

STEVEN J. BOYAJIAN

One Financial Plaza, 14th Floor  
Providence, RI 02903-2485  
Main (401) 709-3300  
Fax (401) 709-3399  
sboyajian@rc.com  
Direct (401) 709-3359

Also admitted in Massachusetts

February 24, 2023

**VIA HAND DELIVERY & ELECTRONIC MAIL**

Luly E. Massaro, Commission Clerk  
Rhode Island Public Utilities Commission  
89 Jefferson Boulevard  
Warwick, RI 02888

**RE: Docket No. 22-33-EE – 2023 Annual Energy Efficiency Plan  
Electric Resistance Heating to Air Source Heat Pumps:  
Implementation Plan for the Income Eligible Sector**

Dear Ms. Massaro:

On behalf of The Narragansett Electric Company d/b/a Rhode Island Energy (“Rhode Island Energy” or the “Company”), I have enclosed the Company’s plan for the acceleration of electric resistance heating to air source heat pump conversions for income eligible customers. This plan is being provided in accordance with the directive of the Public Utilities Commission during its December 20, 2022 open meeting in the referenced docket. The Company looks forward to collaborating and engaging with the intervening parties in the docket to move this plan forward and achieve the purposes for which it has been developed.

Thank you for your attention to this matter. If you have any questions, please contact me at (401) 709-3359.

Very truly yours,



Steven J. Boyajian

Enclosure

cc: Docket 22-33-EE Service List

Certificate of Service

I hereby certify that a copy of the cover letter and any materials accompanying this certificate were electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.



Heidi J. Seddon

February 24, 2023

Date

**Docket No. 22-33-EE – Rhode Island Energy’s Energy Efficiency Plan 2023 Service list updated 11/29/22**

Name /Address	E-mail Distribution List	Phone
<b>The Narragansett Electric Company d/b/a Rhode Island Energy</b> Andrew Marcaccio, Esq. 280 Melrose St. Providence, RI 02907	<a href="mailto:amarcaccio@pplweb.com">amarcaccio@pplweb.com</a> ;	401-784-4263
	<a href="mailto:cobrien@pplweb.com">cobrien@pplweb.com</a> ;	
	<a href="mailto:jhutchinson@pplweb.com">jhutchinson@pplweb.com</a> ;	
	<a href="mailto:jscanlon@pplweb.com">jscanlon@pplweb.com</a> ;	
	<a href="mailto:dmmoreira@rienergy.com">dmmoreira@rienergy.com</a> ;	
	<a href="mailto:MOCrayne@rienergy.com">MOCrayne@rienergy.com</a> ;	
	<a href="mailto:BSFeldman@rienergy.com">BSFeldman@rienergy.com</a> ;	
	<a href="mailto:ACLi@rienergy.com">ACLi@rienergy.com</a> ;	
	<a href="mailto:DJTukey@rienergy.com">DJTukey@rienergy.com</a> ;	
	<a href="mailto:SBriggs@pplweb.com">SBriggs@pplweb.com</a> ;	
	<a href="mailto:BJPelletier@rienergy.com">BJPelletier@rienergy.com</a> ;	
	<a href="mailto:JKessler@rienergy.com">JKessler@rienergy.com</a> ;	
	<a href="mailto:JOliveira@pplweb.com">JOliveira@pplweb.com</a> ;	
	<a href="mailto:mjshafer@pplweb.com">mjshafer@pplweb.com</a> ;	
Leticia C. Pimentel, Esq. Steve Boyajian, Esq. <b>Robinson &amp; Cole LLP</b> One Financial Plaza, 14th Floor Providence, RI 02903	<a href="mailto:kgrant@rienergy.com">kgrant@rienergy.com</a> ;	
	<a href="mailto:sboyajian@rc.com">sboyajian@rc.com</a> ;	
	<a href="mailto:LPimentel@rc.com">LPimentel@rc.com</a> ;	
	<a href="mailto:HSeddon@rc.com">HSeddon@rc.com</a> ;	

<b>Division of Public Utilities and Carriers</b> Margaret L. Hogan, Esq.	<a href="mailto:Margaret.L.Hogan@dpuc.ri.gov">Margaret.L.Hogan@dpuc.ri.gov</a> ;	401-780-2120
	<a href="mailto:Jon.hagopian@dpuc.ri.gov">Jon.hagopian@dpuc.ri.gov</a> ;	
	<a href="mailto:john.bell@dpuc.ri.gov">john.bell@dpuc.ri.gov</a> ;	
	<a href="mailto:Joel.munoz@dpuc.ri.gov">Joel.munoz@dpuc.ri.gov</a> ;	
	<a href="mailto:Machaela.Seaton@dpuc.ri.gov">Machaela.Seaton@dpuc.ri.gov</a> ;	
	<a href="mailto:Paul.Roberti@dpuc.ri.gov">Paul.Roberti@dpuc.ri.gov</a> ;	
<b>Synapse Energy Economics</b> Tim Woolf Jennifer Kallay 22 Pearl Street Cambridge, MA 02139	<a href="mailto:twoolf@synapse-energy.com">twoolf@synapse-energy.com</a> ;	
	<a href="mailto:jkallay@synapse-energy.com">jkallay@synapse-energy.com</a> ;	
<b>RI EERMC</b> Marisa Desautel, Esq. Office of Marisa Desautel, LLC 55 Pine St. Providence, RI 02903	<a href="mailto:marisa@desautelesq.com">marisa@desautelesq.com</a> ;	401-477-0023
	<a href="mailto:mdewey@desautelesq.com">mdewey@desautelesq.com</a> ;	
	<a href="mailto:Adrian.Caesar@nv5.com">Adrian.Caesar@nv5.com</a> ;	
	<a href="mailto:Craig.Johnson@nv5.com">Craig.Johnson@nv5.com</a> ;	
	<a href="mailto:Samuel.Ross@nv5.com">Samuel.Ross@nv5.com</a> ;	
<b>Acadia Center</b> Hank Webster, Director & Staff Atty.	<a href="mailto:HWebster@acadiacenter.org">HWebster@acadiacenter.org</a> ;	401-276-0600 x402
<b>Office of Energy Resources (OER)</b> Albert Vitali, Esq. Dept. of Administration Division of Legal Services One Capitol Hill, 4 <sup>th</sup> Floor Providence, RI 02908	<a href="mailto:Albert.Vitali@doa.ri.gov">Albert.Vitali@doa.ri.gov</a> ;	401-222-8880
	<a href="mailto:Nancy.Russolino@doa.ri.gov">Nancy.Russolino@doa.ri.gov</a> ;	
	<a href="mailto:Christopher.Kearns@energy.ri.gov">Christopher.Kearns@energy.ri.gov</a> ;	
	<a href="mailto:Anika.Kreckel@energy.ri.gov">Anika.Kreckel@energy.ri.gov</a> ;	
	<a href="mailto:William.Owen@energy.ri.gov">William.Owen@energy.ri.gov</a> ;	
	<a href="mailto:Steven.Chybowski@energy.ri.gov">Steven.Chybowski@energy.ri.gov</a> ;	
	<a href="mailto:Nathan.Cleveland@energy.ri.gov">Nathan.Cleveland@energy.ri.gov</a> ;	
<b>Original &amp; 9 copies file w/:</b> Luly E. Massaro, Commission Clerk John Harrington, Commission Counsel Public Utilities Commission 89 Jefferson Blvd. Warwick, RI 02888	<a href="mailto:Luly.massaro@puc.ri.gov">Luly.massaro@puc.ri.gov</a> ;	401-780-2107
	<a href="mailto:John.Harrington@puc.ri.gov">John.Harrington@puc.ri.gov</a> ;	
	<a href="mailto:Alan.nault@puc.ri.gov">Alan.nault@puc.ri.gov</a> ;	
	<a href="mailto:Todd.bianco@puc.ri.gov">Todd.bianco@puc.ri.gov</a> ;	
	<a href="mailto:Emma.Rodvien@puc.ri.gov">Emma.Rodvien@puc.ri.gov</a> ;	
<b>Interested Party</b>		
<b>Dept. of Human Services</b> Frederick Sneesby	<a href="mailto:Frederick.sneesby@dhs.ri.gov">Frederick.sneesby@dhs.ri.gov</a> ;	
<b>RI Infrastructure Bank</b> Chris Vitale, Esq.,	<a href="mailto:cvitale@hvlawltd.com">cvitale@hvlawltd.com</a> ;	
	<a href="mailto:SUsatine@riib.org">SUsatine@riib.org</a> ;	

<b>Green Energy Consumers Alliance</b> Larry Chretien, Executive Director	<a href="mailto:Larry@massenergy.org">Larry@massenergy.org</a> ;	
Amanda Barker	<a href="mailto:amanda@greenenergyconsumers.org">amanda@greenenergyconsumers.org</a> ;	

# **Electric Resistance Heating to Air Source Heat Pumps: Implementation Plan for the Income Eligible Sector**

## **Introduction**

During the Public Utilities Commission's (PUC or the Commission) December 20, 2022 open meeting regarding the 2023 Annual Energy Efficiency Plan in Docket no 22-33-EE, the PUC directed that Rhode Island Energy<sup>1</sup> develop a plan to achieve 750 units<sup>2</sup> of electric resistance heat (ERH) to air source heat pump (ASHP) conversions annually by 2025, with 25% of those customers served being income eligible. As will be described below, the Company is currently nearing the 750 unit goal overall. Therefore, this workplan focuses primarily on upgrading income eligible customers and increasing the percentage of those customers in the overall program. The income eligible effort is comprised of three focus areas: Outreach, Education, and Streamlining the Income Eligible Process. These actions will build on existing activities as well as introduce new strategies to target customers, engage contractors, and help fund barriers to program participation. The cost-effectiveness of this plan will be laid out, and the Company hopes to foster a discussion about which activities should be funded with customer funds and which should use other funding sources, to best balance the needs of the customers for whose benefit this program is being developed and customers generally who will fund some portion of the costs of the program in Rhode Island.

This plan recommends that ASHP upgrades be paired with weatherization. It is critical that HVAC upgrades be paired with weatherization work. Weatherization (which involves insulating and air-sealing a structure) reduces the heat loss through the building envelope, which in turn allows for smaller (and less expensive) HVAC equipment installations and reduces the energy requirements to maintain a specific temperature set point. Weatherization also improves comfort for occupants.

This plan addresses the funding needed to meet the outlined target for ERH to ASHP conversions in 2023. The 2024 and 2025 costs are representative and will be included in the respective year's energy efficiency plan filings.

## **Background**

Home heating is the largest component of energy use and energy costs for Rhode Island residents. Using an ERH system currently costs more than other traditional primary heating fuels or ASHP systems (See Figure 1: Annual Heating Costs for RI Residents, representative costs. Please note that efficiency levels of heating equipment, the prevalence of weatherization, and personal preferences for heating set points can greatly change the costs presented in this figure.).

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<sup>1</sup> The Narragansett Electric Company d/b/a Rhode Island Energy (Rhode Island Energy or the Company).

<sup>2</sup> This 750 number comes from the last Market Potential Study (2019).

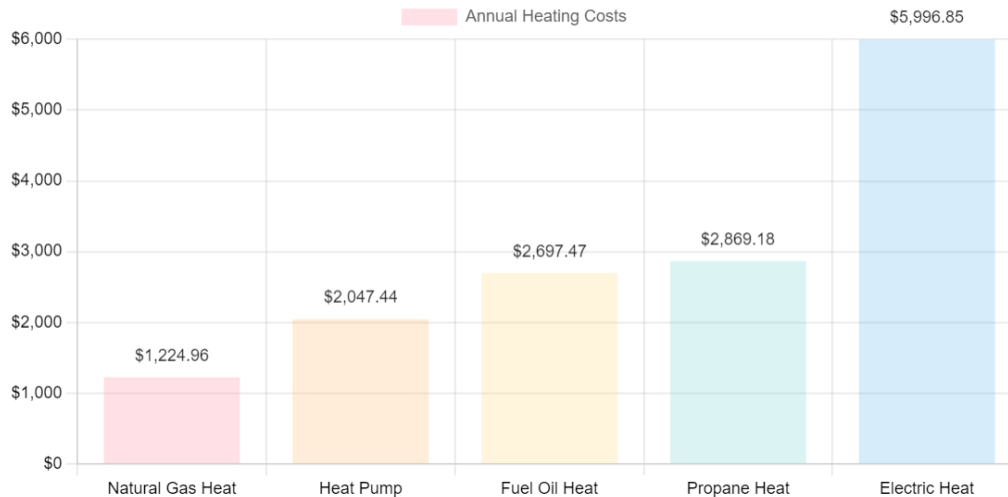


Figure 1: Annual Heating Costs for RI Residents

Source: <https://www.pickhvac.com/calculator/heating-annual-cost/>

Oil and Propane prices from <https://energy.ri.gov/heating-cooling/fossil-fuels/heating-oil/heating-oil-energy-prices>.

\$4.67/gallon for oil and \$3.77/gallon for propane.

Gas and Electric prices from <https://ripuc.ri.gov/utility-information/natural-gas>. \$1.76/therm gas (based on per therm costs)

\$0.294/kWh for electric (current winter rate for per kWh costs).

Given increasing heating costs locally, nationally, and internationally, many solutions are being proposed to mitigate the customer impact. From the Energy Efficiency program perspective, the Company can expand outreach to electric resistance heating customers to encourage upgrading to an ASHP system that will significantly reduce both annual energy expenditures and lifecycle costs including installation and maintenance.

The Rhode Island Strategic Electrification Study (Cadmus, December 23, 2020) cites the main barriers preventing customers from moving to ASHPs as being a lack of awareness and the high initial cost of ASHP installations. While awareness has improved given the increase in customers installing heat pumps (Table 1, Air Source Heat Pump Installations by Program 2020 – 2022), the cost of heat pump installation has increased since 2020 due to rising labor and equipment costs. The trend of increasing costs is anticipated to continue over the next few years. Labor increases are tied to a shortage of trained workforce, as well as minimum wage rates trending upwards in Rhode Island. Equipment cost increases are spurred by chip shortages, testing costs to meet the updated requirements for the Department of Energy SEER<sup>3</sup> 2 standard, and increased demand both domestically and internationally for heat pumps.

<sup>3</sup> SEER is an acronym for Seasonal Energy Efficiency Ratio.

## Current State

In 2022, Rhode Island Energy provided ERH to ASHP incentive upgrades to 747 customers in the following programs with year over year increases.

Program	2020	2021	2022	Totals
<b>HVAC</b>	303	533	671	<b>1,507</b>
<b>Income Eligible Services – Single Family</b>	9	16	26	<b>51</b>
<b>Income Eligible Services – Multifamily</b>	96	0	44	<b>140</b>
<b>Multifamily – Market Rate</b>	0	6	6	<b>12</b>
<b>Totals</b>	<b>408</b>	<b>555</b>	<b>747</b>	<b>1,710</b>

Table 1: Air Source Heat Pump Installations by Program (2020 – 2022)

The Company has been offering enhanced heating incentives within the HVAC program for ERH to ASHP conversions since 2018. The program has also offered enhanced incentives for customers with deliverable heating fuels to efficient electric ASHPs using different streams of funding (initially system benefit charge funding for deliverable fuels, then RGGI funding administered by OER). In 2022, there were 671 customers that used the enhanced electric heat to ASHP incentives through the HVAC program, 26 that received Income Eligible single family upgrades, 6 Multifamily participants, and 44 income eligible multifamily participants.

The PUC directed that the Company develop a plan to achieve 750 conversions annually by 2025 with 25% of those customers served being income eligible. Since the Company is nearing the 750 unit goal through the HVAC program, the focus of this workplan will primarily be on upgrading income eligible customers. Outreach to market rate customers will continue through the HVAC program with anticipated growth continuing as customer acceptance of ASHP technology increases and Inflation Reduction Act<sup>4</sup> funding makes this investment more affordable. The market rate sector (or non-income eligible sector) will be discussed in more detail in the 2024 Energy Efficiency Plan where there will be updated Market Potential Study information to calibrate the size and scope of the remaining market. The Office of Energy Resources' (OER) Heat Pump program will also have started later this year and the Company will look for opportunities to coordinate efforts to speed ASHP conversions.

Using data from the completed Residential Participant and Non-Participant research completed in 2022, the Company identified 64,151 customers that use electricity as their primary heating fuel (see table 2 below). Based on the numbers presented below, the most likely candidates for upgrades are single family homeowners since they possess the authority to upgrade their heating system without potential resistance from a landlord.

Landlord upgrades require much more education about heat pumps, particularly since electric resistance heating does not fail in the same manner as central boiler and furnace heating systems. The split incentive obstacle also reduces a landlord's motivation for upgrading a heating system when the costs savings would very often be realized by the tenant paying the heating bill. The Company plans to continue to provide information to educate landlords so that when renovations are scheduled for a rental property, an upgrade to the heating system will be considered. Table 2 below shows 746 Single Family Income Eligible customers that were not confirmed as being either an owner or a renter. During

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<sup>4</sup> Pub. L. 117-169.

the outreach process, the company will endeavor to determine whether these customers are owners or renters.

Sector	Income Category	Owner	Renter	Unknown	Total
<b>Single Family</b>	Market Rate	33,479	4,014	11,705	<b>49,198</b>
<b>Single Family</b>	Income Eligible	2,260	611	746	<b>3,617</b>
<b>Multifamily</b>	Market Rate	2,510	3,488	4,415	<b>10,413</b>
<b>Multifamily</b>	Income Eligible	128	480	315	<b>923</b>
<b>Total</b>		<b>38,377</b>	<b>8,593</b>	<b>17,181</b>	<b>64,151</b>

Table 2: Electric heat customers in RI based on rate class and home ownership

Rhode Island Energy recognizes the need to lower the electric heating costs for income eligible customers using ERH. Based upon 2021 participant and non-participant data that mapped Company account numbers against purchased public information on primary heating fuel sources of residents, there are an estimated 4,540 single and multifamily customers on the electric income eligible rate. Table 3 below presents the population of customers with electric heat that use more the 6,000 kWh a year.

Some groups of electric heat customers will represent a lower priority than others. For example, customers using fewer than 6,000 kWh annually have electric costs that are more aligned to non-electric heating customers and are therefore a lower priority than customers with higher usage and therefore higher heating costs. There are also customers that use electric heating in seasonal properties or have installed solar, which reduces the overall heating usage and/or costs, which makes them less of a priority over the next three years.

Sector	Income Category	Owner	Renter	Unknown	Total
<b>Single Family</b>	Market Rate	23,846	2,971	6,975	<b>33,792</b>
<b>Single Family</b>	Income Eligible	1,496	523	533	<b>2,552</b>
<b>Multifamily</b>	Market Rate	2,225	3,382	4,007	<b>9,614</b>
<b>Multifamily</b>	Income Eligible	109	471	306	<b>886</b>
<b>Total</b>		<b>27,676</b>	<b>7,347</b>	<b>11,821</b>	<b>46,844</b>

Table 3: Electric heat customers > 6,000 kWh/year in RI based on rate class and home ownership

## Income Eligible Implementation Plan

The Company’s plan to speed ERH to ASHP conversions for income eligible customers consists of three focus areas: Outreach, Education, and Streamlining the ASHP upgrades.

The Company’s Income Eligible ASHP upgrade goals are included in Table 4 below. Over the next three years, the Income Eligible single family (1–4-unit properties) program will double the number of upgrades in 2023 as compared to 2022. Based on the 2023 experiences, the programs will also target doubling the income eligible ASHP upgrades in 2024 over the 2023 goal. In 2025, the Company has a goal of upgrading 190 income eligible electric heat customers. As shown in Table 3 above, the focus in the near term will be on single family income eligible owners since they are the decision makers for their home heating systems. Landlords that are not also income eligible do not currently receive full project upgrades of an income eligible customer’s heating system. However, this plan is recommending that full costs be applied on rental housing that is subject to a deed restriction since tenants at those properties



must be income eligible when they first move to those residences. More will be discussed about Landlords in the education section.

Income Eligible Three Year ASHP Upgrade Goals				
Year	2022 <sup>1</sup>	2023 <sup>2</sup>	2024 <sup>3</sup>	2025
<b>Customers Served</b>	26	60	120	190
<b>ASHP Costs</b>	\$526,630	\$1,215,300	\$2,503,518	\$3,963,904
<b>Weatherization Costs</b>	\$128,050	\$295,500	\$608,730	\$963,823
<b>Leveraged Funding<sup>4</sup></b>	\$117,000	\$270,000	\$556,200	\$880,650
<b>Marketing Costs</b>		\$30,000	\$30,000	\$30,000
<b>Full Project Cost</b>	<b>\$771,680</b>	<b>\$1,810,800</b>	<b>\$3,698,448</b>	<b>\$5,838,377</b>

Table 4: Income Eligible Electric Resistance to ASHP Upgrade Goals

- 1) 2022 costs are based on average project costs. Administration costs are included within each cost category.
- 2) Approximately 1/3 of the funding for weatherization and ASHP is already included in the 2023 Energy Efficiency Plan. Full costs for the work proposed in 2023 are shown in the above table with 2/3 of the cost incremental to the 2023 EE Plan.
- 3) 2024 and 2025 have a 3% increase in costs for inflation. 2024 and 2025 costs will be included in the respective Energy Efficiency Plan for that year.
- 4) Leveraged funding includes Low income Heating Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP) funds used for weatherization, heating system replacements, and pre-weatherization barriers.

The estimated costs associated with the 2023-2025 implementation plan are presented in Table 4 above. Average 2022 costs were used to develop the 2023 costs. For 2023, the costs have already been provided for through the Company’s proposed 2023 Annual Energy Efficiency Plan and the budget reallocations ordered by the Commission at its December 20, 2022 open meeting in Docket No. 22-33-EE. 2024 and 2025 are estimated costs for providing heating system upgrades, weatherization, and remediation of pre-weatherization barriers and are illustrative. Funding for 2024 and 2025 upgrades will be made within the 2024 and 2025 Energy Efficiency plans. Further discussion on pre-weatherization barriers (PWB) and associated remediation is detailed further below.

In order to more than double the productivity of this program, the barriers to quick action, including the delays associated with seeking alternative funding streams for work, need to be minimized so income eligible customers can realize all the benefits that come with an efficient heating system and a weatherized home. Between the funds initially included in the Company’s 2023 Annual Energy Efficiency Plan for ASHP conversions and the budget reallocations ordered by the Commission at its December 20, 2022 open meeting, there is sufficient funding to meet the anticipated costs of the Company’s program for 2023. The Company’s plan to continue to ramp up ERH to ASHP conversions in future years will require similarly stable sources of funding. With the available funding for 2023, the Company proposes to pay the following costs for Income Eligible customers and landlords holding deed restricted property that can only be leased to Income Eligible Customers:

- Funding for electric resistance to ASHP upgrades
- Weatherization funding

- Deferral<sup>5</sup> mitigation for income eligible homes
- Marketing for outreach to income eligible electric heating customers

## Outreach

The Company plans to use three key data sources to enable targeted outreach efforts to Income Eligible customers who are most likely to proceed with ERH to ASHP conversions:

- The first is the purchased data (from the participant and non-participant studies referenced in Tables 2 and 3) that indicates customers relying on electricity as a primary heating source.
- This data can be triangulated with our second key data set on customers that received LIHEAP grants in 2022. These customers are on the A-60 electric rate for low-income customers and indicated electric heat was their primary heating source in the LIHEAP grant application. In 2022 there were 3,347 A-60 electric customers that receive electric LIHEAP grants.
- Our third key data set comes from customers relying upon ERH that have participated in Income Eligible assessments in the past. Using these data sources, the Company believes that it has identified 967 Income Eligible customers using ERH between 2017 and 2022.

Taken together, this information provides a robust group of outreach candidates.

The Company's outreach efforts will include both customers and contractors. Outreach to customers will include direct communication via mail and email as well as some social media outreach. Heating Ventilation, and Air Conditioning (HVAC) contractors will also receive annual, quarterly, and weekly updates on both the program elements in the HVAC Program, changes to equipment efficiency levels, resources to reduce the customers' costs through additional federal and/or state incentive and tax credit opportunities. Due to the ability of homeowners to make decisions regarding heating source conversion, and the desire to quickly increase the number of ERH to ASHP conversions performed for Income Eligible customers, the Company will focus on targeted marketing to Income Eligible homeowners who appear to rely upon electric heating based on the data sources identified above. More general mass marketing may follow as the OER's heat pump program is rolled out to engage and educate Rhode Islanders more generally on the benefits of ASHP conversions.

Initially the Company's targeted outreach will be provided in English, Spanish, and Portuguese based on the language listings from the participant and non-participant research for electric heat homeowners as seen in Table 5.

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<sup>5</sup> As explained in more detail below, "deferral" in this context refers to obstacles to completion of weatherization work such as a loss of customer interest for a variety of reasons including uncertainty about cost-effectiveness. The cost of resolving these issues often leads customers to defer desired weatherization work even if the weatherization work itself is sufficiently incentivized.

Language	% Of Income Eligible Electric Heat Homeowners
English	84%
Spanish	6%
Portuguese	2%
Italian	0.5%
Chinese	0.3%
Vietnamese	0.2%
Other	7%

Table 5: Primary language of income eligible electric heat homeowner population

In addition to direct outreach to Income Eligible homeowners, the Company has reached out to Rhode Island Housing to determine whether the Company and Rhode Island Housing can collaborate on reaching landlords who rent to low income tenants with electric heating. Rhode Island Housing maintains lists of deed restricted housing (the majority of which are 5+ units in size) that identify landlords who can only rent to Income Eligible tenants based upon restrictive covenants contained in the chain of title to the properties. These lists of deed restricted properties, the owners of which are readily identifiable, will be shared with the Multi Family Lead Vendor to perform targeted outreach. The Company will also continue to identify and reach out to other deed restricted landlords to promote the opportunity to upgrade electric resistance heating to ASHPs.

## Education

### *Homeowners*

The Company will develop case studies and/or short videos of prior Income Eligible customers that have upgraded their electric resistance heating systems and operated these systems for a minimum of a year, so both heating and cooling operations can be highlighted. Customers can speak to actual, real-life experiences from their perspective.

Messaging can also highlight additional benefits such as:

- Addition of cooling
- No need to install window air conditioners which can be a strain physically and may damage windows with installation and removal
- Improved security – window air conditioning can provide an entry point for intruders
- Quiet operation
- Healthier home with the addition of weatherization paired with a new heating system
- Safer, cheaper, more environmentally responsible

ERH customers may have declined ASHP systems in the past because the technology was new and unfamiliar. Now with more market rate and income eligible customers completing installations, there are more learnings and experiences to share.

### *Landlords*

Education to landlords will include how system upgrades will make the home more appealing to renters. Tenants will have lower cost heating and cooling with one integrated system. Landlords benefit from

less wear and tear to window frames if room air conditioners were installed and removed each summer and added security for tenants that no longer have an exposed point of entry to their residence. The addition of weatherization will also provide added comfort and will enhance the value of landlords' properties.

For rental housing, rather than targeting renters, the Company intends to focus education on landlords to promote ASHP upgrades. There are concerns in the Income Eligible space that renters might not be willing to approach their landlord for fear of being labeled a difficult tenant. The Company will ask renters if they have contact information for their landlords, or will identify landlords through property records, so that the Company can reach out directly to landlords to facilitate education on ASHP conversions.

Landlords may have both awareness barriers as well as first cost concerns. The current income eligible program would not upgrade a renter's electric resistance heating system unless the landlord is also Income Eligible. Since renters may leave a residence and the unit could then be rented to market rate tenants, the landlord income eligibility requirement prevents non-Income Eligible landlords from taking advantage of the program to receive no cost heating systems. To overcome landlords' cost concerns where possible, the Company requests that it be permitted to offer Income Eligible level incentives for ERH to ASHP conversions to non-Income Eligible landlords renting deed restricted housing units so that their Income Eligible tenants can benefit from the no cost heating system and weatherization upgrades. The deed restrictions typically in place for such housing units require income verification of tenants through qualified monitors, so that the Company's program would not be offering no cost weatherization and ASHP upgrades without being assured that Income Eligible residents obtain the benefits of the incentives being offered.

### ***Contractors***

Some contractors already have long-standing relationships with the Income Eligible single family program. It will be incumbent on the Company to maintain and improve these relationships and to engage additional contractors so that they learn about the program's customer eligibility and want to participate. The Company believes that one of the best ways to attract additional contractors into the program is to make participation easy for them and ensure that payments are made in a timely manner. This Company's streamlining approach for contractors is discussed in the next section, but education regarding the Company's streamlining proposals will be essential to ensure that contractors remain willing to undertake the ERH to ASHP conversions for Income Eligible customers at the pace proposed.

## **Streamlining the Income Eligible Process**

The Company's streamlining approach has three key components:

1. Working directly with select HVAC Contractors,
2. Working to address pre-weatherization barriers, and
3. Working to address funding gaps & cost-effectiveness

### ***Direct Relationships with HVAC Contractors***

Many HVAC and weatherization contractors have moved away from working in the Income Eligible Program. The primary reason is that payment does not come in a timely manner. While the Company reimburses contractors for completed work monthly or more frequently, any time the work is leveraged with federal or state funding there is a delay in payment to the contractors. The solution to this problem is to have the Company issue all payments for these upgrades with energy efficiency funding.

The single-family Income Eligible process can be lengthy given the many steps and parties involved, including a home energy assessment, the contract crews that perform appliance replacement, weatherization, and associated pre-weatherization remediation, and heating system replacements. The Company is proposing a streamlined process for Income Eligible ERH to ASHP upgrades. In 2023, the Company will work with three HVAC contractors and provide two customers each month for each of the contractors to perform ERH to ASHP upgrades<sup>6</sup>. This relationship will streamline the process for the HVAC contractor. Behind the scenes the customer will still receive a home energy assessment and weatherization, but the order of services may be adjusted to fast track the ERH to ASHP upgrade. While in the home, the Home Energy Assessment Specialist provides a holistic view on energy savings and will look for opportunities to replace refrigerators, freezers, dehumidifiers, clothes washers, room air conditioners, and water heaters so that the opportunity to educate an Income Eligible customer on energy savings opportunities is not wasted.

While the Company usually tries to complete weatherization before upgrading heating systems, to ensure that ASHPs are right-sized, to expedite the heating system upgrades at the pace required in this plan the Company will not let weatherization slow down the process. The Company will direct HVAC contractors to size ASHP systems for a fully weatherized home and then install the new system. Weatherization could then occur after the heating system upgrades. This approach carries some risk because there could be unseen pre-weatherization barriers that may ultimately prevent or delay weatherization. The Company will do its best to mitigate this risk by pre-screening customers to identify potential pre-weatherization barriers. However, sometimes unidentified barriers present themselves when walls are opened and weatherization can no longer progress. It will be a rare situation where a customer may have an ASHP system that will be undersized given the lack of weatherization. To provide the most certainty that funding is available to overcome pre-weatherization barriers, the Company is requesting energy efficiency funding to overcome the barriers.

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<sup>6</sup> It is important to note that under current procedures, as well as moving forward, the electric resistance heating system is left in place when installing air source heat pumps. The electric resistance system remains at the customer's home as a backup system for extreme cold conditions or for rooms, such as bathrooms, which may not have an ASHP interior register. The customer will be made aware that the resistance heat is for backup only and that using that system, or both systems, will result in a reduction of heating cost savings.

**Addressing Pre-Weatherization Barriers**

The Company is committed to weatherization with heating system upgrades. Weatherization reduces air leakage between conditioned and unconditioned spaces within a building envelope, thereby reducing overall heating and cooling costs while making a home more comfortable. Weatherization may also allow for a smaller ASHP system to be installed which will also reduce upfront costs. The challenge with weatherization is that the older housing stock found in Rhode Island frequently presents pre-weatherization barriers (PWBs). Currently, remediation of PWBs is primarily funded with federal and state funding. In an effort to streamline the process and achieve the aggressive goals set forth in this plan, the Company is proposing to use energy efficiency funds for PWB remediation so that more system upgrades can be completed.

PWBs and deferrals are significant issues that could impede ERH to ASHP conversions at the pace proposed in this plan. Deferrals and PWBs are typically discovered during energy assessments, and they represent some type of issue that prevents further efficiency work being completed until the issues are resolved. Deferrals represent an issue that is less fixable, such as lack of client interest, or that the proposed measures are not cost effective. A PWB, on the other hand, represents an issue that could be fixed, but it requires time, and more importantly, money. PWBs are typically related to either (1) health and safety issues or (2) structural concerns. Some examples of PWBs include: knob and tube wiring, asbestos, mold/mildew/moisture issues, venting and combustion safety issues. Looking at Q4 2022 data, we found that out of 675 audits in the income eligible single family program, 276 (41%) had some type of deferral and/or PWB. 118 projects had PWBs specifically, or 17% of homes audited.

While PWBs are present with market rate housing, the income eligible sector does not overcome the barriers to the same extent as market rate housing. This discrepancy can be seen in Table 6.

2022 Program Results	Assessments	Weatherization (Wx)	Conversion from Assessment to Weatherization	Electric Customers by Rate Class	% of Eligible Customers Receiving Assessments	% of Eligible Customers Receiving Wx
<b>EnergyWise</b>	9,251	4,143	45%	408,268 (A-16)	2.3%	1.0%
<b>IES SF</b>	2,679	758	28%	39,042 (A-60)	6.9%	1.9%

Table 6: Comparison of services between market rate and income eligible single family

Table 6 above shows that low-income (A-60 rate) customers receive three times more home energy assessments than market rate (A-16 rate) customers as a percentage of customers in that rate class (calculated by the number of assessments/electric customers in that rate class). However, the percentage of customers that move from assessment to weatherization is 17% lower for low-income customers (28% for low-income versus 45% for market rate).

### **Funding and Cost Effectiveness**

The reduced percentage of income eligible customers moving from assessment to weatherization is partially attributed to the limited availability of funding to overcome PWBs. Remediation of PWBs can be both costly and time consuming. Furthermore, existing funding sources for PWB remediation (such as through WAP and LIHEAP) often have a 5-month delay in contractor payment, which creates a serious issue and strong disincentive for weatherization contractors to complete work for the target population. If leveraged funding through federal and state health and safety resources becomes available, and can be fast tracked, the Company will utilize the funding so that more customers can be served. Without the additional funding to address PWBs, the goals in Table 4 will not be achieved. Given past data, without a funding solution for PWBs, approximately 20 – 40% of customers’ homes may not be eligible for ASHPs upgrades.

The Income Eligible program leverages state and federal LIHEAP and WAP funding to reduce overall program costs. While leveraging does accomplish a reduction in program costs, it comes at the expense of expediency. Federal and state funding reimbursement is not as timely as the income eligible energy efficiency program reimbursements and contractors have left the program due to slow reimbursements. To change the current perception and ramp up a successful program the Company proposes that all payments come from energy efficiency program funding. The Company will work with the Rhode Island Department of Human Services (DHS) to try to overcome funding obstacles, and to determine if there are solutions for receiving funding after the fact or even if pre-funding could be an option for the ASHP/PWB/Weatherization work. These conversations have not begun and at a minimum may not be an available option for 2023. The Company is also waiting for IRA funding rules to be communicated and may find another opportunity for additional funding with incoming federal grants.

By funding all PWB and other ERH to ASHP conversion costs, potentially, for 2023, there is a risk that Income Eligible program may not be cost effective at year end. This Implementation Plan will still be administered in the energy efficiency Income Eligible sector. For ease of understanding the costs and associated benefits of the ERH to ASHP conversion measure and electric weatherization measure in isolation from other programs offerings, the two combined costs and benefits are presented below.

Incentive for Heating Upgrade and Weatherization <sup>7</sup>	\$25,180
Benefits from ERH to ASHP Upgrade and Wx	\$26,304
BCR	1.04

The additional costs for the PWB remediation, currently estimated at \$4,500 per home (see table 4 leveraged funding), would make the overall BCR = 0.88. There are several unknowns at this time such as how many homes will have PWBs and whether DHS funding to support this plan could be fast tracked in 2023.

The solution to properly address PWBs in a holistic, efficient, and systematic manner is a large, complex issue that involves many stakeholders. It is not an issue that will be solved within the scope of this ASHP plan. However, to best improve the chances for success of this ASHP plan, as a trial initiative, the Company is requesting that rate-payer funds be permitted for use to remediate PWBs.

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<sup>7</sup> The ASHP and weatherization costs are from Table 4 which are based on 2022 average costs for electrically heating homes that had these upgrades in 2022. ASHP costs were \$20,255/home and weatherization costs were \$4,925/home on average totaling \$25,180.

## **Additional Electric Heat Research**

The Company also proposes completing additional research during the next three years to aid in transformation of the ERH market. First, a market characterization of remaining ERH customers should be completed to provide greater insight on remaining customers relying on ERH. The groupings will translate to go to market strategies that can increase the success of conversion to ASHPs. In the Rhode Island Strategic Electrification Study (Cadmus, December 23, 2020), pricing sensitivity was investigated to aid with incentive design. Similar research should also be engaged with landlords where the investment may not yield direct cost benefits to the landlord. Currently, landlords have the enhanced electric heat incentive of \$1,250/ton, but that may not be enough to motivate the successful conversions to ASHPs. In the Rhode Island Strategic Electrification Study (Cadmus, December 23, 2020), willingness to pay was investigated to aid with incentive design. The Company is proposing a similar willingness to pay analysis specifically focused on landlords. This research can be started in 2023 but may not be completed in time for 2024 planning activities. This landlord focused research will allow the Company to determine whether additional incentives within the HVAC program could motivate landlords to upgrade their properties' heating systems.

The Company is conducting research as to when saturation of ASHP will occur. There will always be ERH within the state, and in some instances, it may make sense to leave the ERH in place. For example, cottages that use ERH on a couple of shoulder periods may not need a full upgrade to ASHP. Likewise, homeowners building additions may find the costs of ERH for some portion of their home a better lifecycle investment. Understanding what constitutes a transformed market as it pertains to ASHPs will help stakeholders understand the ending point for market transformation.

## **Conclusion**

Given the recent increase in energy prices, it is even more important than before to help customers save on their energy bills, especially for Income Eligible customers who feel a greater energy burden than the rest of the market. The more customers that can be converted from electric resistance heat to heat pumps, the better it will be for individual customers and for the system overall. This plan encompasses new methods of reaching customers and contractors to break the inertia of the status quo. It does propose new funding alternatives to overcome the barriers that customers face to installing heat pumps, and the outcome of the decision on those funding sources will impact the cost-effectiveness of the program. The ultimate goal is to craft a plan that best serves the Rhode Island Energy's customers.