1L039	39 WATT LED	39
1L040	40 WATT LED	40
1L041	41 WATT LED	41
1L042	42 WATT LED	42
1L043	43 WATT LED	43
1L044	44 WATT LED	44
1L045	45 WATT LED	45
1L046	46 WATT LED	46
1L047	47 WATT LED	47
1L048	48 WATT LED	48
1L049	49 WATT LED	49
1L050	50 WATT LED	50
1L055	55 WATT LED	55
1L060	60 WATT LED	60
1L070	70 WATT LED	70
1L073	73 WATT LED	73
1L075	75 WATT LED	75
1L080	90 WATT LED	90
1L085	85 WATT LED	85

Device Code	Device Description	Rated Watts
1L090	90 WATT LED	90
LED Lighting Fixtures (cont.)		
1L095	95 WATT LED	95
1L100	100 WATT LED	100
1L106	106 WATT LED	106
1L107	107 WATT LED	107
1L116	116 WATT LED	116
1L120	120 WATT LED	120
1L125	125 WATT LED	125
1L130	130 WATT LED	130
1L135	135 WATT LED	135
1L140	140 WATT LED	140
1L145	145 WATT LED	145
1L150	150 WATT LED	150
1L155	155 WATT LED	155
1L160	160 WATT LED	160
1L165	165 WATT LED	165
1L170	170 WATT LED	170
1L175	175 WATT LED	175
1L180	180 WATT LED	180
1L185	185 WATT LED	185
1L190	190 WATT LED	190
1L200	200 WATT LED	200
1L210	210 WATT LED	210
1L220	220 WATT LED	220
1L240	240 WATT LED	240

Table 5: Retrofit Proposed Lighting Wattage Tables

Device Code	Device Description	Rated Watts
LED Exit Signs		
1E0002	2.0 WATT LED	2
1E0003	3.0 WATT LED	3
1E0005	5.0 WLED	5
1E0005C	0.5 WATT LEC	0.5
1E0008	8.0 WLED	8
1E0015	1.5 WATT LED	1.5
1E0105	10.5 WATT LED	10.5
Compact Fluorescents (CFL's)		
2C0007S	2/7W COMPACT HW	18
1C0005S	5W COMPACT HW	7
1C0007S	7W COMPACT HW	9
1C0009S	9W COMPACT HW	11
1C0011S	11W COMPACT HW	13
1C0013S	13W COMPACT HW	15
1C0018E	18W COMPACT HW ELIG	20
1C0018S	18W COMPACT HW	20
1C0022S	22W COMPACT HW	24
1C0023E	1/23W COMPACT HW ELIG	25
1C0026E	26W COMPACT HW ELIG	28
1C0026S	26W COMPACT HW	28
1C0028S	28W COMPACT HW	30
1C0032E	32W COMPACT HW ELIG	34
1C0032S	32W CIRCLINE HW	34
1C0042E	1/42W COMPACT HW ELIG	48
1C0044S	44W CIRCLINE HW	46
1C0057E	1/57W COMPACT HW ELIG	65
1C2232S	22/32W CIRCLINE HW	58
1C2D10E	10W 2D COMPACT HW ELIG	12
1C2D16E	16W 2D COMPACT HW ELIG	18
1C2D21E	21W 2D COMPACT HW ELIG	22
1C2D28E	28W 2D COMPACT HW ELIG	28
1C2D38E	38W 2D COMP.HW ELIG	36
1C3240S	32/40W CIRCLINE HW	80
2C0005S	2/5W COMPACT HW	14
2C0009S	2/9W COMPACT HW	22
2C0011S	2/11W COMPACT HW	26

Device Code	Device Description	Rated Watts
2C0013E	2/13W COMPACT HW ELIG	28
2C0013S	2/13W COMPACT HW	30
Compact Fluorescents (CFL's) (cont.)		
2C0018E	2/18W COMP. HW ELIG	40
2C0026E	2/26W COMP. HW ELIG	54
2C0032E	2/32W COMPACT HW ELIG	68
2C0042E	2/42W COMPACT HW ELIG	100
3C0009S	3/9W COMPACT HW	33
3C0013S	3/13W COMPACT HW	45
3C0018E	3/18W COMPACT HW ELIG	60
3C0026E	3/26W COMPACT HW ELIG	82
3C0032E	3/32W COMPACT HW ELIG	114
3C0042E	3/42W COMPACT HW ELIG	141
4C0018E	4/18W COMPACT HW ELIG	80
4C0026E	4/26W COMPACT HW ELIG	108
4C0032E	4/32W COMPACT HW ELIG	152
4C0042E	4/42W COMPACT HW ELIG	188
6C0026E	6/26W COMPACT HW ELIG	162
6C0032E	6/32W COMPACT HW ELIG	228
6C0042E	6/42W COMPACT HW ELIG	282
8C0026E	8/26W COMPACT HW ELIG	216
8C0032E	8/32W COMPACT HW ELIG	304
8C0042E	8/42W COMPACT HW ELIG	376
T5 Systems		
1F14SSE	1L2' 14W T5/ELIG	16
2F14SSE	2L2' 14W T5/ELIG	32
3F14SSE	3L2' 14W T5/ELIG	50
4F14SSE	4L2' 14W T5/ELIG	68
1F24HSE	1L2' 24W T5HO/ELIG	29
2F24HSE	2L2' 24W T5HO/ELIG	52
3F24HSE	3L2' 24W T5HO/ELIG	80
1F21SSE	1L3' 21W T5/ELIG	24
2F21SSE	2L3' 21W T5/ELIG	47
1F39HSE	1L3' 39W T5HO/ELIG	42
2F39HSE	2L3' 39W T5HO/ELIG	85
1F28SSE	1L4' 28W T5/ELIG	32
2F28SSE	2L4' 28W T5/ELIG	63
3F28SSE	3L4' 28W T5/ELIG	95
4F28SSE	4L4' 28W T5/ELIG	126

Device Code	Device Description	Rated Watts
6F28SSE	6L4' 28W T5/ELIG	189
1F47HSE	1L4' 47W T5HO/ELIG	53
2F47HSE	2L4' 47W T5HO/ELIG	103
3F47HSE	3L4' 47W T5HO/ELIG	157
T5 Systems (cont.)		
4F47HSE	4L4' 47W T5HO/ELIG	200
5F47HSE	5L4' 47W T5HO/ELIG	260
6F47HSE	6L4' 47W T5HO/ELIG	303
1F50HSE	1L4' 50W T5HO/ELIG	58
2F50HSE	2L4' 50W T5HO/ELIG	110
3F50HSE	3L4' 50W T5HO/ELIG	168
4F50HSE	4L4' 50W T5HO/ELIG	215
5F50HSE	5L4' 50W T5HO/ELIG	278
6F50HSE	6L4' 50W T5HO/ELIG	325
1F54HSE	1L4' 54W T5HO/ELIG	59
2F54HSE	2L4' 54W T5HO/ELIG	117
3F54HSE	3L4' 54W T5HO/ELIG	177
4F54HSE	4L4’ 54W T5HO/ELIG	234
5F54HSE	5L4' 54W T5HO/ELIG	294
6F54HSE	6L4’ 54W T5HO/ELIG	351
8F54HSE	8L4' 54W T5HO/ELIG	468
10F54HSE	10L4’ 54W T5HO/ELIG	585
Two Foot High Efficient T8 Systems		
1F17ESL	1L2' 17W T8EE/ELEE LOW PWR	14
1F17ESN	1L2' 17W T8EE/ELEE	17
1F17ESH	1L2' 17W T8EE/ELEE HIGH PWR	20
1F28BXE	1L2' F28BX/ELIG	32
2F17ESL	2L2' 17W T8EE/ELEE LOW PWR	27
2F17ESN	2L2' 17W T8EE/ELEE	32
2F17ESH	2L2' 17W T8EE/ELEE HIGH PWR	40
2F28BXE	2L2' F28BX/ELIG	63
3F17ESL	3L2' 17W T8EE/ELEE LOW PWR	39
3F17ESN	3L2' 17W T8EE/ELEE	46
3F17ESH	3L2' 17W T8EE/ELEE HIGH PWR	61
3F28BXE	3L2' F28BX/ELIG	94
Three Foot High Efficient T8 Systems		
1F25ESL	1L3' 25W T8EE/ELEE LOW PWR	21
1F25ESN	1L3' 25W T8EE/ELEE	24
1F25ESH	1L3' 25W T8EE/ELEE HIGH PWR	30

Device Code	Device Description	Rated Watts
2F25ESL	2L3' 25W T8EE/ELEE LOW PWR	40
2F25ESN	2L3' 25W T8EE/ELEE	45
2F25ESH	2L3' 25W T8EE/ELEE HIGH PWR	60
3F25ESL	3L3' 25W T8EE/ELEE LOW PWR	58
3F25ESN	3L3' 25W T8EE/ELEE	67
3F25ESH	3L3' 25W T8EE/ELEE HIGH PWR	90
Four Foot T8 High Efficient / Reduce Wattage Systems		
1F25EEH	1L4' 25W T8EE/ELEE HIGH PWR	30
1F25EEE	1L4' 25W T8EE/ELEE	22
1F25EEL	1L4' 25W T8EE/ELEE LOW PWR	19
2F25EEH	2L4' 25W T8EE/ELEE HIGH PWR	57
2F25EEE	2L4' 25W T8EE/ELEE	43
2F25EEL	2L4' 25W T8EE/ELEE LOW PWR	37
3F25EEH	3L4' 25W T8EE/ELEE HIGH PWR	86
3F25EEE	3L4' 25W T8EE/ELEE	64
3F25EEL	3L4' 25W T8EE/ELEE LOW PWR	57
4F25EEH	4L4' 25W T8EE/ELEE HIGH PWR	111
4F25EEE	4L4' 25W T8EE/ELEE	86
4F25EEL	4L4' 25W T8EE/ELEE LOW PWR	75
1F28EEH	1L4' 28W T8EE/ELEE HIGH PWR	33
1F28EEE	1L4' 28W T8EE/ELEE	24
1F28EEL	1L4' 28W T8EE/ELEE LOW PWR	22
2F28EEH	2L4' 28WT8EE/ELEE HIGH PWR	64
2F28EEE	2L4' 28W T8EE/ELEE	48
2F28EEL	2L4' 28W T8EE/ELEE LOW PWR	42
3F28EEH	3L4' 28W T8EE/ELEE HIGH PWR	96
3F28EEE	3L4' 28W T8EE/ELEE	72
3F28EEL	3L4' 28W T8EE/ELEE LOW PWR	63
4F28EEH	4L4' 28W T8EE/ELEE HIGH PWR	126
4F28EEE	4L4' 28W T8EE/ELEE	94
4F28EEL	4L4' 28W T8EE/ELEE LOW PWR	83
1F30EEH	1L4' 30W T8EE/ELEE HIGH PWR	36
1F30EEE	1L4' 30W T8EE/ELEE	26
1F30EEL	1L4' 30W T8EE/ELEE LOW PWR	24
2F30EEH	2L4' 30WT8EE/ELEE HIGH PWR	69
2F30EEE	2L4' 30W T8EE/ELEE	52
2F30EEL	2L4' 30W T8EE/ELEE LOW PWR	45
3F30EEH	3L4' 30W T8EE/ELEE HIGH PWR	103
3F30EEE	3L4' 30W T8EE/ELEE	77

Device Code	Device Description	Rated Watts
3F30EEL	3L4' 30W T8EE/ELEE LOW PWR	68
4F30EEH	4L4' 30W T8EE/ELEE HIGH PWR	133
4F30EEE	4L4' 30W T8EE/ELEE	101
4F30EEL	4L4' 30W T8EE/ELEE LOW PWR	89
1F32EEH	1L4' 32W T8EE/ELEE HIGH PWR	38
1F32EEE	1L4' 32W T8EE/ELEE	28
1F32EEL	1L4' 32W T8EE/ELEE LOW PWR	25
2F32EEH	2L4' 32W T8EE/ELEE HIGH PWR	73
2F32EEE	2L4' 32W T8EE/ELEE	53
Four Foot T8 High Efficient / Reduce Wattage Systems (cont.)		
2F32EEL	2L4' 32W T8EE/ELEE LOW PWR	47
3F32EEH	3L4' 32W T8EE/ELEE HIGH PWR	109
3F32EEE	3L4' 32W T8EE/ELEE	82
3F32EEL	3L4' 32W T8EE/ELEE LOW PWR	72
4F32EEH	4L4' 32W T8EE/ELEE HIGH PWR	141
4F32EEE	4L4' 32W T8EE/ELEE	107
4F32EEL	4L4' 32W T8EE/ELEE LOW PWR	95
6F32EEH	6L4' 32W T8EE/ELEE HIGH PWR	218
6F32EEE	6L4' 32W T8EE/ELEE	168
6F32EEL	6L4' 32W T8EE/ELEE LOW PWR	146
Eight Foot T8 Systems		
1F59SSE	1L8' T8/ELIG	60
1F80SSE	1L8' T8 HO/ELIG	85
2F59SSE	2L8' T8/ELIG	109
2F59SSL	2L8' T8/ELIG LOW PWR	100
2F80SSE	2L8' T8 HO/ELIG	160
LED Lighting Fixtures		
1L002	2 WATT LED	2
1L003	3 WATT LED	3
1L004	4 WATT LED	4
1L005	5 WATT LED	5
1L006	6 WATT LED	6
1L007	7 WATT LED	7
1L008	8 WATT LED	8
1L009	9 WATT LED	9
1L010	10 WATT LED	10
1L011	11 WATT LED	11
1L012	12 WATT LED	12
1L013	13 WATT LED	13

Device Code	Device Description	Rated Watts
1L014	14 WATT LED	14
1L015	15 WATT LED	15
1L016	16 WATT LED	16
1L017	17 WATT LED	17
1L018	18 WATT LED	18
1L019	19 WATT LED	19
1L020	20 WATT LED	20
1L021	21 WATT LED	21
1L022	22 WATT LED	22
1L023	23 WATT LED	23
LED Lighting Fixtures (cont.)		
1L024	24 WATT LED	24
1L025	25 WATT LED	25
1L026	26 WATT LED	26
1L027	27 WATT LED	27
1L028	28 WATT LED	28
1L029	29 WATT LED	29
1L030	30 WATT LED	30
1L031	31 WATT LED	31
1L032	32 WATT LED	32
1L033	33 WATT LED	33
1L034	34 WATT LED	34
1L035	35 WATT LED	35
1L036	36 WATT LED	36
1L037	37 WATT LED	37
1L038	38 WATT LED	38
1L039	39 WATT LED	39
1L040	40 WATT LED	40
1L041	41 WATT LED	41
1L042	42 WATT LED	42
1L043	43 WATT LED	43
1L044	44 WATT LED	44
1L045	45 WATT LED	45
1L046	46 WATT LED	46
1L047	47 WATT LED	47
1L048	48 WATT LED	48
1L049	49 WATT LED	49
1L050	50 WATT LED	50
1L055	55 WATT LED	55

Device Code	Device Description	Rated Watts
1L060	60 WATT LED	60
1L070	70 WATT LED	70
1L073	73 WATT LED	73
1L075	75 WATT LED	75
1L080	90 WATT LED	90
1L085	85 WATT LED	85
1L090	90 WATT LED	90
1L095	95 WATT LED	95
1L100	100 WATT LED	100
1L106	106 WATT LED	106
1L107	107 WATT LED	107
1L116	116 WATT LED	116
1L120	120 WATT LED	120
LED Lighting Fixtures (cont.)		
1L125	125 WATT LED	125
1L130	130 WATT LED	130
1L135	135 WATT LED	135
1L140	140 WATT LED	140
1L145	145 WATT LED	145
1L150	150 WATT LED	150
1L155	155 WATT LED	155
1L160	160 WATT LED	160
1L165	165 WATT LED	165
1L170	170 WATT LED	170
1L175	175 WATT LED	175
1L180	180 WATT LED	180
1L185	185 WATT LED	185
1L190	190 WATT LED	190
1L200	200 WATT LED	200
1L210	210 WATT LED	210
1L220	220 WATT LED	220
1L240	240 WATT LED	240
Electronic Metal Halide Lamps		
1M0150E	150W METAL HALIDE EB	160
1M0200E	200W METAL HALIDE EB	215
1M0250E	250W METAL HALIDE EB	270
1M0320E	320W METAL HALIDE EB	345
1M0350E	350W METAL HALIDE EB	375
1M0400E	400W METAL HALIDE EB	430

Device Code	Device Description	Rated Watts
1M0450E	400W METAL HALIDE EB	480
MH Track Lighting		
1M0020E	20W MH SPOT	25
1M0025E	25W MH SPOT	25
1M0035E	35W MH SPOT	44
1M0039E	39W MH SPOT	47
1M0050E	50W MH SPOT	60
1M0070E	70W MH SPOT	80
1M0100E	100W MH SPOT	111
1M0150E	150W MH SPOT	162

Table 6a: Upstream Lighting Savings[1]

Product type	Category	Installation Rate	Gross kW Saved per Unit	HVAC Interactive Effect (kWh)
G24 LED	4	49%	0.0216	103%
A-line, 40/60w	4	49%	0.0306	103%
A-line, 75/100w	4	49%	0.043	103%
Decoratives	4	49%	0.0192	103%
LED Retrofit kit, <25W	2	98%	0.0434	103%
LED Retrofit kit, >25W	2	98%	0.0561	103%
MR16	4	49%	0.0311	103%
PAR20	4	49%	0.0396	103%
PAR30	4	49%	0.0537	103%
PAR38	4	49%	0.0623	103%
Stairwell Kit, 2ft w/sensor	2	97%	0.0358[2]	100%[2]
Stairwell Kit, 4ft w/sensor	2	97%	0.0309[2]	100%[2]
TLED, 2ft	1	96%	0.0079	102%
TLED, 4ft	1	96%	0.0158	102%

(1) Values in the table are from DNV (2021). Impact Evaluation of PY2019 Rhode Island C&I Upstream Lighting Initiative.

(2) Controls were not updated as part of the aforementioned study.

Table 6b: Upstream Lighting Hours of Use

Building Type	Hours of Use[1]
College & University	4,132
Grocery/Food Sales	5,920
Hospital	5,601
Industrial/Manufacturing	5,229
K-12 School	2,902
Lodging	4,194
Medical Office	3,673
Office Building	4,171
Other	4,141
Parking Garage	8,760
Restaurant/Food Service	4,891
Retail	4,957
Warehouse and storage	6,512

(1) DNV (2021). Impact Evaluation of PY2019 Rhode Island C&I Upstream Lighting Initiative.

Table 7: Efficiency Requirements for C&I Air Conditioning[c]

Equipment Type	Size Category	Heading Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
Air conditioners, air cooled	< 65,000 Btu/h	All	Split system, three phase, and applications outside US single phase[b]	13.4 SEER2	AHRI 210/240-2023
			Single-package, three phase, and applications outside US single phase[b]	13.4 SEER2	AHRI 210/240-2023
Space constrained, air cooled	≤ 30,000 Btu/h	All	Split system, three phase, and applications outside US single phase[b]	11.7 SEER2	AHRI 210/240-2023
			Single-package, three phase, and applications outside US single phase[b]	11.7 SEER2	AHRI 210/240-2023
Small duct high velocity, air cooled	< 65,000 Btu/h	All	Split system, three phase, and applications outside US single phase[b]	12.0 SEER2	AHRI 210/240-2023
Air conditioners, water cooled	< 65,000 Btu/h	All	Split system and single package	12.1 IEER 12.3 IEER	AHRI 210/240
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)		12.1 IEER 13.9 IEER	AHRI 340/360
		All other		11.9 EER 13.7 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric resistance (or none)		12.5 EER 13.9 IEER	
		All other		12.3 EER 13.7 IEER	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Electric resistance (or none)		12.4 EER 13.6 IEER	
		All other		12.2 EER 13.5 IEER	
	≥ 760,000 Btu/h	Electric resistance (or none)		12.2 EER 13.5 IEER	
		All other		12.0 EER 13.3 IEER	

Equipment Type	Size Category	Heading Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
Air conditioners, evaporatively cooled	< 65,000 Btu/h[b]	All	Split system and single package	12.1 EER 12.3 IEER	AHRI 340/360
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)		12.1 EER 12.3 IEER	
		All other		11.9 EER 12.1 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric resistance (or none)		12.0 EER 12.2 IEER	
		All other		11.8 EER 12.0 IEER	
	≥ 240,000 Btu/h and < 760,000	Electric resistance (or none)		11.9 EER 12.1 IEER	
		All other		11.7 EER 11.9 IEER	
	≥ 760,000 Btu/h	Electric resistance (or none)		11.7 EER 11.9 IEER	
		All other		11.5 EER 11.7 IEER	
Condensing units, air cooled	≥ 135,000 Btu/h	-	-	10.5 EER 11.8 IEER	AHRI 365
Condensing units, water cooled	≥ 135,000 Btu/h	-	-	13.5 EER 14.0 IEER	AHRI 365
Condensing units, evaporatively cooled	≥ 135,000 Btu/h	-	-	13.5 EER 14.0 IEER	AHRI 365

From IECC 2024 Table C403.3.2(1)

For SI: 1 British thermal unit per hour = 0.2931 W

a. Chapter 6 contains a complete specification for referenced standards, which include test procedures, including the reference year version of the test procedure.

b. Single-phase, US air-cooled heat pumps less than 65,000 Btu/h are regulated as consumer products by the US Department of Energy Code of Federal Regulations DOE 10 CFR 430. SEER, SEER2, HSPF values for single-phase products are set by the US Department of Energy.

c. DOE 10 CFR 430 Subpart B Appendix M1 includes the test procedure updates effective January 1, 2023, documented in AHRI 210/240 – 2023.

Table 8: Efficiency Requirements for C&I Heat Pumps

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
Air cooled (cooling mode)	< 65,000 Btu/h	All	Split system, three phase, and applications outside US single phase[b]	14.3 SEER2	AHRI 210/240-2023
			Single-package, three phase, and applications outside US single phase[b]	13.4 SEER2	
Space constrained, air cooled (cooling mode)	≤ 30,000 Btu/h	All	Split system, three phase, and applications outside US single phase[b]	11.7 SEER2	AHRI 210/240-2023
			Single-package, three phase, and applications outside US single phase[b]	11.7 SEER2	
Small duct high velocity, air cooled (cooling mode)	< 65,000 Btu/h	All	Split system, three phase, and applications outside US single phase[b]	12.0 SEER2	AHRI 210/240-2023
Air Cooled (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)	Split system and single package	14.1 IEER	AHRI 340/360
		All other		13.9 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric resistance (or none)		13.5 IEER	
		All other		13.3 IEER	
	≥ 240,000 Btu/h	Electric resistance (or none)		12.5 IEER	
		All other		12.3 IEER	
Air cooled (heating mode)	< 65,000 Btu/h (cooling capacity)	-	Split system, three phase, and applications outside US single phase[b]	7.5 HSPF2	AHRI 210/240-2023
			Single-package, three phase, and applications outside US single phase[b]	6.7 HSPF2	

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
Space constrained, air cooled (heating mode)	≤ 30,000 Btu/h (cooling capacity)	-	Split system, three phase, and applications outside US single phase[b]	6.3 HSPF2	AHRI 210/240-2023
			Single-package, three phase, and applications outside US single phase[b]	6.3 HSPF2	
Small duct high velocity, air cooled (heating mode)	< 65,000 Btu/h	-	Split system, three phase, and applications outside US single phase[b]	6.1 HSPF2	AHRI 210/240-2023
Air cooled (heating mode)	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	-	47°F db/43°F wb outdoor air	3.40 COP_H	AHRI 340/360
			17°F db/15°F wb outdoor air	2.25 COP_H	
	≥ 135,000 Btu/h and < 240,000 Btu/h (cooling capacity)		47°F db/43°F wb outdoor air	3.30 COP_H	
			17°F db/15°F wb outdoor air	2.05 COP_H	
	≥ 240,000 Btu/h (cooling capacity)		47°F db/43°F wb outdoor air	3.20 COP_H	
			17°F db/15°F wb outdoor air	2.05 COP_H	

From IECC 2024 Table C403.3.2(2)

For SI: 1 British thermal unit per hour = 0.2931 W, °C = (°F-32)/1.8, wb= wet bulb, db = dry bulb

a. Chapter 6 contains a complete specification for referenced standards, which include test procedures, including the reference year version of the test procedure.
b. Single-phase, US air-cooled heat pumps less than 65,000 Btu/h are regulated as consumer products by the US Department of Energy Code of Federal Regulations DOE 10 CFR 430. SEER, SEER2, HSPF values for single-phase products are set by the US Department of Energy.
c. DOE 10 CFR 430 Subpart B Appendix M1 includes the test procedure updates effective January 1, 2023, documented in AHRI 210/240 – 2023.

Table 9: Water Chilling Packages - Minimum Efficiency Requirements[a,b,e]

Equipment Type	Size Category	Units	Path A	Path B	Test Procedure[c]
Air cooled	< 150 tons	EER (Btu/Wh)	≥ 10.100 FL	≥ 9.700 FL	AHRI 550/590
			≥ 13.700 IPV.IP	≥ 15.800 IPV.IP	
	≥ 150 tons		≥ 10.100 FL	≥ 9.700 FL	
			≥ 14.000 IPV.IP	≥ 16.100 IPV.IP	
Air cooled without condenser,	All capacities	EER (Btu/Wh)	Air-cooled without condenser must be rated with matching condensers		AHRI 550/590

Equipment Type	Size Category	Units	Path A	Path B	Test Procedure[c]
electrically operated			and comply with air-cooled chiller efficiency requirements		
Liquid-cooled, electrically operated positive displacement	< 75 tons	kW/ton	≤ 0.750 FL	≤ 0.780 FL	AHRI 550/590
			≤ 0.600 IPLV.IP	≤ 0.500 IPLV.IP	
	≥ 75 tons and < 150 tons		≤ 0.750 FL	≤ 0.780 FL	
			≤ 0.560 IPLV.IP	≤ 0.490 IPLV.IP	
	≥ 150 tons and < 300 tons		≤ 0.750 FL	≤ 0.780 FL	
			≤ 0.540 IPLV.IP	≤ 0.440 IPLV.IP	
	≥ 300 tons and < 600 tons		≤ 0.750 FL	≤ 0.780 FL	
			≤ 0.520 IPLV.IP	≤ 0.410 IPLV.IP	
	≥ 600 tons		≤ 0.750 FL	≤ 0.780 FL	
			≤ 0.500 IPLV.IP	≤ 0.380 IPLV.IP	
Liquid-cooled, electrically operated centrifugal	< 150 tons	kW/ton	≤ 0.610 FL	≤ 0.695 FL	AHRI 550/590
			≤ 0.550 IPLV.IP	≤ 0.440 IPLV.IP	
	≥ 150 tons and < 300 tons		≤ 0.610 FL	≤ 0.635 FL	
			≤ 0.550 IPLV.IP	≤ 0.400 IPLV.IP	
	≥ 300 tons and < 400 tons		≤ 0.560 FL	≤ 0.595 FL	
			≤ 0.520 IPLV.IP	≤ 0.390 IPLV.IP	
	≥ 400 tons and < 600 tons		≤ 0.560 FL	≤ 0.585 FL	
			≤ 0.500 IPLV.IP	≤ 0.380 IPLV.IP	
	≥ 600 tons		≤ 0.560 FL	≤ 0.585 FL	
			≤ 0.500 IPLV.IP	≤ 0.380 IPLV.IP	
Air cooled absorption, single effect	All capacities	COP (W/W)	≥ 0.600 FL	NA[d]	AHRI 560
Liquid cooled absorption, single effect	All capacities	COP (W/W)	≥ 0.700 FL	NA[d]	AHRI 560
Absorption double effect, indirect fired	All capacities	COP (W/W)	≥ 1.000 FL	NA[d]	AHRI 560
			≥ 0.150 IPLV.IP		
Absorption double effect, direct fired	All capacities	COP (W/W)	≥ 1.000 FL	NA[d]	AHRI 560
			≥ 1.000 IPLV		

From IECC 2024 – Table C403.3.2(3) Liquid-Chilling Packages – Minimum Efficiency Requirements

a. Chapter 6 contains a complete specification for referenced standards, which include test procedures, including the reference year version of the test procedure.
b. The requirements for centrifugal chillers shall be adjusted for nonstandard rating conditions per Section C403.3.2.1 and are applicable only for the range of conditions listed there. The requirements for air-cooled, water-cooled positive displacement and absorption chillers are at a standard rating condition defined in the reference test procedure.
c. Both the full-load and IPLV.OP requirements must be met or exceeded with this standard. When there is Path B, compliance can be with either Path A or Path B for any application.
d. NA means the requirements are not applicable for Path A or Path B for any application.
e. FL is the full-load performance requirements, and IPLV.IP is for the part-load performance requirements.

Table 10: Cooling and Heating Equivalent Full Load Hours

Building (or Space) Type	Cooling Full Load Hours ($EFLH_{cool}$)[a]	Heating Full Load Hours ($EFLH_{heat}$)[b]
Rhode Island Energy (NE – South Coastal)	817	1137

a. Average Cooling EFLHs from the 2010 NEEP HVAC Loadshape study.
b. Average Heating EFLHs derived from 2010 NEEP HVAC Loadshape study and the Connecticut Program Savings Document for 2011 Program Year.

Table 11: Baseline Efficiency Requirements for C&I Gas-Fired Boilers

Equipment Type	Subcategory	Size Category (Input)	Baseline Efficiency[a]	Minimum Efficiency[b]
Boilers, hot water	Gas-fired	<300,000 Btu/h	85% AFUE	90% AFUE for Tier 1 95% AFUE for Tier 2
		>=300,000 Btu/h and <=2,000,000 Btu/h	85% AFUE	90% E_t

a. NMR (2017). Gas Boiler Market Characterization Study Phase II – Final Report.
b. Annual Fuel Utilization Efficiency (AFUE), Thermal efficiency (Et)

Table 12: Large C&I Retrofit, Prescriptive Lighting

Measure	RRe	RR sp	RR wp	Measure Life	Source/Notes for Measure Life
Daylight Dimming Controls	92.9%	99.2%	99.2%	9	c
Integrated Controls	92.9%	99.2%	99.2%	11	c
Occupancy Sensors Controls	100%	93.6%	93.6%	9	c
Exterior Fixtures 24/7	92.9%	99.2%	99.2%	5	b
Exterior Controls, Photocells	100%	98.2%	98.2%	9	c
Exterior Fixtures, Dusk/Dawn	92.9%	99.2%	99.2%	5	b
Exterior Controls, Streetlights	92.9%	99.2%	99.2%	9	c
Compact Fluorescents	92.9%	99.2%	99.2%	1	d
High Intensity Discharge Systems	107%	107%	107%	5	b
Fluorescent System w/Ballast	92.9%	99.2%	99.2%	3	d
Case Refrigeration lighting	92.9%	99.2%	99.2%	3	d
General lighting	92.9%	99.2%	99.2%	3	d
Replacement Lighting	92.9%	99.2%	99.2%	3	d
LED Exit Signs	103.2%	96.1%	96.1%	3	d

a. Realization Rate entries come from the 2022 BC Model and are the weighted average from 2018 pre post.
b. DNV (2022). Rhode Island C&I Lighting Market Characterization and Adjusted Measure Life Study.
c. Dan Mellinger's Lighting Control Measure Life Memo
d. DNV (2024). Rhode Island C&I Lighting Adjusted Measure Life Study Refresh.

Table 13: Large C&I New Construction, Prescriptive Lighting

Measure	RRe	RR sp	RR wp	NTG	Measure Life	Source / Notes for Measure Life
Daylight Dimming Controls	94.8%	99.6%	99.6%	75.7%	9	c
Integrated Controls	94.8%	99.6%	99.6%	75.7%	11	c
Occupancy Sensors Controls	108%	108%	108%	75.7%	9	c
Exterior Fixtures 24/7	94.8%	99.6%	99.6%	75.7%	15	b
Exterior Controls, Photocells	78%	78%	78%	75.7%	9	c
Exterior Fixtures, Dusk/Dawn	94.8%	99.6%	99.6%	75.7%	15	b
Exterior Controls, Streetlights	94.8%	99.6%	99.6%	75.7%	9	c
Compact Fluorescents	94.8%	99.6%	99.6%	75.7%	11	e
High Intensity Discharge Systems	94.8%	99.6%	99.6%	75.7%	15	b
Fluorescent System w/Ballast	94.8%	99.6%	99.6%	75.7%	11	e
Case Refrigeration lighting	94.8%	99.6%	99.6%	75.7%	11	e
General lighting	94.8%	99.6%	99.6%	75.7%	11	e
Replacement Lighting	94.8%	99.6%	99.6%	75.7%	3	e
LED Exit Signs	94.8%	99.6%	99.6%	75.7%	11	e

a. Realization Rate entries come from PY2019 C&I Free-Ridership and Spillover Study. Prepared by Tetra Tech.
b. DNV (2022). Rhode Island C&I Lighting Market Characterization and Adjusted Measure Life Study.
c. Dan Mellinger's Lighting Control Measure Life Memo
d. Based on MA 2023 BC Model. Assuming all Design 2000 lighting is for new building and major renovation.
e. DNV (2024). Rhode Island C&I Lighting Adjusted Measure Life Study Refresh.

Table 14: High Efficiency Condensing Unit

For the upstream HECU measure, prescriptive deemed savings are claimed based on a unit's temperature application, power phase requirements and compressor horsepower rating. For the purposes of the TRM, horsepower ratings are specified in 1/2 horsepower increments. In the event a qualifying unit falls somewhere in the middle of an established category, it will be assigned to the closest category with the most conservative total kWh savings.

HECU Electric Demand Savings

The tabulated energy savings values for each of the three components of the HECU (scroll compressor, compressor fans, floating head pressure controls) were divided by their respective annual full load operation hours, as described in the following table:

Component	Annual Full Operating Hours	Source
Scroll Compressor	2913 (w/ Economizer), 3910 (w/o Economizer)	EVT Refrigeration Analysis Tool (CATInput worksheet)
Compressor Fan(s)	6087	As derived in HECU Compressor Fan Loadshape F
Floating Head Pressure Controls	7221	EVT Refrigeration Analysis Tool (CATInput worksheet)

The resulting connected load savings is shown in the following table. Units are in kW. For the purposes of coincident peak demand savings claims, the savings for each component will be treated separately against its respective loadshape, as described in the load shape section.

Temp	Phase	HP	Scroll Compressor	Condenser Fan(s)	Floating Head Pressure Controls	Total (kW)
Medium	1	1	0.21997	0.07605	0.12982	0.42585
		1.5	0.16477	0.08149	0.15421	0.40047
		2	0.19216	0.09504	0.17984	0.46704
		2.5	0.22508	0.11132	0.21065	0.54705
		3	0.21755	0.14153	0.28241	0.64149
		3.5	0.30964	0.16165	0.30956	0.78086
		4	0.34246	0.17879	0.34237	0.86362
		4.5	0.34856	0.18197	0.34847	0.87901
		5	0.22508	0.18197	0.38505	0.82928
	3	1	0.15623	0.06806	0.11695	0.34125
		1.5	0.13245	0.07799	0.14330	0.35374
		2	0.15447	0.09095	0.16712	0.41255
		2.5	0.18093	0.10654	0.19576	0.48323
		3	0.18620	0.13028	0.24637	0.56284
		3.5	0.27717	0.14907	0.26912	0.69535
		4	0.30654	0.16487	0.29764	0.76905
		4.5	0.31200	0.16780	0.30294	0.78275
		5	0.27084	0.18512	0.34883	0.80478
Low	1	2	0.12604	0.09116	0.16728	0.38449
		2.5	0.11317	0.10645	0.20257	0.42219

		3	0.12627	0.11877	0.22601	0.47105
		3.5	0.15284	0.14376	0.27357	0.57016
		4.5	0.15564	0.15828	0.30390	0.61783
	3	2	0.09065	0.08296	0.15547	0.32908
		2.5	0.09374	0.09918	0.18896	0.38187
		3	0.10458	0.11065	0.21082	0.42606
		3.5	0.12659	0.13394	0.25518	0.51571
		4.5	0.16792	0.15403	0.28875	0.61070

HECU Electric Energy Savings

The following table outlines the energy savings associated with each specified unit. Units are in kWh.

Temp	Phase	HP	Scroll Compressor	Condenser Fan(s)	Floating Head Pressure Controls	Total (kWh)
Medium	1	1	838.1	462.9	937.5	2238.5
		1.5	627.8	496.0	1113.5	2237.4
		2	732.2	578.5	1298.6	2609.3
		2.5	857.6	677.6	1521.1	3056.3
		3	828.9	861.5	2039.3	3729.7
		3.5	1179.8	984.0	2235.4	4399.1
		4	1304.9	1088.3	2472.3	4865.4
		4.5	1328.1	1107.7	2516.3	4952.1
		5	971.9	1151.4	2780.5	4903.8
	3	1	595.3	414.3	844.5	1854.1
		1.5	504.7	474.7	1034.8	2014.2
		2	588.6	553.6	1206.8	2349.0
		2.5	689.4	648.5	1413.6	2751.4
		3	709.4	793.0	1779.0	3281.5
		3.5	1056.0	90.4	1943.3	3906.7
		4	1168.0	1003.5	2149.3	4320.8
		4.5	1188.8	1021.4	2187.6	4397.8
		5	1032.0	1126.8	2518.9	4677.6
Low	1	2	521.7	554.9	1208.0	2284.5
		2.5	468.4	648.0	1462.8	2579.2
		3	522.6	722.9	1632.0	2877.6
		3.5	632.6	875.1	1975.4	3483.1
		4.5	644.2	963.5	2194.5	3802.2
	3	2	375.2	505.0	1122.7	2002.8
		2.5	388.0	603.7	1364.5	2356.1
		3	432.9	673.5	1522.3	2628.7
		3.5	523.9	815.3	1842.7	3181.9
		4.5	695.0	937.6	2085.1	3717.7

Table 15: Low Pressure Drop Filter NEMA Premium Motor Full Load Efficiency

HP	Efficiency
15	92.4%
20	93.0%
25	93.6%
30	93.6%
40	94.1%
50	94.5%
60	95.0%
75	95.4%

Source: U.S. Department of Energy (2014). Premium Efficiency Motor Selection and Application Guide. https://www.energy.gov/eere/amo/articles/premium-efficiency-motor-selection-and-application-guide-handbook-industry

Table 16: HVAC Interactive Lighting Effects for C&I Lighting

Program	Lighting Type	Gas Impact (MMBtu/ΔkWh)[i]	Oil Impact (MMBtu/ΔkWh)[i]
C&I New Construction	Lighting Systems	-0.00043	-0.00083
	Lighting Controls	-0.00028	-0.00055
	Upstream Lighting - LEDs	-0.00050[ii]	
	Upstream Lighting - Fluorescents	-0.00039	-0.00077
C&I Retrofit	Lighting Systems	-0.00043	-0.00083
	Lighting Controls	-0.00028	-0.00055

[i] C&I Lighting Interactive Effects 2015
[ii] Heating interactive effect; DNV-GL (2018), Impact Evaluation of PY2015 C&I Upstream Lighting

Table 17: Savings Factors for C&I VSDs (kWh/HP and kW/HP)

	Building Exhaust Fan	Cooling Tower Fan	Chilled Water Pump	Boiler Feed Water Pump	Hot Water Circulating. Pump	MAF - Make-up Air Fan	Return Fan	Supply Fan	WS Heat Pump Circulating Loop
Annual Energy Savings Factors (kWh/HP)									
University/College	3,641	449	745	2,316	2,344	3,220	1,067	1,023	3,061
Elm/H School	3,563	365	628	1,933	1,957	3,402	879	840	2,561
Multi-Family	3,202	889	1,374	2,340	2,400	3,082	1,374	1,319	3,713
Hotel/Motel	3,151	809	1,239	2,195	2,239	3,368	1,334	1,290	3,433
Health	3,375	1,705	2,427	2,349	2,406	3,002	1,577	1,487	3,670
Warehouse	3,310	455	816	2,002	2,087	3,229	1,253	1,205	2,818
Restaurant	3,440	993	1,566	1,977	2,047	2,628	1,425	1,363	3,542
Retail	3,092	633	1,049	1,949	2,000	2,392	1,206	1,146	2,998

Grocery	3,126	918	1,632	1,653	1,681	2,230	1,408	1,297	3,285
Offices	3,332	950	1,370	1,866	1,896	3,346	1,135	1,076	3,235
Summer Demand Savings Factors (kW/HP_{SP})									
University/College	0.109	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Elm/H School	0.377	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Multi-Family	0.109	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Hotel/Motel	0.109	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Health	0.109	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Warehouse	0.109	-0.023	0.173	0.457	0.091	0.261	0.287	0.273	0.218
Restaurant	0.261	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Retail	0.109	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Grocery	0.261	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Offices	0.109	-0.023	0.173	0.457	0.091	0.109	0.287	0.273	0.218
Winter Demand Savings Factors (kW/HP_{WP})									
University/College	0.377	-0.006	0.184	0.457	0.210	0.109	0.260	0.252	0.282
Elementary/High School	0.457	-0.006	0.184	0.457	0.210	0.109	0.260	0.252	0.282
Multi-Family	0.109	-0.006	0.184	0.355	0.210	0.109	0.260	0.252	0.282
Hotel/Motel	0.109	-0.006	0.184	0.418	0.210	0.109	0.260	0.252	0.282
Health	0.377	-0.006	0.184	0.275	0.210	0.109	0.260	0.252	0.282
Warehouse	0.377	-0.006	0.184	0.178	0.210	0.261	0.260	0.252	0.282
Restaurant	0.109	-0.006	0.184	0.355	0.210	0.109	0.260	0.252	0.282
Retail	0.109	-0.006	0.184	0.275	0.210	0.109	0.260	0.252	0.282
Grocery	0.457	-0.006	0.184	0.418	0.210	0.109	0.260	0.252	0.282
Offices	0.457	-0.006	0.184	0.418	0.210	0.109	0.260	0.252	0.282

Source: Chan, Tumin (2010). Formulation of a Prescriptive Incentive for the VFD and Motors & VFD impact tables at NSTAR. Prepared for NSTAR.

Table 18a: Hand Dryers – Cycles per Day and Occupied Days per Year Assumptions

Usage	Example Building Types	Cycles per Day	Occupied Days per Year (DPY)	Occupied Hours per Day	Coincidence Factor (CF)
Low	Office, Warehouse	50	250	8	0.04
Moderate	Restaurant, Small Grocery, Small Retail	125	365	15	0.09
High (<12 hr/day)	K-12 School, University, Conference Center	250	200	9	0.16
High (>=12 hr/day)	Large Grocery, Retail Department Store	375	365	13	0.29
Heavy - Intermittent	Stadium, Theater, Place of Worship	250	80	6	0.10

Heavy Duty - 24/7	Transportation Center, Airport	750	365	23	0.34

Source: IL TRM v.12.0. 4.8.26 Energy Efficient Hand Dryers. IL-TRM-Version-12.0-Volumes-1-4-Compiled-Final.pdf (ilsag.info)

Table 18b: Hand Dryers Cycle Time Assumptions

Assumptions	Cycle Time (seconds)
Baseline/Existing	37
Efficient/New	12

Source: IL TRM v.12.0. 4.8.26 Energy Efficient Hand Dryers. IL-TRM-Version-12.0-Volumes-1-4-Compiled-Final.pdf (ilsag.info)

Table 19: Default Values for Conventional and HVLS Fan Wattages

Fan Diameter (ft)	$W_{conventional}$	W_{HLVS}
≥ 8 and <10	2,227	377
≥ 10 and <12	2,784	471
≥ 12 and <14	3,341	565
≥ 14 and <16	3,898	659
≥ 16 and <18	4,497	761
≥ 18 and <20	5,026	850
≥ 20 and <24	5,555	940
≥ 24	6,613	1,119

Source: PA 2021 TRM: Technical Reference Manual | PA PUC

Table 20: High Efficiency Evaporator Unit Deemed Savings

# of Fan Evaporator(s)	kW Savings	kWh Savings
1	0.4818	1,067
2	0.8877	1,495
3	1.2936	1,923
4	1.6995	2,351
5	2.1054	2,779
6	2.5113	3,207

Source: 2023 VT TRM
https://publicservice.vermont.gov/sites/dps/files/documents/Efficiency%20Vermont%202022%20Savings%20Verification%20TRM.pdf

Table 21: Commercial Programmable Thermostats Savings

Measure Name	SAVEkWh(kWh/SqFt)	SAVEkW(kW/SqFt)
PT* - Cool Only No Existing Control	0.539	0.000
PT - Cool Only Erratic Existing Control	0.154	0.000
PT - Heat Only No Existing Control	0.418	0.000
PT - Heat Only Erratic Existing Control	0.119	0.000
PT - Cool and Heat No Existing Control	0.957	0.000
PT - Cool and Heat Erratic Existing Control	0.273	0.000

Source: MA Common Assumption

*PT = Programmable Thermostat

Appendix B: Non-Energy Impacts

Table 1: Annual per kWh Non-Energy Impacts for Commercial and Industrial Electric Programs

Program		End Use	NEI	Annual $/kWh	Source
New Construction	Prescriptive	Lighting	O&M	0.020	1
		Motors/Drives	O&M, Non-O&M	0.003	3
		EMS	O&M, Non-O&M	0.111	3
		Envelope	O&M, Non-O&M	0.11	3
		Lighting Controls	O&M, Non-O&M	0.07	3
		Refrigeration	O&M, H&S, etc.	0.001	3
		Food Service	O&M, H&S, etc.	0.01	3
	Custom	EMS	O&M, Non-O&M	0.037	3
		Envelope	O&M, Non-O&M	0.036	3
		Lighting Controls	O&M, Non-O&M	0.087	3
		Refrigeration	O&M, Non-O&M	0.012	3
		Process	O&M, Non-O&M	0.091	3
		HVAC	O&M, Non-O&M	0.02	3
		Motors/Drives	O&M, Non-O&M	0.018	3
		Compressed Air	O&M	0.026	1
		Food Service	O&M, H&S, etc.	0.01	3
Retrofit	Prescriptive	HVAC	Administrative costs, other costs, other labor costs, O&M, rent revenue	0.11	2
		Lighting	Administrative costs, material handling, material movement, other labor costs, O&M, sales revenue, waste disposal	0.027	2
		Refrigeration	Administrative costs, material handling, material movement, other costs, other labor costs, O&M, product spoilage, rent revenue, sales revenue,	0.047	2
		EMS	O&M, Non-O&M	0.116	3
		Envelope	O&M, Non-O&M	0.119	3
		Lighting Controls	O&M, Non-O&M	0.101	3

Program		End Use	NEI	Annual $/kWh	Source
		Motors/Drives	O&M, Non-O&M	0.003	3
		Process	O&M, Non-O&M	0.098	3
		Compressed Air	Administrative costs, material handling, material movement, other costs,	0.056	2
		Food Service	O&M, H&S, etc.	0.01	3
	Custom	EMS	O&M, Non-O&M	0.042	3
		Envelope	O&M, Non-O&M	0.045	3
		Lighting Controls	O&M, Non-O&M	0.084	3
		Motors/Drives	O&M, Non-O&M	0.018	3
		Refrigeration	Administrative costs, material handling, material movement, other costs, other labor costs, O&M, product spoilage, rent revenue, sales revenue,	0.0474	2
		HVAC	O&M, Non-O&M	0.037	3
		CHP Systems	Administrative costs, O&M	-0.0147	2
		Lighting	Administrative costs, material handling, material movement, other costs, other labor costs, O&M, product spoilage, rent revenue, sales revenue,	0.059	2
		Process	O&M, Non-O&M	0.098	3
		Compressed Air	Administrative costs, material handling, material movement, other costs, other labor costs, O&M, product spoilage, rent revenue, sales revenue,	0.056	2
		Food Service	O&M, H&S, etc.	0.01	3

(1) Tetra Tech (2015) Stage 2 Results - Commercial and Industrial New Construction Non-Energy Impacts Study - Final Report

(2) Tetra Tech (2012), Final Report - Commercial and Industrial Non-Energy Impacts Study

(3) DNV (2021). O&M and Non-O&M NEI Study (MA20X10-B-CIOMNEI)

Table 2: Annual per Therm Non-Energy Impacts for Commercial and Industrial Gas Programs

Program		End Use	NEI	Annual $/Therm	Source
New Construction	Prescriptive	Boilers	Admin costs, material movement, other costs, other labor, O&M, product spoilage, waste disposal	-0.08	1
		Other Gas Heating	Admin costs, material movement, other costs, other labor, O&M, product spoilage, waste disposal	0.05	1
		Hot Water	O&M, Non-O&M	0.08	3
		EMS	O&M, Non-O&M	0.68	3
		HVAC	O&M, Non-O&M	0.56	3
		HVAC/Heat Recovery	Admin costs, material movement, other costs, other labor, O&M, product spoilage, waste disposal	0.24	1
		Envelope	O&M, Non-O&M	0.32	3
	Custom	Commercial Kitchen	Admin costs, material movement, other costs, other labor, O&M, product spoilage, waste disposal	3.40	1
		Hot Water	O&M, Non-O&M	0.35	3
		Process	O&M, Non-O&M	-0.05	3
		HVAC	O&M, Non-O&M	-0.07	3
		Other	Admin costs, material movement, other costs, other labor, O&M, product spoilage, waste disposal	-0.03	1
		Envelope	O&M, Non-O&M	0.32	3
Retrofit	Prescriptive	HVAC	Admin costs, material movement, other costs, other labor, O&M, product spoilage, waste disposal	1.35	2
		Hot Water	O&M, Non-O&M	0.08	3
		EMS	O&M, Non-O&M	0.68	3
		Envelope	O&M, Non-O&M	0.32	3
	Custom	HVAC	Admin costs, material movement, other costs, other labor, O&M, product spoilage, waste disposal	0.23	2
		Hot Water	O&M, Non-O&M	0.35	3
		Process	O&M, Non-O&M	-0.05	3
		EMS	O&M, Non-O&M	0.04	3
		Envelope	O&M, Non-O&M	0.32	3

(1) Tetra Tech (2015) Stage 2 Results - Commercial and Industrial New Construction Non-Energy Impacts Study - Final Report

(2) Tetra Tech (2012), Final Report - Commercial and Industrial Non-Energy Impacts Study

(3) DNV (2021). O&M and Non-O&M NEI Study (MA20X10-B-CIOMNEI)

Table 3: Per Participant Non-Energy Impacts for Residential Electric Measures

Program	NEI	Description	Measure Category	Value	Duration
Residential New Construction	Thermal Comfort	Greater participant-perceived comfort in home	Heating System	$91.50	Annual
	Noise Reduction	Less participant-perceived noise in the home		$47.53	Annual
	Asthma Related	Combustion stove NOx		$3.28	Annual
		ERV/HRV reduction of formaldehyde		$0.02	Annual
Residential Cooling and Heating Equipment	Thermal Comfort	Greater participant-perceived comfort in home	Cool Smart AC System	$2.24	Annual
			Cool Smart HP System	$2.88	
			Ductless Mini Split HP System	$2.53	
			Down size 1/2 ton	$0.19	
			QIV and Check up	$0.47	
			Thermostats	$3.07	
	Noise Reduction	Less participant-perceived noise in the home	Cool Smart AC System	$2.03	Annual
	Home Durability	Increased home durability from better quality heating, cooling and structural materials	Cool Smart AC System	$0.65	Annual
			Cool Smart HP System	$0.84	
			Ductless Mini Split HP System	$0.65	
			Down size 1/2 ton	$0.07	
			QIV and Check up	$0.18	
			Thermostats	$1.33	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Cool Smart AC System	$1.07	Annual
			Cool Smart HP System	$1.34	
			Ductless Mini Split HP System	$0.95	
			Down size 1/2 ton	$0.37	

Program	NEI	Description	Measure Category	Value	Duration
			QIV and Check up	$0.87	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization	Cool Smart AC System	$0.07	Annual
			Cool Smart HP System	$0.09	
			Ductless Mini Split HP System	$0.08	
			Down size 1/2 ton	$0.01	
			QIV and Check up	$0.01	
			Thermostats	$0.13	
Single Family - Income Eligible Services	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay their lower bills	Basic Educational Measures	$2.61	Annual
	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annual
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annual
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annual
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and		$0.34	Annual

Program	NEI	Description	Measure Category	Value	Duration
		terminations			
	Improved Safety	Reduced risk of fire and fire-related property damage		$2.67	Annual
	Price Hedging		NA	$0.005/kWh	One-Time
	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$30.13	Annual
			Air Sealing	$35.89	
			Heating System / Heat Pump	$33.24	
			Duct sealing	$0.81	
			Pipe wrap	$6.60	
			Thermostat	$5.78	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$13.56	Annual
			Air Sealing	$16.39	
	Home Durability	Increased home durability from better quality heating, cooling and structural materials	Insulation	$8.76	Annual
			Air Sealing	$10.61	
			Heat pumps	$9.72	
			Thermostat	$1.68	
			Hot Water System	$0.20	
			Air Sealing	$5.69	
			Duct Sealing	$0.23	
			Heating System	$27.43	
			HP Water Heater	$0.20	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System	$9.72	Annual
			Heat Pumps	$27.43	

Program	NEI	Description	Measure Category	Value	Duration
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization	Insulation	$193.15	Annual
			Duct sealing	$5.17	
			Pipe wrap	$42.43	
			Air Sealing	$230.08	
			Heating System/Heat Pumps	213.13	
			Thermostat	37.07	
	Safety-Related Emergency Calls	Financial savings to the utility as a result of fewer safety related emergency calls being made	Heating System/Heat Pumps	$8.43	Annual
	Improved Safety	Reduced risk of fire and fire-related property damage	Insulation	$17.40	Annual
			Air Sealing	$2.24	
			Heating System/ Heat Pumps	$18.87	
			Hot Water System	$4.44	
			Replacement Freezer/Refrigerator	$1.40	
	Thermal Comfort	Greater participant-perceived comfort in home	Window AC	$49.50	Annual
	Property Value Increase		Replacement Freezer/Refrigerator	$26.61	One-Time
			Showerhead	$1.72	
	Heating Benefits		Electric Resistance to MSHP	$187.40	Annual
	Cooling Benefits		Electric Resistance to MSHP	$205.52	Annual
EnergyWise Single Family	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$25.15	Annual
			Air Sealing	$10.13	
			Thermostat	$3.99	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$11.54	Annual
			Air Sealing	$4.88	
	Home Durability	Increased home durability	Insulation	$9.82	Annual

Program	NEI	Description	Measure Category	Value	Duration
		in terms of maintenance requirements because of better quality heating, cooling and structural materials	Air Sealing	$3.95	
			Thermostat	$1.33	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation	$0.80	Annual
			Air Sealing	$0.32	
			Thermostat	$0.13	
	Property Value Increase		Showerheads	$0.37	One-Time
			Refrigerator	$1.44	
			Residential Window	$6.72	Annual
	Heating Benefits		Electric Resistance to MSHP	$187.40	Annual
	Cooling Benefits		Electric Resistance to MSHP	$205.52	Annual
EnergyWise Multifamily	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$25.15	Annual
			Air Sealing	$10.13	
			Thermostat	$3.99	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$11.54	Annual
			Air Sealing	$4.88	
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation	$9.82	Annual
			Air Sealing	$2.58	
			Aerator	$0.37	
			Showerheads	$0.37	
			Thermostat	$4.05	
	Health Benefits	Fewer colds and viruses, improved indoor air quality	Insulation	$0.80	Annual

Program	NEI	Description	Measure Category	Value	Duration
		and ease of maintaining healthy relative humidity as a result of weatherization in home	Air Sealing	$0.32	
			Thermostat	$0.13	
	Rental Units Marketability	Financial savings to owners of MF rental housing as a result of increased marketability of the more efficient housing.	Showerheads/Aerator	$0.01	Annual
			Air Sealing	$0.07	
			Refrigerator	$0.34	
			Thermostat	$0.11	
	Reduced Tenant Complaints	Savings to owners of MF rental housing in terms of staff time and materials as a result of fewer tenant complaints with the more efficient measures.	Showerheads/Aerator	$0.20	Annual
			Air Sealing	$1.37	
			Refrigerator	$12.90	
			Thermostat	$2.16	
	Operations & Maintenance		Common Area Lighting	$0.03/kWh	Annual
				$14.12	Annual
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Thermostat	$3.91	Annual
	Rental Property Value Increase		Refrigerator	$6.86	Annual
EnergyWise Income Eligible Multifamily	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay lower bills	N/A	$2.61	Annual

Program	NEI	Description	Measure Category	Value	Duration
Retrofit	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annual
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annual
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annual
	Price Hedging			$0.005/kWh	One-Time
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and terminations		$0.34	Annual
	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$342.24	Annual
			Heating System	$741.52	
			Heat Pumps – Oil	$836.39	
			Air Sealing	$342.24	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$13.56	Annual
			Air Sealing	$16.39	
	Home Durability	Increased home durability in terms of maintenance	Insulation	$8.76	Annual
			Air Sealing	$2.58	

Program	NEI	Description	Measure Category	Value	Duration
		requirements because of better quality heating, cooling and structural materials	Heating System	$27.43	
			Thermostat	$4.05	
			Showerheads/Aerator	$0.37	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation	$11.76	Annual
			Heating System	$25.48	
			Air Sealing	$11.76	
	Improved Safety	Reduced risk of fire and fire-related property damage	Insulation	$3.12	Annual
			Air Sealing	$3.12	
			Heating System	$6.76	
	Home Productivity	Reduced bad days due to rest/sleep	Insulation	$11.76	Annual
			Air Sealing	$11.76	
			Heating System	$25.48	
	Rental Units Marketability	Financial savings to owners of MF rental housing as a result of increased marketability of the more efficient housing.	Air Sealing	$0.07	Annual
			Water Heater	$0.01	
			Thermostat	$0.11	
			Common Area Lighting/Fixtures	$0.44	
			Showerheads/Aerator	$0.01	
	Reduced Tenant Complaints	Savings to owners of MF rental housing in terms of staff time and materials as a result of fewer tenant complaints with the more efficient measures.	Air Sealing	$1.37	Annual
			Water Heater	$0.20	
			Thermostat	$2.16	
			Showerheads/Aerator	$0.20	

Program	NEI	Description	Measure Category	Value	Duration
	Safety-Related Emergency Calls	Financial savings to the utility as a result of fewer safety related emergency calls being made	Heating System	$8.43	Annual
	Lighting Quality and Lifetime	Better lighting quality and longer life	Common Area Lighting/Fixtures	$0.03/kWh	Annual
				$16.95	
			Common Area Lighting	$3.00	One-Time
			Common Area Fixtures	$3.50	
	Rental Property Value Increase		Common Area Lighting/Fixtures	$7.83	One-Time
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System	$27.43	Annual
			Thermostat	$3.91	

Sources:

(1) Residential New Construction Source: Massachusetts Program Administrators: Massachusetts Special and Cross-Sector Studies Area, Residential New Construction Quick Hit Non-Energy Impacts (NEI) Evaluation, prepared by NMR Group, Inc. and Three3, Inc.

(2) EnergyWise Single Family and Income Eligible Services Single Family Sources: For Thermal Comfort, Health Benefits, and Improved Safety - "Massachusetts Special and Cross-Cutting Research Area: Low-Income Single-Family Health- and Safety-Related Non-Energy Impacts (NEIs) Study (August 5, 2016) prepared by Three3, Inc. and NMR Group." For other NEIs - "Massachusetts Program Administrators: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation," NMR Group, Inc., Tetra Tech. 8.15.2011

(3) EnergyWise Multifamily Retrofit Source: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation, prepared by NMR Group, Inc. and Tetra Tech. Massachusetts Market-Rate Rental Property NEI Study, prepared by NMR Group and DNV GL.

(4) EnergyWise Income Eligible Multifamily Retrofit Source: EnergyWise Multifamily Retrofit Source: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation, prepared by NMR Group, Inc. and Tetra Tech. Massachusetts Market-Rate Rental Property NEI Study, prepared by NMR Group and DNV GL. Massachusetts Low-Income Multifamily Health- and Safety-Related NEIs Study, prepared by NMR Group, Inc. and Three3, Inc.

(5) Price Hedging Source: Lawrence Berkeley National Laboratory (2002). Quantifying the Value That Wind Power Provides as a Hedge Against Volatile Natural Gas Prices.

Table 4: Per Participant Non-Energy Impacts for Residential Gas Programs

Program	NEI	Description	Measure Category	Value	Duration

Program	NEI	Description	Measure Category	Value	Duration
Residential Heating and Cooling equipment	Thermal Comfort	Greater participant-perceived comfort in home	Combo Condensing boiler/DHW	$1.21	Annual
			Furnace w/ECM	$36.35	
			Boiler 90%	$27.61	
			Boiler 95%	$35.77	
			Thermostat	$3.99	
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Combo Condensing boiler/DHW	$0.39	Annual
			DHW - Condensing	$0.70	
			DHW - Tankless	$1.23	
			DHW - Stand Alone	$1.30	
			Furnace w/ECM	$11.53	
			Boiler 90%	$7.33	
			Boiler 95%	$11.25	
			Thermostat	$1.33	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Combo Condensing boiler/DHW	$1.10	Annual
			Furnace w/ECM	$50.69	
			Boiler 90%	$13.88	
			Boiler 95%	$48.23	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization	Combo Condensing boiler/DHW	$0.04	Annual
			Furnace w/ECM	$1.17	
			Boiler 90%	$0.89	
			Boiler 95%	$1.15	
			Thermostat	$0.13	
EnergyWise Single Family	Thermal Comfort	Greater participant-perceived comfort in home	Air Sealing	$10.13	
			Thermostat	$3.99	
			Insulation	$25.15	
	Noise Reduction	Less participant-perceived noise in the home	Air Sealing	$4.88	Annual
			Insulation	$11.54	

Program	NEI	Description	Measure Category	Value	Duration
	Home Durability	Increased home durability from better quality heating, cooling and structural materials	Air Sealing	$3.95	Annual
			Thermostat	$1.33	
			Insulation	$9.82	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity from weatherization	Air Sealing	$0.32	Annual
			Thermostat	$0.13	
			Insulation	$0.80	
EnergyWise Multi Family / C&I Multifamily	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$25.15	Annual
			Duct Sealing	$0.16	
			Thermostat	$3.99	
			Air Sealing	$10.13	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$11.54	Annual
			Air Sealing	$4.88	
	Property Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation	$9.82	Annual
			Duct Sealing	$0.06	
			Thermostat	$4.05	
			Showerhead/Aerators	$0.37	
			Air Sealing	$3.95	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation	$0.80	Annual
			Duct Sealing	$0.01	
			Thermostat	$0.13	
			Air Sealing	$0.32	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Thermostat	$3.91	Annual

Program	NEI	Description	Measure Category	Value	Duration
	Rental Units Marketability	Financial savings to owners of MF rental housing as a result of increased marketability of the more efficient housing.	Thermostat	$0.11	Annual
			Showerhead/Aerators	$0.01	
	Reduced Tenant Complaints	Savings to owners of MF rental housing in terms of staff time and materials as a result of fewer tenant complaints with the more efficient measures.	Thermostat	$2.16	Annual
			Showerhead/Aerators	$0.20	
Single Family - Income Eligible Services	Safety-Related Emergency Calls	Financial savings to the utility as a result of fewer safety related emergency calls being made	Heating System	$8.43	Annual
	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$30.13	Annual
			Air Sealing	$35.89	
			Heating System	$33.24	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$13.56	Annual
			Air Sealing	$16.39	
	Home Durability	Increased home durability in terms of maintenance requirements because of better quality heating, cooling and structural materials	Insulation	$8.76	Annual
			Air Sealing	$10.61	
			Heating System	$27.43	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Heating System	$9.72	Annual
	Health Benefits	Fewer colds and viruses, improved indoor air quality	Insulation	$193.15	Annual
			Air Sealing	$230.08	

Program	NEI	Description	Measure Category	Value	Duration
		and ease of maintaining healthy relative humidity as a result of weatherization in home	Heating System	$213.13	
	Improved Safety	Reduced risk of fire and fire-related property damage	Insulation	$17.40	Annual
			Air Sealing	$2.24	
			Heating System	$18.87	
	Price Hedging		N/A	$0.76/MMBtu	One Time
	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay their lower bills	Participant	$2.61	Annual
	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annual
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annual
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annual
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and terminations		$0.34	Annual
EnergyWise	Rental Units	Financial savings to owners	Air Sealing	$0.07	Annual

Program	NEI	Description	Measure Category	Value	Duration
Income Eligible Multifamily Retrofit	Marketability	of LI rental housing as a result of increased marketability of the more efficient housing.	Water Heater	$0.01	
			Showerhead/Aerators	$0.01	
			Thermostat	$0.11	
	Improved Safety	Reduced risk of fire and fire-related property damage	Insulation	$2.40	Annual
			Air Sealing	$0.31	
			Water Heater	$0.61	
			Heating System	$2.60	
	Property Durability	Financial savings to owners of LI rental housing as a result of more durable and efficient materials being installed.	Air Sealing	$2.58	Annual
			Water Heater	$0.37	
			Showerhead/Aerators	$0.37	
			Heating System	$9.72	
	Reduced Tenant Complaints	Savings to owners of LI rental housing in terms of staff time and materials as a result of fewer tenant complaints with the more efficient measures.	Air Sealing	$1.37	Annual
			Water Heater	$0.20	
			Showerhead/Aerators	$0.20	
			Thermostat	$2.16	
	Safety-Related Emergency Calls	Financial savings to the utility as a result of fewer safety related emergency calls being made	Heating System	$8.43	Annual
	Price Hedging		N/A	$0.76/MMBtu	One Time
	Arrearages	Reduced arrearage carrying costs as a result of customers being more able to pay their lower bills	Participant	$2.61	Annual

Program	NEI	Description	Measure Category	Value	Duration
	Bad Debt Write-offs	Reduced costs to utility of uncollectable, unpaid balances as a result of customers being more able to pay their lower bills		$3.74	Annual
	Terminations and Reconnections	Reduced costs associated with terminations and reconnections to utility due to nonpayment as a result of customers being more able to pay their lower bills		$0.43	Annual
	Customer Calls and Collections	Utility savings in staff time and materials for fewer customer calls as a result of more timely bill payments		$0.58	Annual
	Notices	Financial savings to utility as a result of fewer notices sent to customers for late payments and terminations		$0.34	Annual
	Thermal Comfort	Greater participant-perceived comfort in home	Insulation	$42.46	Annual
			Duct Sealing	$0.68	
			Air Sealing	$31.73	
			Pipe wrap	$5.56	
			Thermostat	$4.87	
			Heating System	$38.92	
	Noise Reduction	Less participant-perceived noise in the home	Insulation	$13.56	Annual
			Air Sealing	$16.39	
	Property Durability	Increased home durability in terms of maintenance requirements because of better quality heating,	Insulation	$8.76	Annual
			Duct Sealing	$0.23	
			Air Sealing	$10.61	

Program	NEI	Description	Measure Category	Value	Duration
		cooling and structural materials	Thermostat	$4.05	
			Heating System	$9.72	
	Equipment Maintenance	Reduced maintenance costs of owning newer and/or more efficient appliance equipment	Thermostat	$3.91	Annual
			Heating System	$27.43	
	Health Benefits	Fewer colds and viruses, improved indoor air quality and ease of maintaining healthy relative humidity as a result of weatherization in home	Insulation	$33.83	Annual
			Duct Sealing	$0.13	
			Air Sealing	$25.28	
			Pipe wrap	$1.05	
			Thermostat	$0.92	
			Heating System	$31.00	

Sources:

Residential New Construction Source: Massachusetts Program Administrators: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation, prepared by NMR Group, Inc. and Tetra Tech.

EnergyWise Single Family and Income Eligible Services Single Family Sources: For Thermal Comfort, Health Benefits, and Improved Safety Massachusetts Special and Cross-Cutting Research Area: Low-Income Single-Family Health- and Safety-Related Non-Energy Impacts (NEIs) Study (August 5, 2016) prepared by Three3, Inc. and NMR Group.For other NEIs - "Massachusetts Program Administrators: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation," NMR Group, Inc., Tetra Tech. 8.15.2011

EnergyWise Multifamily Retrofit Source: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation, prepared by NMR Group, Inc. and Tetra Tech. Massachusetts Market-Rate Rental Property NEI Study, prepared by NMR Group and DNV GL.

EnergyWise Income Eligible Multifamily Retrofit Source: EnergyWise Multifamily Retrofit Source: Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation, prepared by NMR Group, Inc. and Tetra Tech. Massachusetts Market-Rate Rental Property NEI Study, prepared by NMR Group and DNV GL. Massachusetts Low-Income Multifamily Health- and Safety-Related NEIs Study (Phase 1), prepared by NMR Group, Inc. and Three3, Inc.

Price Hedging Source: Lawrence Berkeley National Laboratory (2002). Quantifying the Value That Wind Power Provides as a Hedge Against Volatile Natural Gas Prices.

EnergyWise Single Family and Income Eligible Single Family Electric Resistance to MSHP Source: Residential Heat Pump NEIs Study (MA21X21-E-RHPNEI), prepared by NMR Group,Inc., Three^3, Inc., and DNV.

Loadshapes

Fuel	LS_ID	Summer Peak Energy %	Summer Off-Peak Energy %	Winter Peak Energy %	Winter Off-Peak Energy %	Max Demand Factor	CF sp	CF wp
Electric	ls_00_Electric	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
Electric	ls_10_Electric	0.15	0.18	0.30	0.36	0.0001	1.00	1.00
Electric	ls_04_Electric	0.15	0.17	0.33	0.35	0.0002	0.57	0.89
Electric	ls_01_Electric	0.19	0.17	0.34	0.30	0.0003	0.58	0.46
Electric	ls_75_Electric	0.17	0.14	0.39	0.30	0.0003	0.43	0.58
Electric	ls_76_Electric	0.15	0.18	0.34	0.33	0.0006	0.18	0.39
Electric	ls_03_Electric	0.00	0.00	0.46	0.54	0.0007	0.00	0.70
Electric	ls_04_Electric	0.19	0.15	0.35	0.31	0.0003	0.55	0.85
Electric	ls_06_Electric	0.16	0.17	0.33	0.34	0.0002	0.56	0.77
Electric	ls_91_Electric	0.15	0.17	0.33	0.35	0.0002	0.70	0.89
Electric	ls_78_Electric	0.18	0.21	0.28	0.33	0.0002	0.90	0.58
Electric	ls_07_Electric	0.18	0.20	0.29	0.32	0.0002	0.94	0.72
Electric	ls_77_Electric	0.19	0.22	0.27	0.32	0.0002	0.97	0.57
Electric	ls_79_Electric	0.27	0.32	0.19	0.22	0.0002	0.97	0.24
Electric	ls_80_Electric	0.51	0.37	0.05	0.07	0.0008	0.82	0.00
Electric	ls_81_Electric	0.15	0.16	0.34	0.34	0.0003	0.34	0.49
Electric	ls_83_Electric	0.13	0.14	0.37	0.36	0.0004	0.19	0.32
Electric	ls_08_Electric	0.14	0.13	0.40	0.34	0.0003	0.33	0.64
Electric	ls_09_Electric	0.16	0.14	0.39	0.32	0.0003	0.38	0.77
Electric	ls_82_Electric	0.00	0.00	0.46	0.54	0.0005	0.00	0.72
Electric	ls_73_Electric	0.00	0.00	0.48	0.52	0.0006	0.00	0.68
Electric	ls_90_Electric	0.00	0.00	0.42	0.58	0.0004	0.00	0.70
Electric	ls_11_Electric	0.47	0.42	0.06	0.05	0.0010	1.04	0.00
Electric	ls_18_Electric	0.46	0.48	0.03	0.03	0.0009	1.19	0.00
Electric	ls_89_Electric	0.40	0.37	0.12	0.10	0.0007	1.20	0.00
Electric	ls_84_Electric	0.28	0.26	0.22	0.25	0.0006	1.10	0.25
Electric	ls_85_Electric	0.25	0.24	0.24	0.27	0.0005	1.12	0.38
Electric	ls_86_Electric	0.24	0.23	0.24	0.28	0.0005	1.11	0.37
Electric	ls_87_Electric	0.27	0.26	0.22	0.25	0.0006	1.09	0.25
Electric	ls_88_Electric	0.22	0.21	0.26	0.31	0.0004	1.12	0.41
Electric	ls_12_Electric	0.10	0.09	0.35	0.46			
Electric	ls_13_Electric	0.08	0.07	0.36	0.48			
Electric	ls_14_Electric	0.06	0.05	0.45	0.44		0.33	0.43
Electric	ls_201_Electric	0.47	0.42	0.07	0.04	0.0002	1.00	0.00
Electric	ls_202_Electric	0.00	1.00	0.00	0.00		1.00	0.00
Electric	ls_203_Electric	0.52	0.48	0.00	0.00		1.00	0.00
Electric	ls_204_Electric	0.52	0.48	0.00	0.00		1.00	0.00
Electric	ls_205_Electric	0.15	0.18	0.30	0.36	0.0001	1.00	0.00
Electric	ls_101_Electric	0.27	0.24	0.26	0.24		1.17	0.98
Electric	ls_102_Electric	0.22	0.28	0.22	0.28		1.17	0.98
Electric	ls_103_Electric	0.39	0.39	0.11	0.11		0.42	0.08
Electric	ls_104_Electric	0.53	0.34	0.09	0.05		0.40	0.00
Electric	ls_105_Electric	0.13	0.19	0.26	0.42	0.0002	0.32	0.86

Fuel	LS_ID	Summer Peak Energy %	Summer Off-Peak Energy %	Winter Peak Energy %	Winter Off-Peak Energy %	Max Demand Factor	CF sp	CF wp
Electric	ls_106_Electric	0.23	0.12	0.41	0.24	0.0002	0.88	0.71
Electric	ls_107_Electric	0.32	0.19	0.30	0.19			
Electric	ls_108_Electric	0.22	0.11	0.41	0.25	0.0034	0.32	0.22
Electric	ls_109_Electric	0.15	0.17	0.31	0.37	0.0002	0.68	0.72
Electric	ls_110_Electric	0.24	0.25	0.24	0.27		1.00	1.00
Electric	ls_111_Electric	0.28	0.22	0.28	0.22	0.0002	0.80	0.82
Electric	ls_112_Electric	0.25	0.25	0.25	0.26		1.00	0.82
Electric	ls_113_Electric	0.19	0.15	0.37	0.30		0.00	0.00
Electric	ls_114_Electric	0.35	0.22	0.26	0.17		0.40	0.00
Electric	ls_115_Electric	0.24	0.25	0.24	0.27		1.00	1.00
Electric	ls_116_Electric	0.17	0.17	0.33	0.33		0.77	0.69
Electric	ls_117_Electric	0.16	0.18	0.31	0.35		0.49	0.07
Electric	ls_118_Electric	0.21	0.12	0.42	0.25		1.00	0.84
Electric	ls_119_Electric	0.23	0.10	0.46	0.21		0.69	0.54
Electric	ls_120_Electric	0.20	0.13	0.41	0.26		1.11	0.79
Electric	ls_121_Electric	0.23	0.11	0.46	0.21		0.68	0.62
Electric	ls_122_Electric	0.16	0.14	0.37	0.33	0.0026	0.54	0.56
Electric	ls_123_Electric	0.21	0.12	0.43	0.24		0.85	0.91
Electric	ls_124_Electric	0.15	0.18	0.31	0.36		1.00	0.97
Electric	ls_125_Electric	0.16	0.17	0.32	0.34		0.87	0.51
Electric	ls_126_Electric	0.35	0.22	0.26	0.17		0.94	0.97
Electric	ls_127_Electric	0.07	0.26	0.15	0.52		0.00	0.85
Electric	ls_128_Electric	0.21	0.12	0.42	0.24		0.99	1.00
Electric	ls_129_Electric	0.16	0.17	0.32	0.35		0.99	1.04
Electric	ls_130_Electric	0.16	0.17	0.32	0.34		0.95	0.38
Electric	ls_131_Electric	0.19	0.14	0.38	0.28		0.93	0.80
Electric	ls_132_Electric	0.24	0.25	0.24	0.27		0.69	0.37
Electric	ls_133_Electric	0.16	0.17	0.33	0.34		0.68	0.70
Electric	ls_134_Electric	0.23	0.27	0.23	0.27		0.48	0.73
Electric	ls_135_Electric	0.16	0.14	0.37	0.33		0.54	0.56
Electric	ls_136_Electric	0.18	0.16	0.35	0.31		0.72	0.56
Electric	ls_137_Electric	0.33	0.33	0.17	0.17		0.40	0.00
Electric	ls_138_Electric	0.20	0.14	0.39	0.27		0.77	0.64
Electric	ls_139_Electric	0.54	0.41	0.01	0.04		0.24	0.89
Electric	ls_140_Electric	0.08	0.07	0.34	0.51		0.24	0.89
Electric	ls_141_Electric	0.17	0.16	0.36	0.31		0.24	0.89
Electric	ls_142_Electric	0.14	0.20	0.26	0.40		0.89	1.00
Electric	ls_143_Electric	0.15	0.13	0.40	0.33	0.0002	0.58	1.00
Electric	ls_144_Electric	0.14	0.20	0.26	0.40		0.13	0.16
Electric	ls_145_Electric	0.47	0.42	0.07	0.04		0.35	0.00
Electric	ls_146_Electric	0.15	0.12	0.42	0.31		0.00	0.81
Electric	ls_147_Electric	0.24	0.25	0.24	0.27		0.92	0.61
Electric	ls_148_Electric	0.10	0.09	0.35	0.46		-0.34	0.21
Electric	ls_149_Electric	0.10	0.09	0.35	0.46		-0.21	0.21
Electric	ls_150_Electric	0.10	0.09	0.35	0.46		-0.24	0.21
Electric	ls_151_Electric	0.10	0.09	0.35	0.46		-0.24	0.21

Fuel	LS_ID	Summer Peak Energy %	Summer Off-Peak Energy %	Winter Peak Energy %	Winter Off-Peak Energy %	Max Demand Factor	CF sp	CF wp
Electric	ls_152_Electric	0.10	0.09	0.35	0.46		-0.24	0.21
Electric	ls_153_Electric	0.10	0.09	0.35	0.46		-0.24	0.21
Electric	ls_154_Electric	0.10	0.09	0.35	0.46		0.35	0.53
Electric	ls_155_Electric	0.08	0.07	0.36	0.48		-0.31	0.21
Electric	ls_156_Electric	0.08	0.07	0.36	0.48		-0.31	0.21
Electric	ls_157_Electric	0.08	0.07	0.36	0.48		-0.35	0.21
Electric	ls_158_Electric	0.08	0.07	0.36	0.48		-0.35	0.21
Electric	ls_159_Electric	0.08	0.07	0.36	0.48		-0.35	0.21
Electric	ls_160_Electric	0.08	0.07	0.36	0.48		-0.35	0.21
Electric	ls_161_Electric	0.08	0.07	0.36	0.48		0.23	0.62
Electric	ls_162_Electric	0.10	0.09	0.35	0.46		0.25	0.62
Electric	ls_163_Electric	0.10	0.09	0.35	0.46		0.26	0.62
Electric	ls_164_Electric	0.08	0.07	0.36	0.48		0.27	0.62
Electric	ls_165_Electric	0.00	0.00	0.38	0.62		0.00	0.00
Electric	ls_166_Electric	0.47	0.42	0.07	0.04		0.35	0.00
Electric	ls_167_Electric	0.13	0.15	0.36	0.36		0.17	1.00
Electric	ls_168_Electric	0.34	0.18	0.30	0.17	0.0002	0.80	0.61
Electric	ls_169_Electric	0.18	0.14	0.34	0.34		0.55	0.85
Electric	ls_170_Electric	0.21	0.12	0.43	0.24		0.17	0.16
Electric	ls_171_Electric	0.19	0.15	0.35	0.31		0.55	0.85
Electric	ls_172_Electric	0.13	0.15	0.36	0.36		0.17	0.16
Electric	ls_173_Electric	0.59	0.36	0.02	0.03		0.85	0.00
Electric	ls_174_Electric	0.18	0.18	0.18	0.47		0.13	1.00
Electric	ls_175_Electric	0.19	0.15	0.35	0.31		0.55	0.85
Electric	ls_176_Electric	0.21	0.12	0.43	0.24		0.13	0.16
Electric	ls_177_Electric	0.16	0.17	0.34	0.33		0.77	1.00
Electric	ls_178_Electric	0.13	0.15	0.36	0.36	0.0003	0.17	1.00
Electric	ls_179_Electric	0.09	0.08	0.42	0.41	0.0012	0.01	1.00
Electric	ls_180_Electric	0.47	0.42	0.07	0.04	0.0016	0.35	0.00
Electric	ls_181_Electric	0.19	0.15	0.35	0.31	0.0003	0.55	0.85
Electric	ls_182_Electric	0.15	0.12	0.42	0.31		0.31	0.81
Electric	ls_183_Electric	0.22	0.22	0.25	0.31		0.33	0.22
Electric	ls_184_Electric	0.60	0.34	0.01	0.05	0.0029	1.00	0.00
Electric	ls_185_Electric	0.21	0.12	0.43	0.24	0.0003	0.13	0.16
Electric	ls_186_Electric	0.09	0.03	0.03	0.84	0.0003	0.13	0.16
Electric	ls_187_Electric	0.25	0.24	0.23	0.28	0.0009	0.34	0.17
Electric	ls_188_Electric	0.50	0.50	0.00	0.00		0.71	0.86
Electric	ls_189_Electric	0.50	0.50	0.00	0.00		1.00	1.00
Electric	ls_190_Electric	0.01	0.02	0.49	0.48	0.0005	0.01	1.00
Electric	ls_191_Electric	0.15	0.12	0.42	0.31	0.0070	0.31	0.81
Electric	ls_192_Electric	0.24	0.22	0.34	0.20	0.0430	0.35	0.00
Electric	ls_193_Electric	0.24	0.22	0.34	0.20	0.0430	0.35	0.00
Electric	ls_194_Electric	0.12	0.12	0.38	0.38		1.00	1.00
Electric	ls_195_Electric	0.34	0.32	0.16	0.18		0.82	0.05
Electric	ls_196_Electric	0.50	0.50	0.00	0.00		1.00	1.00
Electric	ls_197_Electric	0.50	0.43	0.03	0.04		0.37	0.00

Fuel	LS_ID	Summer Peak Energy %	Summer Off-Peak Energy %	Winter Peak Energy %	Winter Off-Peak Energy %	Max Demand Factor	CF sp	CF wp
Electric	ls_198_Electric	0.13	0.20	0.27	0.40		1.00	0.00
Electric	ls_199_Electric	0.19	0.15	0.35	0.31		0.55	0.85
Electric	ls_200_Electric	0.00	0.00	0.45	0.55		0.00	0.45
Electric	ls_206_Electric	0.23	0.22	0.25	0.30		0.73	0.34
Electric	ls_207_Electric	0.47	0.42	0.07	0.04		0.35	0.00
Electric	ls_208_Electric	0.22	0.22	0.25	0.31	0.0008	0.33	0.22
Electric	ls_209_Electric	0.19	0.15	0.35	0.31	0.0003	0.55	0.85
Electric	ls_210_Electric	0.21	0.12	0.43	0.24	0.0003	0.17	0.16
Electric	ls_211_Electric	0.19	0.15	0.35	0.31	0.0003	0.55	0.85
Electric	ls_212_Electric	0.13	0.15	0.36	0.36	0.0003	0.17	0.16
Electric	ls_213_Electric	0.00	0.00	0.00	1.00	0.0000	0.00	0.00
Electric	ls_214_Electric	0.30	0.00	0.00	0.70	0.0000	0.00	0.00
Electric	ls_215_Electric	0.15	0.12	0.42	0.31	0.0002	0.31	0.81
Electric	ls_216_Electric	0.00	0.00	0.38	0.62		0.00	0.00
Electric	ls_217_Electric	0.14	0.20	0.26	0.40		1.00	0.00
Electric	ls_218_Electric	0.70	0.30	0.00	0.00		0.30	0.00
Electric	ls_219_Electric	0.14	0.20	0.26	0.40		1.00	0.00
Electric	ls_220_Electric	0.17	0.16	0.36	0.31		1.00	0.00
Electric	ls_221_Electric	0.10	0.30	0.20	0.40		0.30	0.45
Electric	ls_222_Electric	0.25	0.25	0.25	0.25		1.00	0.00
Electric	ls_223_Electric	0.15	0.13	0.36	0.35		0.58	1.00
Electric	ls_224_Electric	0.01	0.03	0.41	0.55		0.01	1.00
Electric	ls_225_Electric	0.53	0.42	0.01	0.04		1.00	0.00
Electric	ls_226_Electric	0.13	0.15	0.36	0.36		0.17	1.00
Electric	ls_227_Electric	0.47	0.42	0.07	0.04		0.35	0.00
Electric	ls_228_Electric	0.00	0.00	0.43	0.57		0.02	0.62
Electric	ls_229_Electric	0.54	0.41	0.01	0.04		1.00	0.00
Electric	ls_230_Electric	0.19	0.15	0.35	0.31		0.55	0.85
Electric	ls_231_Electric	0.35	0.31	0.05	0.28		0.35	0.00
Electric	ls_232_Electric	0.47	0.42	0.07	0.04		0.35	0.00
Electric	ls_233_Electric	0.06	0.20	0.20	0.54		0.13	1.00
Electric	ls_234_Electric	0.19	0.15	0.35	0.31		0.55	0.85
Electric	ls_235_Electric	0.21	0.12	0.43	0.24		0.13	0.16
Electric	ls_236_Electric	0.16	0.17	0.34	0.33		0.77	1.00
Electric	ls_237_Electric	0.00	0.00	0.43	0.57		0.00	0.43
Electric	ls_238_Electric	0.47	0.42	0.07	0.04		0.35	0.00
Electric	ls_239_Electric	0.19	0.15	0.35	0.31		0.55	0.85
Electric	ls_240_Electric	0.15	0.12	0.42	0.31		0.31	0.81
Electric	ls_241_Electric	0.13	0.15	0.36	0.36		0.17	1.00
Electric	ls_242_Electric	0.24	0.25	0.24	0.27		0.37	0.69
Electric	ls_243_Electric	0.25	0.24	0.23	0.28		0.34	0.17
Electric	ls_244_Electric	0.30	0.00	0.00	0.70		0.00	0.00
Electric	ls_245_Electric	0.00	0.00	0.43	0.57		0.00	0.00
Electric	ls_246_Electric	0.15	0.12	0.42	0.31		0.31	0.81
Electric	ls_247_Electric	0.22	0.22	0.25	0.31		0.33	0.22
Electric	ls_248_Electric	0.24	0.25	0.24	0.27		0.37	0.69

Fuel	LS_ID	Summer Peak Energy %	Summer Off-Peak Energy %	Winter Peak Energy %	Winter Off-Peak Energy %	Max Demand Factor	CF sp	CF wp
Electric	ls_249_Electric	0.13	0.17	0.35	0.35		0.40	0.89
Electric	ls_250_Electric	0.17	0.17	0.33	0.33		1.00	1.00
Electric	ls_251_Electric	0.25	0.23	0.26	0.26		1.00	0.00
Electric	ls_252_Electric	0.12	0.10	0.39	0.39		0.58	1.00
Electric	ls_253_Electric	0.02	0.02	0.48	0.48		0.00	1.00
Electric	ls_254_Electric	0.10	0.12	0.39	0.39		0.17	1.00
Electric	ls_255_Electric	0.10	0.14	0.34	0.42	0.0003	0.20	0.44
Electric	ls_256_Electric	0.49	0.49	0.01	0.01		1.00	0.00
Electric	ls_257_Electric	0.50	0.50	0.00	0.00		1.00	1.00
Electric	ls_258_Electric	0.25	0.24	0.26	0.26		1.00	0.82
Electric	ls_259_Electric	0.18	0.18	0.34	0.29		1.00	0.82
Electric	ls_260_Electric	0.50	0.50	0.00	0.00		1.00	1.00
Electric	ls_261_Electric	0.34	0.18	0.30	0.17		0.57	0.58
Electric	ls_262_Electric	0.34	0.18	0.30	0.17		0.00	0.00
Electric	ls_263_Electric	0.34	0.33	0.17	0.16		0.80	0.54
Electric	ls_264_Electric	0.06	0.05	0.45	0.44	0.0000	0.33	0.43
Electric	ls_265_Electric	0.24	0.21	0.25	0.29	0.0000	0.37	0.22
Electric	ls_266_Electric	0.50	0.43	0.04	0.04	0.0000	0.37	0.00
Electric	ls_267_Electric	0.50	0.43	0.04	0.04	0.0000	0.37	0.00
Electric	ls_268_Electric	0.00	0.00	0.00	0.00		0.00	0.00
Electric	ls_269_Electric	0.00	0.00	0.44	0.55		-0.02	0.65
Electric	ls_270_Electric	0.33	0.00	0.67	0.00		0.90	0.90
Electric	ls_271_Electric	0.23	0.27	0.23	0.27		0.90	0.90
Electric	ls_272_Electric	0.08	0.07	0.36	0.48		-0.27	0.62
Electric	ls_273_Electric	0.20	0.15	0.32	0.33		0.06	0.00
Electric	ls_274_Electric	0.36	0.28	0.19	0.17		0.01	0.00
Gas	ls_00_Gas	0.00	0.00	0.00	0.00	0.0000	0.00	0.00
Gas	ls_10_Gas	0.15	0.18	0.31	0.36	0.0001	1.00	1.00
Gas	ls_04_Gas	0.19	0.15	0.35	0.31	0.0003	0.55	0.85
Gas	ls_01_Gas	0.18	0.15	0.36	0.30	0.0003	0.49	0.52
Gas	ls_75_Gas	0.17	0.14	0.39	0.30	0.0003	0.45	0.58
Gas	ls_76_Gas	0.16	0.16	0.38	0.30	0.0003	0.39	0.49
Gas	ls_06_Gas	0.15	0.18	0.32	0.35	0.0002	0.58	0.86
Gas	ls_91_Gas	0.17	0.17	0.33	0.32	0.0002	0.85	0.86
Gas	ls_78_Gas	0.17	0.21	0.29	0.34	0.0001	0.91	0.68
Gas	ls_07_Gas	0.18	0.21	0.29	0.32	0.0002	0.79	0.65
Gas	ls_77_Gas	0.20	0.24	0.26	0.30	0.0002	0.86	0.51
Gas	ls_79_Gas	0.25	0.30	0.22	0.23	0.0002	0.82	0.17
Gas	ls_80_Gas	0.55	0.38	0.05	0.02	0.0011	0.55	0.00
Gas	ls_81_Gas	0.15	0.16	0.34	0.35	0.0003	0.28	0.48
Gas	ls_83_Gas	0.15	0.13	0.39	0.33	0.0002	0.41	0.75
Gas	ls_08_Gas	0.15	0.12	0.42	0.31	0.0002	0.31	0.81
Gas	ls_09_Gas	0.13	0.12	0.41	0.34	0.0004	0.21	0.40
Gas	ls_03_Gas	0.00	0.00	0.43	0.57	0.0007	0.00	0.43
Gas	ls_82_Gas	0.00	0.00	0.45	0.55	0.0006	0.00	0.53
Gas	ls_73_Gas	0.00	0.00	0.45	0.55	0.0006	0.00	0.45

Fuel	LS_ID	Summer Peak Energy %	Summer Off-Peak Energy %	Winter Peak Energy %	Winter Off-Peak Energy %	Max Demand Factor	CF sp	CF wp
Gas	ls_90_Gas	0.00	0.00	0.43	0.57	0.0004	0.00	0.62
Gas	ls_11_Gas	0.47	0.42	0.07	0.04	0.0016	0.35	0.00
Gas	ls_18_Gas	0.48	0.47	0.03	0.02	0.0016	0.33	0.00
Gas	ls_89_Gas	0.43	0.40	0.07	0.09	0.0017	0.29	0.00
Gas	ls_84_Gas	0.23	0.22	0.25	0.30	0.0008	0.34	0.20
Gas	ls_85_Gas	0.25	0.24	0.23	0.28	0.0009	0.34	0.17
Gas	ls_86_Gas	0.22	0.22	0.25	0.31	0.0008	0.33	0.22
Gas	ls_87_Gas	0.23	0.21	0.26	0.31	0.0008	0.34	0.21
Gas	ls_88_Gas	0.23	0.22	0.25	0.30	0.0008	0.34	0.21
Gas	ls_12_Gas	0.10	0.09	0.35	0.46			
Gas	ls_13_Gas	0.08	0.07	0.36	0.48			
Gas	ls_14_Gas	0.06	0.05	0.45	0.44		0.33	0.43
Gas	ls_101_Gas	0.27	0.24	0.26	0.24		1.17	0.98
Gas	ls_102_Gas	0.22	0.28	0.22	0.28		1.17	0.98
Gas	ls_103_Gas	0.39	0.39	0.11	0.11			
Gas	ls_104_Gas	0.53	0.34	0.09	0.05			
Gas	ls_105_Gas	0.13	0.19	0.26	0.42			
Gas	ls_106_Gas	0.23	0.12	0.41	0.24			
Gas	ls_107_Gas	0.32	0.19	0.30	0.19			
Gas	ls_108_Gas	0.22	0.11	0.41	0.25			
Gas	ls_109_Gas	0.15	0.17	0.31	0.37			
Gas	ls_110_Gas	0.24	0.25	0.24	0.27		1.00	1.00
Gas	ls_111_Gas	0.28	0.22	0.28	0.22		0.80	0.82
Gas	ls_112_Gas	0.54	0.41	0.01	0.04			
Gas	ls_113_Gas	0.00	0.00	0.38	0.62			
Gas	ls_114_Gas	0.43	0.50	0.03	0.05			
Gas	ls_115_Gas	0.00	0.00	0.38	0.62			
Gas	ls_116_Gas	0.00	0.00	0.45	0.55		0.00	0.43
Gas	ls_117_Gas	0.15	0.13	0.40	0.33		0.58	1.00
Gas	ls_118_Gas	0.50	0.43	0.04	0.04	0.0014	0.37	0.00
Gas	ls_119_Gas	0.24	0.21	0.25	0.29		0.47	0.22

TRM Updates Tracker

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Commercial & Industrial	Small Business Direct Install	Advanced Power Strips	Added new measure	NA	NA	NA	New measure offering for SBS
Electric	Commercial & Industrial	Small Business Direct Install	Transformers	Added new measure	NA	NA	NA	New measure offering for SBS
Gas	Commercial & Industrial	Small Business Direct Install	Boiler Reset Control	Savings and calculation update	35.5 MMBtu	37.3 MMBtu	Increase in gross savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I Retrofit	Boiler Reset - Multi-Stage	Savings and calculation update	35.5 MMBtu	37.3 MMBtu	Increase in gross savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I Retrofit	Boiler Reset - One-Stage	Savings and calculation update	35.5 MMBtu	37.3 MMBtu	Increase in gross savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I New Construction	BOILER RESET 1 STAGE	Savings and calculation update	35.5 MMBtu	37.3 MMBtu	Increase in gross savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I New Construction	Combo Condensing Boiler/ Water Heater - 90% AFUE	Made inactive	NA	NA		Adoption of MA Study
Gas	Commercial & Industrial	Large C&I New Construction	Combo Condensing Boiler/ Water Heater - 95% AFUE	Savings and calculation update	30.5 MMBtu	43.8 MMBtu	Increase in gross savings	Adoption of MA Study
Electric	Commercial & Industrial	Large C&I New Construction	Dual enthalpy economizer controls	Updating savings from deemed to calculated	289 kWh	Calculated		Adoption of MA Study
Electric	Commercial & Industrial	Large C&I Retrofit	Dual Enthalpy Economizer Control (DEEC)	Updating savings from deemed to calculated	289 kWh	Calculated		Adoption of MA Study
Gas	Commercial & Industrial	Small Business Direct Install	Pre-rinse spray valve	Savings and calculation update	11.4 MMBtu	5.0 MMBtu	Decrease in gross savings	Adoption of MA Study
Electric	Commercial & Industrial	Large C&I New Construction	Electric HW Spray Valve	Savings and calculation update	4648 kWh	1,300 kWh	Decrease in gross savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I Retrofit	Pre-rinse spray valve	Savings and calculation update	11.4 MMBtu	5.0 MMBtu	Decrease in gross savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I New Construction	WATER HEATER - INDIRECT	Savings and calculation update	19 MMBtu	10 MMBtu	Decrease in gross savings	Adoption of MA Study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer, Ultra Low Temperature	Savings	5737 kWh	5142 kWh	Decrease in gross savings	Adoption of MA Study
Gas	Commercial & Industrial	Small Business Direct Install	Steam Trap Repair or Replacement	Measure Life and NTG	90.3% and 6 years	100% and 3 years	Decrease in lifetime savings	Adoption of MA Study
Gas	Commercial & Industrial	Small Business Direct Install	Low-Pressure Steam Trap	Measure Life and NTG	90.3% and 6 years	100% and 3 years	Decrease in lifetime savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap, Custom - Low Pressure	Measure Life and NTG	108.8% and 6 years	100% and 3 years	Decrease in lifetime savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap, Custom - Repair and Replace	Measure Life and NTG	108.8% and 6 years	100% and 3 years	Decrease in lifetime savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap HVAC - High Pressure	Measure Life and NTG	108.8% and 6 years	100% and 3 years	Decrease in lifetime savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap HVAC - Low Pressure	Measure Life and NTG	108.8% and 6 years	100% and 3 years	Decrease in lifetime savings	Adoption of MA Study
Gas	Commercial & Industrial	Large C&I New Construction	Steam Trap	Measure Life and NTG	57.6% and 6 years	100% and 3 years	Decrease in lifetime savings	Adoption of MA Study
Electric	Commercial & Industrial	Small Business Direct Install	Dehumidifier Recycling	Added new measure	NA	NA		New measure offering for SBS
Electric	Commercial & Industrial	Small Business Direct Install	Hand Dryer	Added new measure	NA	NA		New measure offering for SBS
Electric	Commercial & Industrial	Small Business Direct Install	Spray Valves	New Measure/expansion of water heating prescriptive	NA	NA		New Measure/expansion of water heating prescriptive
Electric	Commercial & Industrial	Small Business Direct Install	Showerhead	New Measure/expansion of water heating prescriptive	NA	NA		New Measure/expansion of water heating prescriptive
Electric	Commercial & Industrial	Small Business Direct Install	Salon Nozzle	New Measure/expansion of water heating prescriptive	NA	NA		New Measure/expansion of water heating prescriptive
Electric	Commercial & Industrial	Small Business Direct Install	Advanced Power Strips	New Measure/expansion of water heating prescriptive	NA	NA		New Measure/expansion of water heating prescriptive
Electric	Commercial & Industrial	Small Business Direct Install	Fan Control	Updated calculation and assumptions	NA	NA	Decrease in gross savings	Adoption of MA Study
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator case LED, Custom	Updated calculation and assumptions	NA	NA	Decrease in gross savings	Adoption of MA Study
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Systems, Custom	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Performance Lighting - Tier 1 Interior	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Performance Lighting Tier 2 & 3 Interior	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting - Compact	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting - Custom	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting - Fluorescent	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting - LED Case Ref	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting - LED General	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting - LED Sign	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting- LED	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting - General	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting - Stairwell LED	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting - Linear LED	Measure Life	15	11	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Lighting	Measure Life	multi	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	LEDS	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Lighting Systems, Custom	Measure Life	multi	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Performance Lighting - Tier 1 Interior	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Performance Lighting Tier 2 & 3 Interior	Measure Life	5	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - Compact	Measure Life	2	1	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - Linear LED - Downstream	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - Fluorescent	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - LED Case Ref	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - LED - Downstream	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - LED General	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - LED Replacement	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - LED Sign	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	UPSTR Lighting - LED	Measure Life	6	2	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	UPSTR Lighting - LED High/Low Bay	Measure Life	7	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	UPSTR Lighting - LED Stairwell	Measure Life	6	2	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	UPSTR Lighting - Linear LED	Measure Life	6	2	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Large C&I Retrofit	UPSTR Lighting - General	Measure Life	6	2	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	CUSTOM LIGHTING	Measure Life	multi	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting - Compact, Hard Wired	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting - Compact, Interior Screw-In	Measure Life	2	1	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting - Elig Ballast	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	LED - Interior HW	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	LED - Interior SI	Measure Life	5	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	LED Exit Signs	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerated case LED	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator case LED, Custom	Measure Life	6	3	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Electric	Residential	Residential HVAC	WiFi Thermostat, Gas - Cooling and Heating	Updated source	NA	NA	No impact	Update during source review
Electric	Residential	Residential HVAC	CENTRAL AC	Updated source	NA	NA	No impact	Update during source review
Electric	Residential	Residential HVAC	Central Heat Pump	Updated summer and winter coincident factors	CF sp = 0/ CF wp = 0	CFsp = 0.38/ CFw =0.05	Increase in summer and winter capacity	Update during source review
Electric	Residential	Residential HVAC	CoolSmart AC QIV ES	Updated summer and winter coincident factors	CF sp = 0.35/ CF wp = 0	CFsp = 0.37/ CFw =0	Increase in summer and winter capacity	Update during source review
Electric	Residential	Residential HVAC	CoolSmart HP Tuneup	kW	0.124	0.4	Increase in demand savings	Update during source review
Gas	Commercial & Industrial	Small Business Direct Install	Boiler Reset Control	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Building Shell	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Design	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Design	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Retrofit	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Condensing Boiler	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Condensing Boiler	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Condensing Boiler	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Cooling (CP)	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	DEMAND CIRCULATOR	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	DHW	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Drives on HVAC Systems	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Drives on non-HVAC Systems	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Duct Insulation	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Faucet aerator	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Food Service	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Furnace	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Furnace	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Furnace	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Pump	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Recovery	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Recovery	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Recovery	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Steam Trap Repair or Replacement	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	HVAC	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	HVAC	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Insulation Pipe H2O	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Insulation Pipe H2O	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Insulation Pipe Steam	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Insulation Pipe Steam	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Gas	Commercial & Industrial	Small Business Direct Install	Low-flow showerhead	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Low-Pressure Steam Trap	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Non-Condensing Boiler	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Non-Condensing Boiler	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Non-Condensing Boiler	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Operation & Maintenance	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Other Gas	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Other Gas	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Other Gas	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Other, Custom	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Pipe/Tank/Duct/HVAC Insulation	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Pre-rinse spray valve	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Process Equipment/Controls	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Programmable thermostat	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Salon Nozzle	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Advanced Building	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Air Cooled AC	NTG	53.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Air Cooled AC	NTG	53.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Air Cooled AC	NTG	53.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Air Cooled AC	NTG	53.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirCChiller	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirCChiller	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirCChiller	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirCChiller	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirHP	NTG	55.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirHP	NTG	55.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirHP	NTG	55.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	AirHP	NTG	55.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Boiler, Draft Fan	NTG	65.4%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Boiler, Feedwater Pump	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Building Exhaust Fan	NTG	65.4%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Building Shell	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Chiller	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Chiller, Water Pump	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	CHP	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial Electric Combination Oven	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial Electric Convection Oven	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial Electric Fryer - Large	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial Electric Fryer - Standard	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial Electric Griddle	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial electric steamer	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial Refrigeration	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Comprehensive Design	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Compressed Air	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Compressed Air Nozzle	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Conveyor Broiler	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Conveyor Broiler	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Conveyor Broiler	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Cooling Tower Fan	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Custom HVAC	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Deck Oven	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - High Temperature Door Type	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - High Temperature Multi Tank Conveyor	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - High Temperature Pots and Pans	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - High Temperature Single Tank Conveyor	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - High Temperature Under Counter	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - Low Temperature Door Type	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - Low Temperature Multi Tank Conveyor	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - Low Temperature Single Tank Conveyor	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dishwasher - Low Temperature Under Counter	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Dual enthalpy economizer controls	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ECM fan motor for HVAC	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Electric HW Spray Valve	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	EMS	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Evap AC, over 20 T	NTG	55.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Food Service	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Solid Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Solid Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Solid Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer Solid Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Freezer, Ultra Low Temperature	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Switch	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Switch	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Ground Source Heat Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Ground Source Heat Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Hand Wrapper	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Heating Hot Water Pump	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	High Efficiency Condensing Units	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	High Efficiency Condensing Units	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	High Performance Contact Conveyor Toaster	NTG	84.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Hot Food Holding Cabinet	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Hot Food Holding Cabinet	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Hot Food Holding Cabinet	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	HVAC Fan	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	HVAC Fan	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	HVAC Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	HVAC Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Ice Machine	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Ice Machine	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Ice Machine	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Ice Machine	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	LEDS	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Controls	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Controls	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	**Residential, Income Eligible Residential, Commerical & Industrial**	**Identify the Program Name in the TRM**	**Identify the group/measure name in the TRM.**	**What values were changed?**	**Previous Value**	**Updated Value**	**Impact on Savings (+/-)**	**Describe why the change was made**
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Controls	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Controls	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Controls	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	LoadComp	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	LoadComp	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Low pressure drop filter	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Make Up Air Fan	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Motor	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	ODP Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Other	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Packaged Terminal Air Conditioner	NTG	55.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Packaged Terminal Heat Pumps (PTHP)	NTG	100.0%	89.6%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Continuous	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Continuous	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Continuous	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Continuous	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Variable	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Variable	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Variable	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	PEI H2O Pump, Variable	NTG	54.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Performance Lighting, Custom	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Performance Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Performance Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Performance Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Performance Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Prescriptive Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Process	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Process Cooling	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Process Exhaust Fan	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Process, Cool Pump	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Air Dryer	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Air Dryer	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Air Dryer	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Air Dryer	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Air Dryer	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Chef Base	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Chef Base	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Chef Base	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerated Chef Base	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	**Residential, Income Eligible Residential, Commerical & Industrial**	**Identify the Program Name in the TRM**	**Identify the group/measure name in the TRM.**	**What values were changed?**	**Previous Value**	**Updated Value**	**Impact on Savings (+/-)**	**Describe why the change was made**
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Glass Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Solid Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Solid Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Solid Door	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Refrigerator Solid Door	NTG	75.7%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Room Air Cleaner	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Room Air Cleaner	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Room Air Cleaner	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Sensors	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Split system AC to 5.4 tons	NTG	53.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	TEFC Motor	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Transformers	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Upstream Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Upstream Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Upstream Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Upstream Lighting	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VARICOMP, 75HP	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Vending Miser - Glass Front Refridgerated Coolers	NTG	87.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Vending Miser - Non-Refridgerated Snack Vending Machines UPSTR	NTG	87.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Vending Miser - Refridgerated Beverage Vending Machines UPSTR	NTG	87.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VFD Secondary	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF AC	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF AC	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF AC	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF AC	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF HP	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF HP	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF HP	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VRF HP	NTG	30.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VSD	NTG	75.7%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	VSD Compressor (15<=HP<=75)	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Water Source Heat Pump	NTG	75.7%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	**Residential, Income Eligible Residential, Commerical & Industrial**	**Identify the Program Name in the TRM**	**Identify the group/measure name in the TRM.**	**What values were changed?**	**Previous Value**	**Updated Value**	**Impact on Savings (+/-)**	**Describe why the change was made**
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	WCChill	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I New Construction	Zero loss condensate drain	NTG	75.7%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Boiler, Draft Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Boiler, Feedwater Pump	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Building Exhaust Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Building operator certification	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Building Shell	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Chiller, Water Pump	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Commercial Refrigeration	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Comprehensive Retrofit (CR)	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Compressed Air Nozzle	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Cooling Town Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom CHP	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Compressed Air	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom HVAC	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Motor	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Other	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom process	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom: SEM	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Dual Enthalpy Economizer Control (DEEC)	NTG	85.5%	74.8%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Energy management system, custom	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Food Service	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Switch	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Switch	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Glass front refrigerated coolers	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Sensors	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	LEDS	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Lighting Controls	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Lighting Controls	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Lighting Controls	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Lighting Controls	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Lighting Controls	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Lighting Controls, Custom	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Load Comp, 75HP	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Low pressure drop filter	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Make Up Air Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	**Residential, Income Eligible Residential, Commerical & Industrial**	**Identify the Program Name in the TRM**	**Identify the group/measure name in the TRM.**	**What values were changed?**	**Previous Value**	**Updated Value**	**Impact on Savings (+/-)**	**Describe why the change was made**
Electric	Commercial & Industrial	Large C&I Retrofit	Motor VFD Secondary	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Non-refrigerated snack vending machine	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	O & M	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Packaged Terminal Heat Pumps (PTHP)	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Performance Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Performance Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Performance Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Performance Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Process Cooling	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Process, Exhaust Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Refrigerated beverage vending machine	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Street Lighting	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Street Lighting	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Transformers	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	VARICOMP	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	VARICOMP	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Verified savings	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	VSD	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	VSD	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	VSD compressor up to 75 HP	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Water/Waste Pump	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Weatherization	NTG	65.4%	88.9%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	Zero Loss Drain	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	HVAC Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Large C&I Retrofit	HVAC Fan	NTG	85.5%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Solar Thermal - All	NTG	96.7%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Solar Thermal - Seasonal	NTG	96.7%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Solar Thermal - Year Round	NTG	96.7%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Ventilation reduction	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	Verified Savings Project	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	WiFi Thermostat	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Small Business Direct Install	WiFi Thermostat	NTG	90.3%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Compressed Air, Custom	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	CUSTOM LIGHTING	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Custom Motors/Drives, HVAC	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Custom Motors/Drives, Non-HVAC	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	CUSTOM REFRIGERATION	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Door heater control	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Fan Control	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Freezer Door Heater Controls	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Commercial & Industrial	Small Business Direct Install	Freezer Recycling	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	High Intensity Discharge, Exterior	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Hot Water, Custom	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	HVAC, Custom	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	LED	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	LED	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	LED	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	LED Exit Signs	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerated case LED	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator case LED, Custom	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Motor/Drives, Non-HVAC	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Novelty cooler shutoff	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	OCCUPANCY SENSORS	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	PHOTOCELLS	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Process, Custom	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	PROGRAMMABLE THERMOSTATS	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator Recycling	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	TIMECLOCKS	NTG	88.2%	82.5%	Decrease in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	VENDING MACHINES	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Electric	Commercial & Industrial	Small Business Direct Install	Water Heating	NTG	71.2%	82.5%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Boiler Reset	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Boiler Reset	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Boiler, 95% AFUE < 300 MBU	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Building operator certification	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Building Shell	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Comprehensive Design	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Comprehensive Design	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Comprehensive Retrofit	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Condensing Boiler	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Condensing Boiler	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Condensing Boiler	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Custom Other	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Custom: SEM	NTG	100.0%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Domestic Hot Water	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	ERV	NTG	80.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	ERV	NTG	80.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Faucet aerator	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Food Service	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Furnace	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Furnace	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Furnace	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Pump	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Recovery	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Recovery	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Recovery	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	HVAC	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	HVAC	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	HVAC insulation	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Low-Flow Showerhead	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Non-Condensing Boiler	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Non-Condensing Boiler	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Non-Condensing Boiler	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Operation & Maintenance	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Other Gas	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Gas	Commercial & Industrial	Large C&I Retrofit	Other Gas	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Other Gas	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Pre-rinse spray valve	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Process	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Programmable thermostat	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap, Custom	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap, Custom	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap HVAC	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap HVAC	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Ventilation Reduction	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Verified savings	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	VSDs	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Custom Weatherization	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	VSDs	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	WiFi Thermostat Gas	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	WiFi Thermostat Gas	NTG	108.8%	89.6%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I Retrofit	Programmable Thermostat, Custom	NTG	108.8%	88.9%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Advanced Building	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Boiler	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Boiler	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	BOILER RESET 1 STAGE	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Building Shell	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Combined Heat and Power (Gas)	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COMBO COND FURN/WTR HTR	NTG	29.0%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Combo Condensing Boiler/ Water Heater	NTG	29.0%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Combo Condensing Boiler/ Water Heater	NTG	29.0%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Comprehensive Design	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Comprehensive Design Assessment	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COND UNIT HEATER 151-400 MBH	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Water Heater, 90%MIN 75-800	NTG	29.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Storage Water Heater, 94%MIN 75-300	NTG	29.0%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Conveyor Broiler Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Conveyor Broiler Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Conveyor Broiler Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COOKING-COMBO OVEN 1	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COOKING-CONVECTION OVEN 1	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COOKING-CONVEYOR OVEN 1	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COOKING-FRYER-1000	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COOKING-GRIDDLE 1	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COOKING-RACK OVEN 1	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	COOKING-STEAMER-1000	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	DIRECT FIRE HEATER	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Domestic Hot Water	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Gas	Commercial & Industrial	Large C&I New Construction	ERV	NTG	80.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	ERV	NTG	80.0%	74.8%	Decrease in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Food Service	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Fryer, Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace w/ECM	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace w/ECM	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace w/ECM	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace w/ECM	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Gas driven cooling	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Gas Oven Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Gas Oven Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Gas Oven Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Gas Oven Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Griddle, Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Pump	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Recovery	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Recovery	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Recovery	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	HVAC	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	HVAC	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	HVAC insulation	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	INFRARED HEATER - LOW INT	NTG	57.6%	89.6%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Kitchen Equipment	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Low Flow Cooking Spray Nozzle, Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Non-Condensing Boiler	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Non-Condensing Boiler	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Non-Condensing Boiler	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Other Gas	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Other Gas	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Other Gas	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Pasta Cooker, Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Process	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Steam boiler	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Steam Trap	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Steamer, Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Underfired Broiler, Upstream	NTG	57.6%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Ventilation Reduction	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	VSDs	NTG	57.6%	88.9%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	WATER HEATER - INDIRECT	NTG	36.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Water Heater - On-Demand	NTG	36.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Water Heater - On-Demand	NTG	36.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Water Heater - On-Demand	NTG	36.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Water Heater - On-Demand	NTG	36.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Water Heating Boiler	NTG	44.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Water Heating Boiler	NTG	44.0%	74.8%	Increase in net savings	New Commercial FRSO study
Gas	Commercial & Industrial	Large C&I New Construction	Water Heating Boiler	NTG	44.0%	74.8%	Increase in net savings	New Commercial FRSO study
Electric	Residential	Loadshapes	ls_01_Electric	Loadshape Update	NA	NA	Change in summer and winter demand saving	Adoption of MA Study
Electric	Residential	Loadshapes	ls_75_Electric	Loadshape Update	NA	NA	Change in summer and winter demand saving	Adoption of MA Study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Residential	Loadshapes	ls_76_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_03_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_04_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_06_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_91_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_78_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_07_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_77_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_79_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_80_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_81_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_83_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_08_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_09_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_82_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_73_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_90_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_11_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_18_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_89_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_84_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_85_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_86_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_87_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_88_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Residential	Loadshapes	ls_255_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial and Industrial	Loadshapes	ls_105_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Gas	Commercial and Industrial	Loadshapes	ls_105_Gas	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial and Industrial	Loadshapes	ls_111_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Gas	Commercial and Industrial	Loadshapes	ls_111_Gas	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial and Industrial	Loadshapes	ls_106_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Gas	Commercial and Industrial	Loadshapes	ls_106_Gas	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial and Industrial	Loadshapes	ls_108_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Gas	Commercial and Industrial	Loadshapes	ls_108_Gas	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial and Industrial	Loadshapes	ls_109_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Gas	Commercial and Industrial	Loadshapes	ls_109_Gas	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial and Industrial	Loadshapes	ls_122_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial and Industrial	Loadshapes	ls_135_Electric	Loadshape Update	NA	NA	Change in summer and winter demand savin	Adoption of MA Study
Electric	Commercial & Industrial	Large C&I New Construction	Hot Food Holding Bin	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	Steam Table	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	Soup Wells	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	Radiant Conveyor Toaster 120V	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	Radiant Conveyor Toaster 208V	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	Demand Control Kitchen Ventilation	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	FEI Rated Fans	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	FEI Rated Fans, Variable Speed	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	FEI Rated Fans, Constant Speed	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	High Volume Low Speed (HVLS) Fan	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Large C&I New Construction	High Efficiency Evaporating Units	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Swarm Logic	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Wall Insulation, Electric	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Wall Insulation, Oil	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Wall Insulation, Propane	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Attic Insulation, Electric	New measure	NA	NA	NA	New cost-effective measure

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Commercial & Industrial	Small Business Direct Install	Attic Insulation, Oil	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Attic Insulation, Propane	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Attic Air Sealing, Electric	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Attic Air Sealing, Oil	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Attic Air Sealing Propane	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Basement Insulation, Electric	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Basement Insulation, Oil	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Basement Insulation, Propane	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Weatherstripping, Electric	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Weatherstripping, Oil	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Weatherstripping, Propane	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Wall Insulation, Gas	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Attic Insulation,Gas	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Attic Air Sealing, Gas	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Basement Insulation, Gas	New measure	NA	NA	NA	New cost-effective measure
Electric	Commercial & Industrial	Small Business Direct Install	Weatherstripping, Gas	New measure	NA	NA	NA	New cost-effective measure
Electric	Residential	Residential HVAC	CoolSmart AC QIV ES	NTG	0.91	0.88	Decrease in net savings	Updated source
Electric	Residential	Residential HVAC	CoolSmart HP Tuneup	NTG	0.91	0.88	Decrease in net savings	Updated source
Electric	Residential	Residential HVAC	CoolSmart HP QIV ES	NTG	0.91	0.88	Decrease in net savings	Updated source
Electric	Residential	Residential HVAC	CoolSmart AC Tuneup	NTG	0.91	0.88	Decrease in net savings	Updated source
Gas	Residential	EnergyWise Multifamily	VFD	NTG	0.58	0.896	Increase in net savings	Updated source
Electric	Residential	EnergyWise Multifamily	Boiler Reset Control - Oil	Oil MMBtu	35.50	37.30	Increase in deemed savings	Updated source
Electric	Residential	EnergyWise Multifamily	Boiler Reset Control - Other	Propane MMBtu	35.50	37.30	Increase in deemed savings	Updated source
Electric	Residential	EnergyWise Multifamily	VFD	NTG	0.84	0.896	Decrease in net savings	Updated source
Electric	Income Eligible Residential	Income Eligible Multifamily	Boiler Reset Control - Oil	Oil MMBtu	35.50	37.30	Increase in deemed savings	Updated source
Electric	Income Eligible Residential	Income Eligible Multifamily	Boiler Reset Control - Other	Propane MMBtu	35.50	37.30	Increase in deemed savings	Updated source
Gas	Commercial & Industrial	Small Business Direct Install	Low-flow showerhead	Gas DHW MMBtu	5.20	2.65	Decrease in deemed savings	Reduction of savings in line with MA update
Gas	Commercial & Industrial	Large Commercial New Constru	Boiler - 96% AFUE	Gas Heat MMBtu	29.30	13.80	Decrease in deemed savings	Updated source
Gas	Commercial & Industrial	Large Commercial New Constru	Boiler - 95% AFUE < 300 MBU	Gas Heat MMBtu	29.30	13.80	Decrease in deemed savings	Updated source
Gas	Commercial & Industrial	Large Commercial New Constru	COOKING-STEAMER-1000	Water Savings	103563	162060	Decrease in water savings	Updated source
Gas	Commercial & Industrial	Large Commercial New Constru	Steamer, Upstream	Water Savings	103563	162060	Decrease in water savings	Updated source
Electric	Commercial & Industrial	Large Commercial New Constru	Ice Machine - Ice Making Head	Measure Life	8.00	9.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large Commercial New Constru	Ice Machine - Cont. Remote	Measure Life	8.00	9.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large Commercial New Constru	Ice Machine - Ice Self Contained	Measure Life	8.00	9.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large Commercial New Constru	Ice Machine - Remote/Split	Measure Life	8.00	9.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large Commercial New Constru	Room Air Cleaner - K-12	Measure Life	3.00	9.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large Commercial New Constru	Room Air Cleaner - Office	Measure Life	3.00	9.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large Commercial New Constru	Room Air Cleaner - Retail	Measure Life	3.00	9.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Small Business Direct Install	Freezer Recycling	kWh	663.00	754.00	Increase in gross savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Freezer Recycling	Electric RR	1.00	0.83	Decrease in net savings	In line with source value
Electric	Commercial & Industrial	Small Business Direct Install	Freezer Recycling	NTG	0.825	0.50	Decrease in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator Recycling	kWh	755.00	983.00	Increase in gross savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator Recycling	Electric RR	1.00	0.90	Decrease in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator Recycling	NTG	0.83	0.46	Decrease in net savings	Updated source
Gas	Commercial & Industrial	Large C&I Retrofit	Low-Flow Showerhead	Gas	5.20	2.65	Decrease in deemed savings	Reduction of savings in line with MA update
Gas	Commercial & Industrial	Large C&I New Construction	Water Heating Boiler - 85% TE	Measure Life	15.00	20.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Gas	Commercial & Industrial	Large C&I New Construction	Water Heating Boiler - 92% TE	Measure Life	15.00	20.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Gas	Commercial & Industrial	Large C&I New Construction	Water Heating Boiler - 94% TE	Measure Life	15.00	20.00	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Gas	Residential	Income Eligible Multifamily	Income Eligible Multifamily	Measure Life	25.00	20.00	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Small Business Direct Install	LED - Exterior HW	Electric RR	1.032	1.025	Decrease in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	LED - Interior HW	Electric RR	1.032	1.025	Decrease in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	LED - Interior SI	Electric RR	1.032	1.025	Decrease in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	LED Exit Signs	Electric RR	1.032	1.025	Decrease in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	LED - Exterior HW	Summer RR/winter RR	0.961/0.961	0.906/0.808	Decrease in summer and winter kW savings	Updated source

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Commercial & Industrial	Small Business Direct Install	LED - Interior HW	Summer RR/winter RR	0.961/0.961	0.906/0.808	Decrease in summer and winter kW savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	LED - Interior SI	Summer RR/winter RR	0.961/0.961	0.906/0.808	Decrease in summer and winter kW savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	LED Exit Signs	Summer RR/winter RR	0.961/0.961	0.906/0.808	Decrease in summer and winter kW savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerated case LED	Electric RR	0.94	1.03	Increase in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator case LED, Custom	Electric RR	1.032	1.025	Decrease in net savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerated case LED	Summer RR/winter RR	1/1	0.906/0.808	Decrease in summer and winter kW savings	Updated source
Electric	Commercial & Industrial	Small Business Direct Install	Refrigerator case LED, Custom	Summer RR/winter RR	1/1	0.906/0.808	Decrease in summer and winter kW savings	Updated source
Electric	Commercial & Industrial	Large C&I New Construction	MFHR - Lighting	Measure Life	15.00	11.00	Decrease in lifetime savings	Updated based on RI Mercury Ban in 2025
Gas	Residential	EnergyWise Multifamily	Duct Insulation, MF	Measure Life	25.00	20.00	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Small Business Direct Install	PROGRAMMABLE THERMOSTATS	Savings Calculation	NA	NA	NA	Review of programmable thermostat savings methodology
Electric	Commercial & Industrial	Large C&I New Construction	Building Shell	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Chiller	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Commercial Refrigeration	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Compressed Air	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Custom HVAC	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	EMS	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Food Service	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Cell	Electric /summer/winter RR	1/1/1	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Switch - DHW	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Switch - HVAC	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Motor	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Other	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Process	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Process Cooling	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	Transformers	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I New Construction	VSD-Non HVAC	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Building Shell	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Commercial Refrigeration	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Compressed Air	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom HVAC	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Motor	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Other	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom process	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	EMS 5k-40ksqft	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	EMS 40k-80ksqft	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	EMS 80k-200ksqft	Electric /summer/winter RR	1.036/1.027/1.027	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Energy management system, custom	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Food Service	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Cell	Electric /summer/winter RR	1/1/1	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Switch - DHW	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Switch - HVAC	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Heating Hot Water Pump	Electric /summer/winter RR	0.94/0.987/0.989	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	O & M	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Process Cooling	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Process, Cool Pump	Electric /summer/winter RR	0.94/0.987/0.989	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Transformers	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	VFD Secondary	Electric /summer/winter RR	0.94/0.987/0.989	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	VSD-HVAC	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	VSD-Non HVAC	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Water Source Heat Pump	Electric /summer/winter RR	0.94/0.987/0.989	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Electric	Commercial & Industrial	Large C&I Retrofit	Custom Weatherization	Electric /summer/winter RR	0.882/0.733/1.059	0.814/0.737/0.983	Decrease in net savings	Adoption of RI C&I Custom Electric Study
Gas	Commercial & Industrial	Large C&I Retrofit	Building Shell	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Condensing Boiler - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Condensing Boiler - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Gas	Commercial & Industrial	Large C&I Retrofit	Condensing Boiler - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Domestic Hot Water	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Food Service	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Furnace - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Furnace - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Furnace - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Pump	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Recovery - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Recovery - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Heat Recovery - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	HVAC - Controls and EMS	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	HVAC - Equipment	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	HVAC insulation	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Non-Condensing Boiler - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Non-Condensing Boiler - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Non-Condensing Boiler - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Other Gas - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Other Gas - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Other Gas - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Process	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Ventilation Reduction	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	VSDs - Non-HVAC	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Advanced Building	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Building Shell	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Domestic Hot Water	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Food Service	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Furnace - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Gas driven cooling	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Pump	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Recovery - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Recovery - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Heat Recovery - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	HVAC - Controls and EMS	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	HVAC - Equipment	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	HVAC insulation	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Kitchen Equipment	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Non-Condensing Boiler - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Non-Condensing Boiler - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Non-Condensing Boiler - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Other Gas - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Other Gas - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Other Gas - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Process	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Gas	Commercial & Industrial	Large C&I New Construction	Steam boiler	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Ventilation Reduction	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	VSDs - Non-HVAC	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	VSDs - HVAC	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I New Construction	Steam Trap	Gas RR	0.844	1	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Custom Other	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Operation & Maintenance	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Verified savings	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Custom Weatherization	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Comprehensive Design - CD	Gas RR	0.844	0.97	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Comprehensive Design - CDA	Gas RR	0.844	0.97	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Comprehensive Retrofit	Gas RR	0.844	0.97	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Steam Trap Repair or Replacement	Gas RR	0.83	1	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Large C&I Retrofit	Low-Pressure Steam Trap	Gas RR	0.83	1	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Building Shell	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Design - CD	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Design - CDA	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Retrofit	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Condensing Boiler - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Condensing Boiler - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Condensing Boiler - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	DHW	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Drives on HVAC Systems	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Drives on non-HVAC Systems	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Food Service	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Furnace - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Furnace - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Furnace - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Pump	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Recovery - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Recovery - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Heat Recovery - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	HVAC - Controls and EMS	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	HVAC - Equipment	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Non-Condensing Boiler - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Non-Condensing Boiler - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Non-Condensing Boiler - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Operation & Maintenance	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Other Gas - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Other Gas - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Other Gas - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Other, Custom	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Pipe/Tank/Duct/HVAC Insulation	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Process Equipment/Controls	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Solar Thermal - All	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Solar Thermal - Seasonal	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Solar Thermal - Year Round	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Ventilation reduction	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Gas	Commercial & Industrial	Small Business Direct Install	Verified Savings Project	Gas RR	0.844	0.8881	Increase in net savings	Adoption of RI C&I Custom Gas Study
Electric	Residential	Residential HVAC	Electric Resistance to MSHP	NEI_148	5.15	196.46	Increase in NEI benefits	Review of MA NEIs and updated source and NEI
Electric	Residential	EnergyWise Single Family	Electric Resistance to MSHP	NEI_148	5.15	196.46	Increase in NEI benefits	Review of MA NEIs and updated source and NEI
Electric	Income Eligible Residential	Income Eligible Single Family	MSHP - Electric Resistance	NEI_149	310.82	196.46	Decrease in NEI benefits	Review of MA NEIs and updated source and NEI
Electric	Residential	Residential HVAC	Central Heat Pump	NEI_25	5.15	8.21	Increase in NEI benefits	Review of MA NEIs and updated source and NEI
Gas	Residential	Residential HVAC	Combo Furnace	NEI_G18	47.16	99.74	Increase in NEI benefits	Review of MA NEIs and updated source and NEI

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Gas	Residential	Residential HVAC	Furnace w/ ECM - 97% AFUE	NEI_G18	47.16	99.74	Increase in NEI benefits	Review of MA NEIs and updated source and NEI
Gas	Residential	Residential HVAC	Forced Hot Water Boiler - >=95% AFUE	NEI_G19	49.11	96.4	Increase in NEI benefits	Review of MA NEIs and updated source and NEI
Electric	Income Eligible Residential	Income Eligible Multifamily	Programmable thermostat	Measure Life	13	19	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Residential	Residential HVAC	ECM Pumps	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump - <= 1/8 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump - <=1/20 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump - 1/20 to 1/8 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump - 1/8 to 1/6 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump - 1/6 to 3/4 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	DHW ECM Pump - 3/4 to 3 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump - <= 1/8 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump - <=1/20 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump - 1/20 to 1/8 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump 3/4 to 3 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump 1/8 to 1/6 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	ECM Pump - 1/6 to 3/4 HP	Measure Life	20	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	Water Source Heat Pump	Measure Life	12	15	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Gas	Commercial & Industrial	Small Business Direct Install	Pre-rinse spray valve	Measure Life	3	5	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Large C&I New Construction	Electric HW Spray Valve	Measure Life	3	5	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Commercial & Industrial	Small Business Direct Install	Spray Valves	Measure Life	3	5	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Gas	Commercial & Industrial	Large C&I Retrofit	Pre-rinse spray valve	Measure Life	3	5	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Gas	Commercial & Industrial	Small Business Direct Install	Programmable thermostat	Measure Life	11	15	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Gas	Commercial & Industrial	Large C&I Retrofit	Programmable thermostat	Measure Life	11	15	Increase in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Residential	Residential HVAC	HP ducted or mix ducted	Measure Life	18	15	Decrease in lifetime savings	Recommendation from Measure Life Review Phase II
Electric	Residential	Residential New Construction	Clothes Washer	Measure Life	11	14	Increase in lifetime savings	Recommendation from Measure Life Review Phase I
Electric	Residential	Residential New Construction	Clothes Washer	kWh savings	46.3	27.7	Decrease in gross kWh savings	IECC 2024 updated baseline
Electric	Residential	Residential Consumer Products	Clothes Washer Most Efficient	kWh savings	265.45	29.25	Decrease in gross kWh savings	IECC 2024 updated baseline
Electric	Residential	Residential New Construction	Refrigerators	kWh savings	101.4	95.7	Decrease in gross kWh savings	IECC 2024 updated baseline
Electric	Residential	Residential Consumer Products	Dryer Most Efficient	NTG	0.52	1	Increase in net savings	review of NTG and was not appropriate for most efficient dry
Electric	Residential	Residential New Construction	Showerheads	Water Savings	3696	1565	Decrease in non-resource benefits	Review of water savings
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Controls - Dimming	Offering of Measure	NA	NA	No longer offered	Per IECC 2024 C405.2.2.3 - dimming controls are required
Electric	Commercial & Industrial	Large C&I New Construction	Lighting Controls - Sensor	Offering of Measure	NA	NA	No longer offered	Per IECC 2024 C405.2.1 - occupancy sensors are required
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Design - CD	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Small Business Direct Install	Comprehensive Design - CDA	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting - Compact, Exterior HW	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting - Compact, Hard Wired	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting - Compact, Interior Screw-In	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Small Business Direct Install	Fluorescent Lighting - Elig Ballast	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal - All	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal - Year Round	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I Retrofit	Solar Thermal - Seasonal	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	Custom: SEM	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I Retrofit	Custom: SEM	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Cell	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Switch - DHW	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	Fuel Switch - HVAC	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	P4P -1 Year	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	P4P - 2 Year	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	P4P - 3 Year	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	P4P - 4 Year	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	P4P - 5 Year	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	Verified savings	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I Retrofit	Prescriptive Lighting - LED Sign	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal - All	Removed Measure	NA	NA	No longer offered	Clean up of retired measures

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal - Year Round	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Solar Thermal - Seasonal	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Underfired Broiler, Upstream	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Kitchen Equipment	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Furnace - All	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Furnace - Seasonal	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Furnace - Year Round	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	HVAC insulation	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Food Service	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	DIRECT FIRE HEATER	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Advanced Building	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Combined Heat and Power (Gas)	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	Condensing Boiler - All	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	Large C&I New Construction	COMBO COND FURN/WTR HTR	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Switch - DHW	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Switch - HVAC	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	Fuel Cell	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	ECM fan motor for HVAC	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	Evap AC, over 20 T	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting- LED	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting - General	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting - Stairwell LED	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Commercial & Industrial	Large C&I New Construction	UPSTR Lighting - Linear LED	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	Residential New Construction	Room AC	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	Residential HVAC	ENERGY STAR STORAGE WATER HEATER .64 UEF (med draw)	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	Residential HVAC	Seasonal Savings Cooling	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	Residential HVAC	Boiler Reset Controls	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	Residential HVAC	Combo Condensing Boiler/Water Heater - 90% AFUE	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	Residential HVAC	WiFi programmable thermostat with cooling (gas)	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	C&I Multifamily	Boiler, Hot Water_MF	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	C&I Multifamily	Custom	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	C&I Multifamily	Heat Pump, Custom	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	C&I Multifamily	HVAC, Custom	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Commercial & Industrial	C&I Multifamily	Participant	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	AC Timer	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Air Sealing Kit, Elec	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Air Sealing Kit, Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Air Sealing Kit, Others	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Refrig rebate	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Window -Electric Resistance	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Window -Heat Pump	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Window -Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Single Family	Window -Propane	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	EnergyWise Single Family	Air Sealing Kit, Gas	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	EnergyWise Single Family	Triple Pane Windows	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	Window -Electric Resistance	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	Window -Heat Pump	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	Window -Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	Window -Propane	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	ACTIMER	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	Heat Pumps - Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	MSHP - Oil Fuel Switching	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	LED - Bulbs	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Single Family	LED - Reflectors	Removed Measure	NA	NA	No longer offered	Clean up of retired measures

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	Residential, Income Eligible Residential, Commerical & Industrial	Identify the Program Name in the TRM	Identify the group/measure name in the TRM.	What values were changed?	Previous Value	Updated Value	Impact on Savings (+/-)	Describe why the change was made
Electric	Income Eligible Residential	Income Eligible Single Family	LED - EISA EXEMPT	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	AC Timer	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Boiler Reset Control - Other	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Heating System Retrofit-Boiler	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Refrig rebate	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Pipe Wrap DHW	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Thermostatic Shut-off Valve	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Vending Miser	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Water Heating, Custom	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Wi-Fi Thermostat	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	EnergyWise Multifamily	Boiler, Hot Water	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	EnergyWise Multifamily	Heat Pump, Custom	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Residential	EnergyWise Multifamily	Participant	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Residential	EnergyWise Multifamily	Participant	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	CFL Fixture - Common Int	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	CFL Fixture - Dwelling Int	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	CFL Fixture - Dwelling Ext	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	CFLs	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Common Int LED Bulbs	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Common Occupancy Sensor	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Dehumidifier	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	EISA Exempt Lighting - Common Ext	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	EISA Exempt Lighting - Dwelling Int	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	EISA Exempt Lighting - Dwelling Ext	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Heat Pumps - Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	LED Bulbs	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Lighting Fixtures - Indoor	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Lighting Fixtures - Outdoor	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	LED Fixture - Dwelling Int	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	LED Fixture - Dwelling Ext	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Reflector Lighting - Common Ext	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Reflector Lighting - Common Int	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Reflector Lighting - Dwelling Ext	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Reflector Lighting - Dwelling Int	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Refrigerator	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Window -Electric Resistance	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Window -Heat Pump	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Window -Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Window -Propane	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Participant (NEB)	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Pipe Wrap DHW	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Pipe Wrap DHW - Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Pipe Wrap DHW Other	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Programmable Thermostat - Oil	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Thermostatic Shut-off Valve	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	Vending Miser	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	CONTROLS_LI	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Demand Circulator	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Electric	Income Eligible Residential	Income Eligible Multifamily	CUSTOM CHP	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Triple Pane Windows	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Thermostatic Shut-off Valve	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Heating System Retrofit, Boiler	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Heating System Retrofit, Commercial Boiler	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Heating System Retrofit, Furnace	Removed Measure	NA	NA	No longer offered	Clean up of retired measures

Fuel	Sector	Program Name	TRM Group/Measure Name	Change/Addition Made				Reason for Update
Electric, Gas	**Residential, Income Eligible Residential, Commerical & Industrial**	**Identify the Program Name in the TRM**	**Identify the group/measure name in the TRM.**	**What values were changed?**	**Previous Value**	**Updated Value**	**Impact on Savings (+/-)**	**Describe why the change was made**
Gas	Income Eligible Residential	Income Eligible Multifamily	Low Flow Showerhead - Showerhead w/ TSV	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Participant	Removed Measure	NA	NA	No longer offered	Clean up of retired measures
Gas	Income Eligible Residential	Income Eligible Multifamily	Wi-Fi Thermostat (controls gas heat only)	Removed Measure	NA	NA	No longer offered	Clean up of retired measures

Appendix E: Acronyms

ACRONYM	DESCRIPTION
AC	Air Conditioning
AFUE	Annual Fuel Utilization Efficiency (see the Glossary)
AHU	Air Handling Unit
Btu	British Thermal Unit (see the Glossary)
CF	Coincidence Factor (see the Glossary)
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
COP	Coefficient of Performance (see the Glossary)
DCV	Demand Controlled Ventillation
DHW	Domestic Hot Water
DOER	Department of Energy Resources
DSM	Demand Side Management (see the Glossary)
ECM	Electrically Commutated Motor
EER	Energy Efficiency Ratio (see the Glossary)
EF	Efficiency Factor
EFLH	Equivalent Full Load Hours (see the Glossary)
ES	ENERGY STAR® (see the Glossary)
FCM	Forward Capacity Market
FR	Free-Ridership (see the Glossary)
HE	High-Efficiency
HID	High-Intensity Discharge (a lighting technology)
HP	Horse Power (see the Glossary)
HSPF	Heating Seasonal Performance Factor (see the Glossary)
HVAC	Heating, Ventilating, and Air Conditioning
ISO	Independent System Operator
ISR	In-Service Rate (see the Glossary)
kW	Kilo-Watt, a unit of electric demand equal to 1,000 watts
kWh	Kilowatt-Hour, a unit of energy (1 kilowatt of power supplied for one hour)
LED	Light-Emitting Diode (one type of solid-state lighting)
LCD	Liquid Crystal Display (a technology used for computer monitors and similar displays)
MMBtu	One million British Thermal Units (see “Btu” in the Glossary)
MW	Megawatt – a measure of electric demand equal to 1,000 kilowatts
MWh	Megawatt-hour – a measure of energy equal to 1,000 kilowatt-hours
NEB	Non-Electric Benefit (see the Glossary)
NEI	Non-Energy Impact
NE-ISO	New England Independent System Operator
NTG	Net-to-Gross (see the Glossary)
O&M	Operations and Maintenance
PA	Program Administrator (see the Glossary)
PC	Personal Computer
RR	Realization Rate (see the Glossary)
SEER	Seasonal Energy Efficiency Ratio (see the Glossary)
SO	Spillover (see the Glossary)
SPF	Savings Persistence Factor (see the Glossary)
SSL	Solid-State Lighting (e.g., LED lighting)
VSD	Variable-Speed Drive

Appendix F: Glossary

This glossary provides definitions as they are applied in this TRM for Rhode Island' energy efficiency programs. Alternate definitions may be used for some terms in other contexts.

TERM	DESCRIPTION
Adjusted Gross Savings	Gross savings (as calculated by the measure savings algorithms) that have been subsequently adjusted by the application of all impact factors except the net-to-gross factors (free-ridership and spillover).
AFUE	Annual Fuel Utilization Efficiency. The measure of seasonal or annual efficiency of a furnace or boiler. AFUE takes into account the cyclic on/off operation and associated energy losses of the heating unit as it responds to changes in the load, which in turn is affected by changes in weather and occupant controls.
Baseline Efficiency	The level of efficiency of the equipment that would have been installed without any influence from the program or, for retrofit cases where site-specific information is available, the actual efficiency of the existing equipment.
Btu	British thermal unit. A Btu is approximately the amount of energy needed to heat one pound of water by one degree Fahrenheit.
Coefficient of Performance (COP)	Coefficient of Performance is a measure of the efficiency of a heat pump, air conditioner, or refrigeration system. A COP value is given as the Btu output of a device divided by the Btu input of the device. The input and output are determined at AHRI testing standards conditions designed to reflect peak load operation.
Coincidence Factor (CF)	Coincidence Factors represent the fraction of connected load expected to occur concurrent to a particular system peak period; separate CF are found for summer and winter peaks. The CF given in the TRM includes both coincidence and diversity factors multiplied into one number. Coincidence factors are provided for peak periods defined by the NE-ISO for FCM purposes and calculated consistent with the FCM methodology.
Connected Load kW Savings	The connected load kW savings is the power saved by the equipment while in use. In some cases the savings reflect the maximum power draw of equipment at full load. In other cases the connected load may be variable, which must be accounted for in the savings algorithm.
Deemed Savings	Savings values (electric, fossil fuel and/or non-energy benefits) determined from savings algorithms with assumed values for all algorithm parameters. Alternatively, deemed savings values may be determined from evaluation studies. A measure with deemed savings will have the same savings per unit since all measure assumptions are the same. Deemed savings are used by program administrators to report savings for measures with well-defined performance characteristics relative to baseline efficiency cases. Deemed savings can simplify program planning and design, but may lead to over- or under-estimation of savings depending on product performance.
Deemed Calculated Savings	Savings values (electric, fossil fuel and/or non-energy benefits) that depend on a standard savings algorithm and for which at least one of the algorithm parameters (e.g., hours of operation) is project specific.
Demand Savings	The reduction in demand due to installation of an energy efficiency measure, usually expressed as kW and measured at the customer's meter (see Connected Load kW Savings).
Demand Side Management (DSM)	Strategies used to manage energy demand including energy efficiency, load management, fuel substitution, and load building.

TERM	DESCRIPTION
Diversity	A characteristic of a variety of electric loads whereby individual maximum demands occur at different times. For example, 50 efficient light fixtures may be installed, but they are not necessarily all on at the same time. See Coincidence Factor.
Diversity Factor	This TRM uses coincidence factors that incorporate diversity (See Coincidence Factor), thus this TRM has no separate diversity factors. A diversity factor is typically calculated as: 1) the percent of maximum demand savings from energy efficiency measures available at the time of the company's peak demand, or 2) the ratio of the sum of the demands of a group of users to their coincident maximum demand.
End Use	Refers to the category of end use or service provided by a measure or technology *(*e.g., lighting, cooling, etc.). For the purpose of this manual, the list of end-uses include: Lighting — HVAC Refrigeration — Hot Water Food Service — Behavior Compressed Air — Motors & Drives Products — Custom
Energy Efficiency Ratio (EER)	The Energy Efficiency Ratio is a measure of the efficiency of a cooling system at a specified peak, design temperature, or outdoor temperature. In technical terms, EER is the steady-state rate of heat energy removal (i.e. cooling capacity) of a product measured in Btuh output divided by watts input.
ENERGY STAR® (ES)	Brand name for the voluntary energy efficiency labeling initiative sponsored by the U.S. Environmental Protection Agency.
Energy Costing Period	A period of relatively high or low system energy cost, by season. The energy periods defined by ISO-NE are: • **Summer Peak**: 6am–10pm, Monday–Friday (except ISO holidays), June–September • **Summer Off-Peak:** Summer hours not included in the summer peak hours: 10pm–6am, Monday–Friday, all day on Saturday and Sunday, and ISO holidays, June–September • **Winter Peak:** 6am–10pm, Monday–Friday (except ISO holidays), January–May and October–December • **Winter Off-Peak:** Winter hours not included in the sinter peak hours: 10pm–6am, Monday–Friday, all day on Saturday and Sunday, and ISO holidays, January–May and October–December.
Equivalent Full Load Hours (EFLH)	The equivalent hours that equipment would need to operate at its peak capacity in order to consume its estimated annual kWh consumption (annual kWh/connected kW).
Free Rider	A customer who participates in an energy efficiency program, but would have installed some or all of the same measure(s) on their own, with no change in timing of the installation, if the program had not been available.
Free-Ridership Rate	The percentage of savings attributable to participants who would have installed the measures in the absence of program intervention.
Gross kW	Expected demand reduction based on a comparison of standard or replaced equipment and equipment installed through an energy efficiency program.
Gross kWh	Expected kWh reduction based on a comparison of standard or replaced equipment and equipment installed through an energy efficiency program.
Gross Savings	A saving estimate calculated from objective technical factors. In this TRM, "gross savings" are calculated with the measure algorithms and do not include any application of impact factors. Once impact factors are applied, the savings are called "Adjusted Gross Savings".

TERM	DESCRIPTION
High Efficiency (HE)	Refers to the efficiency measures that are installed and promoted by the energy efficiency programs.
Horsepower (HP)	A unit for measuring the rate of doing work. One horsepower equals about three-fourths of a kilowatt (745.7 watts).
Heating Seasonal Performance Factor (HSPF)	A measure of the seasonal heating mode efficiencies of heat pumps expressed as the ratio of the total heating output to the total seasonal input energy.
Impact Factor	Generic term for a value used to adjust the gross savings estimated by the savings algorithms in order to reflect the actual savings attributable to the efficiency program. In this TRM, impact factors include realization rates, in-service rates, savings persistence, peak demand coincidence factors, free-ridership, spillover and net-to-gross factors. See the section on Impact Factors for more detail.
In-Service Rate	The percentage of units that are actually installed. For example, efficient lamps may have an in-service rate less than 100% since some lamps are purchased as replacement units and are not immediately installed. The in-service rate for most measures is 100%.
Measure Life	The number of years that an efficiency measure is expected to garner savings. These are generally based on engineering lives, but sometimes adjusted based on observations of market conditions.
Lost Opportunity	Refers to a measure being installed at the time of planned investment in new equipment or systems. Often this reflects either new construction, renovation, remodeling, planned expansion or replacement, or replacement of failure.
Measure	A product (a piece of equipment), combination of products, or process designed to provide energy and/or demand savings. Measure can also refer to a service or a practice that provides savings. Measure can also refer to a specific combination of technology and market/customer/practice/strategy (e.g., direct install low income CFL).
Net Savings	The final value of savings that is attributable to a program or measure. Net savings differs from gross savings (or adjusted gross savings) because it includes adjustments due to free-ridership and/or spillover. Net savings is sometimes referred to as "verified" or “final” savings.
Net-to-Gross Ratio	The ratio of net savings to the adjusted gross savings (for a measure or program). The adjusted gross savings include any adjustment by the impact factors other than free-ridership or spillover. Net-to-gross is usually expressed as a percent.
Non-Electric Benefits (NEBs)	Quantifiable benefits (beyond electric savings) that are the result of the installation of a measure. Fossil fuel, water, and maintenance are examples of non-electric benefits. Non-electric benefits can be negative (i.e. increased maintenance or increased fossil fuel usage which results from a measure) and therefore are sometimes referred to as “non-electric impacts”.
Non-Participant	A customer that does not directly participate in an efficiency program.
On-Peak kW	See Summer/Winter On-peak kW
Operating Hours	Hours that a piece of equipment is expected to be in operation, not necessarily at full load (typically expressed per year).
Participant	A customer that reduces or otherwise modifies their energy end use patterns due to involvement in an efficiency program. Participation is measured differently in different programs. For several programs, a participant is defined as a customer account (electric or gas). In contrast, the Residential Consumer Products program measures participation by the number of rebates processed.

TERM	DESCRIPTION
Prescriptive Measure	A prescriptive measure is generally offered by use of a prescriptive form with a prescribed incentive based on the parameters of the efficient equipment or practice.
Realization Rate (RR)	The ratio of measure savings developed from impact evaluations to the estimated measure savings derived from the TRM savings algorithms. This factor is used to adjust the estimated savings when significant justification for such adjustment exists. The components of the realization rate are described in detail in the section on Impact Factors.
Retrofit	The replacement of a piece of equipment or device before the end of its useful or planned life for the purpose of achieving energy savings. "Retrofit" measures are sometimes referred to as "early retirement" when the removal of the old equipment is aggressively pursued.
Savings Persistence Factor (SPF)	Percentage of first-year energy or demand savings expected to persist over the life of the installed energy efficiency equipment. The SPF is developed by conducting surveys of installed equipment several years after installation to determine the operational capability of the equipment. In contrast, *measure persistence* takes into account business turnover, early retirement of installed equipment, and other reasons the installed equipment might be removed or discontinued. Measure persistence is generally incorporated as part of the measure life, and therefore is not included as a separate impact factor.
Seasonal Energy Efficiency Ratio (SEER)	A measurement of the efficiency of a central air conditioner over an entire season. In technical terms, SEER is a measure of equipment the total cooling of a central air conditioner or heat pump (in Btu) during the normal cooling season as compared to the total electric energy input (in watt-hours) consumed during the same period.
Sector	A grouping of participants by customer rate class. Programs are organized by these groupings. There are three sectors: Residential, Income Eligibe, and Commericial and Industrial.
Spillover Rate	The percentage of savings attributable to the program, but additional to the gross (tracked) savings of a program. Spillover includes the effects of (a) participants in the program who install additional energy efficient measures outside of the program as a result of hearing about the program and (b) non-participants who install or influence the installation of energy efficient measures as a result of being aware of the program.
Summer/Winter On-Peak kW	The average demand reduction during the summer/winter on-peak period. The summer on-peak period is 1pm-5pm on non-holiday weekdays in June, July and August; the winter on-peak period is 5pm-7pm on non-holiday weekdays in December and January.
Ton	Unit of measure for determining cooling capacity. One ton equals 12,000 Btu.
Watt	A unit of electrical power. Equal to 1/1000 of a kilowatt.