STATE OF RHODE ISLAND AND PROVIDENCE
PLANTATIONS ENERGY FACILITY SITING BOARD

In re: Ocean State Power, LLC	**:**	
Upgrade to Steam Turbine	**:**	**Docket No. SB-2022-XX**
	:	

PETITION FOR DECLARATORY ORDER

Ocean State Power, LLC

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Date: August 5, 2022

I. INTRODUCTION

In accordance with R.I. Gen. Laws § 42-35-8, Ocean State Power, LLC ("OSP") petitions the Rhode Island Energy Facility Siting Board ("EFSB") for a declaration that the replacement and upgrade of certain internal components in one half of OSP's combined cycle electric generation facility in Harrisville, Rhode Island (the "Modification") is not subject to the jurisdiction of the EFSB. The Modification does not require a license from the EFSB because it is not an alteration of a major energy facility.

The law does not require a license from the EFSB to upgrade a "major energy facility"[1] unless it results in an "alteration," which the Energy Facility Siting Act (the "Act") defines as:

> a significant modification to a major energy facility, which, as determined by the board, will result in a significant impact on the environment, or the public health, safety, and welfare.

R.I. Gen. Laws § 42-98-3(b). Here, OSP's proposed Modification is not an "alteration" because it will not result in a "significant impact on the environment, or public health, safety, and welfare."

The Modification will not adversely impact the environment; the environmental impact will be positive. The Modification will result in an overall decrease in air emissions by improving the OSP facility's existing pollution control equipment. Although the Modification will increase the facility's generation capacity, it will reduce the facility's "potential to emit" nitrogen oxides ("NOx"), carbon monoxide ("CO"), and volatile organic compounds ("VOCs") and will not exceed emissions limits in the facility's current air permit. The Modification also will result in lower annual greenhouse gas ("GHG") emissions on an annualized basis. In fact, the Rhode Island Department of Environmental Management ("RIDEM") issued a minor source air permit for the

[1] A "major energy facility" includes a facility "for the generation of electricity designed or capable of operating at a gross capacity of forty (40) megawatts or more[.]" R.I. Gen. Laws § 42-98-3(d).

Modification in May 2022, approving these improvements under the applicable air pollution control regulations.

The Modification also will not adversely impact public health, safety, or welfare. There are no impacts to the site or surrounding local area, wetlands, or wastewater discharges. Water use could slightly increase during peak electrical demand, but it will not exceed the current water use permit limitations. Further, the facility will not be louder or busier, and the Modification will not increase hazard risks from operations.

For these reasons, OSP respectfully requests that the EFSB issue a declaration that the Modification is not subject to EFSB jurisdiction because it is not an "alteration" of a "major energy facility" under the Act.

II. OVERVIEW OF THE MODIFICATION

A. Ocean State Power Facility Description and Setting

The OSP facility is a 560 Megawatt ("MW"), dual-fuel, combined cycle electric generating facility, which the EFSB approved for construction on October 25, 1988. *See* Final Decision and Order, *In re: Application of Ocean State Power filed January 13, 1987 to Site and Construct a Major Energy Facility*, Docket No. S.B. 87-1 (Oct. 25, 1988). The facility is composed of two power blocks arranged in phases. Phase 1 was commissioned in 1990, with Phase 2 following shortly thereafter in 1991. The facility is located approximately 25 miles northwest of Providence on an approximately 62-acre site. The main entrance from Sherman Farm Road is located on the west side of the site. The site is in a wooded area surrounded largely by undeveloped parcels of land. Eversource is the most significant landowner in the area surrounding the plant. The facility is approximately 1.5 miles from Spring Lake, the nearest body of water, and 3.4 miles from the

Blackstone River. The nearest occupied structure is approximately 250 yards away from the property boundary and 500 yards away from the generating facility.

Each phase of the facility includes two General Electric ("GE") 7EA combustion turbines and one GE dual-pressure steam turbine. Each combustion turbine exhausts into its own heat recovery steam generator ("HRSG"), which in turn provides steam to the steam turbines for additional energy production, thereby increasing the overall efficiency of the facility. Each of the six turbines is coupled to an individual electric generator, which then connects to a 345kV high voltage transmission line through step-up transformers with disconnects and circuit breakers. The combustion turbines operate primarily on pipeline natural gas, but they also have the capability of running secondarily on #2 ultra-low sulfur diesel ("ULSD") fuel.

B. <u>The Proposed Modification</u>

The proposed Modification applies to the Phase 2 equipment only, and thus it affects only one half of the facility. The Modification involves replacement of certain internal components of the Phase 2 steam turbine, the addition of wet compression skids for the combustion turbines, and modifications to the steam and combustion turbine generators. OSP expects the proposed Modification to increase the aggregate summer capability of the facility by 64MW, or approximately 12 percent of the total output. The Modification also will make the facility more energy efficient by increasing the electricity generated per standard unit of gas consumed, resulting in a better Standard Cubic Foot to Megawatt Hour ("SCF/MWh") ratio. Additionally, the proposed Modification will not increase ULSD fuel usage.

OSP seeks to implement the Modification during the regular maintenance cycle, which typically occurs every ten years. The proposed Modification would occur during a preexisting regularly scheduled period for maintenance and inspection work planned for 2024. This previously planned maintenance work already will require full disassembly of the high-pressure ("HP") and low-pressure ("LP") sections of the steam turbine and will include regularly scheduled hot gas path inspections of the combustion turbines. OSP also will disassemble the electric generators as part of this work. The specific work that would occur to complete the Modification is set forth below.

1. Steam Turbine Upgrade

OSP's existing steam turbine is an 88MW straight condensing steam turbine consisting of HP and LP sections coupled to a single electric generator. The steam turbine is a dual casing, one admission opening machine, which first receives high pressure steam into the HP section. Lower pressure steam exits the HP section and is directed to the LP section of the steam turbine with a double flow exhaust section into a condenser. The electric generator is rated to 126,000kVA at 13.8 kilovolts. The steam turbine Generator Step-Up Transformer ("GSU") steps up the voltage to match the 345kV electric transmission grid.

The steam turbine modification consists of: (i) swapping out the existing HP section with a new and more efficient HP section, (ii) modifying internal components of the LP section and steam turbine generator, and (iii) changing the balance of plant to accommodate these changes. With these changes, the steam turbine generator will be able to utilize the full steam capability of the HRSGs, where historically the steam turbine was limited and made the overall steam cycle less efficient.

a. HP Section of Steam Turbine

HP steam production will increase due to the combustion turbine modifications and by removing the restrictions that have limited the duct burner output. The duct burners can then operate at their full design capacity.

The steam pressure to the HP section will increase by approximately 200 psi to 1375 psi, and the flow of steam will improve by 40%, from 750,000 lb/hr to 1,050,000 lb/hr. The increased HP steam flow will be used in the new, larger HP section. Although the new HP section of the steam turbine will be higher capability than the original, it will be located in the same position as the existing one.

b. LP Section of Steam Turbine and Generator

The existing LP section of the steam turbine and the electric generator are both capable of accommodating the increased steam flow and higher electric output subject to internal modifications. The existing LP casing and rotor will remain, but the first two stages of the LP rotor will be upgraded with new buckets and diaphragms to improve efficiency. New coupling hardware will also be installed for the connection between the existing LP rotor and generator rotor.

The existing steam turbine generator stator will be rewound and have new connection rings and a new end winding support system installed. The generator field will also be rewound with new c-coil copper and have a new collector ring assembly and new bore copper installed. New coolers also will be installed to improve the cooling efficiency of the steam turbine generator.

c. Balance of Plant

The proposed Modification will require installation of larger HP steam piping and a new main steam combined stop and control valve to accommodate the increased steam flow from the HRSGs. Efficiency improvements also will be made to the auxiliary cooling system for the electric generator by adding a new heat exchanger. Additionally, a booster condensate pump will be installed to handle additional condensate flow resulting from the higher steam flow.

2. Combustion Turbine

In addition to regularly scheduled maintenance, the proposed Modification would add wet compression skids to the combustion turbines. Wet compression injects water into the combustion turbine inlet, increasing mass flow through the turbine and thus increasing generator output. Wet compression is considered a peaking product and will be utilized only during peak demand periods.

Upgrades to the electric generators on the combustion turbines include a stator rewind with new optimized stator bars in addition to new optimized connection rings. The new design will reduce ongoing maintenance related to the electric generators. Additionally, new coolers will replace the existing coolers and improve the electric generators' cooling efficiency.

3. Pollution Control Equipment

The proposed Modification also includes improvements to the existing Selective Catalytic Reduction ("SCR") catalyst modules in Phase II to state of the art technology. The new custom-built catalyst modules will not only provide greater reductions in NOx than the existing catalyst modules, but will also reduce CO and VOC emissions—which the existing catalyst modules are not capable of reducing. These upgrades will *lower* turbine NOx emissions by 67%, CO emissions by 50%, and VOC emissions by 63% per unit of heat input to the turbine.[2]

III. ANALYSIS

The Modification does not require a license by the EFSB because is not an "alteration" under the Energy Facility Siting Act, R.I.G.L. § 42-98-3(b).

A. Standard of Review

The EFSB recently discussed the relevant standard for determining whether proposed projects are jurisdictional alterations in a proceeding initiated by Sea 3 Providence, LLC seeking a petition for a declaratory order on whether a proposed action or project constitutes an "alteration" under R.I.G.L. § 42-98-3(b). In its Decision and Order on the Sea 3 Providence, LLC petition, issued May 31, 2022, the EFSB explained the standard it applied to a petition for declaratory judgment that a modification to a major energy facility is not jurisdictional: "The Petitioner bears the burden of proof to show that there is no significant risk of impact, or if the risk is realized, that any such impact would not be significant." Decision and Order, *In Re: Sea 3 Providence, LLC Petition for Declaratory Order Regarding the Rail Service Incorporation Project*, Docket No. SB-2021-03, (Order No. 153, May 31, 2022) at 25. The EFSB also concluded that the petitioner must meet this burden by "clear and convincing" evidence.[3] *Id.* at 26.

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[2] *See* State of Rhode Island Department of Environmental Management Office of Air Resources, Major Source Permit, *Ocean State Power*, RI-PSD-1 (dated May 31, 2022), which is attached to this petition as Exhibit 1.

[3] The EFSB defined the "clear and convincing evidence" standard as requiring that the factfinder "'must believe that the truth of the facts asserted is highly probable.'" *In Re: Sea 3 Providence, LLC Petition for Declaratory Order Regarding the Rail Service Incorporation Project,* Docket No. SB-2021-03, (Order No. 153, May 31, 2022) at 26 (quoting *Parker v. Parker*, 103 R.I. 435, 442, 238 A.2d 57, 61 (1968)). The clear and convincing evidence standard does not require that the evidence negate all reasonable doubt or that the evidence must be uncontroverted." *Cahill v. Morrow,* 11 A.3d 82, 88 n. 7 (R.I.2011) (quoting 29 Am.Jur.2d *Evidence* § 173 at 188–89 (2008)).

B. <u>The Modification Will Not Create a (1) Significant Risk of an Adverse Impact on the Environment, Public Health, Safety or Welfare, or (2) a Significant Adverse Impact</u>

The Modification will have only one direct impact on the environment, public health, safety and welfare: a positive impact on air quality. The Modification will result in an overall decrease in potentially harmful air emissions.

The OSP facility is subject to RIDEM's air pollution control regulations and has a Title V Operating Permit, which is a comprehensive air permit that governs all aspects of the facility's air emissions. The proposed Modification required OSP to obtain a so-called pre-construction "minor source" air permit. RIDEM approved the Modification and issued that permit on May 31, 2022 (*see* Exhibit 1). In issuing this "minor source" air permit, RIDEM evaluated the Modification's "potential to emit" ("PTE") air emissions and compared that to baseline actual emissions. RIDEM found that the Modification would not result in emissions that exceed the threshold levels that RIDEM defines as "a significant emissions increase," which would have triggered the requirement for a "major source" air permit. RIDEM approved the Modification as one that is not considered a "significant emissions increase" or "major modification" of air emission under its regulations. The "minor source" permit limits the facility's use of fuel on an annual basis. Additionally, the new permit requires stack testing to ensure that the facility remains in compliance with the new emissions limits. The "minor source" air permit contains provisions that require Phase II of the facility to operate within the new permit limits shown in Tables 3.1 (for operation on natural gas) and 3.2 (for operation on #2 fuel oil) below.

Table 3.1 - Phase II Short Term Limit Comparison-NG, Turbine + Duct Burner		
Pollutant	Current Permit lb/hr	New Permit lb/hr
NOx	75.40	16.81
CO	65.15	34.11
SO2	4.09	3.04
PM10/2.5	13.80	9.44
VOC	6.08	2.93
NH3	54.00	20.74

Table 3.2 - Phase II Short Term Limit Comparison-#2 Fuel Oil , Turbine Only		
Pollutant	Current Permit lb/hr	New Permit lb/hr
NOx	81.60	44.70
CO	81.70	65.31
SO2	1.85	1.75
PM10/2.5	23.00	13.80
VOC	10.30	4.68
NH3	50.30	16.55

RIDEM also reduced the number of hours per year that Phase 2 can operate by imposing a fuel throughput limit. To better align with the needs of the grid in the current energy transition period, Phase 2 will better utilize the post-Modification capacity during periods of peak demand.

As shown in Table 3.3, the Modification will significantly reduce PTE for all criteria pollutant emissions, lower overall annual emissions, and decrease GHG emissions.

Table 3.3 - Phase II Emissions Reduction vs. Current PTE			
Pollutant	Current PTE	New Permit PTE	% Reduction
NOx	669.65	60.51	91
CO	595.13	122.8	79
SO2	35.83	10.95	69
PM10/2.5	200.6	27.4	86
VOC	53.29	10.55	80
NH3	473.04	74.66	84
Total HAP	7.79	2.95	62
Lead	0.03	0.004	87

The Modification also is consistent with the recently enacted Act on Climate. The Act on Climate directs state agencies to exercise their existing powers in furtherance of the General Assembly's policies on "climate change mitigation, adaptation, and resilience." R.I. Gen. Laws § 42-6.2-8. Here, the Modification furthers these policies by reducing overall GHG emissions due to the increased efficiency of the steam cycle post-Modification. This CO2 decrease is detailed in the Black and Veatch study titled "Ocean State Power CO2 Emissions Summary." A copy of this study is attached to this petition as Exhibit 2. Although CO2 emissions will slightly increase during peak demand periods, CO2 emissions will decrease on a tons/MWH basis. As new renewables penetrate the market, CO2 emissions from OSP will continue to decrease on an annualized basis.

The Modification presents no other potential risk of impacts on the environment, or to public health, safety and welfare. The Modification will not increase or change the facility's footprint or boundaries. The Modification will not increase the number of permanent employees, so it will not impact local traffic. The Modification will not impact the facility's zero-liquid-discharge system for process wastewater.

OSP will continue to operate the facility within its existing water use permit. The Modification will increase water usage minimally when wet compression is in service, which is expected to occur only at peak demand times during the summer months. This increase will not impact the environment or the local water supply infrastructure. The Modification will not impact wetlands or drainage at or near the site. The Modification also will not impact ambient noise levels. There will be no change to the operation of the plant due to the Modification.

The only impacts that will extend outside the facility are the emissions reductions described above. Therefore, the Modification will not adversely impact the surrounding community; there is no risk of impact to public safety, health or welfare.[4]

C. <u>The Modification Supports the Transition to Renewable Energy Generation</u>

Improving the flexibility and efficiency of power generation plants like the OSP facility is critical to support the transition to renewable energy and achieve net zero emissions by 2050. In the years to come, as renewable resources like wind and solar produce ever increasing amounts of clean energy, there will be periods when the regional grid operator, ISO New England ("ISO-NE"), will need energy storage and efficient natural gas generation to fill the gaps between consumer demand for electricity and the production of clean energy. In its 2022 Regional Electricity Outlook, ISO-NE noted that it "remains certain that some resources will be necessary to balance renewable energy on a routine basis."[5]

For example, balancing resources will be needed to assist with sustained winter cold-snaps or with hour-to-hour renewable integration. Cold snaps are a fact of life in New England, and, although incremental renewable generation can help reduce the amount of energy that must be sourced from stored fuels, those renewable resources will not eliminate the need for balancing resources to support renewable electric generation to meet the increased electric demand triggered by those cold snaps. A recent study concluded that up to 32 GW of balancing resources would be

[4] In addition to the favorable emissions impacts, the Modification will provide a financial benefit for the community. Under the existing tax agreement between OSP and the Town of Burrillville, OSP will pay approximately $250,000 more annually in taxes to the Town due to the increased plant capacity from the Modification.

[5] On the Horizon, 2022 Regional Electricity Outlook, ISO New England at 15. An excerpted copy of the relevant portions of this report is attached to this petition as Exhibit 3.

needed to cover cold-snap weeks by 2050, noting: "the biggest reliability challenge by 2050 is multi-day periods of low renewable energy production."[6]

Balancing resources also will be required to help manage renewable output on an hour-to-hour basis. In California, the so-called "duck-curve" – the late afternoon period when solar generation reduces as the sun sets – already strains the system.[7] Solar is not *causing* these problems, but additional resources are necessary to ensure reliable integration of the clean power. As more renewable generation comes online, the Modification will make the OSP facility a better balancing resource with greater peak demand capacity that can respond quickly to changes in generation supply.

With the current absence of large-scale battery storage or other storage mechanisms in the ISO-NE market, natural gas-fired plants such as the OSP facility must bridge the gap when renewable generation is unavailable or insufficient. Studies conducted by ISO-NE, the Commonwealth of Massachusetts, and the State of Connecticut, all indicate that natural-gas fired power plants, such as the OSP facility, will need to balance the system for decades to come. For example, the ISO-NE Pathways study indicates that the region requires approximately 20 GW of gas-combined cycles or gas turbines both today and in 2040.[8] The Massachusetts Decarbonization Roadmap and Connecticut Integrated Resources Plan reach the same conclusion using different

[6] Energy + Environmental Economics & Energy Futures Initiative, Net-Zero New England: Ensuring Electric Reliability in a Low-Carbon Future (November 2020) at 43-48. An excerpted copy of the relevant portions of this report is attached to this petition as Exhibit 4.

[7] California Independent System operator, California Public Utilities Commission, & California Energy Commission, "Preliminary Root Cause Analysis: Mid-August 2020 Heat Storm" (Oct. 6, 2020) at 5-7. An excerpted copy of the relevant portions of this report is attached to this petition as Exhibit 5.

[8] Analysis Group, Pathways Study: Evaluation of Pathways to a Future Grid, Schatzki, Todd, Ph.D, et al (April 2022) at 42-46. An excerpted copy of the relevant portions of this report is attached to this petition as Exhibit 6.

modeling approaches.[9] Although these natural gas resources should be decreasing in *energy* production significantly over the next two decades, their *capacity* remains critical for system reliability.[10] And, it is possible that, in the future, these turbines could rely on a renewable natural gas or hydrogen for their occasional run periods.

Additionally, the ISO-NE power market continues to incentivize generators like OSP to make improvements like those in the proposed Modification. The incremental capacity from the proposed Modification cleared the ISO-NE Forward Capacity Auction #15 for the 2024/2025 capacity year.[11]

In summary, the Modification will further strengthen the OSP facility's ability to serve as a balancing resource by providing peaking products, such as wet compression and increased duct burner capacity during peak demand periods, while still using the existing OSP infrastructure.

IV. CONCLUSION

The EFSB should find that the OSP has demonstrated that (1) there is no significant risk that the Modification will adversely impact the environment, or the public health, safety and welfare and (2) any adverse impact will not be significant. OSP respectfully requests that the EFSB issue a Declaratory Order pursuant to R.I. Gen Laws § 42-35-8 that OSP's Modification does not require a license from the EFSB because it is not an alteration of a major energy facility.

[9] Evolved Energy Research, Energy Pathways to Deep Decarbonization: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study (December 2020) at Figure 53. An excerpted copy of the relevant portions of this report is attached to this petition as Exhibit 7. Connecticut Department of Energy and Environmental Protection, Integrated Resources Plan: Pathways to achieve a 100% zero carbon electric sector by 2040 (October 2021) at Appendix A-3, Figures 1-2. An excerpted copy of the relevant portions of this report is attached to this petition as Exhibit 8.

[10] E3 & EFI estimate the capacity factor of gas units will fall from around 30% to 10% by 2050, *see* Exhibit 4 at 48, while the ISO-NE Pathway's study shows comparable reductions by 2040. *See* Exhibit 6 at 52-53.

[11] *See* ISO New England Inc., Docket No. ER21-___-000, Forward Capacity Auction Results Filing (February 26, 2021) at 30. A copy of the filing is attached to this petition as Exhibit 9.

OCEAN STATE POWER, LLC
By its Attorneys,

/s/ Adam M. Ramos

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DATED: August 5, 2022

EXHIBIT 1

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

OFFICE OF AIR RESOURCES
235 Promenade Street
Providence, Rhode Island 02908

31 May 2022

Mr. Jeffrey Stewart
Facility Manager
Ocean State Power
1575 Sherman Farm Road
Harrisville, RI 02830

Dear Mr. Stewart:

The Department of Environmental Management, Office of Air Resources has reviewed and approved your application for the proposal to upgrade turbines and install new air pollution control equipment at your facility located at 1575 Sherman Farm Road, Harrisville , RI 02830.

Enclosed is a revised major source permit issued pursuant to our review of your request (RI-PSD-1).

The issuance of this major source permit qualifies as an Off-Permit Change for your Title V Operating Permit under Operating Permits, 250-RICR-120-05-29.15.2. This minor source permit will be incorporated into your operating permit at the time of renewal or re-opening.

A copy of this major source permit and a copy of your application should be maintained with your operating permit at all times until this permit is incorporated into your operating permit. In addition, as stated in 250-RICR-120-05-29.15.2(D), the permit shield in Section II of your operating permit shall not apply to this permit until it is incorporated into your operating permit.

If there are any questions concerning this permit, please contact me by telephone at 401-222-2808, extension 2777154 or by email at jikku.samuel@dem.ri.gov.

Sincerely,

Jikku Samuel
Senior Air Quality Specialist
Office of Air Resources

STATE OF RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

MAJOR SOURCE PERMIT

OCEAN STATE POWER

RI-PSD-1

Pursuant to the provisions of Air Pollution Control Permits, 250-RICR-120-05-9, this major source permit is issued to:

Ocean State Power

For the following:

Proposal for upgrading Turbines 3 and 4 in Power Block 2 to increase electric power output, the installation of a Cormetech CMHCDMPTM SCR/oxidation catalyst, and new emission limits for Turbines 3 and 4, including PM-2.5

Located at: *1575 Sherman Farm Road, Harrisville*

This permit shall be effective from the date of its issuance and shall remain in effect until revoked by or surrendered to the Department. This permit does not relieve *Ocean State Power* **from compliance with applicable state and federal air pollution control rules and regulations. The design, construction and operation of this equipment shall be subject to the attached permit conditions and emission limitations.**

Laurie A. Grandchamp

Laurie Grandchamp, P.E.,
Chief Office of Air Resources

May 31, 2022

Date of issuance

STATE OF RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

Permit Conditions and Emissions Limitations

OCEAN STATE POWER

RI - PSD - 1
(Revised May 2022)

A. Emission Limitations - Turbines

1. Natural Gas Firing – Turbines 1 and 2

   a. Nitrogen oxides (as nitrogen dioxide (NO_2)

      1. The concentration of nitrogen oxides discharged to the atmosphere from each flue shall not exceed 9 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

      2. The emission rate of nitrogen oxides discharged to the atmosphere from each flue shall not exceed 37.4 lbs/hr. when both turbines in a two-turbine combined cycle system are operating, nor exceed 53.0 lbs/hr. when only one turbine in that two turbine combined cycle system is operating.

   b. Carbon Monoxide (CO)

      1. The concentration of carbon monoxide discharged to the atmosphere from each flue shall not exceed 20 ppmv, on a dry basis, corrected to 15 percent O_2 (24 hour block average beginning at 0800).

      2. The emission rate of carbon monoxide discharged to the atmosphere from each flue shall not exceed 46.8 lbs/hr. when both turbines in a two-turbine combined cycle system are operating, nor exceed 64.8 lbs/hr. when only one turbine in that two turbine combined cycle system is operating.

   c. Sulfur Dioxide (SO_2)

      1. The emission rate of sulfur dioxide discharged to the atmosphere from each flue shall not exceed 0.0027 lbs per million BTU heat input (HHV) or a maximum of 3.1 lbs/hr., whichever is more stringent, when both turbines in a two turbine combined cycle system are operating.

      2. The emission rate of sulfur dioxide discharged to the atmosphere from each flue shall not exceed 0.0027 lbs per million BTU heat input (HHV) or a maximum of 4.2 lbs/hr., whichever is more stringent, when only one turbine in a two turbine combined cycle system is operating.

d. Particulate Matter

1. The emission rate of particulate matter discharged to the atmosphere from each flue shall not exceed 0.01 lbs per million BTU heat input (HHV) or a maximum of 11.5 lbs/hr, whichever is more stringent, when both turbines in a two turbine combined cycle system are operating.

2. The emission rate of particulate matter discharged to the atmosphere from each flue shall not exceed 0.01 lbs per million BTU heat input (HHV) or a maximum of 18 lbs/hr., whichever is more stringent, when only one turbine in a two turbine combined cycle system is operating.

e. Total Nonmethane Hydrocarbons (NMHC)

1. The concentration of total nonmethane hydrocarbons discharged to the atmosphere from each flue shall not exceed 4.1 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of total nonmethane hydrocarbons discharged to the atmosphere from each flue shall not exceed 4.7 lbs/hr. when both turbines in a two turbine combined cycle system are operating, nor exceed 7.2 lbs/hr. when only one turbine in that two turbine combined cycle system is operating.

f. Ammonia (NH_3)

1. The concentration of ammonia discharged to the atmosphere from each flue shall not exceed 30 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of ammonia discharged to the atmosphere from each flue shall not exceed 54 lbs/hr. when both turbines in a two-turbine combined cycle system are operating, nor exceed 65 lbs/hr. when only one turbine in that two turbine combined cycle system is operating.

2. Fuel Oil Firing – Turbines 1 and 2

a. Nitrogen Oxides (as nitrogen dioxide (NO_2)

1. The concentration of nitrogen oxides discharged to the atmosphere from each flue shall not exceed 18 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average)

2. The emission rate of nitrogen oxides discharged to the atmosphere from each flue shall not exceed 81.6 lbs/hr.

3. The total quantity of nitrogen oxides discharged to the atmosphere from the four combustion turbines combined, during discretionary oil firing, shall not exceed 4000 lbs per calendar month based upon a 12-month rolling average.

b. Carbon Monoxide (CO)

1. The concentration of carbon monoxide discharged to the atmosphere from each flue shall not exceed 30 ppmv, on a dry basis, corrected to 15 percent O_2 (24 hour block average beginning at 0800).

2. The emission rate of carbon monoxide discharged to the atmosphere from each flue shall not exceed 81.7 lbs/hr.

c. Sulfur Dioxide (SO_2)

1. The owner/operator shall not use fuel oil in any turbine or store fuel oil for use in any turbine with a sulfur content greater than 15 ppm by weight.

2. The emission rate of sulfur dioxide discharged to the atmosphere from each flue shall not exceed 1.85 lbs/hr.

d. Particulate Matter

The emission rate of particulate matter discharged to the atmosphere from each flue shall not exceed 0.01 lbs per million BTU heat input (HHV) or a maximum of 11.5 lbs/hr whichever is more stringent.

e. Total Nonmethane Hydrocarbons (NMHC)

1. The concentration of total nonmethane hydrocarbons discharged to the atmosphere from each flue shall not exceed 7.2 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of total nonmethane hydrocarbons discharged to the atmosphere from each flue shall not exceed 10.3 lbs/hr.

f. Ammonia (NH_3)

1. The concentration of ammonia discharged to the atmosphere from each flue shall not exceed 30 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of ammonia discharged to the atmosphere from each flue shall not exceed 50.3 lbs/hr.

3. Natural Gas Firing – Turbines 3 and 4 without Duct Burners Firing

a. Nitrogen oxides (as nitrogen dioxide (NO_2)

1. The concentration of nitrogen oxides discharged to the atmosphere from each flue shall not exceed 3 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of nitrogen oxides discharged to the atmosphere from each turbine shall not exceed 12.75 lbs/hr.

b. Carbon Monoxide (CO)

1. The concentration of carbon monoxide discharged to the atmosphere from each flue shall not exceed 10 ppmv, on a dry basis, corrected to 15 percent O_2 (24 hour block average beginning at 0800).

2. The emission rate of carbon monoxide discharged to the atmosphere from each turbine shall not exceed 25.88 lbs/hr.

c. Sulfur Dioxide (SO_2)

The emission rate of sulfur dioxide discharged to the atmosphere from each turbine shall not exceed 0.002 lbs per million BTU heat input (HHV) or a maximum of 2.31 lbs/hr, whichever is more stringent.

d. Particulate Matter (PM-10/PM-2.5)

The emission rate of particulate matter discharged to the atmosphere from each turbine shall not exceed 0.005 lbs per million BTU heat input (HHV) or a maximum of 5.77 lbs/hr, whichever is more stringent.

e. Total Nonmethane Hydrocarbons (NMHC)

1. The concentration of total nonmethane hydrocarbons discharged to the atmosphere from each flue shall not exceed 1.5 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of total nonmethane hydrocarbons discharged to the atmosphere from each turbine shall not exceed 2.22 lbs/hr.

f. Ammonia (NH_3)

1. The concentration of ammonia discharged to the atmosphere from each flue shall not exceed 10 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of ammonia discharged to the atmosphere from each turbine shall not exceed 15.73 lbs/hr.

4. Fuel Oil Firing – Turbines 3 and 4 without Duct Burners Firing

   a. Nitrogen Oxides (as nitrogen dioxide (NO_2)

      1. The concentration of nitrogen oxides discharged to the atmosphere from each turbine shall not exceed 10 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average)

      2. The emission rate of nitrogen oxides discharged to the atmosphere from each turbine shall not exceed 44.70 lbs/hr.

      3. The total quantity of nitrogen oxides discharged to the atmosphere from the four combustion turbines combined, during discretionary oil firing, shall not exceed 4000 lbs per calendar month based upon a 12-month rolling average.

   b. Carbon Monoxide (CO)

      1. The concentration of carbon monoxide discharged to the atmosphere from each flue shall not exceed 24 ppmv, on a dry basis, corrected to 15 percent O_2 (24-hour block average beginning at 0800).

      2. The emission rate of carbon monoxide discharged to the atmosphere from each turbine shall not exceed 65.31 lbs/hr.

   c. Sulfur Dioxide (SO_2)

      1. The owner/operator shall not use fuel oil in any turbine or store fuel oil for use in any turbine with a sulfur content greater than 15 ppm by weight.

      2. The emission rate of sulfur dioxide discharged to the atmosphere from each turbine shall not exceed 1.75 lbs/hr.

   d. Particulate Matter (PM-10/PM-2.5)

      The emission rate of particulate matter discharged to the atmosphere from each turbine shall not exceed 0.012 lbs per million BTU heat input (HHV) or a maximum of 13.80 lbs/hr, whichever is more stringent.

   e. Total Nonmethane Hydrocarbons (NMHC)

      1. The concentration of total nonmethane hydrocarbons discharged to the atmosphere from each flue shall not exceed 3 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

      2. The emission rate of total nonmethane hydrocarbons discharged to the atmosphere from each flue shall not exceed 4.68 lbs/hr.

f. Ammonia (NH_3)

1. The concentration of ammonia discharged to the atmosphere from each flue shall not exceed 10 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average).

2. The emission rate of ammonia discharged to the atmosphere from each flue shall not exceed 16.55 lbs/hr.

5. Co-firing - Natural Gas and Oil without Duct Burners Firing

During periods when the combustion turbine is firing natural gas and fuel oil simultaneously, the emission limitation for nitrogen oxides, carbon monoxide, sulfur dioxide, particulate matter, total nonmethane hydrocarbons and ammonia, shall be determined by the following equation:

$$E_{co} = \frac{(E_{gas})(H_{gas}) + (E_{oil})(H_{oil})}{H_{gas} + H_{oil}}$$

where:

E_{co} = emission limitation (ppm, lb/hr or lb/MMBTU) during co-firing of natural gas and fuel oil

E_{gas} = emission limitation (ppmv, lb/hr, or lb/MMBTU) during natural gas firing

H_{gas} = heat input from the combustion of natural gas (MMBTU)

E_{oil} = emission limitation (ppmv, lb/hr, or lb/MMBTU) during fuel oil firing

H_{oil} = heat input from the combustion of fuel oil (MMBTU)

B. Emission Limitations - Duct Burners for Turbines 1 and 2

1. Natural Gas Firing

a. Nitrogen Oxides (as nitrogen dioxide (NO_2)

The emission rate of nitrogen oxides from each duct burner shall not exceed 0.1 lbs per million BTU heat input (HHV) or a maximum of 38 lbs/hr., whichever is more stringent.

b. Particulate Matter

The emission rate of particulate matter from each duct burner shall not exceed 0.03 lbs per million BTU heat input (HHV) or a maximum of 11.4 lbs/hr., whichever is more stringent.

c. Sulfur dioxide (SO_2)

The emission rate of sulfur dioxide from each duct burner shall not exceed 0.2 lbs per million BTU heat input (HHV) or a maximum of 76 lbs/hr., whichever is more stringent.

C. Emission Limitations - Duct Burners for Turbines 3 and 4

1. Natural Gas Firing

a. Nitrogen Oxides (as nitrogen dioxide (NO_2)

The concentration of nitrogen oxides discharged to the atmosphere from each duct burner shall not exceed 3 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average), or a maximum of 4.06 lb/hr, whichever is more stringent.

b. Carbon Monoxide (CO)

The concentration of CO discharged to the atmosphere from each duct burner shall not exceed 10 ppmv, on a dry basis, corrected to 15 percent O_2 (24-hour block average beginning at 0800), or a maximum of 8.23 lb/hr, whichever is more stringent.

c. Sulfur dioxide (SO_2)

The emission rate of sulfur dioxide from each duct burner shall not exceed 0.002 lbs per million BTU heat input (HHV) or a maximum of 0.73 lbs/hr, whichever is more stringent.

d. Particulate Matter (PM-10/PM-2.5)

The emission rate of particulate matter from each duct burner shall not exceed 0.01 lbs per million BTU heat input (HHV) or a maximum of 3.67 lbs/hr, whichever is more stringent.

e. Total Nonmethane Hydrocarbons (NMHC)

The concentration of NMHC discharged to the atmosphere from each duct burner shall not exceed 1.5 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average), or a maximum of 0.71 lb/hr, whichever is more stringent.

f. Ammonia (NH_3)

The concentration of NH_3 discharged to the atmosphere from each duct burner shall not exceed 10 ppmv, on a dry basis, corrected to 15 percent O_2 (1 hour average), or a maximum of 5.00 lb/hr, whichever is more stringent.

D. Emissions Limitations for Turbines 3 and 4 with Duct Burners Firing

1. Natural Gas Firing

a. Nitrogen Oxides (as nitrogen dioxide (NO_2)

Total emissions of nitrogen oxides from Turbines 3 and 4 and associated duct burners shall not exceed 60.51 tons in any 12-month period.

b. Carbon Monoxide (CO)

Total emissions of CO from Turbines 3 and 4 and associated duct burners shall not exceed 122.80 tons in any 12-month period.

c. Sulfur dioxide (SO_2)

Total emissions of SO_2 from Turbines 3 and 4 and associated duct burners shall not exceed 10.95 tons in any 12-month period.

d. Particulate Matter (PM-10/PM-2.5)

Total emissions of particulate matter from Turbines 3 and 4 and associated duct burners shall not exceed 27.40 tons in any 12-month period.

e. Total Nonmethane Hydrocarbons (NMHC)

Total emissions of NMHC from Turbines 3 and 4 and associated duct burners shall not exceed 10.55 tons in any 12-month period

E. Operating Requirements

1. Total natural gas use for Turbines 3 and 4 will be limited to 10,950,000 MMBtu per 12-month rolling period. If the duct burners are used, or if fuel oil is used in the turbines, natural gas usage in the turbines for the turbines shall be limited as follows:

$$\mathrm{NG}_{\mathrm{Turbines}\ 3-4} = \frac{54{,}800 - Oil_{Turbines} \times 0.140 \times \mathrm{A} - \mathrm{NG}_{duct\ burners\ 3-4} \times \mathrm{B}}{C}$$

Where:

$\mathrm{NG}_{\mathrm{Turbines}\ 3\text{-}4}$: Maximum quantity of natural gas in MMBtu that may be burned in Turbines 3 and 4 combined over any consecutive 12-month period, excluding duct burners

$\mathrm{Oil}_{\mathrm{Turbines}\ 3\text{-}4}$: Fuel oil in gallons burned in Turbines 3 and 4 combined during the 12- month period

$\mathrm{NG}_{\mathrm{duct\ burners}\ 3\text{-}4}$: Natural gas in MMBtu that is burned in the duct burners associated with Turbines 3 and 4 combined during the 12-month period.

A: PM-2.5 emission rate in lb/MMBtu for oil firing in Turbines 3 and 4 or other value determined by stack testing.

B: PM-2.5 emission rate in lb/MMBtu for natural gas firing in Turbines 3 and 4 or other value determined by stack testing.

C: PM-2.5 emission rate in lb/MMBtu for natural gas firing in Turbines 3 and 4 or other value determined by stack testing.

2. Oil use, for the combustion turbines, shall be limited to that needed to maintain oil system readiness and times when natural gas is unavailable and, during the period 1 October to 30 April, on a discretionary basis as limited by this permit. This limitation on discretionary oil burning shall not apply to oil burned when natural gas is unavailable or when operating to maintain oil system readiness. Maintenance of oil system readiness is limited to burning oil for the purposes of ensuring adequate fuel flow, monitoring and adjusting operating parameters and testing emissions.

   Natural gas shall be deemed unavailable only in cases of interruption in supply or transportation resulting from equipment failure, regulatory actions or interruption of supply outside of the control of the owner/operator. Natural gas shall be deemed unavailable during instances where the gas pressure in the gas pipeline drops below 350 psig at the plant boundary. Operation during gas pipeline low pressure incidents shall follow the procedures in Condition K.1 - K.5.

   Natural gas shall be deemed unavailable if:

   a. ISO-New England has declared a "Cold Weather Event" pursuant to Market Rule 1, Appendix H, "Operations During Cold Weather Conditions". The permittee may utilize fuel oil for each Operating Day (12AM-12PM) that this condition exists; or,

   b. ISO-New England has declared a "Cold Weather Watch" or a "Cold Weather Warning" pursuant to Market Rule 1, Appendix H, "Operations During Cold Weather Conditions" and either ISO-New England has forecast ISO New England Operating Procedure No. 4 conditions in its Morning Report or as revised/updated during the Operating Day, or has taken any action under ISO New England Operating Procedure No. 4. The owner/operator may utilize fuel oil for the 24-hour period between issuance of the Morning Reports (9AM Day 1 to 9 AM Day 2) that this condition exists.

   Natural gas shall not be deemed unavailable on the basis of any increase in the cost of supply or transportation or allocation of available natural gas to other facilities within the control of the owner/operator.

   If the primary natural gas supply is unavailable, the owner\operator will make all reasonable efforts to promptly obtain other natural gas supplies via the Tennessee or Algonquin pipelines.

   If natural gas is unavailable, the owner/operator may utilize fuel oil, with a sulfur content of 15 ppm or less by weight, as a replacement fuel.

3. In no event shall the hours of operation on oil exceed 1200 hours per turbine in any consecutive 12-month period for conditions where natural gas is deemed unavailable.

4. The duct burners shall be fired with natural gas only.

5. The natural gas combusted by the duct burners associated with Turbines 3 and 4 shall be limited to 1,100,000 MMBtu for any consecutive 12-month period.

6. Visible emissions from any stack at this facility shall not exceed 10% opacity except for a period or periods aggregating no more than three minutes in any one hour.

7. The owner/operator shall limit the combined quantity of fuel oil combusted during discretionary oil burning to 4,539,000 gallons or less for any consecutive 12-month period in all 4 burners and 2,269,500 gallons or less for any consecutive 12-month period in Turbines 3 and 4.

F. Continuous Monitors

1. Continuous emission monitoring systems (CEMS) shall be installed, operated and maintained for opacity, nitrogen oxides, carbon monoxide and oxygen.

2. The continuous monitors must satisfy EPA performance specifications in 40 CFR 60, Appendix B.

3. Performance specifications, monitor location, calibration and operating procedures and quality assurance procedures for each monitor must be submitted to the Office of Air Resources for review and approval at least 180 days prior to expected start-up.

4. All data shall be monitored and recorded continuously.

5. Natural gas and fuel oil flows to each turbine and the duct burners shall be continuously measured and recorded.

6. A method for monitoring and recording ammonia concentrations in the turbine flue gases shall be proposed for the Office of Air Resources' approval and implementation.

7. Catalyst bed temperature shall be continuously measured and recorded.

8. The facility shall have the capability of transmitting all of the collected continuous monitoring data to the Office of Air Resources' office via a telemetry system. The owner/operator must provide all of the necessary funds for installation and operation of this equipment. A plan for accomplishing this must be submitted to the Office of Air Resources for review and approval prior to installation of the equipment and at least 180 days prior to expected start-up. This plan shall also define procedures to test and protect the integrity of transmitted data.

G. Stack testing

1. Within 180 days of start-up, initial performance testing shall be conducted for Turbines 3 and 4. Performance testing shall be conducted for nitrogen oxides, carbon monoxide, particulate matter (PM-10 and PM-2.5), non-methane hydrocarbons, sulfur dioxide, and ammonia.

2. A stack testing protocol shall be submitted to the Office of Air Resources for review and approval prior to the performance of any stack tests. The owner/operator shall provide the Office of Air Resources at least 60 days prior notice of any performance test.

3. All test procedures used for stack testing shall be approved by the Office of Air Resources prior to the performance of any stack tests.

4. The owner/operator shall install any and all test ports or platforms necessary to conduct the required stack testing, provide safe access to any platforms and provide the necessary utilities for sampling and testing equipment.

5. Initial performance testing shall be conducted when burning natural gas and when burning fuel oil. All testing shall be conducted under operating conditions deemed acceptable and representative for the purpose of assessing compliance with the applicable emission limitation.

6. A final report of the results of stack testing shall be submitted to the Office of Air Resources no later than 45 days following completion of the testing.

7. All stack testing must be observed by the Office of Air Resources or its authorized representatives to be considered acceptable.

H. Recordkeeping and Reporting

1. The owner/operator shall maintain a record of all measurements, performance evaluations, calibration checks, and maintenance or adjustments for each continuous monitor.

2. The owner/operator shall, on a monthly basis, no later than five (5) business days after the first of the month, determine the total quantity of nitrogen oxides discharged to the atmosphere from the four combustion turbines combined, and Turbines 3 and 4 combined, during discretionary oil burning, for the previous month. The owner/operator shall keep records of this determination and provide such records to the Office of Air Resources upon request.

3. The owner/operator shall, on a monthly basis, no later than five (5) business days after the first of the month, determine the total quantity of fuel oil combusted during discretionary oil burning for the previous month. The owner/operator shall keep records of this determination and provide such records to the Office of Air Resources upon request.

4. The owner/operator shall notify the Office of Air Resources, in writing, after an exceedance of any emission limitation is discovered. This notification shall be made within five (5) days of the exceedance. Notification shall be provided on forms furnished by the Office of Air Resources and must provide all of the information requested on the form.

5. The owner/operator shall notify the Office of Air Resources, in writing, after the discovery that a continuous emission monitor has malfunctioned. This notification shall be made within five (5) days of when the continuous emission monitor malfunctioned. Notification shall be provided on forms furnished by the Office of Air Resources and must provide all of the information requested on the form.

6. The owner/operator shall notify the Office of Air Resources, in writing, whenever the combined quantity of fuel oil combusted during discretionary oil burning exceeds 4,539,000 gallons for any consecutive 12-month period or 2,269,500 gallons for any consecutive 12-month period for Turbines 3 and 4.

7. The owner/operator shall notify the Office of Air Resources of any anticipated noncompliance with the terms of this permit or any other applicable air pollution control rules or regulations.

8. The owner/operator shall maintain the following records for each turbine:

    a. The hours of operation, including any start up, shut down or malfunction in the operations of the facility.

    b. The date, start time, end time and amount of fuel used for any period when fuel oil is burned. Records must indicate whether fuel oil was burned under discretionary oil burning, during the unavailability of natural gas or to maintain oil system readiness.

    c. If co-firing natural gas and fuel oil, the heat input (MMBTU) from the combustion of each fuel.

    d. The calculated emission limitations for each pollutant when co-firing.

    e. Any malfunction of the air pollution control system.

9. The owner/operator shall notify the Office of Air Resources of the anticipated date of the initial start-up not more than 60 days nor less than 30 days prior to such date.

10. The owner/operator shall notify the Office of Air Resources in writing of the date construction of the facility commenced no later than 30 days after such date.

11. The owner/operator shall notify the Office of Air Resources in writing of the date of actual initial start-up no later than fifteen days after such date.

12. The owner/operator shall notify the Office of Air Resources in writing of any physical or operational change to the facility which would:

    a. Change the representation of the facility in the application.

    b. Alter the applicability of any state or federal air pollution rules or regulations.

    c. Result in the violation of any terms or conditions of this permit.

d. Qualify as a modification under 250-RICR-120-05-9.

Such notification shall include:

- Information describing the nature of the change.
- Information describing the effect of the change on the emission of any air contaminant.
- The scheduled completion date of the planned change.

Any such change shall be consistent with the appropriate regulation and have the prior approval of the Director.

13. The owner/operator shall notify the Office of Air Resources in writing of the date upon which initial performance testing of the continuous emission monitors commences at least 30 days prior to such date.

14. The owner/operator shall notify the Office of Air Resources prior to burning fuel oil in any turbine. Such notification shall include:

    a. The date and time fuel oil burning is expected to commence

    b. The reasons for the fuel oil burning (unavailability of natural gas or discretionary oil burning)

    c. The anticipated length of time fuel oil will be burned

    This requirement for prior notification does not apply to those times when oil is burned to maintain oil system readiness

15. The owner/operator shall submit a written report of excess emissions as measured by a continuous emission monitor for every calendar quarter. All quarterly reports shall be received no later than 30 days following the end of each calendar quarter and shall include the following information:

    a. The date and time of commencement and completion of each time period of excess emissions and the magnitude of the excess emissions.

    b. Identification of the suspected reason for the excess emissions and any corrective action taken.

    c. The date and time period any continuous emission monitor was inoperative, except for zero and span checks and the nature of system repairs or adjustments.

    When none of the above items have occurred, such information shall be stated in the report.

16. All records required in this permit shall be maintained for a minimum of three years after the date of each record and shall be made available to representatives of the Office of Air Resources upon request.

17. Deviations from permit conditions shall be reported to the Office of Air Resources, in writing, within five (5) business days of the deviation. Reports shall describe the probable cause of such deviations and any corrective actions or preventative measures taken.

I. Other Permit Conditions

1. There shall be no by passing of the air pollution control equipment during start-up, operation or shutdown. Ammonia will not be injected during start-up or shutdown unless the catalyst bed is at, or above, the manufacturer's specified minimum operating temperature.

2. An operation and maintenance plan for the facility must be submitted to the Office of Air Resources at least 180 days prior to start-up of the facility.

3. The facility shall be designed, constructed and operated consistent with the representation of the facility in the PSD permit application and the minor modification application received by Office of Air Resources on November 3, 2021.

4. Except for the circumstances described in paragraph a. below, a malfunction of any air pollution control equipment that would result in the exceedance of any emission limitation in this permit will necessitate the shutdown of the unit(s) which would cause the exceedance. The unit(s) must remain shutdown until the malfunction has been identified and corrected.

   A shutdown will not be necessitated under the following circumstances:

   a. If during a malfunction that would cause an exceedance of any applicable 1-hour average emission limitation, the emissions, when averaged over an 8-hour period beginning with the hour in which the malfunction occurred, do not exceed the applicable limitation.

5. Employees of the Office of Air Resources and its authorized representatives shall be allowed to enter the facility at all times for the purpose of inspecting any air pollution source, investigating any condition it believes may be causing air pollution or examining any records required to be maintained by the Office of Air Resources.

6. The owner/operator shall have each delivery of fuel oil analyzed for sulfur content. The fuel oil must be sampled and analyzed according to ASTM methods which have the prior approval or are required by the Director. Records of the fuel oil analyses shall be maintained by the owner/operator.

7. This facility is subject to the requirements of the Federal New Source Performance Standards 40 CFR 60, Subparts A (General Provisions), Da (Electric Utility Steam Generating Units) and GG (Stationary Gas Turbines). Compliance with all applicable provisions of these regulations is required.

8. Construction access and circulation routes shall be provided a temporary crushed gravel or pavement surface.

9. All construction related travel routes, exposed or excavated areas, shall be watered down as frequently as necessary to minimize dust.

10. Construction vehicles transporting loose aggregate shall be covered with a tarpaulin or similar dust resistant membrane.

11. Construction vehicle operating speeds shall be controlled to minimize generation of dust.

12. All construction related open storage areas and/or piles of soil, aggregates or any other dust producing material shall be covered or watered down as necessary to prevent generation of dust.

13. Any spillage from construction trucks or other construction equipment on any public street shall be removed promptly.

14. The natural gas fired in each turbine shall be analyzed daily for sulfur content every six months. Sampling and analysis shall be conducted using either ASTM reference methods D1072-80, D3031-81, D3246-81, D4084-82 or other EPA approved methods. Fuel sampling of the natural gas for nitrogen content is waived in its entirety if the facility continues to use pipeline quality natural gas.

15. The applicant must file applications for approval to construct/install and receive approval prior to construction/installation of the following equipment:

    a. the combustion turbine(s)
    b. the heat recovery steam generator(s)
    c. the SCR system(s)

    Each application must be submitted at least 120 days prior to the anticipated date of construction/installation. [This condition is no longer applicable to Ocean State Power. However, for historical purposes it will remain in the permit.]

16. During the first year of operation of the facility, the owner/operator shall sample and analyze the cooling tower water influent for total chromium and hexavalent chromium. Samples shall be taken daily and composited and analyzed monthly. The results of this analysis shall be submitted to the Office of Air Resources quarterly. The Office of Air Resources may continue this sampling and analysis requirement beyond the first year's operation at it's discretion, in consideration of the results.

17. At all times, including periods of startup, shutdown and malfunction, the owner/operator shall, to the extent practicable, maintain and operate the facility in a manner consistent with good air pollution control practice for minimizing emissions. The general duty to minimize emissions does not require you to make any further efforts to reduce emissions if levels required by this permit have been achieved. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Office of Air Resources which may include, but is not

limited to, monitoring results, opacity observations, review of operating and maintenance procedures and inspection of the source.

18. The Office of Air Resources may reopen and revise this permit if it determines that:

    a. A material mistake was made in establishing the operating restrictions; or,

    b. inaccurate emission factors were used in establishing the operating restrictions; or,

    c. emission factors have changed as a result of stack testing or emissions monitoring; or,

    d. revisions that are necessary due to additional applicable requirements pursuant to state or federal law or from any regulatory agency.

J. Startup/Shutdown Conditions and Initial Commissioning

1. Turbine startup/shutdown shall be defined as that period of time from initiation of combustion turbine firing until the unit reaches steady state load operation. This period shall not exceed 60 minutes for a hot start, 180 minutes for a warm start, nor 240 minutes for a cold start. A warm start shall be defined as startup when the generating unit has been down for more than 2 hours and less than or equal to 48 hours. A cold start shall be defined as startup when the generating unit has been down for more than 48 hours. Unit shutdown shall be defined as that period of time from steady state operation to cessation of combustion turbine firing. This period shall not exceed 60 minutes.

2. Initial turbine commissioning shall be defined as the first 200 hours of combustion turbine operation following initial startup or to commercial acceptance whichever is less.

3. The emission limitations of Conditions A.1-A.4 shall not apply during turbine startup/shutdown conditions or each turbine's initial commissioning.

4. The emission limitations of Conditions A.1.b, A.2.b, A.3.b, and A.4.b shall not apply during equipment cleaning, e.g. on-line washing of the turbine.

5. The owner/operator shall submit to the Office of Air Resources for review and approval, at least 180 days prior to startup, the procedures to be followed during turbine startup/shutdown conditions and initial turbine commissioning. The procedures shall be designed to minimize the emission of air contaminants to the maximum extent practical.

K. Gas Pipeline Low Pressure Incidents

Natural gas shall be deemed unavailable during instances where the gas pipeline pressure drops below 350 psig at the plant boundary. Operation during gas pipeline low pressure incidents shall follow the following procedures:

1. The fuel oil system shall be prepared for operation when the gas pipeline pressure drops to 375 psig.

2. One combustion turbine will be transferred over to fuel oil firing when the gas pipeline pressure drops to 350 psig. The remaining combustion turbines will continue to operate on natural gas.

3. The facility shall continue to operate in this mode if the gas pipeline pressure stabilizes at or near 350 psig.

4. A second combustion turbine will be transferred to fuel oil if the gas pipeline pressure continues to drop. This procedure will continue until either the gas pipeline pressure is stabilized or all four combustion turbines have been transferred to fuel oil,

5. Once the gas pipeline pressure returns to 375 psig or higher, the combustion turbines will be transferred back to natural gas.

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EXHIBIT 2

CLIENT NAME: LS POWER | PROJECT NAME: OCEAN STATE POWER
PROJECT NUMBER: 411089 | REVISION: A | DATE: 28-JUL-2022

EMISSION ESTIMATE LIST OF ASSUMPTIONS / NOTES

NO.	DESCRIPTION OF ASSUMPTION / NOTE
1)	Emissions estimates are preliminary and do not include any margins. Any relevant margins have to been included by permitting engineer. No guarantees apply.
2)	The emissions estimates provided are per stack.
3)	A dry ambient air composition of 0.98% Ar, 78.03% N2, and 20.99% O2 is assumed.
4)	Standard conditions are defined as 60.0° F, 14.696 psia.
5)	Combustion turbine performance is based on data provided by GE for Standard combustor (OSP ITO_Unified Format_Values.xlsx) in April 2022 and Caldwell/Gtanalysis for performance and estimates with wet compression (Esitmated Wet Compression Water Requirements_April Revised OEM Data.xlsx)in June 2022.
6)	Post combustion emissions control equipment include an SCR and CO Catalyst.
7)	All ppm values are based on CH4 calibration gas.
8)	Sulfur content of the fuel is assumed to be 1ppm of H2S.
9)	NOx is controlled to 3.0 ppmvd@15%O2 at the stack. CO is controlled to 10.0 ppmvd at the stack and NH3 slip to 10 ppm as per email from LS power dated 6/17/2021.
10)	For pollutant emissions where CTG manufacturer data of lb/h was available, the greater of the manufactuer's estimate and B&V's estimate was used in the summary table.
11)	Fuel gas used for estimates is based on average of monthly samples for Ocean State Power of year 2020.
12)	The heat input to duct burner for the fired cases is based on B&V Combined Cycle preliminary Heat Balances 2022.
13)	The emission rate (lb/MMBtu HHV) of duct burner for UHC, VOC, PM(filterable) and PM (total) was assumed to be 0.03 lb/MMBtu HHV, 0.01 lb/MMBtu HHV, 0.005 lb/MMBTu HHV and 0.01 lb/MMBtu HHV respectively as there was no available reference. The emission rate for Nox and CO was considered to be 0.08 lb/MMBtu HHV and 0.05 lb/MMBtu HHV based on communication from ethosenergygroup.
14)	The SO2 oxidation rate in CTG, CO catalyst, SCR and duct burner are assumed to be 15%, 20%, 3% and 10% respectively. Ammonium sulfates created downstream of the SCR are included in front half particulates and front&back half particulates. The assumption that 100% SO3 is converted to ammonium sulfates results in "worst case" particulate emissions. The SO2 estimates without any consideration of oxidation is also provided in summary for conservative estimate.
15)	The Steam Turbine output included in estimates is an indicative estimate based on current set of heat balances and provided for information and no guarantees are applicable. The CO2 tons/MWH is estimated based on gross plant output (CTG1+CTG2+STG) for 2x1 CC with performance and emissions being the same for both gas turbine units.
16)	The stack diameter was assumed to be 21 feet.
17)	The CO and VOC removal efficiency in the CO catalyst were assumed to be 35.1% and 46.4% to limit stack emissions to permit limits of 10 ppmvd@15%O2 and 1.5 ppmvd@15%O2 respectively. Cormatech has indicated in their response that VOC reduction rate in the catalyst for these estimates can met based on Saturated VOC's being 40% or lower.
18)	The gas turbine emission rates are assumed to remain the same even with impact of wet compression (no emissions data was provided by Caldwell). Gas Turbine PM emissions are based on data provided for GE.
19)	Gas Turbine inlet loss assumed to be 4in H20.

CLIENT NAME: LS POWER | PROJECT NAME: OCEAN STATE POWER
PROJECT NUMBER: 411089 | REVISION: A | DATE: 28-JUL-2022

	Without Capacity Increase						With Capacity Increase					
CASE NUMBER	**1**	**2**	**3**	**31**	**32**	**33**	**13**	**16**	**17**	**18**	**19**	**21**
Ambient Dry Bulb Temperature, ° F	0.0	59.0	90.0	0.0	59.0	90.0	59.0	90.0	0.0	59.0	90.0	90.0
Configuration	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC
CTG Manufacturer	GE	GE	GE	GE	GE	GE	GE	GE	GE	GE	GE	GE
CTG Model	7EA	7EA	7EA	7EA	7EA	7EA	7EA	7EA	7EA	7EA	7EA	7EA
CTG Combustor Type	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD
CTG Load, percent of base load	100.0	100.0	100.0	100.0	100.0	100.0	100.0	Peak	100.0	100.0	100.0	Peak
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Inlet Air Cooling Type	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger	Evap. Fogger
CTG Inlet Air Cooling Status, On/Off	OFF	OFF	ON	OFF	OFF	ON	ON	ON	OFF	ON	ON	ON
Wet Compression Status, On/Off	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	ON	ON
Duct Burner Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
HRSG Duct Firing	Unfired	Unfired	Unfired	Fired	Fired	Fired	Unfired	Unfired	Fired	Fired	Fired	Fired
Post Combustion NOx Emissions Control	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR
Post Combustion CO Emissions Control	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst	CO Catalyst
AMBIENT CONDITIONS												
Ambient Dry Bulb Temperature, ° F	0.0	59.0	90.0	0.0	59.0	90.0	59.0	90.0	0.0	59.0	90.0	90.0
Ambient Relative Humidity, %	55.0	60.0	45.0	55.0	60.0	45.0	60.0	45.0	55.0	60.0	45.0	45.0
Atmospheric Pressure, psia	14.420	14.420	14.420	14.420	14.420	14.420	14.420	14.420	14.420	14.420	14.420	14.420
COMBUSTION TURBINE PERFORMANCE												
CTG Performance Reference	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell	GE |Caldwell
CTG Inlet Air Conditioning Effectiveness, percent	0.0	0.0	95.0	0.0	0.0	95.0	95.0	95.0	0.0	95.0	95.0	95.0
CTG Compressor Inlet Dry Bulb Temperature, ° F	0.0	59.0	73.8	0.0	59.0	73.8	51.8	73.8	0.0	51.8	73.8	73.8
CTG Compressor Inlet Relative Humidity, percent	54.4	59.4	75.2	54.4	59.4	75.2	77.2	75.2	54.4	77.2	75.2	75.2
Inlet Loss, in. H2O	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Exhaust Loss, in. H2O	18.6	15.0	13.9	18.6	15.0	13.9	16.4	15.3	18.6	16.4	15.2	15.3
CTG Load Level, percent of base load	100.0	100.0	100.0	100.0	100.0	100.0	100.0	Peak	100.0	100.0	100.0	Peak
Gross CTG Output, kW	102,509	90,451	85,289	102,509	90,451	85,289	104,451	107,000	102,509	104,451	99,289	107,000
Gross CTG Heat Rate, Btu/kWh (LHV)	10,195	10,515	10,651	10,195	10,515	10,651	10,262	10,219	10,195	10,262	10,396	10,219
Gross CTG Heat Rate, Btu/kWh (HHV)	11,321	11,675	11,827	11,321	11,675	11,827	11,395	11,347	11,321	11,395	11,543	11,347
CTG Heat Input, MBtu/h (LHV)	1,045.1	951.1	908.4	1,045.1	951.1	908.4	1,071.9	1,093.4	1,045.1	1,071.9	1,032.2	1,093.4
CTG Heat Input, MBtu/h (HHV)	1,160.5	1,056.1	1,008.7	1,160.5	1,056.1	1,008.7	1,190.2	1,214.1	1,160.5	1,190.2	1,146.1	1,214.1
CTG Water/Steam Injection Flow, lb/h	37,899	37,355	45,126	37,899	37,355	45,126	104,181	106,056	37,899	104,181	102,628	106,056
Injection Fluid/Fuel Ratio	0.77	0.84	1.06	0.77	0.84	1.06	2.07	2.07	0.77	2.07	2.12	2.07
CTG Exhaust Flow, lb/h	2,621,220	2,305,205	2,211,769	2,621,220	2,305,205	2,211,769	2,415,051	2,330,595	2,621,220	2,415,051	2,320,197	2,330,595
CTG Exhaust Temperature, ° F	931	1,014	1,026	931	1,014	1,026	1,029	1,100	931	1,029	1,041	1,100

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
COMBUSTION TURBINE FUEL												
Total CTG Fuel Flow, lb/h	49,030	44,610	42,610	49,030	44,610	42,610	50,280	51,290	49,030	50,280	48,420	51,290
CTG Fuel Temperature, ° F	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
CTG Fuel LHV, Btu/lb	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318
CTG Fuel HHV, Btu/lb	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671
HHV/LHV Ratio	1.1104	1.1104	1.1104	1.1104	1.1104	1.1104	1.1104	1.1104	1.1104	1.1104	1.1104	1.1104
CTG Fuel Composition (Ultimate Analysis by Weight)												
Ar, % wt.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C, % wt.	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64
H2, % wt.	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76
N2, % wt.	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
O2, % wt.	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
S, % wt.	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020
Total, % wt.	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Fuel Sulfur Content (grains/100 standard cubic feet)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Fuel Sulfur Content, ppm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
COMBUSTION TURBINE EXHAUST												
CTG EXHAUST ANALYSIS (VOLUME BASIS - WET)												
Ar, % vol.	0.93	0.91	0.90	0.93	0.91	0.90	0.87	0.86	0.93	0.87	0.86	0.86
CO2, % vol.	3.29	3.39	3.35	3.29	3.39	3.35	3.58	3.76	3.29	3.58	3.57	3.76
H2O, % vol.	8.85	10.19	11.82	8.85	10.19	11.82	14.63	16.34	8.85	14.63	15.79	16.34
N2, % vol.	73.66	72.69	71.39	73.66	72.69	71.39	69.37	68.19	73.66	69.37	68.47	68.19
O2, % vol.	13.27	12.82	12.54	13.27	12.82	12.54	11.54	10.86	13.27	11.54	11.31	10.86
SO2, (after SO2 oxidation), % vol.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SO3, (after SO2 oxidation), % vol.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total, % vol.	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Molecular Wt, lb/mol	28.30	28.16	27.98	28.30	28.16	27.98	27.69	27.52	28.30	27.69	27.56	27.52
Specific Volume, ft^3/lb	34.94	37.54	38.20	34.94	37.54	38.20	38.43	40.61	34.94	38.43	39.04	40.61
Specific Volume, scf/lb	13.41	13.47	13.56	13.41	13.47	13.56	13.70	13.79	13.41	13.70	13.77	13.79
Exhaust Gas Flow, acfm	1,526,424	1,442,290	1,408,159	1,526,424	1,442,290	1,408,159	1,546,840	1,577,424	1,526,424	1,546,840	1,509,675	1,577,424
Exhaust Gas Flow, scfm	585,843	517,518	499,860	585,843	517,518	499,860	551,437	535,648	585,843	551,437	532,485	535,648
CTG NOX EMISSIONS (WITHOUT POST COMBUSTION EMISSIONS CONTROL)												
NOx Massflow Added to Match CTG Manufacturer's NOx Emissions Estimate, lb/h	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
NOx, ppmvd (dry, 15% O2)	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0
NOx, ppmvd (dry)	45.1	47.1	47.4	45.1	47.1	47.4	52.4	56.2	45.1	52.4	53.0	56.2
NOx, ppmvw (wet)	41.1	42.3	41.8	41.1	42.3	41.8	44.7	47.0	41.1	44.7	44.6	47.0
NOx, lb/h as NO2	175.0	159.3	152.1	175.3	159.6	152.4	179.8	183.4	175.3	179.8	173.2	183.4
NOx, lb/MBtu (LHV) as NO2	0.1675	0.1675	0.1675	0.1678	0.1678	0.1678	0.1677	0.1678	0.1678	0.1677	0.1678	0.1678
NOx, lb/MBtu (HHV) as NO2	0.1508	0.1508	0.1508	0.1511	0.1511	0.1511	0.1511	0.1511	0.1511	0.1511	0.1511	0.1511

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
CTG CO EMISSIONS (WITHOUT POST COMBUSTION EMISSIONS CONTROL)												
CO Massflow Added to Match CTG Manufacturer's CO Emissions Estimate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO, ppmvd (dry, 15% O2)	9.3	8.9	8.9	9.3	8.9	8.9	8.0	7.5	9.3	8.0	7.9	7.5
CO, ppmvd (dry)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
CO, ppmvw (wet)	9.1	9.0	8.8	9.1	9.0	8.8	8.5	8.4	9.1	8.5	8.4	8.4
CO, lb/h	23.7	20.6	19.5	23.7	20.6	19.5	20.9	19.8	23.7	20.9	19.9	19.8
CO, lb/MBtu (LHV)	0.0226	0.0217	0.0215	0.0226	0.0217	0.0215	0.0195	0.0182	0.0226	0.0195	0.0192	0.0182
CO, lb/MBtu (HHV)	0.0204	0.0195	0.0194	0.0204	0.0195	0.0194	0.0175	0.0163	0.0204	0.0175	0.0173	0.0163
CTG SO2 EMISSIONS (WITHOUT THE EFFECTS OF SO2 OXIDATION)												
SO2, ppmvd (dry, 15% O2)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
SO2, ppmvd (dry)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
SO2, ppmvw (wet)	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.04	0.03	0.04
SO2, lb/h	0.19	0.17	0.17	0.19	0.17	0.17	0.20	0.20	0.19	0.20	0.19	0.20
SO2, lb/MBtu (LHV)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
SO2, lb/MBtu (HHV)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
CTG SO2 EMISSIONS (WITH THE EFFECTS OF SO2 OXIDATION, WITHOUT POST COMBUSTION EMISSIONS CONTROL)												
Assumed SO2 oxidation rate in CTG, vol%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
SO2, ppmvd (dry, 15% O2)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
SO2, ppmvd (dry)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.04
SO2, ppmvw (wet)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
SO2, lb/h	0.16	0.15	0.14	0.16	0.15	0.14	0.17	0.17	0.16	0.17	0.16	0.17
SO2, lb/MBtu (LHV)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
SO2, lb/MBtu (HHV)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
CTG UHC EMISSIONS (WITHOUT POST COMBUSTION EMISSIONS CONTROL)												
UHC Massflow Added to Match CTG Manufacturer's UHC Emissions Estimate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UHC, ppmvd (dry, 15% O2)	7.2	7.0	7.0	7.2	7.0	7.0	6.6	6.3	7.2	6.6	6.6	6.3
UHC, ppmvd (dry)	7.7	7.8	7.9	7.7	7.8	7.9	8.2	8.4	7.7	8.2	8.3	8.4
UHC, ppmvw (wet)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
UHC, lb/h as CH4	10.4	9.2	8.9	10.4	9.2	8.9	9.8	9.5	10.4	9.8	9.5	9.5
UHC, lb/MBtu as CH4 (LHV)	0.0100	0.0097	0.0098	0.0100	0.0097	0.0098	0.0092	0.0087	0.0100	0.0092	0.0092	0.0087
UHC, lb/MBtu as CH4 (HHV)	0.0090	0.0087	0.0088	0.0090	0.0087	0.0088	0.0082	0.0078	0.0090	0.0082	0.0083	0.0078
CTG VOC EMISSIONS (WITHOUT POST COMBUSTION EMISSIONS CONTROL)												
VOC Massflow Added to Match CTG Manufacturer's VOC Emissions Estimate, lb/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC percentage of UHC	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
VOC, ppmvd (dry, 15% O2)	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.4	1.3	1.3	1.3
VOC, ppmvd (dry)	1.5	1.6	1.6	1.5	1.6	1.6	1.6	1.7	1.5	1.6	1.7	1.7
VOC, ppmvw (wet)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
VOC, lb/h as CH4	2.1	1.8	1.8	2.1	1.8	1.8	2.0	1.9	2.1	2.0	1.9	1.9
VOC, lb/MBtu as CH4 (LHV)	0.0020	0.0019	0.0020	0.0020	0.0019	0.0020	0.0018	0.0017	0.0020	0.0018	0.0018	0.0017
VOC, lb/MBtu as CH4 (HHV)	0.0018	0.0017	0.0018	0.0018	0.0017	0.0018	0.0016	0.0016	0.0018	0.0016	0.0017	0.0016

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
CTG CO2 EMISSIONS												
CO2, lb/h	134,100	122,011	116,541	134,100	122,011	116,541	137,519	140,281	134,100	137,519	132,432	140,281
CO2, lb/MBtu (LHV)	128	128	128	128	128	128	128	128	128	128	128	128
CO2, lb/MBtu (HHV)	116	116	116	116	116	116	116	116	116	116	116	116
CTG PM10 EMISSIONS (WITHOUT THE EFFECTS OF SO2 OXIDATION)												
PM10 EMISSIONS - FRONT HALF CATCH ONLY												
PM10, lb/h	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
PM10, lb/MBtu (LHV)	0.0026	0.0028	0.0030	0.0026	0.0028	0.0030	0.0025	0.0025	0.0026	0.0025	0.0026	0.0025
PM10, lb/MBtu (HHV)	0.0023	0.0026	0.0027	0.0023	0.0026	0.0027	0.0023	0.0022	0.0023	0.0023	0.0024	0.0022
PM10 EMISSIONS - FRONT AND BACK HALF CATCH												
PM10, lb/h	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
PM10, lb/MBtu (LHV)	0.0051	0.0056	0.0058	0.0051	0.0056	0.0058	0.0049	0.0048	0.0051	0.0049	0.0051	0.0048
PM10, lb/MBtu (HHV)	0.0046	0.0050	0.0053	0.0046	0.0050	0.0053	0.0045	0.0044	0.0046	0.0045	0.0046	0.0044
HRSG DUCT BURNERS												
DUCT BURNER FUEL												
Duct Burner Heat Input, MBtu/h (LHV)	0.0	0.0	0.0	276.7	232.4	235.4	0.0	0.0	276.7	232.4	235.4	196.8
Duct Burner Heat Input, MBtu/h (HHV)	0.0	0.0	0.0	307.2	258.0	261.4	0.0	0.0	307.2	258.0	261.4	218.6
Total Duct Burner Fuel Flow, lb/h	0	0	0	12,978	10,900	11,042	0	0	12,978	10,900	11,042	9,233
Duct Burner Fuel LHV, Btu/lb	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318	21,318
Duct Burner Fuel HHV, Btu/lb	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671	23,671
Duct Burner Fuel Composition (Ultimate Analysis by Weight)												
Ar, % wt.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C, % wt.	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64
H2, % wt.	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76
N2, % wt.	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
O2, % wt.	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
S, % wt.	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020	0.00020
Total, % wt.	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Fuel Sulfur Content (grains/100 standard cubic feet)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
DUCT BURNER EMISSIONS												
Duct Burner NOx, lb/MBtu (HHV)	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800
Duct Burner CO, lb/MBtu (HHV)	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Duct Burner UHC (as CH4), lb/MBtu (HHV)	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300
Duct Burner VOC (as CH4), lb/MBtu (HHV)	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Duct Burner PM10, lb/MBtu (HHV) (front half catch only)	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Duct Burner PM10, lb/MBtu (HHV) (front and back half catch)	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Assumed SO2 oxidation rate in Duct Burner, vol%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0
Total SO2, lb/h from Duct Burner Fuel only (after SO2 oxidation)	0.0000	0.0000	0.0000	0.0506	0.0425	0.0430	0.0000	0.0000	0.0455	0.0382	0.0387	0.0324
Total SO3, lb/h from Duct Burner Fuel only (after SO2 oxidation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0063	0.0053	0.0054	0.0045
Duct Burner NOx, lb/h	0.00	0.00	0.00	24.58	20.64	20.91	0.00	0.00	24.58	20.64	20.91	17.48
Duct Burner CO, lb/h	0.00	0.00	0.00	15.36	12.90	13.07	0.00	0.00	15.36	12.90	13.07	10.93
Duct Burner UHC (as CH4), lb/h	0.00	0.00	0.00	9.22	7.74	7.84	0.00	0.00	9.22	7.74	7.84	6.56
Duct Burner VOC (as CH4), lb/h	0.00	0.00	0.00	3.07	2.58	2.61	0.00	0.00	3.07	2.58	2.61	2.19
Duct Burner PM10, lb/h (front half catch only)	0.0	0.0	0.0	1.5	1.3	1.3	0.0	0.0	1.5	1.3	1.3	1.1
Duct Burner PM10, lb/h (front and back half catch)	0.0	0.0	0.0	3.1	2.6	2.6	0.0	0.0	3.1	2.6	2.6	2.2

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
STACK EMISSIONS												
STACK EXHAUST ANALYSIS (VOLUME BASIS - WET)												
Ar, % vol.	0.93	0.91	0.90	0.92	0.91	0.89	0.87	0.86	0.92	0.86	0.85	0.85
CO2, % vol.	3.29	3.39	3.35	4.12	4.18	4.18	3.58	3.76	4.12	4.33	4.35	4.41
H2O, % vol.	8.85	10.19	11.82	10.48	11.73	13.42	14.63	16.34	10.48	16.05	17.26	17.56
N2, % vol.	73.66	72.69	71.39	73.03	72.10	70.78	69.37	68.19	73.03	68.85	67.92	67.73
O2, % vol.	13.27	12.82	12.54	11.45	11.08	10.73	11.54	10.86	11.45	9.92	9.61	9.45
SO2, (after SO2 oxidation), % vol.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SO3, (after SO2 oxidation), % vol.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total, % vol.	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Stack Exit Temperature, ° F	222.7	213.7	219.2	211.7	206.9	210.2	216.7	219.9	208.6	208.7	211.9	212.9
Stack Diameter, ft (estimated)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Stack Flow, lb/h	2,621,220	2,305,205	2,211,769	2,634,198	2,316,104	2,222,811	2,415,051	2,330,595	2,634,198	2,425,950	2,331,239	2,339,827
Stack Flow, scfm	585,843	517,518	499,860	590,938	521,895	504,208	551,437	535,648	590,938	555,947	536,574	538,940
Stack Flow, acfm	783,745	683,493	665,374	777,966	682,479	662,398	731,760	713,550	774,454	728,594	706,754	710,918
Stack Exit Velocity, ft/s	65	57	55	64	57	55	61	59	64	60	59	59
STACK NOX EMISSIONS WITHOUT THE EFFECTS OF SELECTIVE CATALYTIC REDUCTION (SCR) †												
NOx, ppmvd (dry, 15% O2)	42.0	42.0	42.0	37.9	38.1	37.9	42.0	42.0	37.9	38.5	38.3	39.0
NOx, ppmvd (dry)	45.1	47.1	47.4	51.9	53.7	54.5	52.4	56.2	51.9	59.0	60.0	62.0
NOx, ppmvw (wet)	41.1	42.3	41.8	46.4	47.4	47.2	44.7	47.0	46.4	49.5	49.6	51.1
NOx, lb/h as NO2	175.0	159.3	152.1	199.9	180.2	173.3	179.8	183.4	199.9	200.5	194.1	200.9
NOx, lb/MBtu (LHV) as NO2	0.1675	0.1675	0.1675	0.1513	0.1523	0.1515	0.1677	0.1678	0.1513	0.1537	0.1531	0.1557
NOx, lb/MBtu (HHV) as NO2	0.1508	0.1508	0.1508	0.1362	0.1371	0.1365	0.1511	0.1511	0.1362	0.1384	0.1379	0.1402
† Note: includes NOx massflow added to match CTG manufacturer estimate and duct burner NOx.												
STACK NOX EMISSIONS WITH THE EFFECTS OF SELECTIVE CATALYTIC REDUCTION (SCR) †												
NOx, ppmvd (dry, 15% O2)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
NOx, ppmvd (dry)	3.2	3.4	3.4	4.1	4.2	4.3	3.7	4.0	4.1	4.6	4.7	4.8
NOx, ppmvw (wet)	2.9	3.0	3.0	3.7	3.7	3.7	3.2	3.4	3.7	3.9	3.9	3.9
NOx, lb/h as NO2	12.5	11.4	10.9	15.8	14.2	13.7	12.8	13.1	15.8	15.6	15.2	15.5
NOx, lb/MBtu (LHV) as NO2	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120
NOx, lb/MBtu (HHV) as NO2	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108	0.0108
SCR NH3 slip, ppmvd (dry, 15% O2)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
SCR NH3 slip, lb/h	15.43	14.04	13.41	19.51	17.47	16.88	15.82	16.14	19.51	19.25	18.71	19.04
† Note: includes NOx massflow added to match CTG manufacturer estimate and duct burner NOx.												
STACK CO EMISSIONS WITHOUT THE EFFECTS OF CATALYTIC REDUCTION (CO CATALYST) †												
CO, ppmvd (dry, 15% O2)	9.3	8.9	8.9	12.2	11.7	11.7	8.0	7.5	12.2	10.7	10.7	9.8
CO, ppmvd (dry)	10.0	10.0	10.0	16.7	16.4	16.9	10.0	10.0	16.7	16.3	16.7	15.6
CO, ppmvw (wet)	9.1	9.0	8.8	14.9	14.5	14.6	8.5	8.4	14.9	13.7	13.9	12.9
CO, lb/h	23.7	20.6	19.5	39.0	33.5	32.6	20.9	19.8	39.0	33.8	32.9	30.8
CO, lb/MBtu (LHV)	0.0226	0.0217	0.0215	0.0295	0.0283	0.0285	0.0195	0.0182	0.0295	0.0259	0.0260	0.0239
CO, lb/MBtu (HHV)	0.0204	0.0195	0.0194	0.0266	0.0255	0.0257	0.0175	0.0163	0.0266	0.0233	0.0234	0.0215
† Note: includes CO massflow added to match CTG manufacturer estimate and duct burner CO.												

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
STACK CO EMISSIONS WITH THE EFFECTS OF CATALYTIC REDUCTION (CO CATALYST) †												
CO, ppmvd (dry, 15% O2)	6.1	5.8	5.8	7.9	7.6	7.6	5.2	4.9	7.9	6.9	6.9	6.4
CO, ppmvd (dry)	6.5	6.5	6.5	10.8	10.7	10.9	6.5	6.5	10.8	10.6	10.9	10.1
CO, ppmvw (wet)	5.9	5.8	5.7	9.7	9.4	9.5	5.5	5.4	9.7	8.9	9.0	8.4
CO, lb/h	15.4	13.4	12.7	25.3	21.7	21.2	13.5	12.9	25.3	21.9	21.4	20.0
CO, lb/MBtu (LHV)	0.0147	0.0141	0.0140	0.0192	0.0184	0.0185	0.0126	0.0118	0.0192	0.0168	0.0169	0.0155
CO, lb/MBtu (HHV)	0.0132	0.0127	0.0126	0.0173	0.0166	0.0167	0.0114	0.0106	0.0173	0.0151	0.0152	0.0139
† Note: includes CO massflow added to match CTG manufacturer estimate and duct burner CO.												
STACK SO2 EMISSIONS WITHOUT THE EFFECTS OF SO2 OXIDATION †												
SO2, ppmvd (dry, 15% O2)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
SO2, ppmvd (dry)	0.04	0.04	0.04	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05
SO2, ppmvw (wet)	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
SO2, lb/h	0.19	0.17	0.17	0.24	0.22	0.21	0.20	0.20	0.24	0.24	0.23	0.24
SO2, lb/MBtu (LHV)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
SO2, lb/MBtu (HHV)	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
† Note: SO2 from CTG and and duct burner SO2.												
STACK SO2 EMISSIONS WITH THE EFFECTS OF SO2 OXIDATION †												
Assumed SO2 oxidation rate in CO Catalyst, vol%	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Assumed SO2 oxidation rate in SCR, vol%	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
SO2, ppmvd (dry, 15% O2)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
SO2, ppmvd (dry)	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
SO2, ppmvw (wet)	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03
SO2, lb/h	0.13	0.11	0.11	0.17	0.15	0.14	0.13	0.13	0.15	0.15	0.14	0.14
SO2, lb/MBtu (LHV) (incl. duct burner fuel)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
SO2, lb/MBtu (HHV) (incl. duct burner fuel)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
† Note: Also includes assumed SO2 oxidation rate in CTG.												
STACK UHC EMISSIONS †												
UHC, ppmvd (dry, 15% O2)	7.2	7.0	7.0	10.7	10.3	10.5	6.6	6.3	10.7	9.7	9.8	9.0
UHC, ppmvd (dry)	7.7	7.8	7.9	14.6	14.5	15.1	8.2	8.4	14.6	14.8	15.4	14.2
UHC, ppmvw (wet)	7.0	7.0	7.0	13.1	12.8	13.1	7.0	7.0	13.1	12.4	12.7	11.7
UHC, lb/h as CH4	10.4	9.2	8.9	19.6	17.0	16.7	9.8	9.5	19.6	17.6	17.3	16.1
UHC, lb/MBtu (LHV) as CH4	0.0100	0.0097	0.0098	0.0149	0.0143	0.0146	0.0092	0.0087	0.0149	0.0135	0.0137	0.0125
UHC, lb/MBtu (HHV) as CH4	0.0090	0.0087	0.0088	0.0134	0.0129	0.0132	0.0082	0.0078	0.0134	0.0121	0.0123	0.0112
† Note: includes UHC massflow added to match CTG manufacturer estimate and duct burner UHC.												
STACK VOC EMISSIONS WITHOUT THE EFFECT OF OXIDATION IN CO CATALYST †												
VOC, ppmvd (dry, 15% O2)	1.4	1.4	1.4	2.8	2.7	2.8	1.3	1.3	2.8	2.5	2.6	2.3
VOC, ppmvd (dry)	1.5	1.6	1.6	3.8	3.8	4.0	1.6	1.7	3.8	3.8	4.0	3.6
VOC, ppmvw (wet)	1.4	1.4	1.4	3.4	3.3	3.4	1.4	1.4	3.4	3.2	3.3	3.0
VOC, lb/h as CH4	2.1	1.8	1.8	5.2	4.4	4.4	2.0	1.9	5.2	4.5	4.5	4.1
VOC, lb/MBtu (LHV) as CH4	0.0020	0.0019	0.0020	0.0039	0.0037	0.0038	0.0018	0.0017	0.0039	0.0035	0.0036	0.0032
VOC, lb/MBtu (HHV) as CH4	0.0018	0.0017	0.0018	0.0035	0.0034	0.0035	0.0016	0.0016	0.0035	0.0031	0.0032	0.0029
† Note: includes VOC massflow added to match CTG manufacturer estimate and duct burner VOC.												

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
STACK VOC EMISSIONS WITH THE EFFECTS OF CATALYTIC REDUCTION (CO CATALYST) †												
VOC, ppmvd (dry, 15% O2)	0.8	0.7	0.8	1.5	1.4	1.5	0.7	0.7	1.5	1.3	1.4	1.2
VOC, ppmvd (dry)	0.8	0.8	0.9	2.1	2.0	2.1	0.9	0.9	2.1	2.1	2.1	1.9
VOC, ppmvw (wet)	0.8	0.8	0.8	1.8	1.8	1.8	0.8	0.8	1.8	1.7	1.8	1.6
VOC, lb/h as CH4	1.1	1.0	1.0	2.8	2.4	2.4	1.1	1.0	2.8	2.4	2.4	2.2
VOC, lb/MBtu (LHV) as CH4	0.0011	0.0010	0.0010	0.0021	0.0020	0.0021	0.0010	0.0009	0.0021	0.0019	0.0019	0.0017
VOC, lb/MBtu (HHV) as CH4	0.0010	0.0009	0.0009	0.0019	0.0018	0.0019	0.0009	0.0008	0.0019	0.0017	0.0017	0.0015
† Note: includes VOC massflow added to match CTG manufacturer estimate and duct burner VOC.												
STACK CO2 EMISSIONS †												
CO2, lb/h	134,100	122,011	116,541	169,596	151,822	146,743	137,519	140,281	169,596	167,330	162,633	165,533
CO2, lb/MBtu (LHV)	128	128	128	128	128	128	128	128	128	128	128	128
CO2, lb/MBtu (HHV)	116	116	116	116	116	116	116	116	116	116	116	116
CO2, tons/h	67.1	61.0	58.3	84.8	75.9	73.4	68.8	70.1	84.8	83.7	81.3	82.8
CTG output, MW	102.5	90.5	85.3	102.5	90.5	85.3	104.5	107.0	102.5	104.5	99.3	107.0
CO2, tons/MWH per CTG Gross Ouput	0.654	0.674	0.683	0.827	0.839	0.860	0.658	0.656	0.827	0.801	0.819	0.774
Estimated STG output, MW	83.5	87.8	83.6	141.0	136.6	132.9	94.2	98.7	141.0	143.2	139.3	140.4
CO2, tons/MBtu (LHV) (emissions per CTG+DB Heat Input)	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064
CO2, tons/MBtu (HHV) (emissions per CTG+DB Heat Input)	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058
CO2, tons/MWH per Total Gross Power Block	0.4648	0.4541	0.4585	0.4902	0.4782	0.4836	0.4537	0.4486	0.4902	0.4753	0.4814	0.4671
				57.5	48.8	49.2						
† Note: includes CO2 emissions from CTG and duct burner.				0.477	0.467	0.472						
PM10 WITHOUT THE EFFECTS OF SO2 OXIDATION †												
PM10 EMISSIONS - FRONT HALF CATCH ONLY												
PM10, lb/h	2.7	2.7	2.7	4.2	4.0	4.0	2.7	2.7	4.2	4.0	4.0	3.8
PM10, lb/MBtu (LHV) (incl. duct burner fuel)	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035	0.0025	0.0025	0.0032	0.0031	0.0032	0.0029
PM10, lb/MBtu (HHV) (incl. duct burner fuel)	0.0023	0.0026	0.0027	0.0029	0.0030	0.0032	0.0023	0.0022	0.0029	0.0028	0.0028	0.0026
PM10 EMISSIONS - FRONT AND BACK HALF CATCH												
PM10, lb/h	5.3	5.3	5.3	8.4	7.9	7.9	5.3	5.3	8.4	7.9	7.9	7.5
PM10, lb/MBtu (LHV) (incl. duct burner fuel)	0.0051	0.0056	0.0058	0.0063	0.0067	0.0069	0.0049	0.0048	0.0063	0.0060	0.0062	0.0058
PM10, lb/MBtu (HHV) (incl. duct burner fuel)	0.0046	0.0050	0.0053	0.0057	0.0060	0.0062	0.0045	0.0044	0.0057	0.0054	0.0056	0.0052
† Note: PM10 based on CTG manufacturer estimate and includes duct burner PM10.												
PM10 WITH THE EFFECTS OF SO2 OXIDATION [INCLUDES MAX. (NH4)2-(SO4)] †												
PM10 EMISSIONS - FRONT HALF CATCH ONLY												
PM10, lb/h	2.8	2.8	2.8	4.4	4.1	4.1	2.8	2.8	4.4	4.2	4.2	4.0
PM10, lb/MBtu (LHV) (incl. duct burner fuel)	0.0027	0.0030	0.0031	0.0033	0.0035	0.0036	0.0026	0.0026	0.0033	0.0032	0.0033	0.0031
PM10, lb/MBtu (HHV) (incl. duct burner fuel)	0.0024	0.0027	0.0028	0.0030	0.0031	0.0033	0.0024	0.0023	0.0030	0.0029	0.0030	0.0028
PM10 EMISSIONS - FRONT AND BACK HALF CATCH												
PM10, lb/h	5.4	5.4	5.4	8.5	8.0	8.1	5.4	5.4	8.6	8.1	8.1	7.7
PM10, lb/MBtu (LHV) (incl. duct burner fuel)	0.0052	0.0057	0.0060	0.0065	0.0068	0.0070	0.0051	0.0050	0.0065	0.0062	0.0064	0.0059
PM10, lb/MBtu (HHV) (incl. duct burner fuel)	0.0047	0.0051	0.0054	0.0058	0.0061	0.0063	0.0046	0.0045	0.0058	0.0056	0.0058	0.0054
† Note: PM10 based on CTG manufacturer estimate and includes duct burner PM10, and (NH4)2(SO4) as front half catch (assuming 100% conversion from SO3 to (NH4)2(SO4)).												
PM2.5 WITHOUT THE EFFECTS OF SO2 OXIDATION †												
PM2.5 EMISSIONS - FRONT HALF CATCH ONLY												
PM2.5, lb/h	2.7	2.7	2.7	4.2	4.0	4.0	2.7	2.7	4.2	4.0	4.0	3.8
PM2.5, lb/MBtu (LHV) (incl. duct burner fuel)	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035	0.0025	0.0025	0.0032	0.0031	0.0032	0.0029
PM2.5, lb/MBtu (HHV) (incl. duct burner fuel)	0.0023	0.0026	0.0027	0.0029	0.0030	0.0032	0.0023	0.0022	0.0029	0.0028	0.0028	0.0026
PM2.5 EMISSIONS - FRONT AND BACK HALF CATCH												
PM2.5, lb/h	5.3	5.3	5.3	8.4	7.9	7.9	5.3	5.3	8.4	7.9	7.9	7.5
PM2.5, lb/MBtu (LHV) (incl. duct burner fuel)	0.0051	0.0056	0.0058	0.0063	0.0067	0.0069	0.0049	0.0048	0.0063	0.0060	0.0062	0.0058
PM2.5, lb/MBtu (HHV) (incl. duct burner fuel)	0.0046	0.0050	0.0053	0.0057	0.0060	0.0062	0.0045	0.0044	0.0057	0.0054	0.0056	0.0052

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
† Note: PM2.5 based on CTG manufacturer estimate and includes duct burner PM2.5.												

CASE NUMBER	1	2	3	31	32	33	13	16	17	18	19	21
TOTAL EFFECTS OF SO2 OXIDATION												
Total SO2 to SO3 conversion rate, %vol	34.0	34.0	34.0	31.6	31.8	31.6	34.0	34.0	38.4	38.8	38.7	39.0
Total Amount of SO2 converted to SO3, lb/h	0.07	0.06	0.06	0.08	0.07	0.07	0.07	0.07	0.09	0.09	0.09	0.09
Maximum Stack Ammonium Sulfate [(NH4)2-(SO4)] (assuming 100% conversion from SO3), lb/h	0.13	0.12	0.12	0.16	0.14	0.14	0.14	0.14	0.19	0.19	0.18	0.19
Maximum Stack Sulfur Mist [H2SO4] (assuming 100% conversion from SO3 to H2SO4), lb/h	0.10	0.09	0.09	0.12	0.11	0.10	0.10	0.10	0.14	0.14	0.14	0.14
POST COMBUSTION EMISSIONS CONTROL EQUIPMENT												
CATALYTIC CONVERSION IN CO CATALYST												
CO removed in CO Catalyst, %wt	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1
CO removed in CO Catalyst, lb/h	8.3	7.2	6.8	13.7	11.7	11.4	7.3	7.0	13.7	11.8	11.5	10.8
VOC removed in CO Catalyst, %wt	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
VOC removed in CO Catalyst, lb/h	1.0	0.9	0.8	2.4	2.1	2.0	0.9	0.9	2.4	2.1	2.1	1.9
SELECTIVE CATALYTIC REDUCTION (SCR)												
NOx Removed in SCR, %wt	92.9	92.9	92.9	92.1	92.1	92.1	92.9	92.9	92.1	92.2	92.2	92.3
NOx removed in SCR, lb/h	162.5	147.9	141.3	184.1	166.0	159.6	167.0	170.3	184.1	184.8	178.9	185.4
Ammonia Slip, lb/h	15.4	14.0	13.4	19.5	17.5	16.9	15.8	16.1	19.5	19.3	18.7	19.0
NH3 Reagent Type	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)	Aqueous (19%)
Assumed stoichiometric ratio for NH3 consumption	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total NH3 Reagent Consumption, lb/h	525	477	456	605	545	524	539	550	605	605	586	606
ESTIMATED SULFURIC ACID STACK DEW POINT TEMPERATURE												
MAXIMIM OF ALL METHODS BELOW												
Sulfuric Acid Dewpoint, ° F	190	194	197	195	198	201	202	205	197	207	208	209
OKKES METHOD †												
Sulfuric Acid Dewpoint, ° F	190	194	197	195	198	201	202	205	197	207	208	209
† Note: valid for dewpoint temperatures ≥ 220° F (105° C).												
Source: A.G. Okkes, "Get acid dew point of flue gas", Hydrocarbon Processing, July 1987, pp. 53-55.												
PIERCE METHOD †												
Sulfuric Acid Dewpoint, ° F	172	176	179	178	181	184	185	188	180	191	193	193
† Note: max. deviation 7° C. Equation does not reduce to the dew point of H2O when SO3 is zero. In the range of 121-100° C, the experimental dew points are 2.5-4.0° C (4.5-7.2° F) low. Caution for SO3 range below 10 ppmv.												
Source:Robert R. Pierce, "Estimating acid dewpoints in stack gases", Chemical Engineering, April 11, 1977, pp. 125-128.												
KIANG METHOD †												
Sulfuric Acid Dewpoint, ° F	171	175	178	177	180	183	184	187	180	190	192	193
† Note: Equation Nooter/Eriksen uses with 6% SO2-SO3 conversion rate (always at atmospheric pressure), given by Shaun Hennessey; Better predicts dew point temperatures at lower temperatures.												
Source:Yen-Hsiung Kiang, "Predicting dewpoints of acid gases", Chemical Engineering, February 9, 1981, p. 127.												
ZARENEZHAD METHOD												
Sulfuric Acid Dewpoint, ° F	151	155	158	158	161	164	164	168	161	172	174	174
Source: Correlation developed by Bahman Zarenezhad, "New correlation predicts dewpoints of acidic combustion gases", Oil & Gas Journal, Volume 107, 2011.												

GT3 and GT 4 Units CO2 Preliminary Comparison

			Current Operations Unit 3&4 (CTG Basis - GE/Caldwell)					Capacity Increase Estimates Modification(CTG Basis - GE/Caldwell)			
	Scenario	Duration -Year 2021	Representative Ambient Temperature, °F	Description	Average **CO2 T/MWH (on Power Block Basis)**	Average **CO2 T/MMBtu (Total Heat Input Basis)**		Representative Ambient Temperature, °F	Description	Average **CO2 T/MWH (on Power Block Basis)**	Average **CO2 T/MMBtu(Total Heat Input HHV Basis)**
1	**Scenario 1**	Jan, Feb, March	0	Unfired	**0.465**	**0.0594**		0	Unfired	**0.465**	**0.0578**
2	**Scenario 2**	April, May, October	59	Fired	**0.467**	**0.0594**		59	Fired	**0.457**	**0.0578**
3	**Scenario 3**	June, September	90	Fired	**0.472**	**0.0594**		90	Fired	**0.462**	**0.0578**
4	**Scenario 4**	July, August	90	Peak Load WC, Fired	**0.472**	**0.0594**		90	Peak Load WC, Fired	**0.455**	**0.0578**
5	**Scenario 5**	November, December	0	Unfired	**0.465**	**0.0594**		0	Unfired	**0.465**	**0.0578**
		Annual Average			**0.469**	**0.0594**				**0.459**	**0.0578**

Notes

1. Above estimates are preliminary.
2. The capacity increase CO2 emission estimates are based on OSP monthly average fuel gas analysis and based on GE/Caldwell gas turbine performance and emissisons data.
3. The CO2 T/MWH levels for capacity increase cases have been adjusted to approximately similar duct firing as PI data provided for 2021.
4. The heat input provided in Unit PI data is assumed to be on HHV basis.
5. The scenarios and corresponding ambient temperatures are based on OSP (Scott Weis) email on July 21st 2022 and duct firing levels correspond to 27 MW increase in ST output.
6. The Annual emissions represents weighted average of CO2 emissions across the year.

EXHIBIT 3

On the Horizon

2022 Regional Electricity Outlook

25 years
ISO new england

2 BALANCING RESOURCES

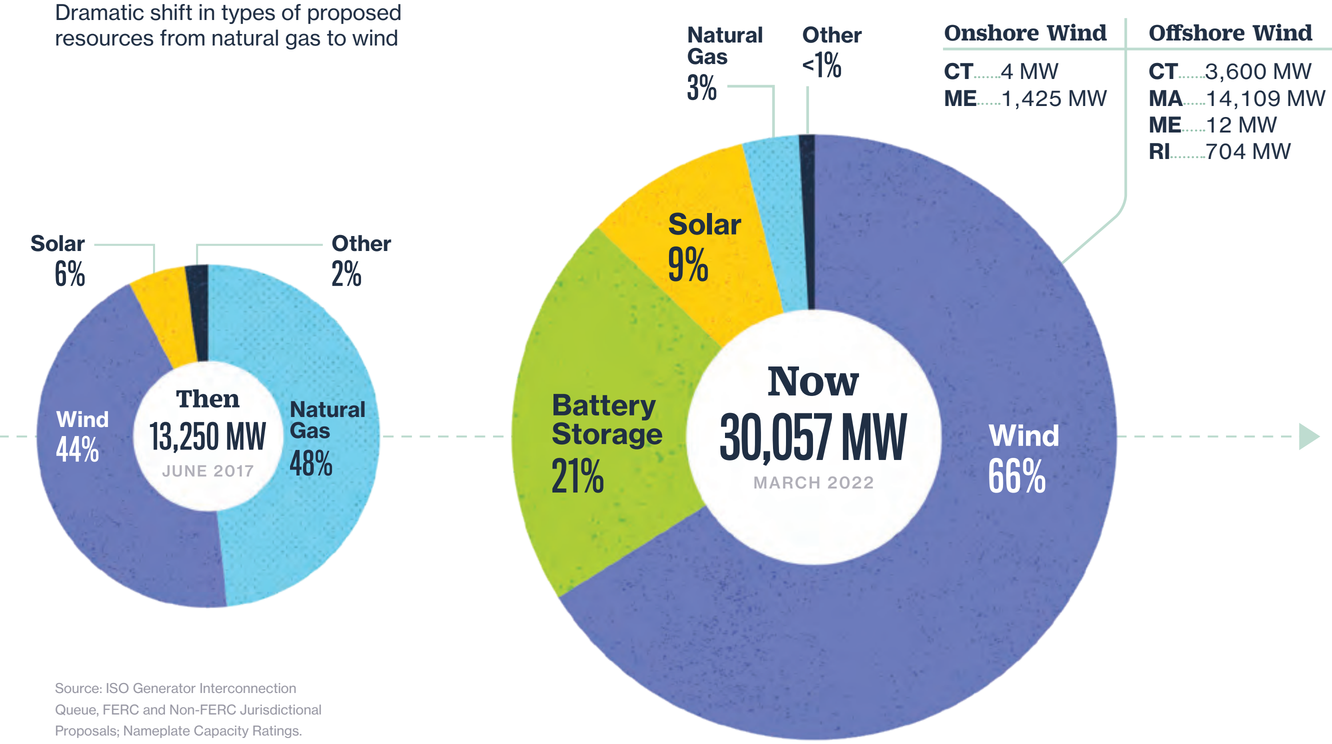
Keeping Electricity Flowing Across the Region

The ISO remains certain that some resources will be necessary to balance renewable energy on a routine basis. This fleet of balancing resources will keep energy flowing when intermittent resources aren't able to run, ensuring a greener future grid that New Englanders can rely on to power their lives.

Stakeholders are currently determining if a consensus can be reached on market approaches to spur the development of clean energy. It's also necessary for the region's energy stakeholders to consider how balancing resources will be compensated for their reliability value in a future system with significant amounts of renewable resources. This is particularly critical as older, fuel secure resources seek to retire.

The ISO Generator Interconnection Queue Provides Snapshots of the Future Resource Mix

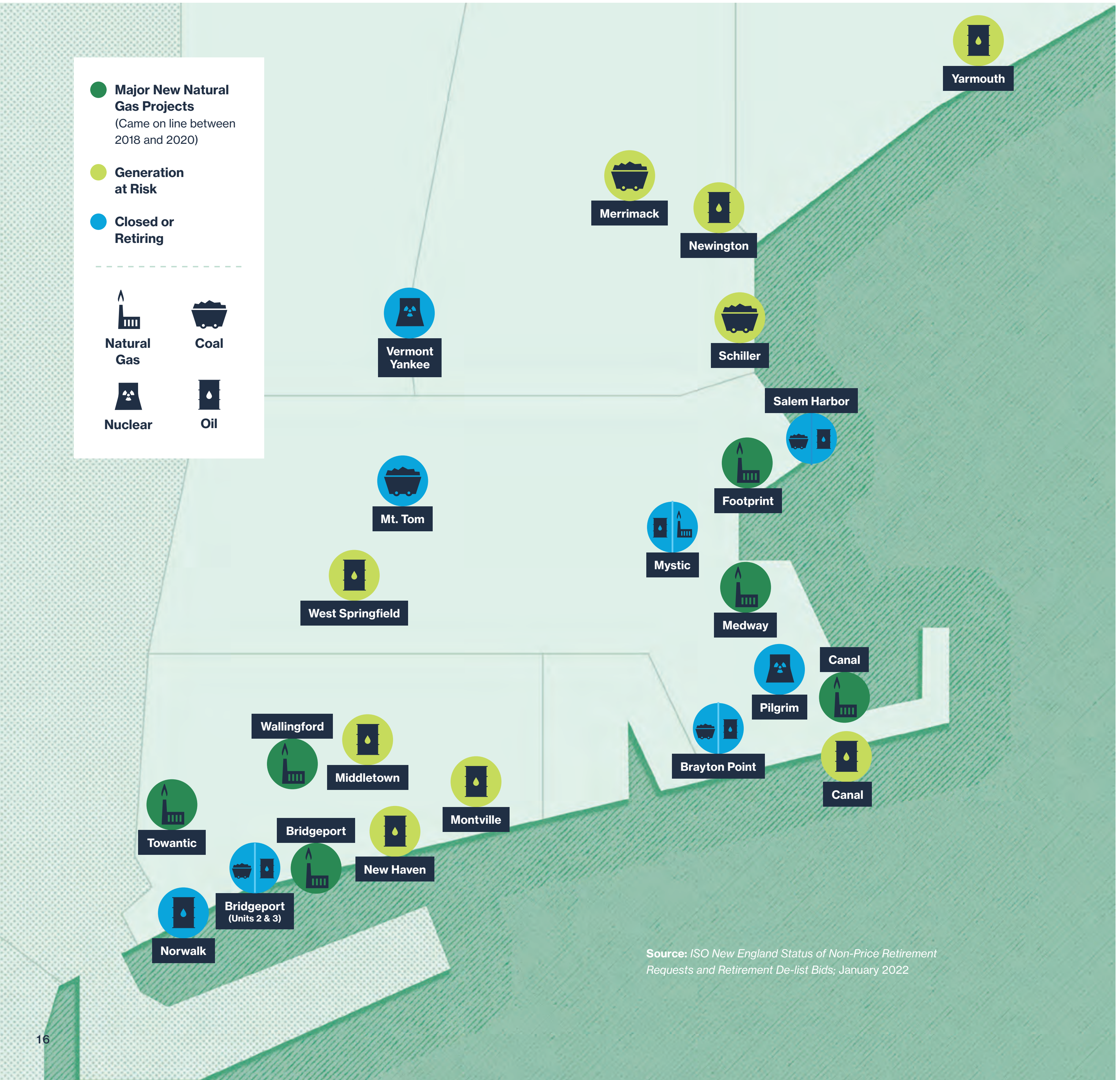
Dramatic shift in types of proposed resources from natural gas to wind



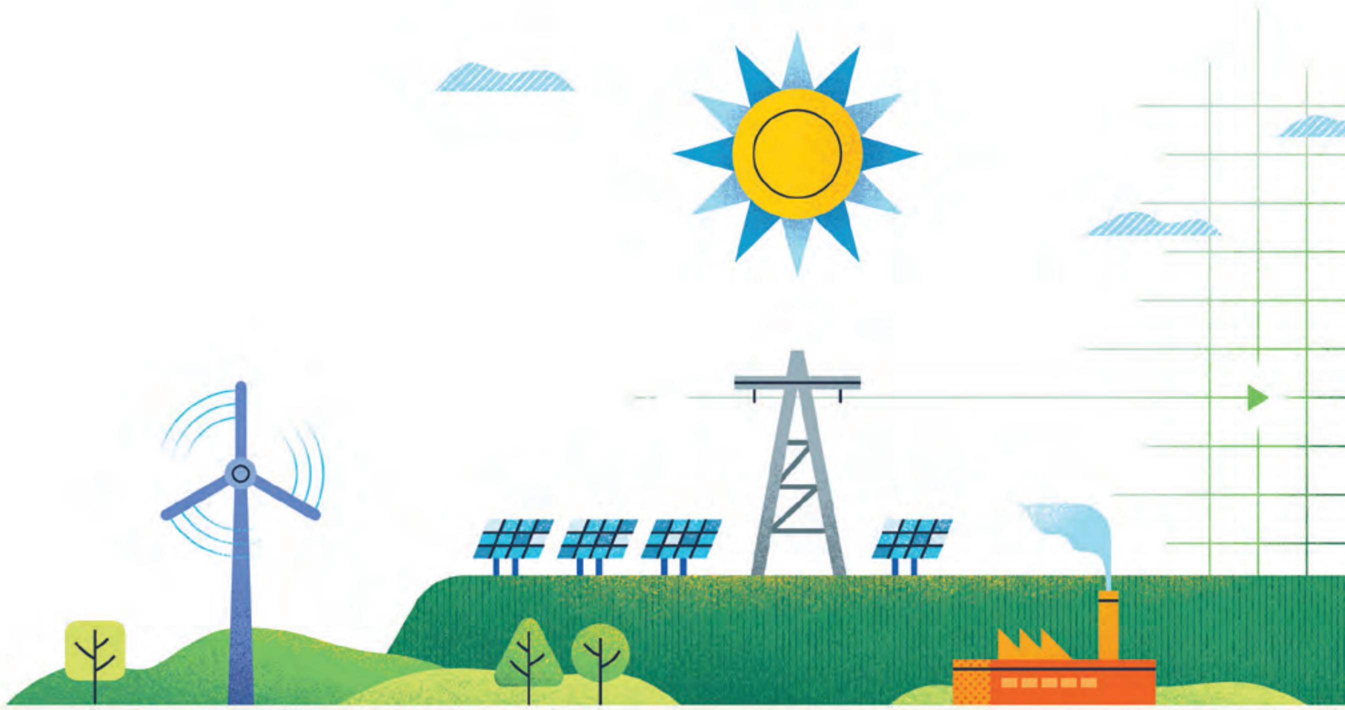
Source: ISO Generator Interconnection Queue, FERC and Non-FERC Jurisdictional Proposals; Nameplate Capacity Ratings.

Since 2013, Roughly 7,000 MW of Generation Have Retired or Announced Plans for Retirement in the Coming Years

- Predominantly coal, oil, and nuclear resources
- Another 5,000 MW of remaining coal and oil are at risk of retirement
- These resources have played an important role in recent winters when natural gas supplies are constrained in New England



Source: *ISO New England Status of Non-Price Retirement Requests and Retirement De-list Bids; January 2022*



Supporting a Reliable Transition to Clean Energy

Reliability is the focus of key initiatives the ISO is working on with stakeholders.

In ***The Future Grid Reliability Study*** (FGRS), ISO staff are studying how our regional grid will operate when it is powered primarily by renewable resources and serving significantly increased demand. The FGRS examines 24 different future grid scenarios, developed through stakeholder discussions, to better understand the implications for reliability when most of the electricity in the region comes from weather-dependent resources. Phase one of the study was launched in March 2021, with results expected in summer 2022.

Another project, known as **Resource Capacity Accreditation**, is focused on developing ways to more accurately reflect a generator's contributions to resource adequacy, which will be critical to a reliable and efficient clean energy transition.

A third project, **Day-Ahead Ancillary Services**, seeks to ensure the market is providing the services needed for a reliable, next-day power system operating plan with the region's evolving generation fleet.

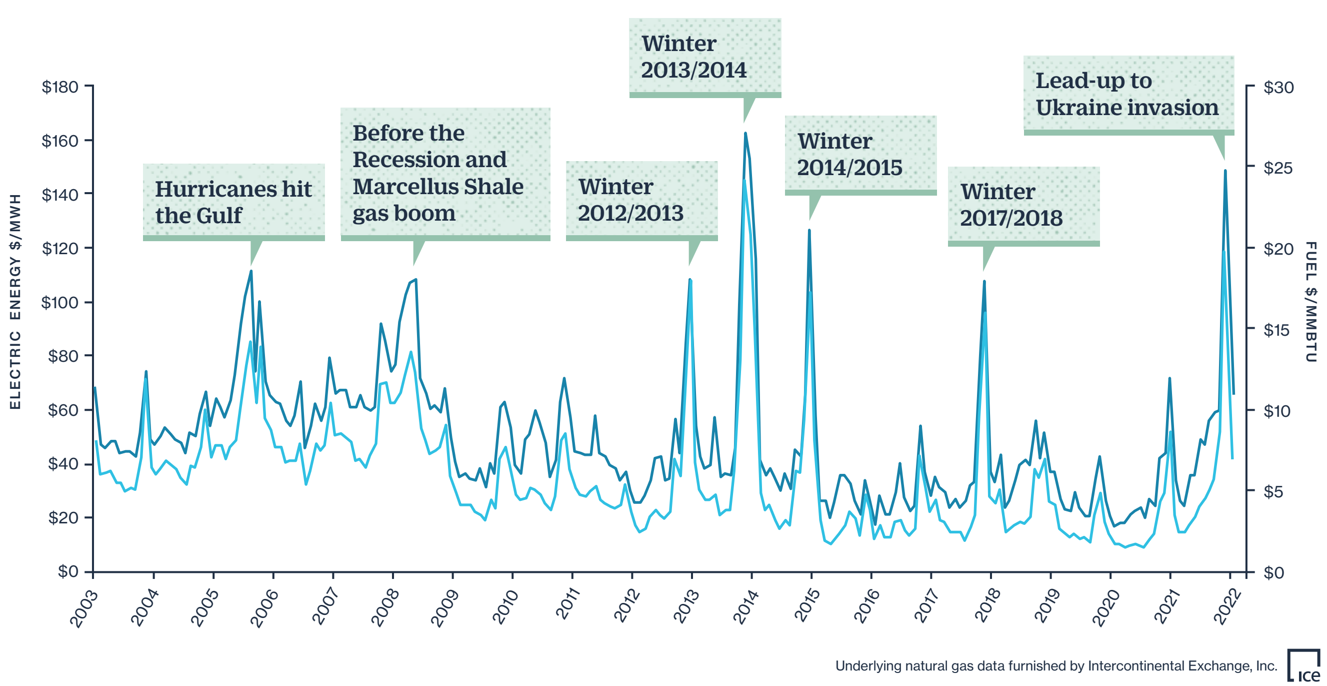
As the region’s power generation fleet transforms over the coming decades, the competitive wholesale markets will become even more critical to ensuring that balancing resources—in particular, generation that can produce electricity on demand, as well as different types of storage, which rely primarily on market revenues—remain viable to support the demands of the future grid.

New England has a successful track record of developing wholesale markets that deliver on regional policy objectives. In the late 1990s, that objective was lower cost – and over the past 25 years, the wholesale markets we designed have largely achieved it. We believe a robust marketplace, one that fosters wholesale competition and efficient economic outcomes among new and existing resources, can meet the region’s evolving objectives to decarbonize the electricity sector while maintaining system reliability.

Wholesale markets have spurred almost $12 billion in new resource investment since 1999.

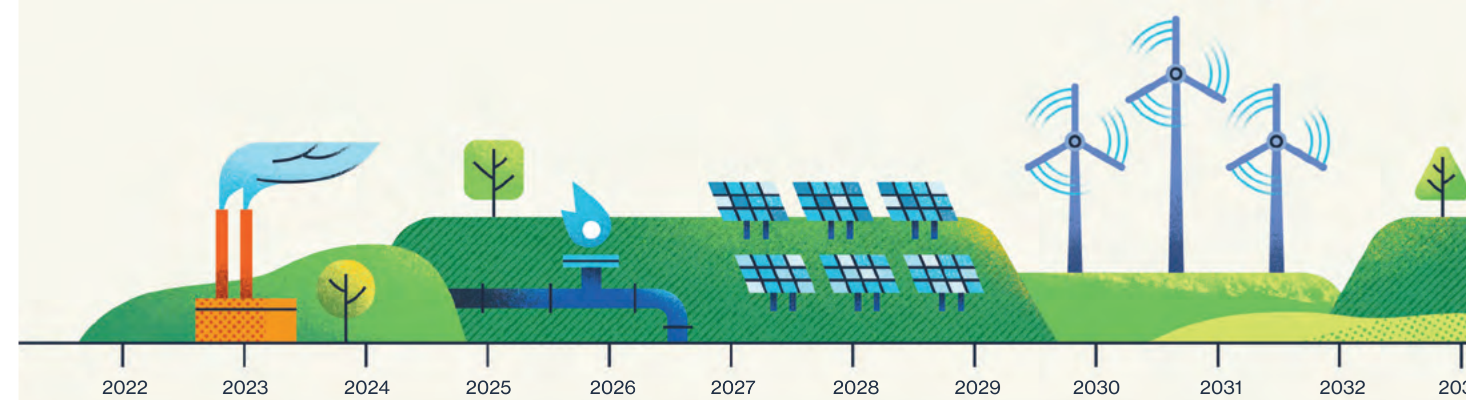
Prices Reflect the Cost of Inputs

Wholesale prices since 2003 – showing the increase of fuel costs in the few years of higher prices.



Underlying natural gas data furnished by Intercontinental Exchange, Inc. ICE

Wholesale Markets and the Future Grid



New England’s energy future relies on a foundation of stakeholder input and consensus. Our energy stakeholders will determine how wholesale markets will be used to reliably achieve our clean energy goals.

How will we pay for clean energy—by rewarding clean energy attributes, pricing carbon emissions, or a combination of both?

We will also need to gain consensus on the reliability benefits of balancing resources and determine how to maintain their financial certainty.

Long-term market mechanisms for decarbonizing the energy system are presented in the *Pathways to a Future Grid* report.

25 years

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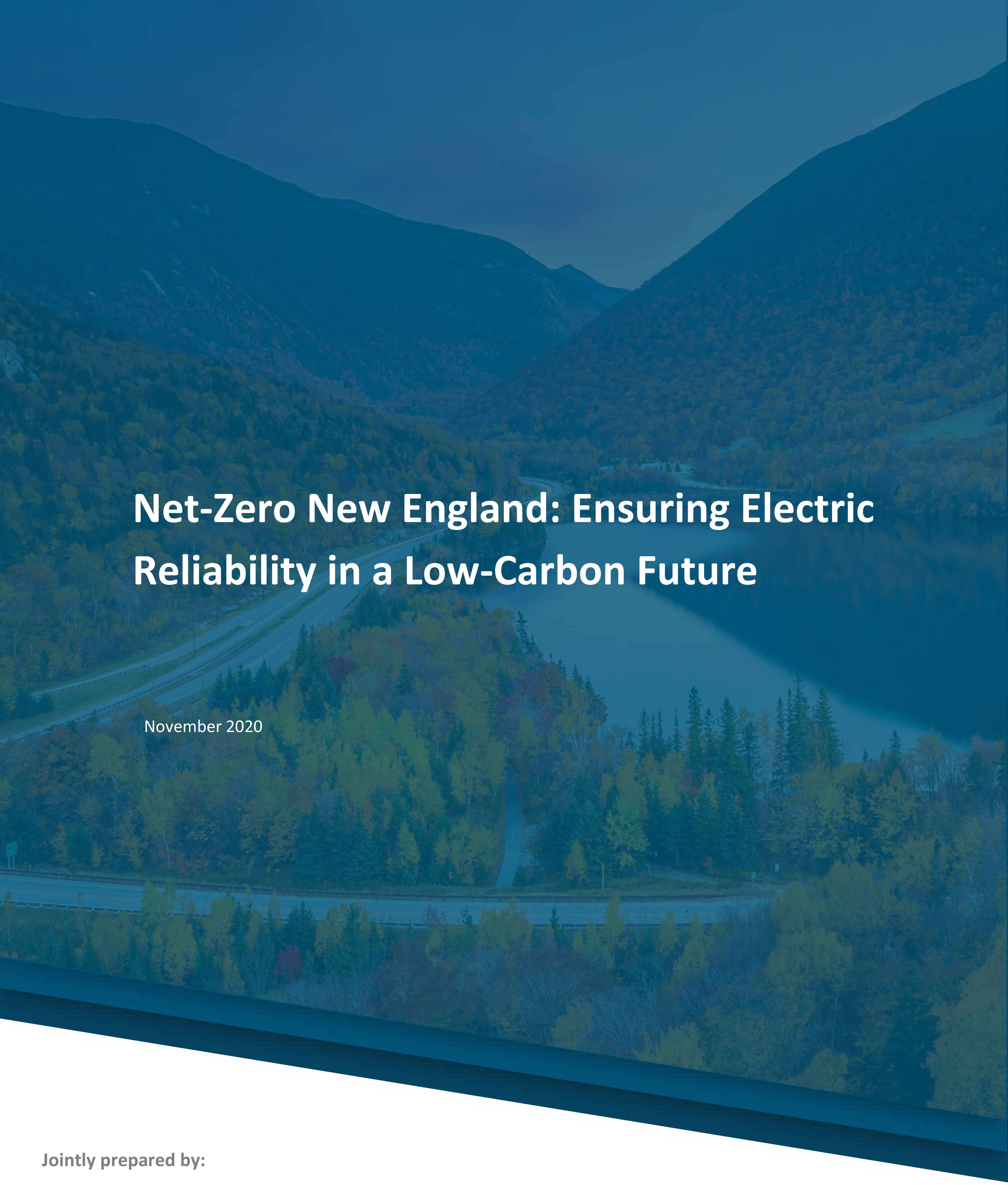
EXHIBIT 4



Net-Zero New England: Ensuring Electric Reliability in a Low-Carbon Future

November 2020

Jointly prepared by:

Energy+Environmental Economics

ENERGY FUTURES INITIATIVE

Project Team

This report was produced in collaboration between E3 and EFI and sponsored by Calpine Corporation. While Calpine provided input and perspectives regarding the study scope and analysis, all decisions regarding the analysis were made by E3 and EFI. Thus, this report solely reflects the research, analysis, and conclusions of the E3 and EFI study authors.

Energy and Environmental Economics, Inc. (E3) is a leading economic consultancy focused on the clean energy transition. E3's analysis is utilized by the utilities, regulators, developers, and advocates that are writing the script for the emerging clean energy transition in leading-edge jurisdictions such as California, New York, Hawaii and elsewhere. E3 has offices in San Francisco, Boston, New York, Calgary, and Raleigh.

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The Energy Futures Initiative, Inc. (EFI) is a nonprofit clean energy think tank dedicated to harnessing the power of innovation–both in technology and policy–to create clean energy jobs, grow economies, enhance national and global energy security, and address the imperatives of climate change. EFI was founded in Washington, DC by former Energy Secretary Ernest Moniz. The EFI team and its global network of experts provides policymakers, industry leaders, NGOs and other leaders with analytically based, unbiased policy options to advance a cleaner, safer, more affordable and more secure energy future. The majority of project funding is derived from charitable and educational nonprofit institutions. EFI maintains editorial independence from its public and private sponsors.

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Advisory Group

The report authors greatly benefited from the advice and feedback of an Advisory Group comprising a diverse group of stakeholders with relevant expertise for this project and chaired by former energy secretary Ernest Moniz. Participation on the Advisory Group does not imply endorsement of any of the report's conclusions.

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Daniel Sosland, Acadia Center

Arnie Quinn, Vistra Energy

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Patricia DiOrio, National Grid

Armond Cohen, Clean Air Task Force

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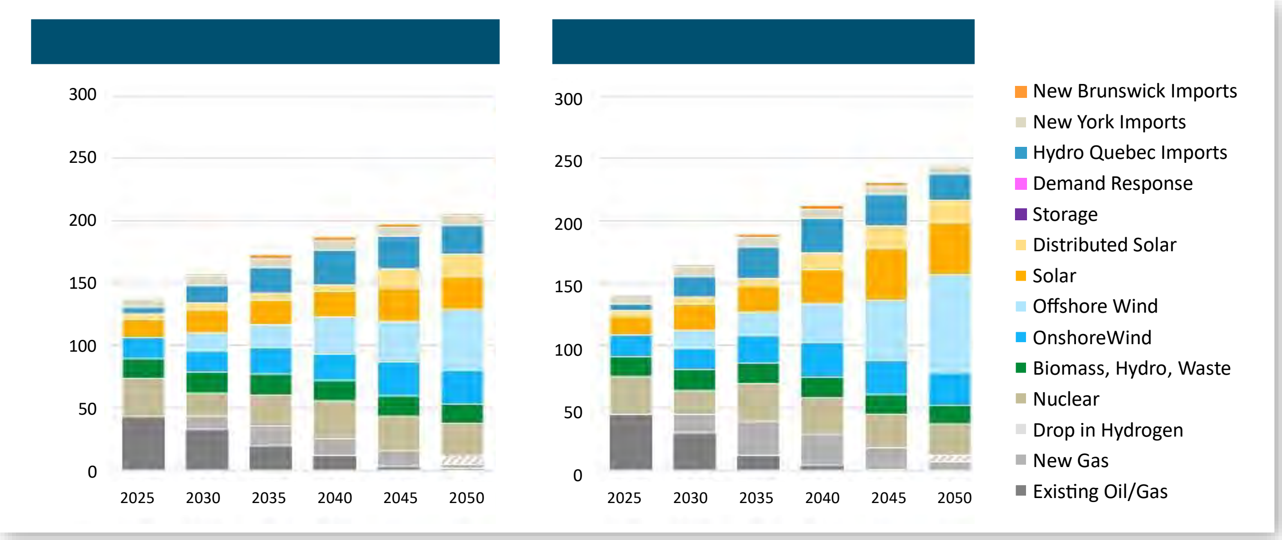
Abbreviations

RPS	Renewable Portfolio Standard
TCI	Transportation Climate Initiative
EEPS	Energy Efficiency Portfolio Standard
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
SIT	EPA's State Inventory Tool
SEDS	EIA's State Energy Data System
IPCC	Intergovernmental Panel on Cimate Change
ISO-NE	Independent System Operator-New England
CELT	ISO-NE's annual Capacity, Energy, Loads and Transmission Report
NEG-ECP	New England Governors and Eastern Canadian Premiers
NEPOOL	New England Power Pool
NYSERDA	New York State Energy Research and Development Authority
FAA	Federal Aviation Administration
CLEEN	FAA's Continuous Lower Energy, Emissions and Noise Program
NREL	National Renewable Energy Laboratory
ReEDS	Regional Energy Deployment System, NREL-developed capacity planning model
SAM	NREL's System Advisor Model
NASEM	National Academies of Science, Engineering and Medicine
DOT	Department of Transportation
NEMS	EIA's National Energy Modeling System
RECS	EIA's Residential Energy Consumption Survey
CBECS	EIA's Commercial Buildings Energy Consumption Survey
AEO	EIA's Annual Energy Outlook
NEEP	Northeast Energy Efficiency Partnership
NOAA	National Oceanic and Atmospheric Administration
ARPA-E	Advanced Research Projects Agency - Energy
GHG	Greenhouse Gas
MMT CO_2e	Million Metric Tons of CO_2 equivalent
VMT	Vehicle Miles Travelled
ODS	Ozone Depleting Substance
GWP	Global Warming Potential
LOLP	Loss of Load Probability
LOLE	Loss of Load Expectation
PRM	Planning Reserve Margin
UCAP	Unforced Capacity
ELCC	Effective Load Carrying Capability
MTTR	Mean Time to Repair
FOF	Forced Outage Factor

IPPU	Industrial Processes and Product Use
CC/CCGT	Combined Cycle Gas Turbines
CT	Combustion Turbines
ST	Steam Turbines
ZEV	Zero Emission Vehicle
EV	Electric Vehicle
L/M/HDV	Light/Medium/Heavy Duty Vehicles
LED	Light Emitting Diode
CDR	Carbon Dioxide Removal
CCS	Carbon Capture and Storage
BECCS	Bio-Energy with Carbon Capture and Storage
DAC	Direact Air Capture
SMR	Steam Methane Reforming
NSMR	Nuclear Small Modular Reactors
AS/GSHP	Air-Source/Ground-Source Heat Pump
ccASHP	Cold Climate Air-Source Heat Pump
COP	Coefficient of Performance
BTM PV	Behind-the-Meter Solar Photovoltaic
NECEC	New England Clean Energy Connect
CAES	Compressed Air Energy Storage

Figure 4-7. Total Electricity Generation



4.3 Resource Adequacy Summary

4.3.1 Reliability in New England

The resource portfolios under both the High Electrification and High Fuels scenarios in 2050 are tested after the capacity expansion modeling to confirm they remain reliable. Using RECAP simulations, both portfolios were confirmed to be reliable, generating LOLE values less than 0.1 days/year.[t]

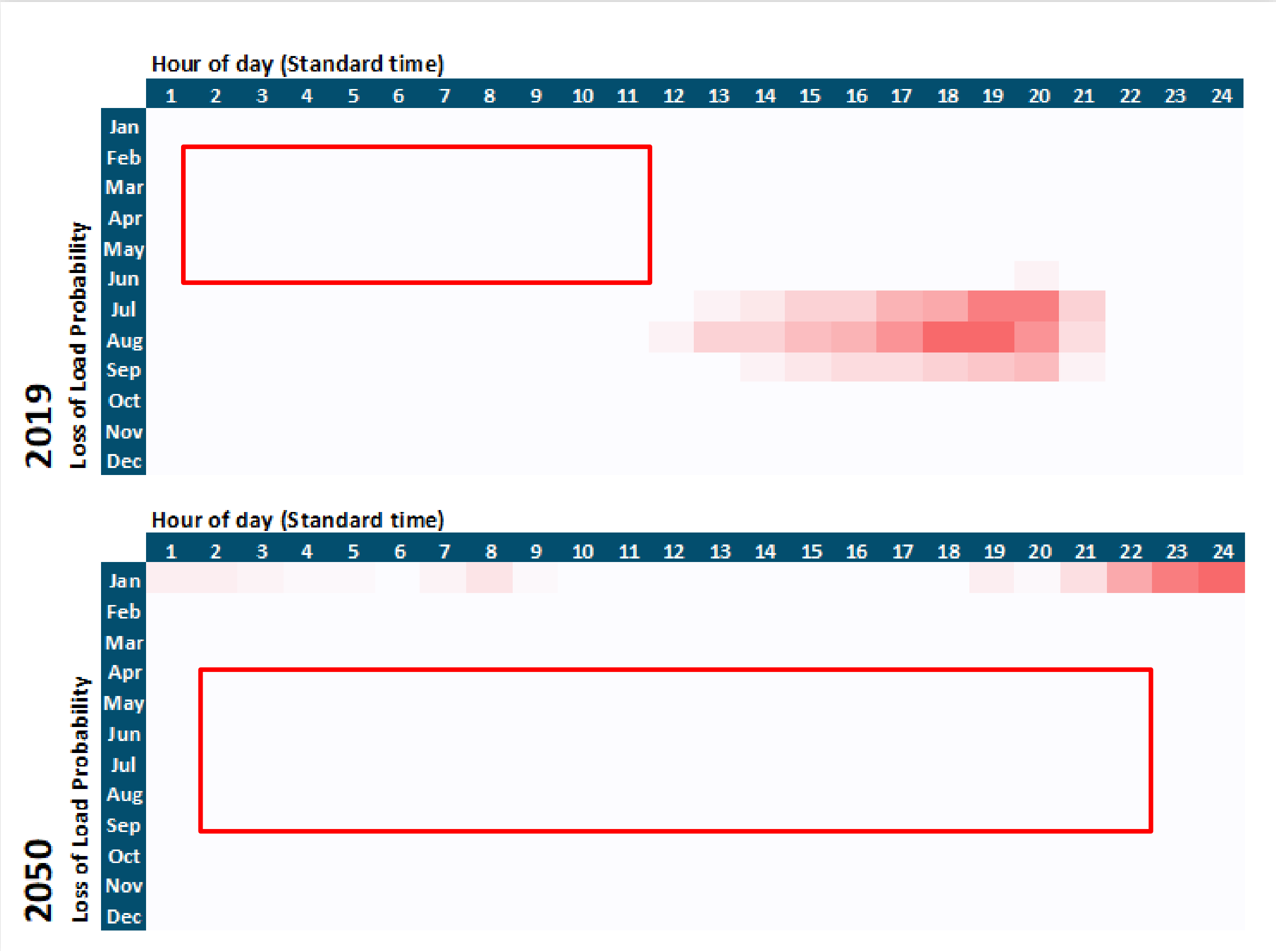
The nature of reliability challenges in 2050 is significantly different from current challenges. Because most existing generation capacity is dispatchable, the biggest reliability challenge is peak load events when there is the greatest probability that loads will exceed available generation. Presently, this typically occurs on hot summer afternoons (Figure 4-8). In the 2050 system where a significant amount of generation is variable or energy-limited, loss-of-load events do not necessarily occur in peak load hours but rather during extended periods where available generation is very low.

In the electricity system portfolios analyzed as part of this analysis, the biggest reliability challenge by 2050 is multi-day periods of low renewable energy production. When renewable energy production is low for only a short period of time (such as at summer nights when solar production is nil), existing energy storage technologies are capable of providing sufficient energy. However, when renewable production is low for a longer period of time (two or more days), limited-duration energy storage is insufficient to provide all required energy. Demand response resources can help mitigate the energy shortfall but

[t] The reliability target of 0.1 days/year for New England in 2050 translates to a target PRM of about 10.2% on an Unforced Capacity (UCAP) basis, which accounts for contributions from all resource types, including thermal, at their respective ELCCs. On an Installed Capacity (ICAP) basis, the target PRM is closer to 15%. The portfolios from both scenarios naturally satisfy the PRM requirement since the resulting LOLE is superior to the target.

practical limitations on magnitude and duration of response limit their contributions. For example, it would be unrealistic to expect a majority of buildings to reduce electricity use for heating during a prolonged cold snap. These prolonged periods of low renewable production are most likely to occur in winter when solar production is lowest, and at night when storage is most likely to become depleted (Figure 4-8).

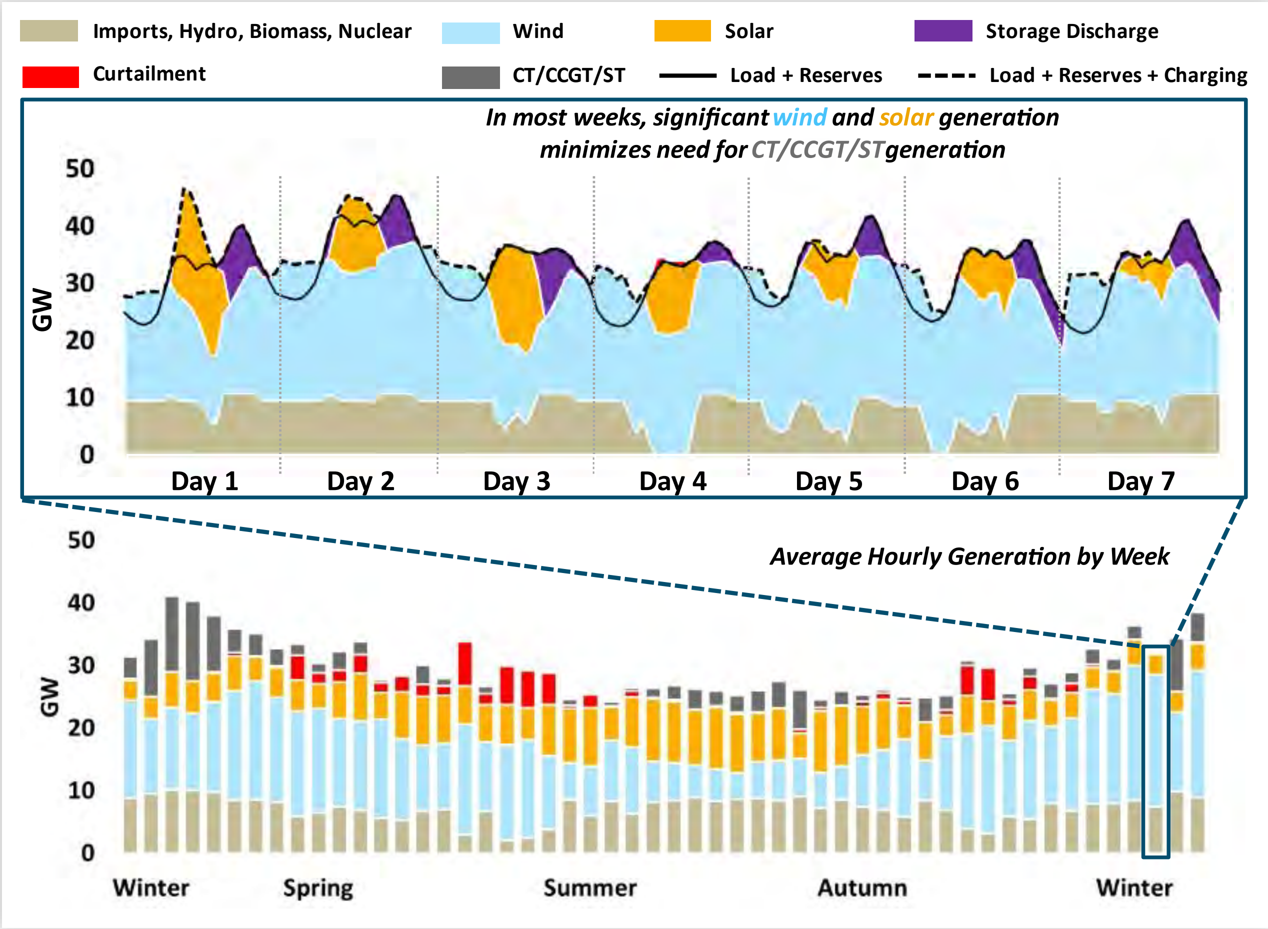
Figure 4-8. Loss-of-Load Probability Distribution by Month-Hour (High Electrification Scenario)



4.3.2 Role of Firm Generation

The portfolios developed in both the High Electrification and High Fuels scenarios contain a significant amount of new renewable capacity. In many weeks of the year when solar and wind are producing at average or above average output, the generation from these resources, in conjunction with the storage on the system, is sufficient to meet all energy needs as shown in Figure 4-9.

Figure 4-9. Illustrative Dispatch over a Typical Week in 2050[u] (High Electrification Scenario)



Note: CT/CCGT/ST could represent natural gas with or without CCS, hydrogen or other zero-carbon fuels burned in CT/CCGT, advanced nuclear or long duration storage.

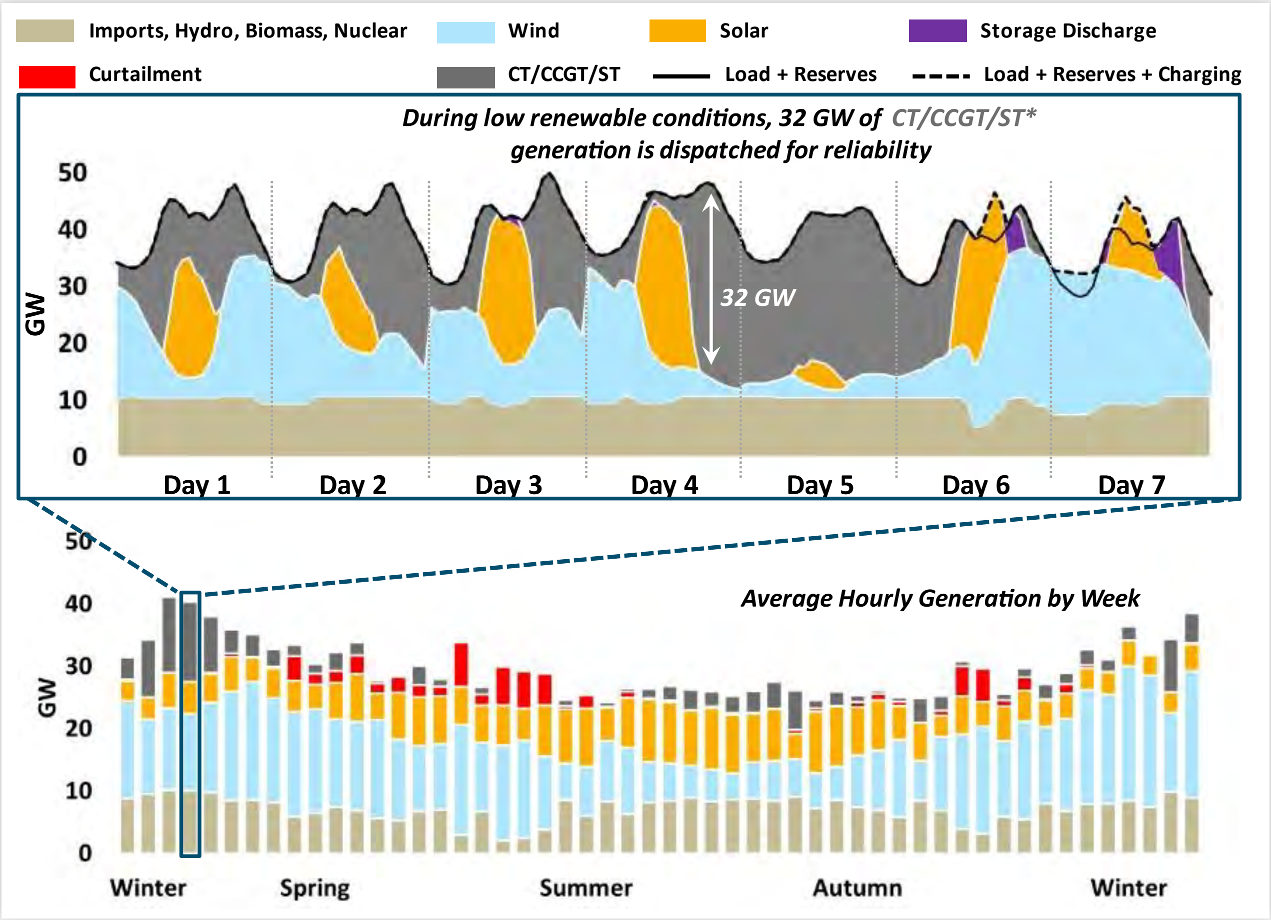
However, during weeks with prolonged low solar and wind generation, it becomes necessary to dispatch firm resources as shown in Figure 4-10. As an example, the combined capacity factor of solar and wind generation is 6% in Day 5 of the sample week, leading to insufficient generation to either serve load or charge energy storage. Approximately one such equivalent day every year was identified in the historical solar and wind availability data sourced from NREL.[v] The additional solar, wind and storage that would need to be built to serve load in such instances would be significant and would also lead to significant renewable oversupply during average generation weeks. This outcome is shown in Figure 4-11.

---

[u] The figure reflects one specific realization among several RECAP simulations of the year 2050 under different weather conditions, resource availability and outages.

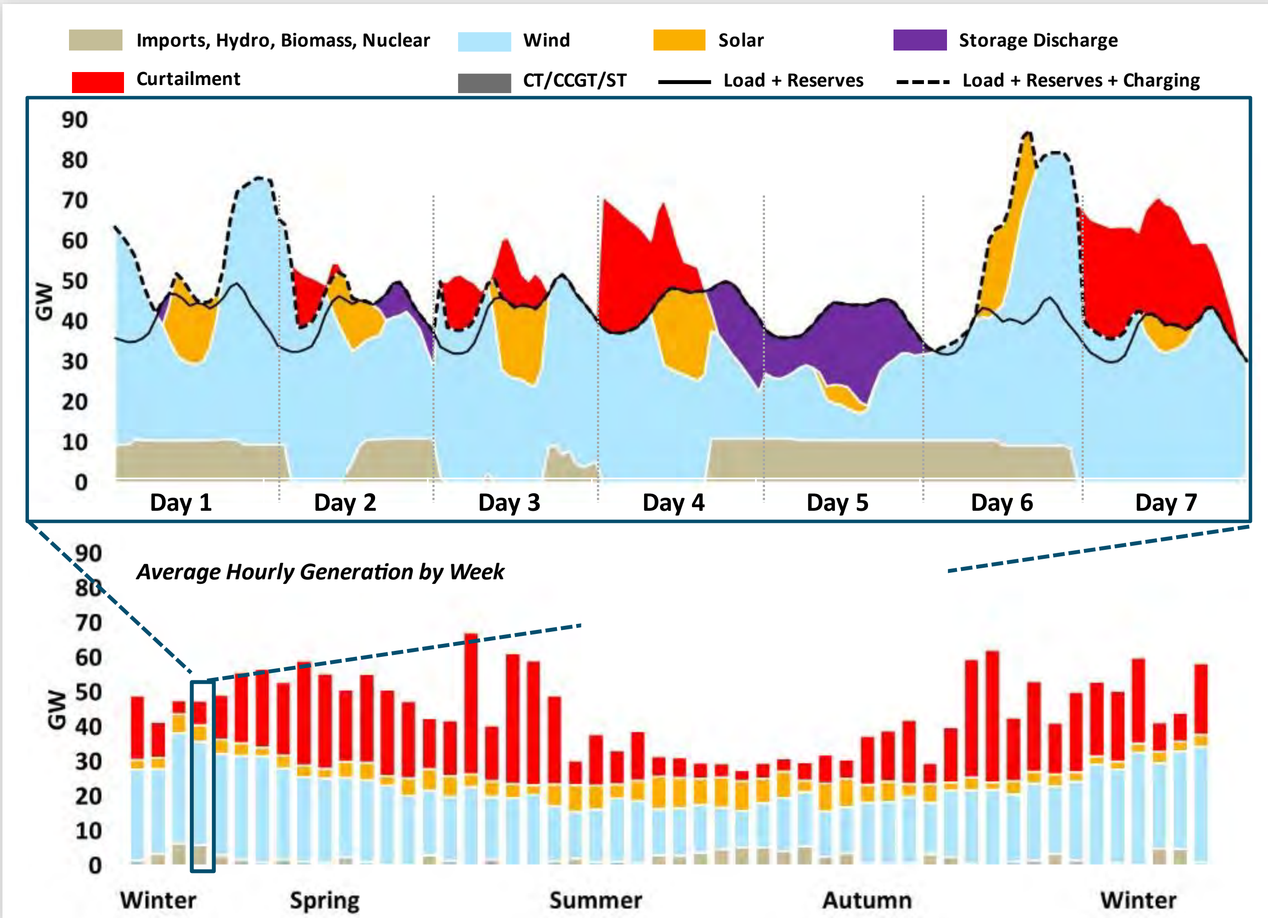
[v] Wind speed and solar insolation data were obtained from the NREL Wind Toolkit and the NREL Solar Prospector Database, respectively for 2007-2012. They were then transformed into hourly production profiles using the NREL System Advisor Model. Further details in Section 7.4.

Figure 4-10. Illustrative Dispatch over a Critical Week in 2050 (High Electrification Scenario)



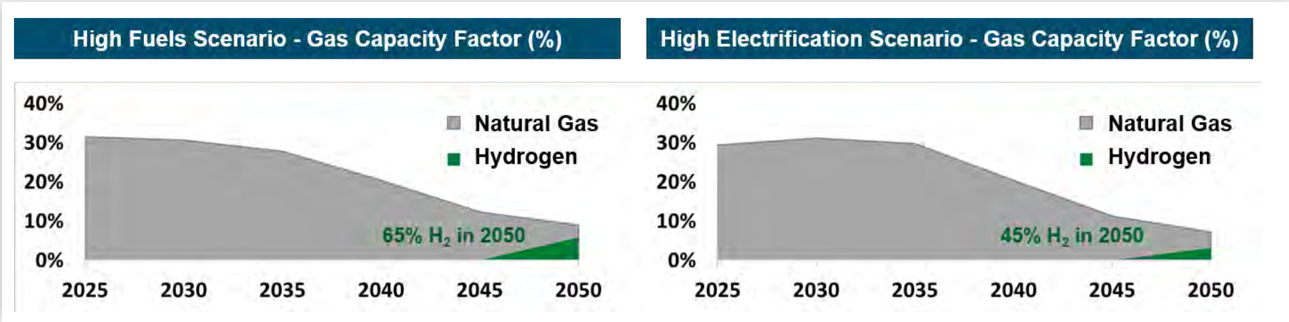
*Note: * CT/CCGT/ST could represent natural gas with or without CCS, hydrogen or other zero-carbon fuels burned in CT/CCGT, advanced nuclear or long duration storage.*

Figure 4-11. Illustrative Dispatch over a Critical Week in 2050 (No Combustion Resources with High Electrification Scenario)



Generation from natural gas combustion-based resources is relatively infrequent and, if based in part on carbon-free fuels, can still ensure compliance with stringent emission targets. As shown in Figure 4-12, the fleet-wide capacity factor of natural gas units reduces from about 30% in 2025 to 7-9% in 2050, with 45-65% of the fuel burned in 2050 being hydrogen, though this could be replaced with another zero-carbon drop-in fuel such as renewable natural gas. These combustion resources ensure that the system has sufficient firm capacity while meeting the electricity sector carbon target of 1.9-2.5 MMT/yr.

Figure 4-12. Gas Units (CC/CT) Capacity Factor Results



Taken together, a key finding of this study is that both retaining existing and building new natural gas capacity is consistent with deep decarbonization GHG targets as long as it is coupled with significant renewable resource additions, which provide the preponderance of energy generation.

4.3.3 ELCC Results

Effective load carrying capability (ELCC) is the quantity of "perfect capacity" that could be replaced or avoided with a resource while providing equivalent system reliability as described in Section 3.5.2. Figure 4-13 and Figure 4-14 show the ELCC provided by wind (offshore and onshore) and four-hour battery storage while also highlighting the significant diminishing marginal ELCC value at high penetrations of these resources. These diminishing returns for wind are due to saturation of production during high load hours and for battery storage are due to peak clipping that ultimately requires longer durations to continue to generate across all peak hours. These are well recognized phenomena within the industry.[w]

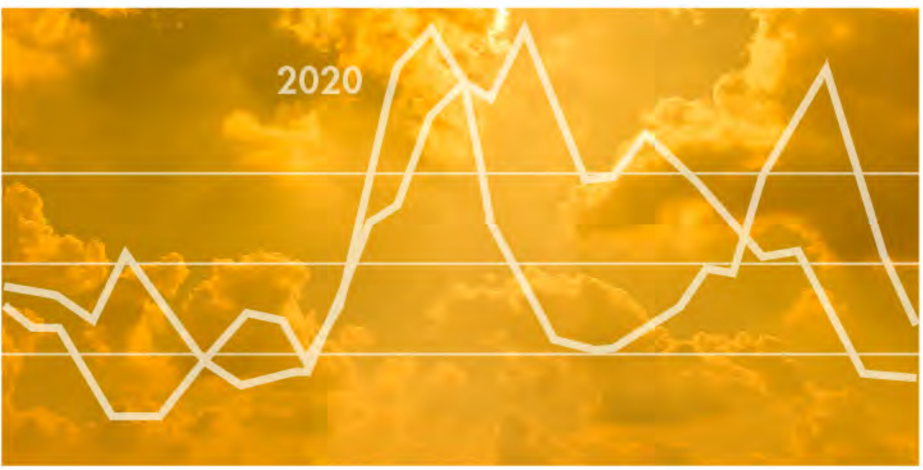
[w] See: https://www.ethree.com/wp-content/uploads/2020/08/E3-Practical-Application-of-ELCC.pdf

EXHIBIT 5

Preliminary Root Cause Analysis

Mid-August 2020 Heat Storm

October 6, 2020



California ISO

Prepared by:
California Independent System Operator
California Public Utilities Commission
California Energy Commission

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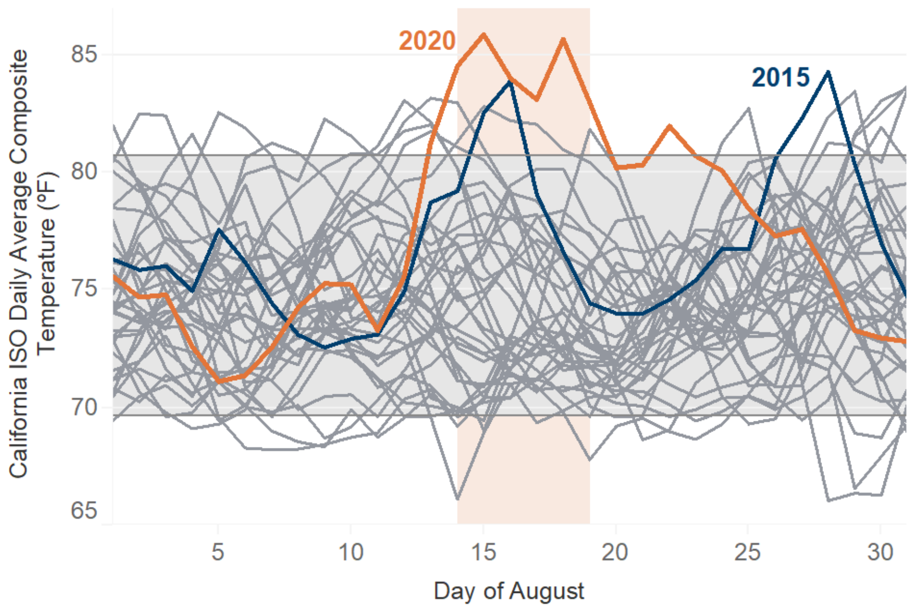
GLOSSARY OF ACRONYMS

ACRONYM	DEFINITION
AAEE	Additional Achievable Energy Efficiency
AB	Assembly Bill
A/S	Ancillary Services
AWE	Alerts, Warnings, and Emergencies
BA	Balancing Authority
BAA	Balancing Authority Area
BPM	Business Practice Manual
CAISO	California Independent System Operator Corporation
CARB	California Air Resources Board
CCA	Community Choice Aggregator
CDWR	California Department of Water and Power
CEC	California Energy Commission
CHP	Combined Heat and Power
COI	California Oregon Intertie
CPM	Capacity Procurement Mechanism
CPUC	California Public Utilities Commission
DMM	CAISO Department of Market Monitoring
EIM	Energy Imbalance Market
ELCC	Effective Load Carrying Capability
ESP	Electric Service Provider
FERC	Federal Energy Regulatory Commission
GHG	Greenhouse Gas
IERP	Integrated Energy Policy Report
IFM	Integrated Forward Market
IOU	Investor Owned Utility
IRP	Integrated Resource Planning
JASC	Joint Agency Steering Committee
LADWP	Los Angeles Department of Water and Power
LMS	Load Management Standards
LOLE	Loss of Load Expectation
LRA	Local Regulatory Authority
LSE	Load Serving Entity
MW	Megawatt
MWD	Metropolitan Water District
NCPA	Northern California Power Agency
NERC	North American Electric Reliability Corporation
NOB	Nevada Oregon Border

ACRONYM	DEFINITION
NQC	Net Qualifying Capacity
NWS	National Weather Service
PDCI	Pacific DC Intertie
PDR	Proxy Demand Resource
PGE	Portland General Electric
PG&E	Pacific Gas & Electric
PIME	Price Inconsistency Market Enhancements
POU	Publicly Owned Utility
PRM	Planning Reserve Margin
QC	Qualifying Capacity
RA	Resource Adequacy
RAAIM	Resource Adequacy Availability Incentive Mechanism
RDRR	Reliability Demand Response Resource
RMO	Restricted Maintenance Operations
RMR	Reliability Must Run
RUC	Residual Unit Commitment
SB	Senate Bill
SCE	Southern California Edison
SDGE	San Diego Gas & Electric
SMUD	Sacramento Municipal Utility District
TAC	Transmission Access Charge
TOU	Time of Use
WAPA	Western Area Power Administration
WECC	Western Electric Coordinating Council

Figure ES.1: August Temperatures 1985 - 2020



(Source: CEC Weather Data/CEC Analysis)

Based on CEC analysis, the heat storm experienced in August was a 1-in-35 year weather event.[1] Moreover, the rapidly evolving demand patterns induced by COVID-19 were not anticipated in the planning and resource procurement timeframe, which is necessarily an iterative, multi-year process. The energy markets can help fill the gap between planning and real-time conditions, but the West-wide nature of this heat storm limited the energy markets' ability to do so.

In Transitioning to a Reliable, Clean, and Affordable Resource Mix, Resource Planning Targets Have Not Kept Pace to Lead to Sufficient Resources That Can Be Relied Upon to Meet Demand in the Early Evening Hours, Which Were Amplified by the Extreme Heat

For August 2020, all LSEs met their resource adequacy (RA) obligations either with physical resources or demand response shown to the CAISO, allocations from resources backstopped under a Reliability Must Run (RMR) agreement, or through credits that are applied by the local regulatory authority (LRA) on behalf of a LSE. Collectively, the obligations include a 15% PRM added to the peak of the August forecasted 1-in-2 demand. However, on August 14, the operational need was 1.3 to 2.5% higher than the PRM driven by higher load and therefore higher contingency reserve requirements and reduced resource and transmission availability. On August 15 the operational need

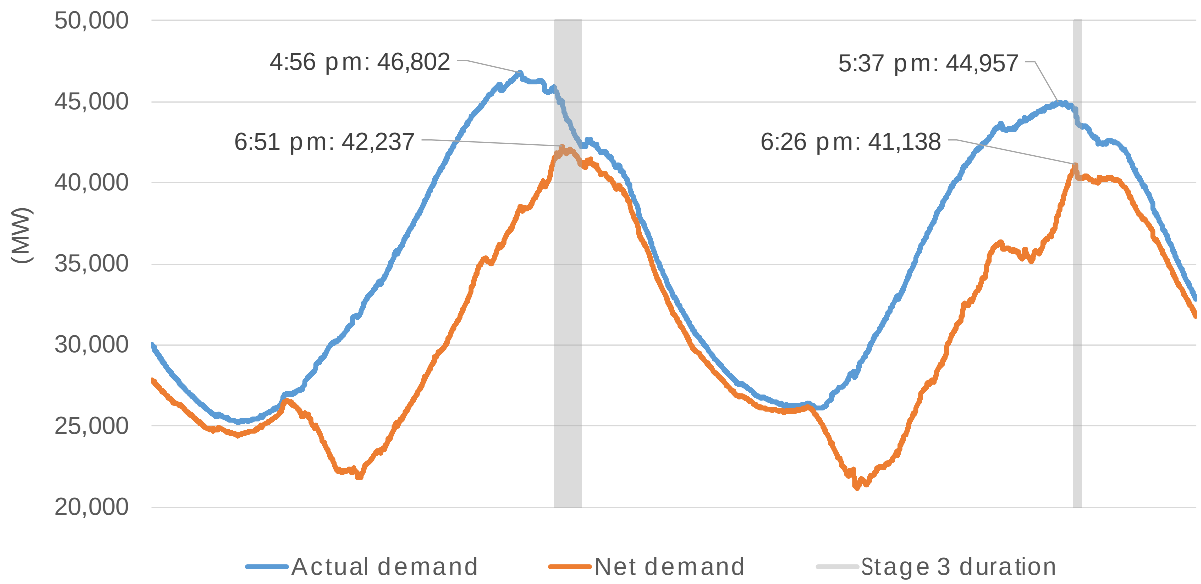
[1] Currently the RA obligation is planned for a 1-in-2 weather and adds a 15% PRM, in part to act as buffer for deviations from the 1-in-2 weather event.

was 0.7 to 1.7% lower than the PRM. While a PRM comparison is informative, the rotating outages both occurred after the peak hour, as explained below.

The construct for RA was developed around peak demand, which until recently has been the most challenging and highest cost moment to meet demand. The principle was that if enough capacity was available at peak demand there would be enough capacity at all other hours of the day as well since most resources could run 24/7 if needed. With the increase of solar penetration in recent years, however, this is no longer the case. The single critical period of peak demand is giving way to multiple critical periods during the day. A second critical period is the net demand peak, which is the peak of load net of solar and wind generation resources and occurs later in the day than the peak. While RA processes should meet load at all times throughout the day, the net demand peak is becoming the most challenging time period in which to meet demand. Over time, critical grid needs may manifest in other hours, seasons or conditions as the energy resource portfolio continues to evolve.

August 14 illustrates the challenges of with the net demand peak. Figure ES.2 shows the demand peak and net demand peak for August 14 and 15. On August 14, the net demand peak of 42,237 MW at 6:51 pw was 4,565 MW lower than the peak demand at 4:56 pm but wind and solar generation have decreased by 5,431 MW during the same time period. The net demand peak shown is already reduced by the impact of emergency demand response triggered by this time, as discussed further later. The difference between the demand curve (in blue) and the net demand curve (in orange) is largest in the middle of the day (approximately 10 am until 4 pm) when renewables are generating at the highest levels and serving significant CAISO load. Most important, the rotating outages coincide closely with the net demand peaks.

Figure ES.2: Demand and Net Demand for August 14 and 15



On August 14 the Stage 3 Emergency was declared at 6:38 pm, right before the net demand peak at 6:51 pm. Similarly, on August 15 the Stage 3 Emergency was called at 6:28 pm, just after the net demand peak at 6:26 pm.

<u>Supply Side Resources Were Differently Impacted</u>

In addition to the fact that California and the West were facing an extreme heat storm that pushed forecasted demand up to and beyond the limits that California's RA programs anticipate, many resources that were required to provide energy to the CAISO Balancing Authority Area (BAA) did not, or were not able to, deliver that energy during the hours of peak and net demand peak.

Figure ES.3 shows how selected resources performed during the net demand peak on August 14 across three different time periods. It shows: (1) the levels of shown RA and RMR for August 2020 (blue markers); (2) the real-time awards for energy and ancillary services from shown RA capacity and for amounts above the shown RA (solid yellow and yellow cross-hatched bars) net of planned and forced outages (black bars); and (3) the actual energy delivered (green circles). For real-time awards and actual energy, the amounts are divided between shown RA and RMR capacity and for the amounts above the shown RA. As a simplifying assumption, all wind and solar generation is assumed to count towards RA capacity. Each resource is discussed below.

EXHIBIT 6

ANALYSIS GROUP

Pathways Study

Evaluation of Pathways to a Future Grid

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Preface

ISO New England is pleased to present the *Pathways Study*, *Evaluation of Pathways to a Future Grid* by The Analysis Group, which provides important information to the region on potential pathways to meet the New England states' decarbonization goals. In early 2021, the ISO's Board of Directors directed the ISO management team to pursue an assessment of policy and market frameworks that could further advance the evolution of the regional power grid. The ISO retained the Analysis Group to conduct the study, which is part of New England's Future Grid Initiative to assist the region's transition to a future grid that is efficient, clean and reliable. The Analysis Group worked closely with ISO staff, regional stakeholders, and the New England states to gather input on the development of the assumptions, scenarios, and sensitivities, but it exercised its independent judgement in carrying out the modeling work and the production of study results.

This study is part of ISO New England's broader efforts to assist the region in evaluating the potential needs of a future grid that meets the states' climate and energy goals. The process leading to the final report of this study included numerous meetings with the New England states and the New England Power Pool (NEPOOL) participants to identify the potential approaches, including design concepts; to develop assumptions, scenarios and sensitivities; and to discuss the quantitative and qualitative analysis approach and findings. The ISO and the Analysis Group sought and received valuable feedback during the study process and on a draft version of this report.

The *Pathways Study* provides the region with significant data and analysis to evaluate four approaches that could meet the New England states' ambitious environmental goals. The objective of the study was not to determine a preferred approach, but rather to examine key differences and tradeoffs between the pathways. The findings indicate that all of the approaches considered can achieve substantial greenhouse gas emissions reductions; however, each approach has different implications for economic and market outcomes. Each approach also differs in the degree of coordination needed among the six New England states, as well as in the level of complexity in implementation. In addition, as detailed in the *Pathways Study*, certain approaches have greater implications for the sustainability of competitive wholesale electricity markets.

ISO New England appreciates the work of the Analysis Group and all of those who participated in the process. With this critical information in hand, the region can now seek to find consensus on a path forward and begin to discuss important related issues, such as legal and jurisdictional issues and market design requirements.

A lot of work remains, but the ISO looks forward to the continued collaboration with the states and regional stakeholders to find the most efficient way to meet New England's needs for a clean and reliable future grid.

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Glossary of Terms

Abbreviation	Definition
AEO	Annual Energy Outlook
ATB	Annual Technology Baseline
ATWACC	After-Tax Weighted Average Cost of Capital
BOEM	Bureau of Ocean Energy Management
BTM	Behind-the-meter
BTM PV	Behind-the-meter Photovoltaic
CEC	Clean Energy Certificate
CELT	Capacity, Energy, Loads, and Transmission Report
CEM	Capacity Expansion Model
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
EAS	Energy and Ancillary Services
EIA	Energy Information Administration
EMS	Energy Market Simulation
FCA	Forward Capacity Auction
FCEM	Forward Clean Energy Market
FCM	Forward Capacity Market
FERC	Federal Energy Regulatory Commission
FGRS	Future Grid Reliability Study
GHG	Greenhouse Gases
ICCM	Integrated Clean Capacity Market
ICR	Installed Capacity Requirement
LMP	Locational Marginal Price
MT	Metric Ton
MTCO2e	Metric Ton Carbon Equivalent
NA	Not Applicable
NCP	Net Carbon Pricing
NECEC	New England Clean Energy Connect
NEPOOL	New England Power Pool
NESCOE	New England States Committee on Electricity
NREL	National Renewable Energy Laboratory
O&M	Operations and Maintenance
PPA	Power Purchase Agreement

Abbreviation	Definition
PV	Photovoltaic
REC	Renewable Energy Certificate
RGGI	Regional Greenhouse Gas Initiative
RPS	Renewable Portfolio Standard(s)
SMART	Solar Massachusetts Renewable Target
SRMC	Short-Run Marginal Cost

V. Results of Quantitative Analysis: Decarbonization of the New England Electric Power Sector

The focus of the Pathways Study is on tradeoffs between alternative policy approaches to achieving decarbonization of the New England electric power system. However, before evaluating these tradeoffs, we first provide an overview of the quantitative modeling results with the goal of giving the reader background and intuition for key market and system changes arising from the transition to a more decarbonized grid. This background is valuable in its own right, given the challenges the region will face to making this transition, but also important background for the comparison of policy approaches we undertake in **Section VI**.

This section presents a description of several key mechanisms by which the power system evolves to drive emissions down to the target of 80% below 1990 emissions by 2040. The discussion focuses on results from the Status Quo approach, in part because this is the pathway the region is currently moving along, in which states achieve this decarbonization target via bilateral power purchase agreements rather than a centralized market mechanism. However, the issues and concepts discussed in this section are common across policy approaches, and thus we could have reviewed any approach to illustrate these issues. If readers are interested in the corresponding figures for other policy approaches, these are provided in **Appendix B**.

A. Resource Mix

Decarbonization of the New England electric power system is accomplished largely through changing the mix of physical assets in the system. **Figure V-1** shows the annual resource mix over the study period under the Status Quo approach. The changes in resource mix over the study period reflect the entry of new capacity, as well as the retirement of older fossil-fired resources, although the quantity of retirements is small in comparison to new entry. **Figure V-2** shows the incremental entry of new capacity by year over the study period, while incremental retirements are show below, in **Figure V-3**.

The specific change in the resource mix shown in **Figure V-1** reflects many factors, including increasing loads (due to heating and transportation electrification), baseline state policies, and achievement of the 2040 emission target. To better understand the incremental changes in the resource mix needed to achieve decarbonization in New England, **Table V-1** shows the change in the resource mix from 2020 to 2040 under the Status Quo:

- ***Clean Energy Resources.*** The largest system change is the significant expansion of clean energy resources to achieve decarbonization. Clean energy resource capacity increases by 35.3 GW across many technologies, including solar (BTM and utility scale PV), wind (offshore and onshore), and hydroelectric (NECEC).
- ***Storage Resources.*** To complement the variable output of solar and wind resources, 12.9 GW of battery storage is developed.
- ***Fossil Resources.*** While clean energy and storage resources increase, on net fossil resource capacity declines by 2.1 GW, reflecting an increase of 3.1 GW of combustion turbine capacity, 1.4 GW of efficient combined cycle capacity, and the retirements of 6.6 GW of existing combined cycle, existing combustion turbines, coal, and steam capacity. Thus, fossil resources are retired on net to meet the

increasingly stringent carbon target, but the mix of resources shifts toward lower capital cost-higher operating cost combustion turbines that can more cost-effectively supply resource adequacy.

Figure V-1. Resource Mix, Status Quo Policy Approach, 2020-2040 (MW)

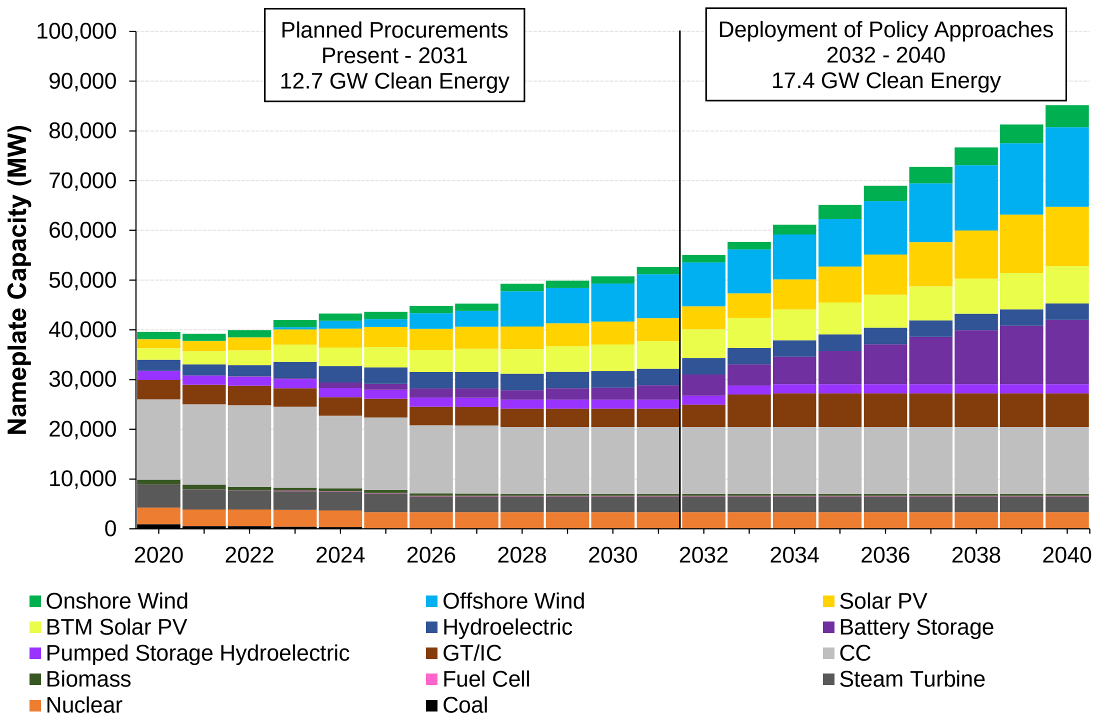


Figure V-2. Capacity Additions, Status Quo Policy Approach, 2021-2040 (MW)

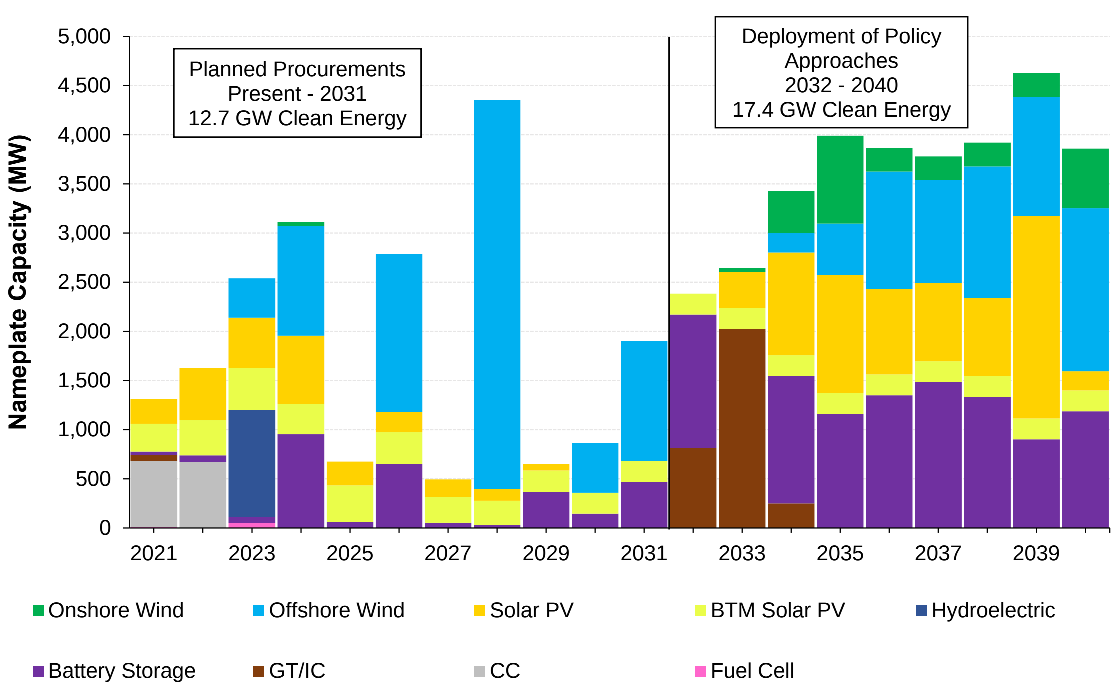


Table V-1. Change in Resource Mix from 2020 to 2040, Status Quo Policy Approach (MW)

Unit Type	2020 Baseline	Capacity in 2040 (MW)	Change in Capacity: 2020 to 2040 (MW)
Biomass	972	361	-612
BTM Solar PV	2,363	7,500	5,137
CC	16,158	13,474	-2,684
Coal	917	0	-917
Battery Storage	8	12,953	12,945
Fuel Cell	30	94	64
Hydroelectric	2,234	3,311	1,077
GT/IC	3,893	6,765	2,873
Nuclear	3,349	3,349	0
Offshore Wind	29	16,014	15,985
Pumped Storage	1,826	1,826	0
Solar PV	1,807	11,928	10,121
Steam Turbine	4,591	3,188	-1,403
Onshore Wind	1,424	4,401	2,977

As we discuss in **Section VI**, the mix of substitutions that occurs to achieve decarbonization varies across policy approaches given differences in incentives created by each policy. However, the general pattern of changes in resource mix — more renewables and storage and less fossil generation — is the same across all policy approaches.

Below, we provide further discussion of the changes in resource mix by technology type:

- ***Deployment of new clean energy resources*.** The starting point for decarbonization is the deployment of new, clean energy capacity that can supply energy to displace energy generated from fossil resources. Under the Status Quo, solar, offshore wind, and onshore wind are the primary new forms of clean energy generation, reflecting current commercially viable technologies.

  In the 2020s, new renewable resources enter largely as a result of the baseline state policies, common to all four policy approaches. Much of this new renewable capacity is offshore wind, reflecting planned procurements, largely comprised of projects in Bureau of Ocean Energy Management ("BOEM") lease areas off the coast of Southern New England.

  In the 2030s, new renewable capacity is mostly offshore wind and solar. In the Status Quo, these resource decisions reflect state roadmaps and plans. In the other policy approaches, the mix of resources reflects economic factors, with the model determining resource outcomes based on the financial incentives created by each approach with the goal of minimizing social costs. In these cases, the resulting resource mix reflects a combination of factors, particularly new build (capital) costs. These costs change over time due to multiple factors, particularly technological improvements (which lower costs and occur independent of resources developed in New England) and transmission and siting considerations (which increase costs as earlier projects exploit the most favorable (lowest cost) transmission and siting resource opportunities).

Under the Status Quo, expanded clean energy supplies are the result of expanded state procurements throughout the study period. While the analysis includes state RPS at existing statutory levels, the RPS targets are not binding, and thus REC prices fall to zero, during the study period because the supplies procured through the state sponsored PPAs to meet the 80 percent regional decarbonization objective exceed the quantity of clean energy that would be incented by the RPS alone.[106]

Another important factor is the interaction of supply from renewable resources with correlated output. These interactions have an important — but complex — impact on outcomes. Output from correlated renewables can lead to "economic curtailment" of supply because there is insufficient demand to consume all renewable output in some hours, particularly when demand is low but available renewable supply is high. This correlation in resource output, in turn, can diminish a resource's competitiveness by reducing its effective supply (given the curtailments). Thus, a higher-cost renewable resource with output that is less correlated with other existing renewable resources may be more competitive than a less-costly resource with more-highly-correlated output, because its output is less likely to be economically curtailed or earn lower revenues for its energy, because of negative LMPs. We discuss economic curtailments in further detail, below in **Section V.B.3**.

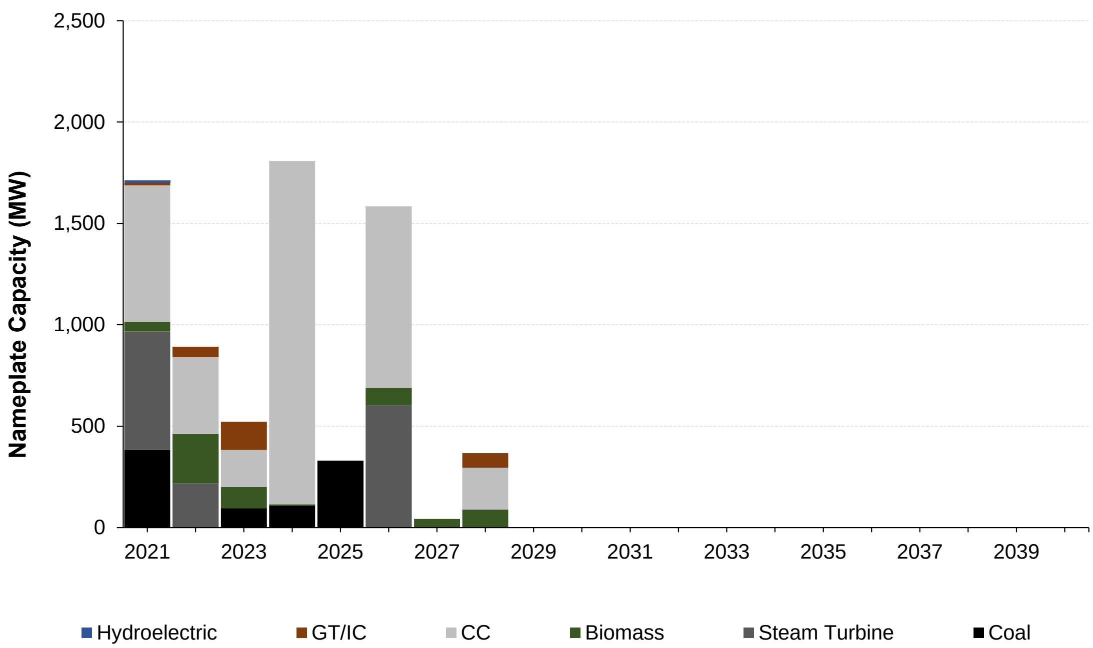
- ***Entry, retention and retirement of fossil dispatchable resources***. From 2020 to 2040, dispatchable fossil capacity falls from 25.6 GW to 23.5 GW, reflecting both resource retirements and new entry. Although new renewable capacity is needed to achieve decarbonization targets, dispatchable fossil-fuel generation like natural gas fired combined cycle and combustion turbines is still needed to meet demand during periods of low variable renewable output (recall, the Central Cases assume the region targets an 80% reduction in carbon emissions, which still allow some carbon emissions to occur in 2040). In the Status Quo, as additional variable renewable resources come online and displace output from fossil fuel generation, total (net) energy market revenues for existing generators decline due to reduced capacity factors and lower hourly LMPs. However, until new technologies emerge that can cost-effectively offer long-term storage or zero-emissions dispatchable generation, fossil fuel generation appears likely to be needed to ensure resource adequacy.

  Although some dispatchable technology is required to meet resource adequacy requirements, the transition to a low-carbon power system, along with other market forces, will lead to retirements of existing generators. Retirements are most likely for generators that are costly to operate (*i.e.*, high on-going fixed operation costs), are less efficient (*i.e.*, have higher heat rates), and are less able to quickly ramp up or down to meet load as variable renewable energy generation fluctuates. **Figure V-3** shows retirements under the Status Quo, which includes 6.6 GW of fossil fuel and 620 MW of biomass that retires before 2030. Most of this retired capacity reflects announced retirements, rather than

[106] When the supply of RECs created by state clean energy procurements exceeds regulatory requirements from state RPS, we expect the price of RECs to fall to zero in a competitive market.

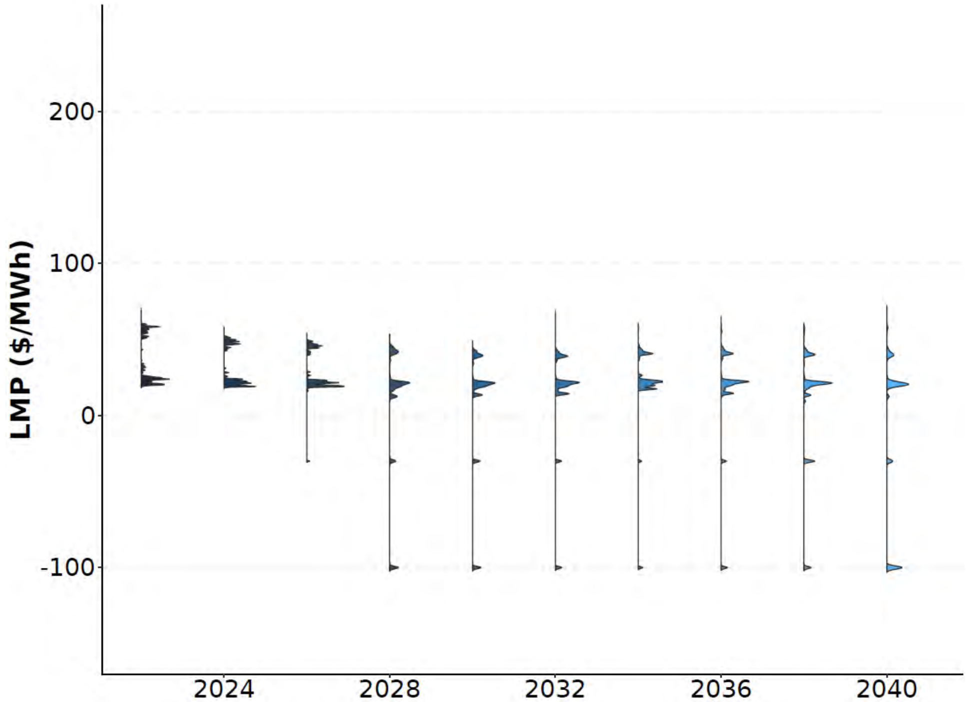
"economic" retirement decisions by units within the model. Economic retirements are limited, as the model finds that it is generally more cost-effective to retain existing capacity to meet the increasing resource adequacy requirements from electrification of other sectors of the economy (heating, transportation) than to retire this capacity and replace it with new capacity to meet the growing resource adequacy needs. In fact, under the Status Quo policy approach, 3.1 GW of new gas turbines are installed between 2032 and 2034 to help meet resource adequacy. However, on net, total retirements exceed new entry of fossil resources, reducing the total quantity of fossil-fired resources in the system, despite the total increases in peak loads across the study period.

Figure V-3. Capacity Retirements, Status Quo Policy Approach, 2021-2040 (MW)



- ***Development of storage resources.*** Over the study period, there is substantial development of storage resources, which play an important role in maintaining resource adequacy in the modeled decarbonized system. Due to the expansion of variable renewable resources that may not provide energy supply during certain weather conditions (*e.g.*, when the sun is not shining or the wind is not blowing), meeting customer loads in all hours requires dispatchable resources that can deliver supply to meet energy demand and reserve requirements, independent of weather conditions. As the emission target becomes more stringent, there is a need for a zero (or low) emission source of dispatchable electricity to maintain resource adequacy. Within our analysis, storage resources play this role, as we assume no backstop dispatchable zero-carbon technology, given their current lack of commercially viability. Moreover, the entry of 12.9 GW of new battery storage more than offsets the loss of 2.1 GW of fossil generation, allowing the system to maintain resource adequacy despite the increased loads from electrification of heating and transportation. In fact, by the end of the study period, battery storage more cost-effectively provides resource adequacy than gas-fired technologies.

Figure V-5. Distribution of LMPs by Year, Status Quo Policy Approach, 2022-2040 ($2020/MWh)

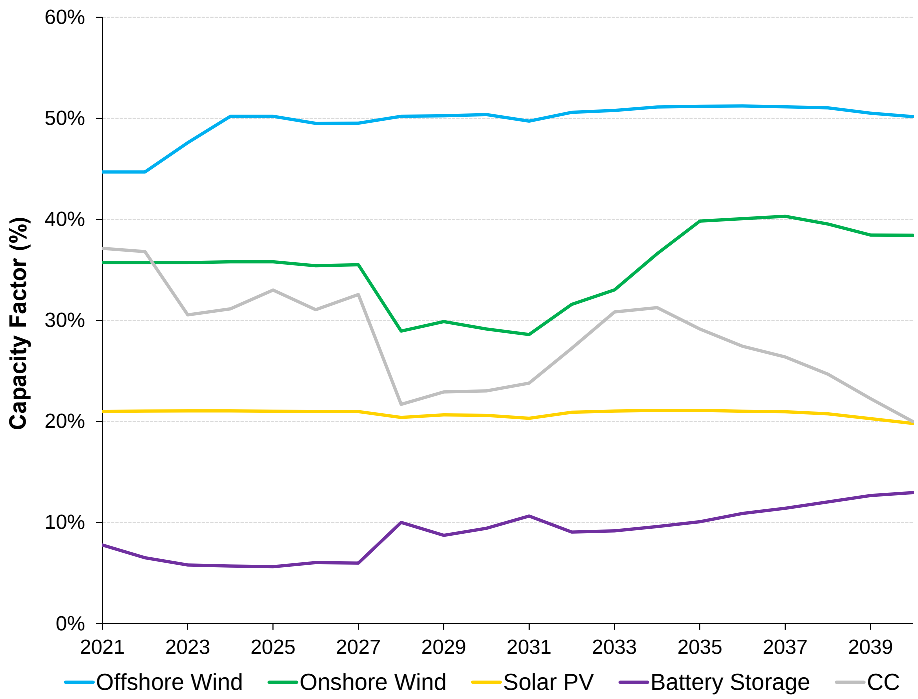


2. *Implications for Gas-Fired Resources*

For gas-fired resources, particularly combined cycle resources, total output declines across the gas-fired fleet, as much of their production is displaced by that from renewable resources with zero or very low operating costs. This decline in total output reflects both a decline in capacity and a decline in output per unit of capacity ("capacity factor"). **Figure V-6** shows the annual capacity factors for certain technologies over the period 2021 to 2040. Reduced capacity factors are consistent with declining prices over time — that is, with lower prices less efficient gas-fired capacity becomes less competitive.[113] In effect, over time, energy from gas-fired resources is increasingly needed for load-following or peaking supply, rather than as a source of baseload energy. These changes reflect reductions in total energy supplied and increased volatility in load net of variable renewable generation.

[113] We do not include combustion turbines in **Figure V-6** because energy supply from combustion turbines is limited and episodic in our analysis, due to, among other things, the model representing less real-time operational variability (*e.g.*, plant and transmission outages) than what might occur in the real world.

Figure V-6. Capacity Factors for Combined Cycle, Battery Storage, Offshore Wind, Onshore Wind, and Solar PV, Status Quo Policy Approach, 2021-2040 (%)



3. *Implications for Variable Renewable and Storage Operations*

As variable renewable and storage resources become a larger fraction of system resources, interactions between these resources have important consequences for their operations and the output they supply.

a) "Economic Curtailment" of variable renewable generation

"Economic curtailment" refers to a reduction in the output of a generator relative to what it could have otherwise produced. Generally, curtailment can occur due to transmission congestion, lack of firm transmission access, or excess generation ("overgeneration") during low load periods.[114] Here, we focus on curtailment due to overgeneration,[115] and refer to this as "economic curtailment" under the assumption that output is "economically" curtailed because the offer price exceeds the (potentially negative) LMP, rather than because of specific actions from ISO operators due to an imbalance between electricity supply and demand, and/or a physical constraint in the transmission system.

[114] NREL (National Renewable Energy Laboratory). 2014. "Wind and Solar Energy Curtailment: Experience and Practices in the United States." Golden, CO: National Renewable Energy Laboratory, available at https://www.nrel.gov/docs/fy14osti/60983.pdf.

[115] Our quantitative model does not capture other forms of curtailment.

EXHIBIT 7

Energy Pathways to Deep Decarbonization

A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study

December 2020

Executive Office of Energy and Environmental Affairs

Massachusetts Global Warming Solutions

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4 Pathway definitions

We explored eight net-zero emissions pathways for the Northeast. The analysis started by defining a pathway we call "All Options," which was created using assumptions found compatible with deep decarbonization in previous studies. Pathways are varied one dimension at a time in order to isolate the impact of specific factors. The eight pathways are described in Table 6. The dimensions of variation studied include:

- Behind the meter (BTM) solar and flexible end-use load explored in the "DER Breakthrough" scenario;
- Rates of building and industry electrification explored in the "Pipeline Gas" scenario;
- Deployment of energy efficiency explored in the "Limited Efficiency" scenario;
- Ease of transborder infrastructure development explored in the "Regional Coordination" scenario;
- Availability of gas thermal power plants explored in the "No Thermal" scenario;
- Cost and potential of offshore wind in the "Offshore Wind Constrained" scenario;
- And, the availability of non-renewable inputs to the 2050 energy system (excludes nuclear & fossil) in the "100% Renewable Primary" scenario.

Aside from the differences highlighted in Table 6, data and assumptions are shared between all pathways. For example, all scenarios meet the same demand for energy services,[25] assume the same cost for demand-side technology adoption, and meet the same emissions targets. Data inputs are from public sources and are provided along with important assumptions in Section 7. The assumption of consistent service demand is of particular importance as a design criterion as a way to show the feasibility and affordability of a technological transition to deep decarbonization. With this in mind, energy conservation and lifestyle change could significantly ease parts of the transition.

For several pathways listed in Table 6, descriptors "High," "Medium," and "Low" are used as a shorthand for describing the assumptions. This shorthand is used due to the complexity of the inputs, which are difficult to describe succinctly in one table row. For example, different heat pump adoption rates are specified for space and for water heating, each separately for residential and commercial customers. The detailed sales share inputs and resulting stock shares are provided for Massachusetts in Section 7.14.

An important clarification is that the pathway titled "All Options" pathway is not meant to be interpreted as an endorsed pathway for the Commonwealth. Indeed, it is not lowest cost or necessarily preferred along other dimensions. Instead, the role of "All Options" is as a point of comparison between different pathways—a role that is played by a reference or baseline scenario in most studies. This study is not an investigation of whether Massachusetts should decarbonize,[26] given that the net-zero target is current state policy; thus, a reference scenario, while it was developed, is not a focus within the results.[27] Thus, the seven other pathways represent deviations from All Options meant to explore how technological evolutions could ease the transition to a net-zero future or how certain constraints or secondary goals could make that transition different, if not more

[25] For example, demand for maintaining a comfortable indoor temperature can be met using any combination of fossil energy (e.g. natural gas-fired furnaces), electric energy (e.g. heat pumps), and efficiency measures (e.g. air sealing and weatherization).

[26] This report does not discuss the quantitative benefits from avoided climate damages or the cost of climate adaptation, and thus, gives an incomplete picture of the societal net benefits of decarbonization. Many of these elements are discussed in the Roadmap Study.

[27] The reference scenario represents a baseline loosely based on the 2019 U.S. Annual Energy Outlook. Carbon emissions are not capped, and only minor changes are assumed to occur on the energy demand-side. For example, electric vehicle adoption is much lower than assumed in the decarbonization pathways.

difficult. The Pipeline Gas pathway assumes low electrification of gas applications in buildings and industry (e.g. water heating). Other types of electrification are still assumed, for example heat pumps still replace fuel oil in buildings. The Pipeline Gas pathway does not pre-constrain the composition of gas in the pipeline (e.g. biogas or hydrogen) but instead solves for this mix in the supply-side optimization in RIO, which is subject to the emissions constraints.

Table 6 Scenario matrix contrasting the eight net-zero emissions pathways. The "All options" scenario serves as a common point of comparison across the seven variations that test key uncertainties or explore alternate strategies. The differences from the All options scenario are highlighted in orange. Each of the qualitative descriptions (e.g. high vs. low) are defined in Section 7.

	All Options	DER Breakthrough	Pipeline Gas	Limited Efficiency	Regional Coordination	No thermal	Offshore Wind Constrained	100% Renewable Primary
Mass BTM solar in 2050	7 GW	**17 GW**	7 GW	7 GW	7 GW	7 GW	7 GW	7 GW
Flexible end-use loads	Medium	**High w V2G**	Medium	Medium	Medium	Medium	Medium	Medium
Building & industry electrification	High	High	**Low electrification of pipeline gas applications**	High	High	High	High	High
Energy Efficiency	High	High	High	**Reference efficiency across buildings, industry and transport**	High	High	High	High
Captured CO_2 Export	No	No	No	No	**Yes**	No	No	No
Intra-regional transmission cost	$5,600/MW-mile within New England; $9,400/MW-mile to Quebec	$5,600/MW-mile within New England; $9,400/MW-mile to Quebec	$5,600/MW-mile within New England; $9,400/MW-mile to Quebec	$5,600/MW-mile within New England; $9,400/MW-mile to Quebec	**$3,300/MW-mile within New England; $4,700/MW-mile to Quebec**	$5,600/MW-mile within New England; $9,400/MW-mile to Quebec	$5,600/MW-mile within New England; $9,400/MW-mile to Quebec	$5,600/MW-mile within New England; $9,400/MW-mile to Quebec
New gas power plants	Disallowed in Massachusetts	Disallowed in Massachusetts	Disallowed in Massachusetts	Disallowed in Massachusetts	Disallowed in Massachusetts	**Disallowed everywhere**	Disallowed in Massachusetts	Disallowed in Massachusetts
New offshore wind power plants	Economic, ATB low	Economic, ATB low	Economic, ATB low	Economic, ATB low	Economic, ATB low	Economic, ATB low	**30 GW Northeast Cap w ATB mid**	Economic, ATB low
New nuclear power plants	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed	**Economic**[28]	Disallowed
Existing nuclear	Maintain	Maintain	Maintain	Maintain	Maintain	Maintain	Maintain	**Retire**
Use of fossil fuels	Constrained by emissions	Constrained by emissions	Constrained by emissions	Constrained by emissions	Constrained by emissions	Constrained by emissions	Constrained by emissions	**No fossil fuels in 2050**

[28] A base assumption of 'no new nuclear build' in the Northeast was implemented due to the perceived difficulty of siting new nuclear and noting it was not a necessary part of the solution in test runs. However, the study team also had interest in a 'nuclear breakthrough' scenario. Due to limitations on the total number of pathways we could study, the decision was made to add economic nuclear to the Offshore Wind Constrained scenario. The underlying assumption was that if any scenario would best highlight the potential role for nuclear, it was one in which offshore wind was limited.

Creating the eight pathways in the analysis was an iterative process that started with observing early model results from the All Options pathway and soliciting feedback on the list of uncertainties in Section 3.3.2. For example, after noting the importance of offshore wind to New England in early runs, the "Offshore Wind Constrained" scenario was devised to test how increases in offshore wind cost and decreases in potential would impact the results. Other pathways were developed in response to key questions on the minds of stakeholders or state policymakers, such as the role for gas in buildings and power plants or the feasibility of an energy system in 2050 that uses zero fossil fuels.

The eight pathways are themselves not exhaustive and leave some of the uncertainties described in Section 3.3.2 as subjects for future work. However, the primary goal in the pathways design was accomplished, which was to perturb the All Options pathway in various ways (some making decarbonization more challenging, others less), in order to observe the commonalities between all pathways that achieve Net Zero. The use of pathways is discussed further in Section 2.3.

4.1 Energy & Industrial CO_2 emission constraints

The emission of CO_2 from the energy and industrial sectors represents the largest, but not the only contributors to economy-wide net-zero GHG emissions. The companion *Non-Energy Technical Report* found that emissions of fluorinated compounds, fugitive methane, and other non-combustion emissions could be limited to 4.6 $MtCO_2e$ in 2050. Meanwhile, the Land-Use study analyzed how natural and working lands in the Commonwealth can help remove residual emissions in 2050 in order to bring Massachusetts towards a net-zero economy. However, because the Massachusetts GHG Inventory (a matter of law) is currently a gross emissions accounting framework, this report makes no attempt to resolve how biogenic sequestration of carbon in natural and working lands might impact a net-zero emissions accounting. During the framing of this study, EEA undertook a process to seek public comment on setting a gross emissions limit in support of net-zero emissions at an 80%, 85%, or 90% reduction from 1990 emissions levels by 2050. While the Secretary of EEA ultimately determined that 85% was the most appropriate gross emissions reduction goal, the timing considerations required that modeling for this study needed to be underway prior to that determination. Thus, the project team was instructed to target the upper bound of those options (90% or 9.5 $MtCO_2e$). Leaving a set-aside for the 4.6 $MtCO_2e$ from the non-energy sector in 2050, this left the energy and industrial sectors with a reduction target of no more than 5 $MtCO_2e$ in 2050. Interim years (e.g., 2030, 2040) were set as a straight-line reduction from the previously established 2020 emissions limit to the 2050 modeling target.

The emissions accounting framework used in this study is based on the system used for the Massachusetts GHG inventory but differs in several ways based on the net-zero framing.[29] Emissions rates for electricity generators were benchmarked against the factors assumed in the 2017 MassDEP GHG Emissions Inventory; this approximates, but does not precisely replicate the interstate emissions accounting system MassDEP uses. Within Northeastern states, imports of net-zero carbon liquid or gaseous fuels was an option in the model as a replacement for fossil fuels in applications such as aviation or building heating. Combusting these biomass- or electricity-derived synthetic fuels would result in positive gross carbon emissions within Massachusetts, but the carbon in these fuels is assumed to come either from the atmosphere or from captured carbon that would

[29] Until very recently, Massachusetts GHG targets were based on a gross emission reduction target. The assumptions made in this analysis were made for expedience and do not resolve all questions or endorse a specific methodology in the inventory moving forward.

5 Results

The results of the modeling are described below in six subsections, beginning with an overview of the 2050 energy system, followed by a detailed examination of emissions, energy end uses, electricity, fuels, and costs. In most cases, the results focus on Massachusetts only, but regional snapshots are also provided. Supplemental results figures and tables are provided in Section 8. For clarity and economy of space, not all pathways are shown in all figures in this section, but in general the full set can be found in the supplemental results.

This section focuses on describing the technical results of the modeling with a minimum of commentary. The subsequent section discusses the main conceptual findings revealed by the modeling. The discussion section identifies and elaborates on commonalities and contrasts found across cases, referring back to the results presented below.

5.1 Energy system overview

The 2050 energy systems that reach a net-zero E&I CO_2 target look dramatically different from today's. A series of "Sankey diagrams" (Figure 7) provide an overview of this transformation, and illustrate at a high level how energy is produced and consumed in a net-zero system in 2050. Sankey diagrams show the flow of energy through the economy, with the left-hand side showing primary energy supplied within Massachusetts, and imports into Massachusetts, and moving through various conversion processes, such as electricity generation, to end-use consumption in buildings, industry, and transportation on the right-hand side.

The first diagram shows the current energy system of Massachusetts in 2020. Almost all energy is provided by imports of petroleum or natural gas. Natural gas use is split between buildings and electricity generation. Electricity is primarily consumed in buildings. Transportation consumes most of the petroleum, but some is consumed in buildings (distillate oil-based heating) and some in industry. Industrial energy demand in Massachusetts is small compared to consumption in buildings and transportation but has the most diverse set of final energy supplies, requiring electricity, liquids, asphalt, pipeline gas, and steam.

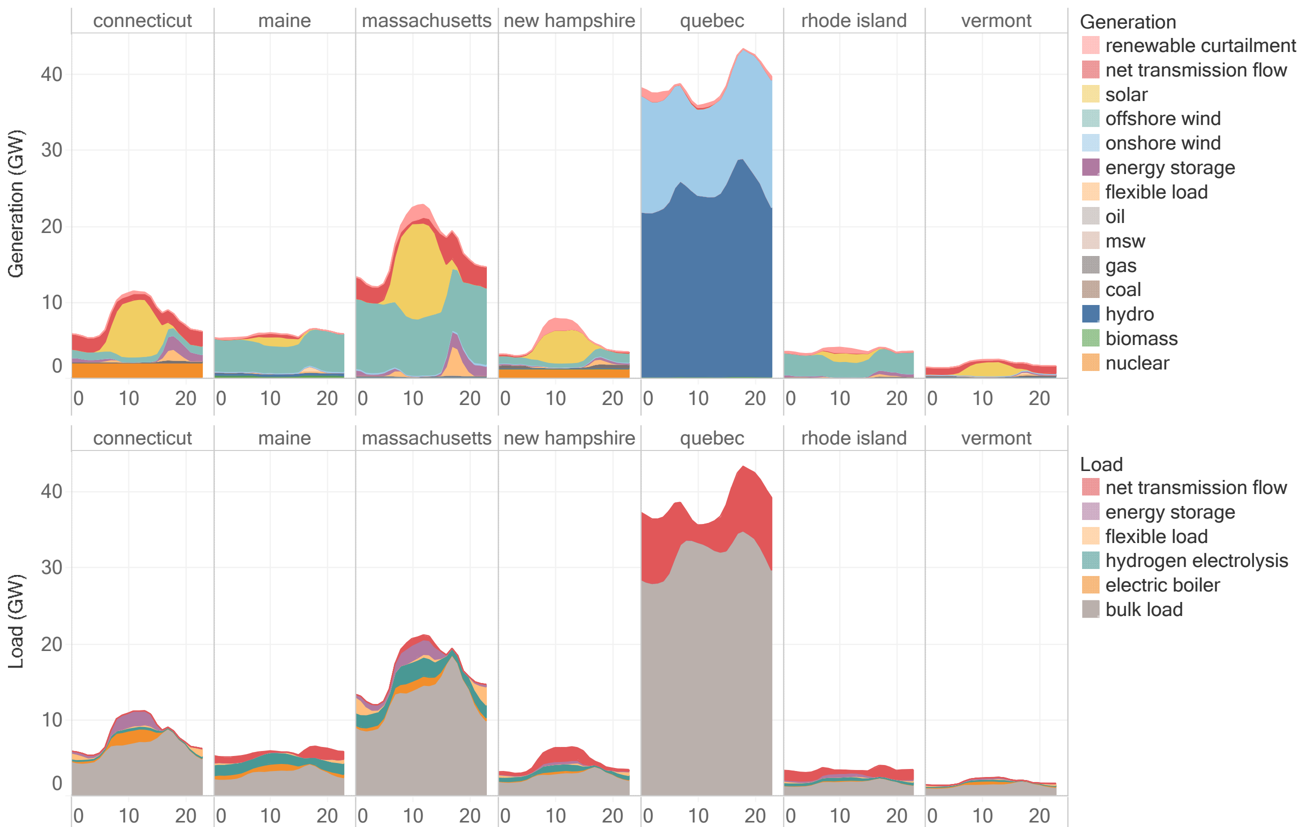
The second diagram shows the All Options net-zero pathway in 2050, which has dramatically different energy flow patterns. Overall, energy demand has decreased, electricity dominates end uses, and the source of primary energy has shifted away from fossil fuels and toward renewables. Final energy demand in buildings and transportation has decreased by about half due to same-fuel efficiency improvements plus the efficiency benefits that come from electrification.

The process of electrification has created new connections that do not exist at a significant level in the current system (i.e. electricity in transportation), and roughly doubles the amount of final energy demand that must be supplied by electricity. Electricity also has an additional new role as an intermediate energy carrier used in the production of steam and hydrogen.

Hydrogen emerges as an important final energy carrier in transportation, with small amounts also used in industry. The source of electricity has shifted away from natural gas and towards solar and offshore wind. Both net imports and net exports of electricity have increased, indicating increased regional interdependence. Both natural gas and petroleum are still imported but decreased to roughly one-tenth of today's quantity, with new carbon neutral imported fuels taking their place in some applications. In-state biomass use has not grown but has shifted towards fuel production rather than electricity generation. Liquid and gaseous fuels are still important energy carriers (for example, in aviation), but due to electrification and efficiency the quantity of fuels required is greatly reduced.

Figure 7 Energy system Sankey diagrams for Massachusetts show the flow of energy from primary sources or imports (left) through conversion processes (middle) to final energy demand or exports (right). The width of each line is proportional to the energy flow with units shown in TBtus. Diagrams are shown for the 2020 energy system and for the eight decarbonization pathways in 2050, across three pages. The difference in line width between flows into a node and out of a node represents energy losses during conversion or delivery. To improve readability, annual flows smaller than 3 TBtus are excluded—for example, the small amount of LPG used in buildings in 2050 does not appear. Net annual transmission flows from/to neighboring regions are shown across the top of each figure and abbreviated "TX". In the Pipeline Gas and 100% Renewable Primary pathways, hydrogen is produced from electrolysis and some of it is used later to generate electricity; only the net flow is shown (in these pathways more hydrogen is produced than is consumed in electricity).

Figure 26. Daily average electricity operations in the All Options pathway, by zone. (Top) Generation, imports, storage discharge, and curtailment. (Bottom) Load, imports, and storage charging. Flexible load on the generation side represents a reduction in bulk load. The hours to which this load has been shifted is shown in the same color in the load panel. Because an average value for all days is displayed, artifacts of the diversity between days are apparent in the figure. For example, in Massachusetts at mid-day, renewable curtailment and transmission imports can both be seen occurring in the same hour; however, in actuality, both do occur, but on different days.



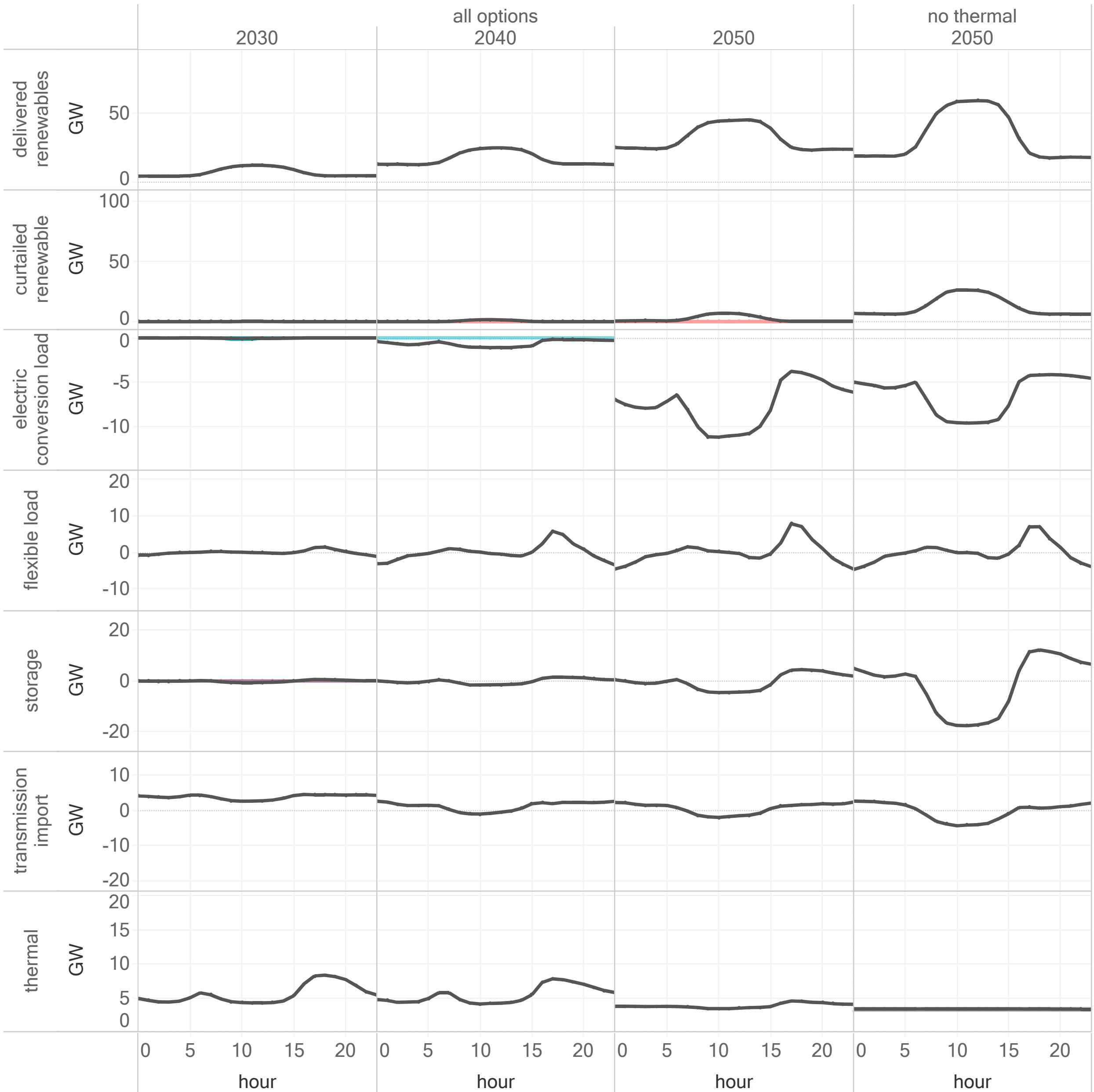
5.4.3 Operations and renewable balancing

The electricity systems in all the pathways studied had high penetrations of wind and solar generation, as described in the previous section. This outcome was not pre-ordained, but was the solution selected by the RIO optimization model for the lowest cost electricity system consistent with the net-zero emissions target. However, although wind and solar generation have substantially lower levelized cost of energy than any other technology considered, they do present unique operational challenges due to their variability. "Renewable balancing" is the term that describes the operational measures used to address the mismatch between variable renewable supply and must-serve load. Sometimes renewable supply is far in excess of load, leading to curtailment of renewable generation and reducing the economic competitiveness of these resources. At other times, a shortfall of renewable generation on the system results in the need for dispatchable resources to maintain system reliability. System operators must forecast both surplus and deficits, or "net load," with sufficient lead time to apply a suite of tools that enable the system to maintain reliability while meeting carbon constraints at low cost.

The deployment of each of these balancing tools, aggregated for all of ISO-NE, is shown in Figure 27. The first three columns show the All Options pathway in 2030, 2040, and 2050. The right-most column shows the No Thermal pathway in 2050, in order to illustrate the measures required to replace all thermal power plants without harming reliability. In each row of the chart, a series of translucent colored lines is shown, one for each of the 45 sample days used by RIO. The solid black line is the average of all the sample day values.

The top row of the chart shows delivered renewables and the second row shows curtailed renewables, with the sum of the two being total generation potential. Although various balancing strategies are applied to minimize curtailment, curtailment is also a critical balancing strategy. Designing a system to have no curtailment would significantly increase overall system cost because (1) it would have a lower renewable capacity build, resulting in a larger generation deficit, and a consequent need for other, more costly generation resources, at times of the year when load exceeds renewable generation, and/or (2) it would require overbuilding other balancing resources such as energy storage that are expensive and would be infrequently utilized on the margin.

Figure 27. ISO-NE renewable balancing in the All Options pathway in 2030, 2040, and 2050, and in the No Thermal pathway in 2050. Each sample day (45 total) is shown using stacked colored lines with the average across all sample days shown in black. Note that the scale is different for each row. Negative values indicate storage charging or an increase in load while positive values indicate generation or a decrease in load.



The third row of Figure 27 shows electric conversion loads. These are electric boiler and electrolysis loads that are large (5-10 GW on average in 2050) and are not must-serve. Electric boilers are built in a dual-fuel configuration that allows use of gas when electricity is not available or not at the desired price. Hydrogen can be stored, blended into the pipeline, or produced by other methods, including imports, when not available via electrolysis. As evident in the figure, on some days electric conversion loads do not operate at all, and on other days they average 10-15 GW during most of the day. The importance of this conversion load strategy for high renewables power systems cannot be overstated. By providing a productive use for surplus renewable generation on days with low loads, additional renewable capacity can be built to provide energy at times when there would otherwise be larger renewable deficits. Put another way, conversion loads enable a strategy of "overbuilding" renewables that permits wind and solar to be utilized to the maximum extent for the energy system as a whole.

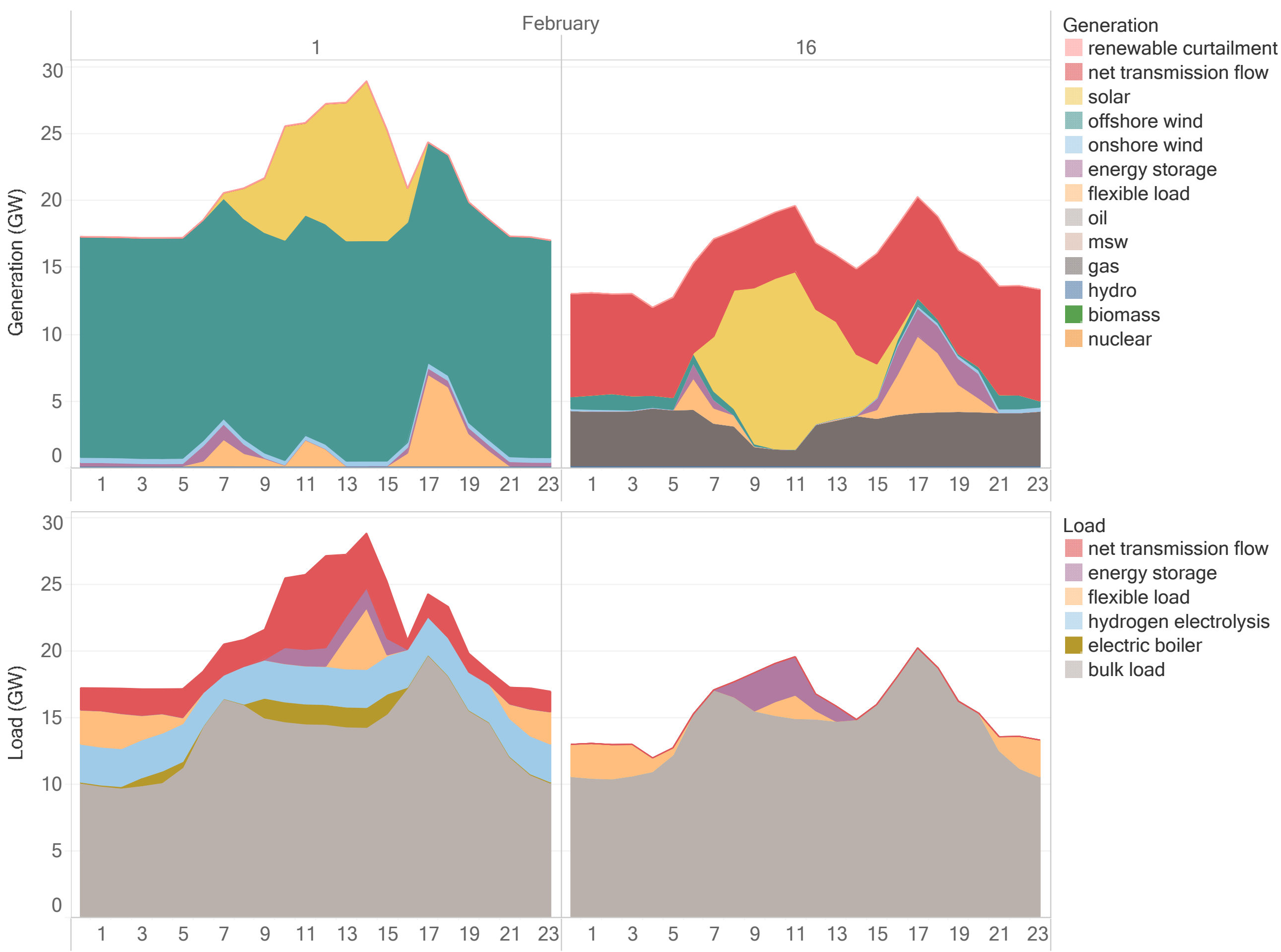
The fourth and fifth rows show flexible load and energy storage. Both show values above and below the x-axis, with positive values representing storage discharge or a reduction in load, and negative values indicating storage charging or an increase in load. The main source of flexible load is delayed EV charging, moving the charging load out of the 5-8 pm window to the middle of the night. The flexible use of space heating is also apparent in a narrow morning spike. The diurnal EV and heating loads modeled here do not have the flexibility to shift load into the middle of the day when solar is available; this is where energy storage is most critical. Energy storage discharges, on average, during nighttime hours with a large discharge peak in the evening and a smaller peak in the morning. Storage dispatch in the No Thermal pathway dwarfs that in the All Options pathway. The large amount of storage required to maintain reliability in the No Thermal pathway also competes with electric conversion loads for the use of renewable over-generation, which is why there is lower conversion load in this pathway. The state of charge over the course of the year for the long-duration storage built in the No Thermal pathway is shown for Massachusetts in the technical supplement, Figure 54.

The second to last row of Figure 27 shows net transmission flow into (positive) and out of (negative) ISO-NE. Over time, transmission flows become increasingly variable as a way of compensating for mismatches between renewable supply and generation, and the magnitude of the flows grow with transmission capacity, as discussed in Section 5.4.4. All pathways use the Quebec hydro system in effect as a form of seasonal energy storage, with energy exported to Quebec during many hours to serve Quebec loads, and with imports from Quebec in other hours to serve loads in New England and New York. Because it lacks thermal generation, dispatchable hydro capacity is of especially high value in the No Thermal pathway, and it therefore builds larger interties to Quebec than in any other pathway. No Thermal is also the only pathway in which it was found economical to build new hydro in Quebec beyond that which is already assumed. The hydro capacity build in Quebec is shown in the technical supplement, Figure 56.

The bottom row shows the operation of gas thermal power plants. An interesting trend emerges from 2030 to 2050 period, as the average daily use of gas capacity (shown by the solid black line) decreases, but maximum daily use increases. In the All Options pathway in 2050, one sample day in particular stands out from the rest (the uppermost translucent grey line). On this day, the electricity system requires almost 15 GW of thermal generation, dispatched across all hours, to maintain reliability. It is the effort to replicate this level of sustained energy production—potentially over multiple days in a row during a prolonged wind drought—that requires a very large amount of energy storage in the No Thermal pathway.

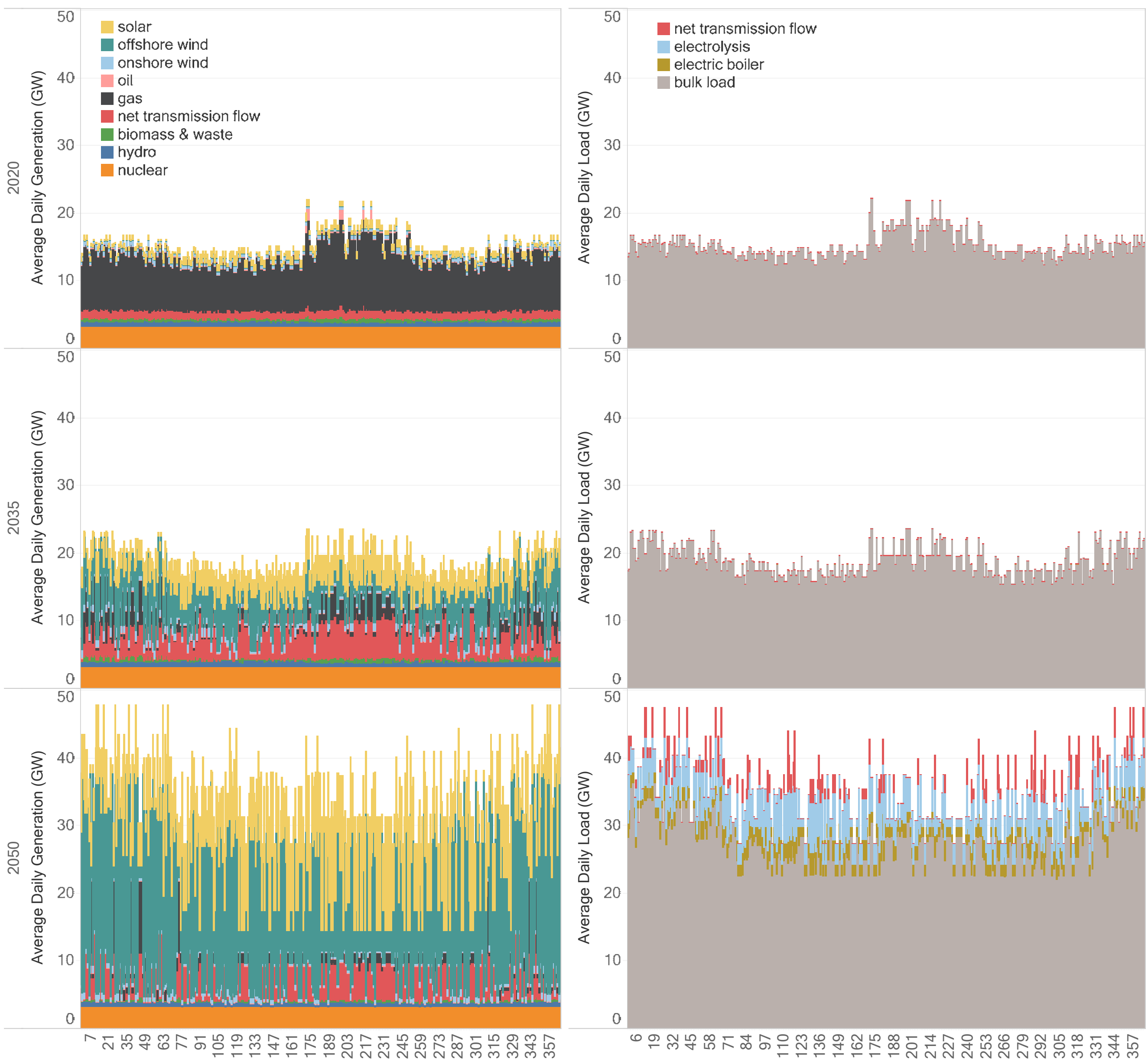
The sample day with 24 hours of gas thermal dispatch is February 16th. Figure 28 contrasts this day with February 1st from the same 2012 weather-year for the All Options pathway in Massachusetts. On February 1st, the output of offshore wind is close to its nameplate capacity for the entire day. The system is balanced by exporting energy to surroundings ISO-NE states and to Quebec and operating electrolysis and electric boiler loads. Two weeks later, on February 16th, the lowest offshore wind production of the year occurs. On this day, gas generation is needed in every hour of the day in combination with the maximum possible transmission imports from Quebec. Solar production is significant for a winter day, but still far too small to meet total energy demand. Any loads that are not "must-serve" are turned off during the day, so there are no electrolysis or electric boiler loads on this day. While keeping thermal generating capacity online when it is infrequently used may seem inefficient when viewed from the perspective of its contribution to annual energy production (Figure 23), the steps required to maintain today's electricity system reliability without this capacity on days like February 16th turn out to be extremely costly. Solar shows less day-to-day variability than offshore wind in New England, which is the primary reason for the large overbuild of solar in the No Thermal pathway. By greatly increasing solar generation on February 16th, the amount of energy to be provided by energy storage can be reduced. The flip side of this strategy occurs during other times of the year when up to 100 GW of renewables are curtailed at once across the region (Figure 27). Across New England, 25% of potential renewable generation is curtailed in the No Thermal pathway, compared to about 4% in All Options.

Figure 28. All Options pathway daily operations for Massachusetts in 2050. February 1st (a high offshore wind generation day) is contrasted to February 16th (lowest offshore wind day of the year). Generation is shown in the top panel and load in the bottom panel.



To further illustrate the operational implications of the sample days discussed above, average daily generation and load in ISO-NE across 365 days in 2020, 2035, and 2050 (based on the 2012 weather year) is shown in Figure 29.

Figure 29. Average daily energy generation and load in the All Options pathway for ISO-NE in 2020, 2035, and 2050, based on the 2012 weather year. Electricity supply is on the left and load on the right. Net transmission flows on the supply side represent net daily imports, and on the load side represent net exports. Energy storage is omitted in the figure because in all pathways except No Thermal, only small amounts of energy are shifted between days. From an daily energy perspective, storage appears primarily as a load, representing round-trip losses.



The three snapshot years illustrate the trends discussed so far. In 2020, gas generation follows load, oil generation is used on peak days, net daily imports occur on every day of the year, and the days with highest average energy consumption are in the summer. Renewables are meaningful but still small. In 2035, the system has winter days with load equal to that of summer peak days, and yet overall load has not yet grown substantially. Sales shares of electric technologies are high, as described in Section 5.3 and Figure 14, Figure 15, and Figure 17, but the stock itself is not yet highly electrified. High levels of solar and offshore wind are apparent in 2035 and while exports from ISO-NE are not yet seen, imports to ISO-NE vary significantly across days as a function of load and renewables. Days of high thermal power plant use can be seen throughout the year, concentrated mainly during summer and winter peaks. Finally, in 2050 the full set of balancing strategies is on display. Final energy demand has grown dramatically as electric technology stocks finally reach saturation levels. Renewable generation has also grown dramatically. Large electrolysis and boiler loads, and exports from ISO-NE, occur on days with surplus renewables. There are many days in which no thermal capacity is used, but there are also numerous days in all seasons, especially in winter, that require significant use of thermal capacity. Imports are even more sporadic than in 2035, and while it is clear that transmission lines are utilized extensively, net imports over the course of the year have actually shrunk because power is flowing in more equal quantities in both directions. In the next section we will examine transmission in greater detail.

5.4.4 Transmission and distribution

This study analyzed the role of, and impacts on, the transmission and distribution (T&D) system in the process of deep decarbonization. Four categories of T&D were considered:

- New inter-regional transmission between states, or between Canada and the US: This transmission is solved for explicitly in RIO as part of the capacity expansion modeling and is co-optimized with other supply- and demand-side resources.
- Distribution circuit upgrades (residential, commercial, industrial) within each zone: Simultaneous peak load by customer class was calculated, and the distribution revenue requirement for each class was scaled according to peak load growth.
- Transmission upgrades within each state, treated separately from lines between states (for example, new transmission into Boston from other part of Massachusetts). The simultaneous gross load peak in each state is pegged to the current revenue requirement, and scaled with peak load growth. It is assumed to be additive with new inter-regional transmission.
- Renewable interconnections and spur lines to connect solar and wind to load: New lines to connect renewables to load or the nearest available transmission. This category includes lines to connect offshore wind.

The latter two categories (in-state bulk transmission and spur lines) are not explicitly addressed in this section, but are included in the cost estimates in Section 5.6. The first two categories are examined in more detail below.

5.4.4.1 Inter-regional transmission

New inter-regional transmission was a critical part of all pathways because of its importance as a balancing strategy in high renewables systems. Its value stems from three factors: weather diversity across zones, complementary resource endowments, and the flexibility of the Quebec hydro system. Figure 54 in the technical supplement shows a map of the transmission lines modeled in RIO and contrasts the 2050 transmission capacity in six pathways, including the reference case. In all pathways, the transmission paths from Quebec to New York, and from Quebec to Massachusetts, had significant new capacity build. In the No Thermal pathway and the Regional Coordination pathway, significant new capacity was also built from New York to PJM. Beyond these major transmission paths, numerous smaller upgrades were made within New England and between New England and New York. Table 8 shows the cumulative transmission build in each of the studied transmission paths. The net-zero scenarios with the highest total regional transmission build are on the left side of the table, and those with the lowest total build are on the right side. Massachusetts does not always follow the regional trends. The highest builds occurred in the No Thermal, Regional Coordination, and

6.4 Electricity balancing

In the pathways studied, nearly all electricity not supplied by nuclear generation or imports comes from non-dispatchable, variable renewable generation. Gas generation plays a critical reliability role in such a system, but its contribution to total annual energy production is small. These changes represent a fundamental shift in the planning and operation of power systems, and the implications warrant further discussion.

One important conclusion is that the procurement of capacity (MW) and energy (MWh) are fundamentally separate in decarbonized energy systems. The most resource-constrained days (for example, see the February 16th hourly profile in Figure 28) look nothing like the average day (see Figure 25). The average day indicates the requirements for renewable procurement and meeting the carbon emissions target, which are primarily about energy. The resource-constrained day, on the other hand, indicates the requirements for storage, transmission, and thermal power plants, which are primarily about capacity.

For evaluating the operational impacts of high variable generation on the electricity system, it is instructive to consider the temporal and spatial dimensions of different aspects of the balancing problem shown in

Figure 41. The solution to any one of the challenges shown must be specific to its location on the system (described in terms of voltage level) and the timescale over which the challenge manifests. Thought about in this way, it is clear that there are no silver bullet solutions that address all the challenges raised by variable generation; instead, what is required is a collection of different measures that work in concert. A subset of these, including thermal generation, storage, flexible load, transmission, and curtailment, are shown in Figure 27.

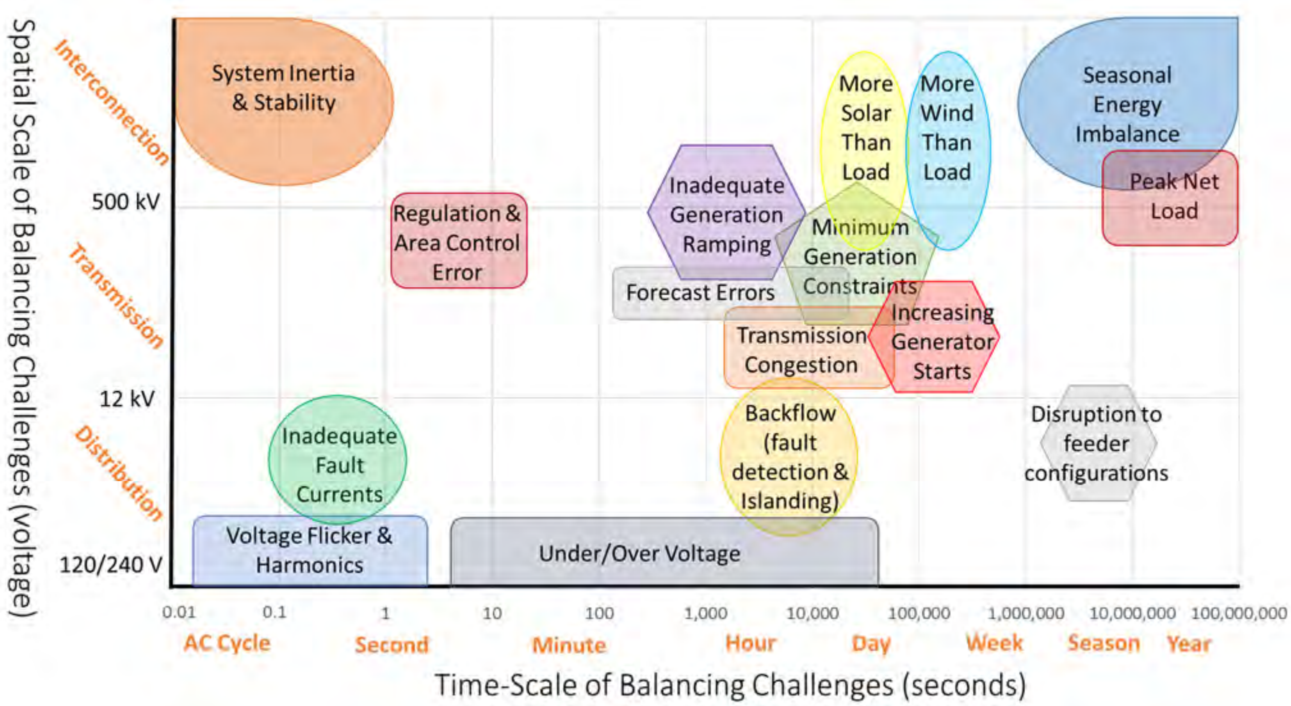
This study has not addressed balancing challenges that occur either at the sub-hourly time scale or on geographic scales smaller than New England states. As noted elsewhere, local electricity storage could play an important role in addressing both sub-state and sub-hourly balancing challenges. Pathways such as the DER Breakthrough, with a high rooftop PV build, may create challenges for distribution systems. Some of these challenges could be addressed through flexible load operation, and others could be addressed by the same upgrades that will already be required to meet new electrification loads, but these aspects were not explored in this report.

The Northeast region presents a unique set of challenges and opportunities when it comes to renewable balancing. The region has large offshore wind potential that is anticipated to have a low levelized cost of energy, but simulated wind datasets show that offshore wind can drop to near zero in any month and remain at low levels of output for long stretches.[70] Across all pathways, the challenges posed by wind variability are made manageable, in part through gas generation and in part through operational coordination with Hydro Quebec, which has over 100 TWh of energy stored behind dams in Quebec, and the ability to shift energy on a seasonal time scale. This study's results are in full agreement with previous studies that highlight the mutual benefits of transborder electricity trade. However, operational coordination involves more than the single issue of trade with Quebec; it also encompasses greater coordination with New York, and between different ISO-NE regions. For example, this study's results show clear patterns of resource specialization within ISO-NE—Massachusetts building offshore wind while Vermont and New Hampshire build solar, with mutually beneficial

[70] The NREL wind toolkit shows offshore wind in Massachusetts dropping below 5% for six consecutive days in August 2012.

trade among them taking advantage of resource diversity. This dynamic among others represents a new operational paradigm in the region, and with it come challenges that go beyond a mere tabulating of the transmission and generating technologies that must be built. The next section discusses electricity markets, just one of the institutional barriers that ahead on the path to Net Zero.

Figure 41. The challenges that can arise in balancing high variable generation (wind & solar) systems are numerous. Most have been extensively studied, with technical solutions existing for each. However, the associated costs are uncertain and no power systems the size of ISO-NE have yet achieved renewable penetrations that match those envisioned in this study. Figure credit: Evolved Energy Research



6.5 Electricity markets

The rapid decarbonization of the New England electricity system envisaged in this report points to the need for major changes in ISO-NE electricity markets, quite distinct from whatever changes are required in engineering and operating procedures to support a high renewables electricity system. We described the basic issues in previous work,[71] which is summarized here in abridged form. The need for changes in electricity markets stems from the fact that electricity markets were originally designed under a paradigm in which most generators were assumed to be dispatchable and to have a non-zero marginal cost, and in which load was passive and far more difficult and costly to control than supply. These assumptions are almost entirely flipped on their heads in a high renewables system, giving rise to a new market paradigm in which almost all costs are fixed, supply itself is variable, and new technology enables demand-side flexibility.

The first key market challenge is how to keep the necessary level of thermal generators in the system. This report highlights the role of thermal generation in a future ISO-NE system with high penetrations of wind and solar (discussed in Sections 5.4.3 and 6.1.2). Thermal generating plants are needed for reliability in a lowest-

[71] Jones, et al. 2019, IEEE Power & Energy Magazine, Electrification and the Future of Electricity Markets, https://www.evolved.energy/post/2018/07/18/future-of-electricity-markets

Figure 53 ISO-NE installed capacity by year across pathways.

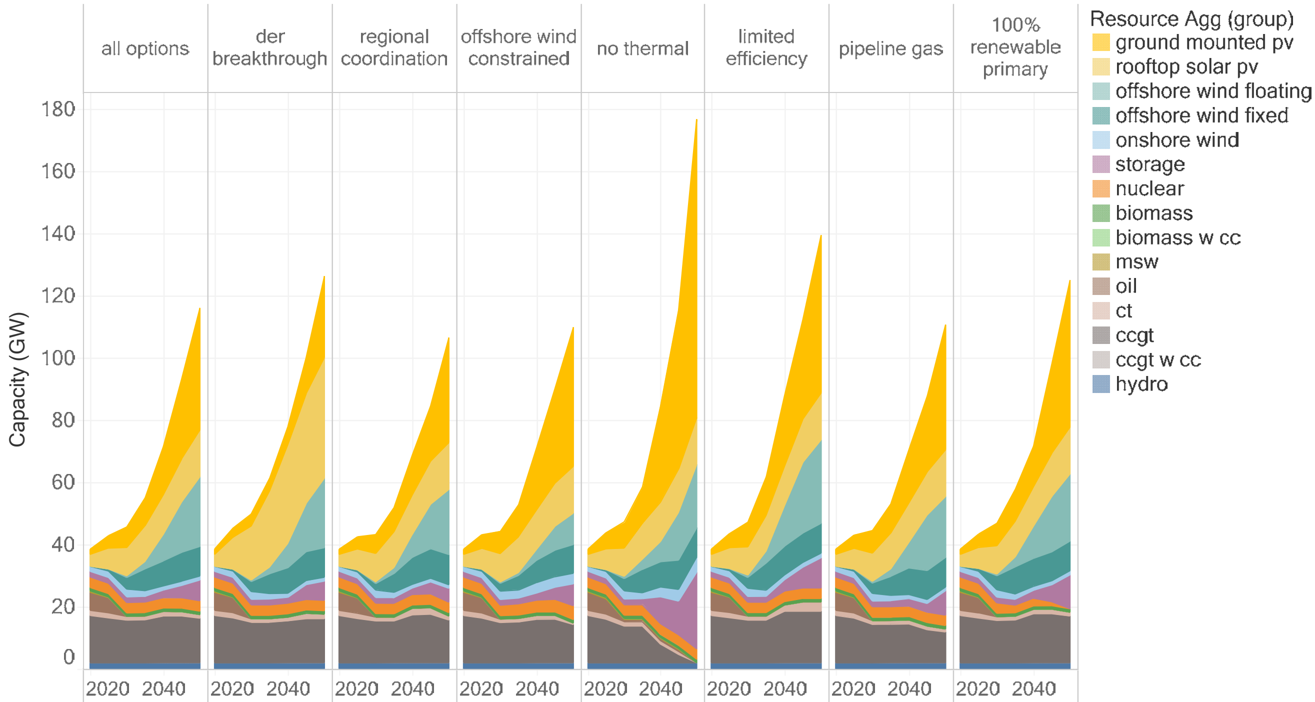


Figure 54 Electricity supply in the Offshore Wind Constrained pathway for each zone in the Northeast.

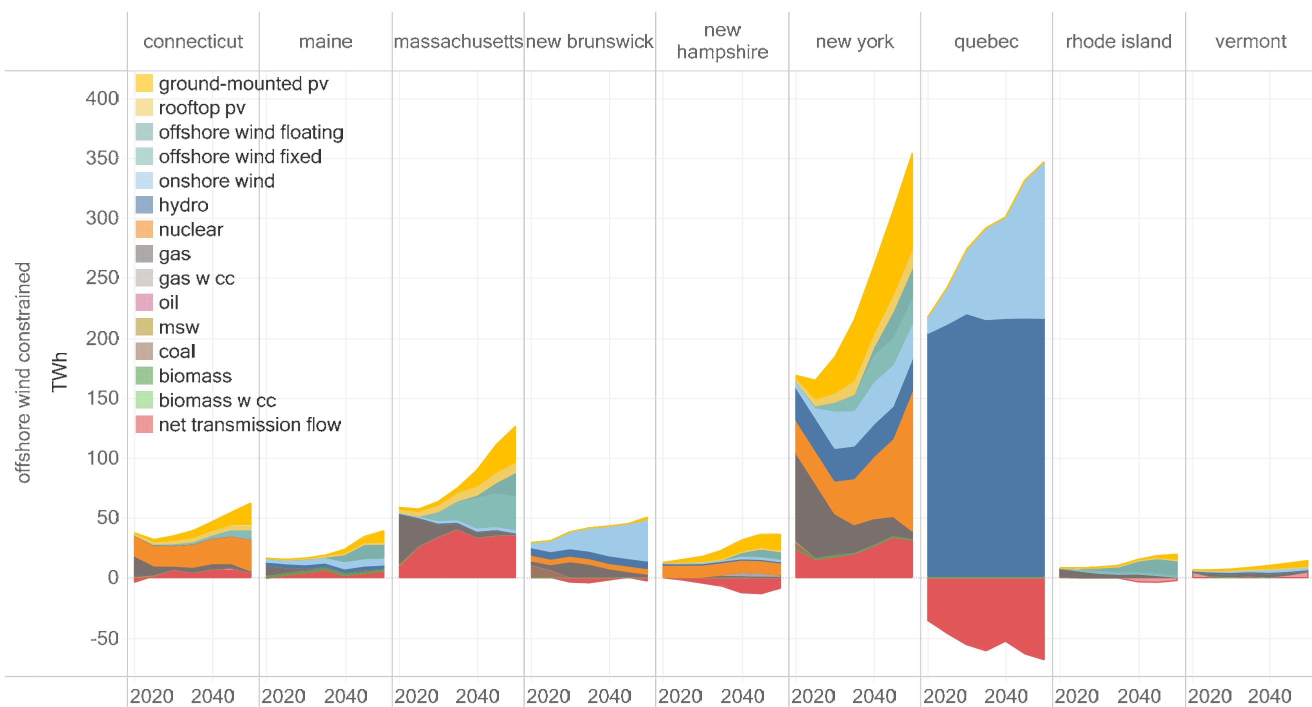
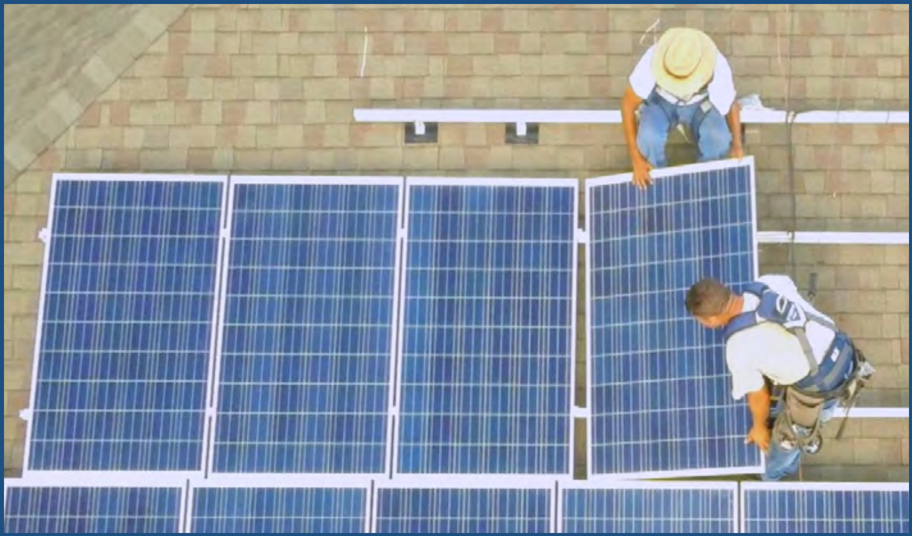


EXHIBIT 8

Prepared in accordance with Section 16a-3a of the Connecticut General Statutes



Integrated Resources Plan

Pathways to achieve a 100% zero carbon electric sector by 2040

OCTOBER 2021

Connecticut Department of Energy and Environmental Protection

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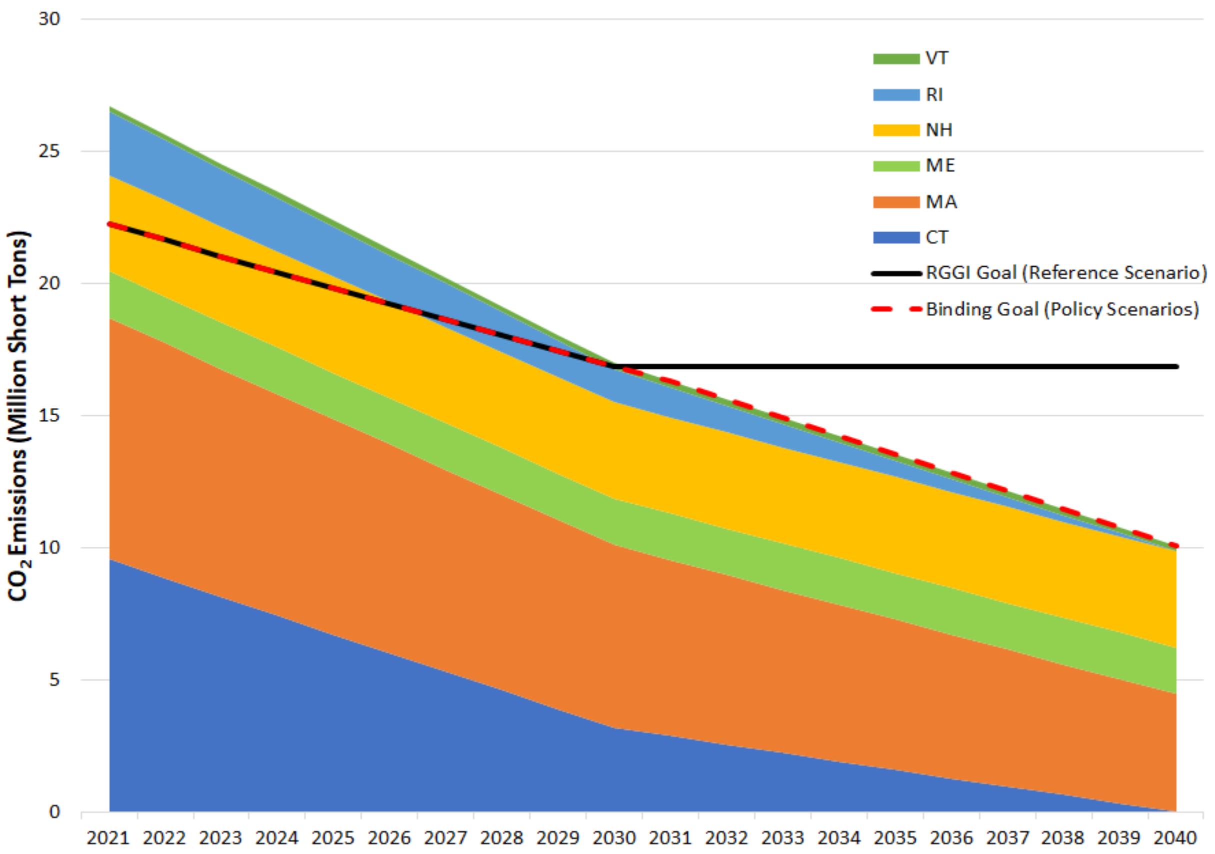
Figure 1.1: Annual ISO-NE CO_2 Emissions Comparison, Base Load Scenarios



Additionally, the model was required to meet long-term resource adequacy (reliability) requirements. This means that, given current technology, the model retained some fossil generation to ensure that there are enough resources that can quickly produce power during periods of extreme peak demand in the region, or if a resource suddenly goes offline.

APPENDIX A1

The model also calculates the present value of all existing resources and determines which existing generators would be likely to shut down, or retire, based on differential costs and benefits through 2040. The model runs until it produces a balanced solution of new generating resource additions and retirements, taking into account electric system needs, including reliability, and ratepayer cost. Each time the model is run, it refines the set of new resource options and retirements it places into the system and tracks their economic performance based on anticipated market prices resulting from which resources are selected in the model run. Specifics about projected resource costs are included in Appendix A1. At the end of each run, the model decides how to adjust the current set of new builds and retirements until the model selects an optimal solution. Because Connecticut is part of the New England regional electricity market, forcing the model to retire all of Connecticut's in-state fossil generation would ultimately not achieve the outcomes desired by such a policy. The reality is that, under the current market structure, if Connecticut were to force the closure of all in-state fossil plants the result would likely be that more expensive, dirtier fossil plants in other states would fill in the gap, exporting their power to consumers in Connecticut. Thus, while emissions from plants located in Connecticut would go down, regional emissions would increase significantly, which is not a desirable outcome, particularly because climate change is a global problem. The Department has determined that the balance of interests supports allowing the model to retire the most uneconomic and dirtiest plants throughout New England towards meeting the aggregate emissions reductions goals of the New England states, including the 100% Zero Carbon Target assumed for Connecticut. This approach is currently consistent with that of policies developing in other states. As of July 2021, nearly all of the states with 100% zero or net-zero carbon electricity supply statutory goals focus their goals on the GHG emissions of electricity sold to ratepayers, not energy generated in the state.[32]

Elsewhere in this IRP, however, the Department identifies strategies for reducing emissions from in-state fossil generation, which contributes to air quality impacts that disproportionately harm many environmental justice communities. These include market reforms (discussed in Objective 2), placing a carbon tax on in-state generation (discussed in Objective 4), advancing technology in energy storage and hydrogen production (discussed in Objective 5), and continued refinement of modeling assumptions.

Determining What Counts towards Connecticut's 100% Zero Carbon Target

Another important assumption used in the modeling exercise is what types of resources "count" towards compliance with the 100% Zero Carbon Target. For the purpose of this IRP, DEEP took a multi-step approach—which can be described as a simplified consumption-based emissions accounting method—to determine what emissions should be "assigned" (i.e. credited to Connecticut) towards meeting the 100% Zero Carbon Target.[33]

First, the emissions profile from any zero carbon resources that have already been, or would need to be, procured by Connecticut under long-term contracts funded by Connecticut ratepayers to meet the 100% Zero Carbon Target are assigned to the State. This assignment is made even though any RECs associated with those contracts may be either retained or sold by the EDCs under current practice. Using this GHG consumption-based inventory for the electric sector, the IRP identified the percent of Connecticut's electricity consumption that will be carbon-free over the Reference scenario study period.

After the emission profiles from these contracted resources are assigned to Connecticut's load, the emissions from the remaining "unassigned" resources across the region are totaled, and the model assigns each state a share of those emissions proportional to the state's electricity consumption, or load. Connecticut's load share of those emissions from "unassigned" resources in the region is applied to the remaining load needed to be met in Connecticut. To account for the fossil fuel resources needed for reliability purposes in 2040, additional clean energy is brought online and attributed to Connecticut in the IRP modeling to meet the 100% Zero Carbon Target as required by EO3. It is important to note that the modeling selects specific types of resource additions (technologies) needed each year to maintain progress towards the Regional Emissions Goal based on reliability and projected cost optimization, as described above. The resulting assignments of these selected resources to Connecticut in each year should be interpreted as the quantity of zero carbon energy the State would need to procure based on those resource cost projections. Any procurements DEEP conducts for resources based on the findings of

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[32] The states referenced in this statement currently include Arizona, California, Hawaii, Maine, New Mexico, New York, Nevada, Oregon, Virginia, Vermont, and Washington.

[33] As defined in DEEP's *2017 Greenhouse Gas Emissions Inventory*, "a consumption-based approach calculates emissions based on Connecticut's share of electricity consumption in New England, using the emissions profile of the regional electric grid's generation fuel mix." https://portal.ct.gov/-/media/DEEP/climatechange/2017_GHG_Inventory/2017_GHG_Inventory.pdf

this IRP to meet the 100% Zero Carbon Target would open to all zero carbon Class I resources, consistent with past grid-scale procurements conducted by the State.

An overview of the modeling results for each scenario is presented below in this Objective, with more detailed modeling results included in Appendix A3.

APPENDIX A3

The Scenarios Tested in the Model

For the IRP, DEEP tested five scenarios, including a "business-as-usual" Reference scenario which meets the existing regional emissions reduction target established by RGGI, plus four scenarios which use different resource portfolios to meet the Regional Emissions Target (including the 100% Zero Carbon Target) by 2040. Each of the five scenarios is evaluated against two different forecasts of electricity consumption trends:

- in the "Base" case, electricity consumption continues on the existing trajectory based on current energy policies and primarily relies on the ISO-NE 2019 Capacity, Energy, Loads and Transmission (CELT) Forecast;[34]
- in the other "Electrification" case, the deployment of electric vehicles and building heating technology are assumed to triple by 2040, increasing electricity consumption by 18,800 GWh in 2040 relative to the base case.[35]

APPENDIX A1

Additional information on the assumptions used to develop the load cases can be found in Appendix A1. In each of the scenarios, the model selects different quantities of zero-emission resources to meet the Regional Emissions Target, including the 100% Zero Carbon Target for Connecticut, with the goal of minimizing associated costs. The zero-emission resource types selected include:

- offshore wind (OSW),
- land-based wind (LBW),
- grid-scale solar photovoltaics (PV),
- nuclear generation,
- hydroelectricity imported from Canada, and
- grid-scale battery storage.

The model also relied on some fossil-fueled generation and imports from New York and Canada over existing transmission tie lines to meet the reliability requirements of the region, without exceeding the applicable Regional Emissions Target for each scenario. The ten resulting scenarios are summarized by Table 1.1 below.

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[34] Each year, ISO New England prepares a projected forecast of the next 10 years' annual capacity, energy demand, loads, and transmission needs. This is used in power systems planning and reliability studies. These studies are all accessible at https://www.iso-ne.com/system-planning/system-plans-studies/celt/

[35] The purpose of the Electrification load case is to begin planning and modeling resource needs under a future with significantly higher forecasted electricity demand. The assumptions used to develop this load case are not policy recommendations but were influenced by policy recommendations from other statutory reports produced by DEEP. the Governor's Council on Climate Change, and regional efforts. Electrification assumptions were based on what was known and knowable at the time of modeling and are subject to change with continued planning, modeling, and research. Detailed discussion on these assumptions is available in Appendix A1.

Appendix A3. Results

1 Capacity Expansion

As explained in Appendix 1, Aurora's long-term capacity expansion function was used to determine economic resource additions and retirements over the IRP planning horizon over and above known resource additions and retirements. The following charts reflect the resource balance after accounting for both scheduled and economic resource additions and retirements.

Figure 1 and Figure 2 provide an overview of total nameplate capacity by fuel type in 2040, the final year of the study period. The final resource mix for each scenario reflects the various retirements and additions resulting from the scenario capacity expansion. All Electrification load scenarios resulted in fewer retirements and increased OSW build out due to the higher load relative to the counterpart scenarios under the Base load case. As shown in Section 4.1, fossil generation declines over time, but capacity is still needed to meet resource adequacy needs.

Figure 1: 2040 Regional Capacity by Fuel Type, Base Load Scenarios

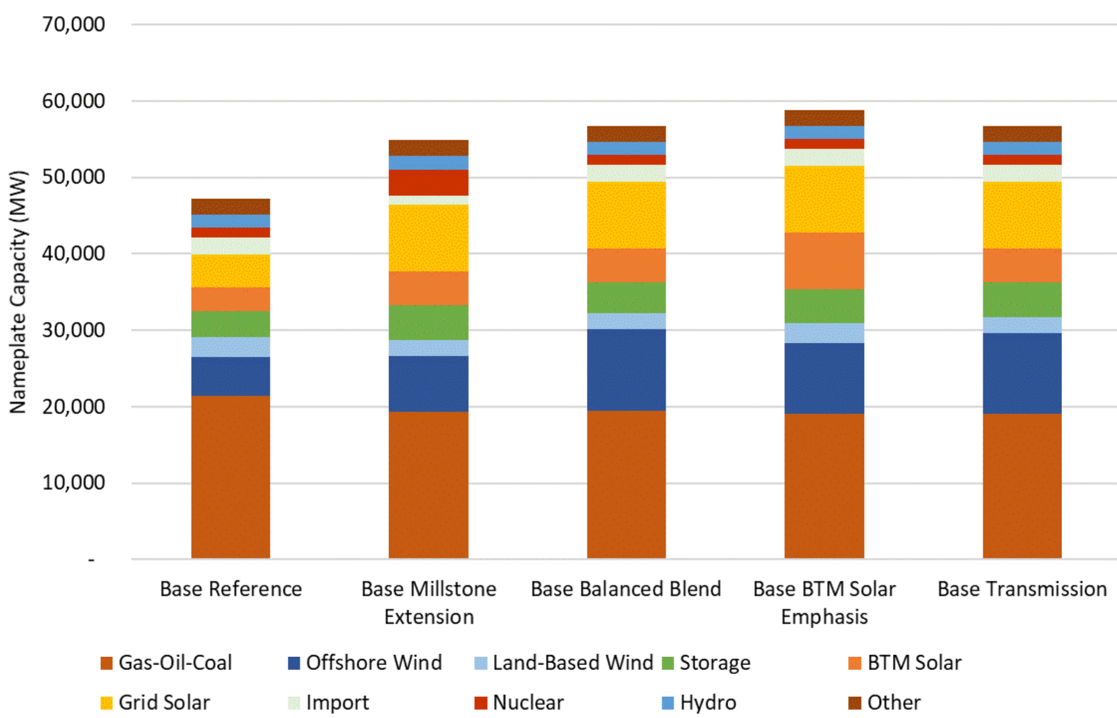
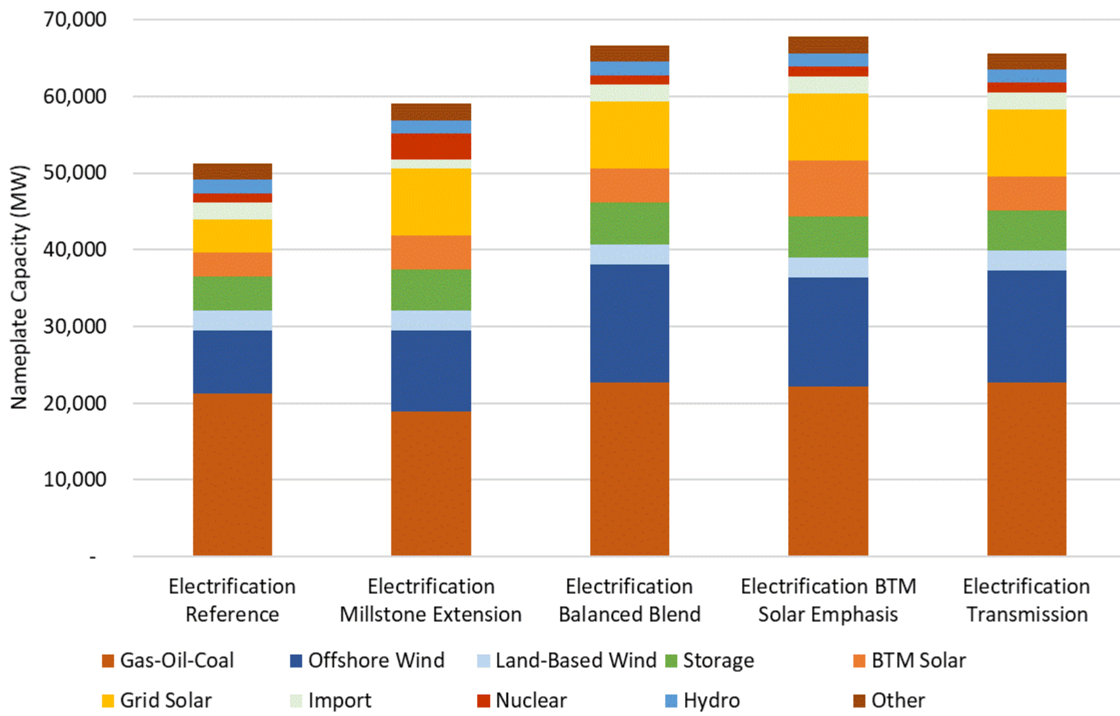


Figure 2: 2040 Regional Capacity by Fuel Type, Electrification Load Scenarios



The change in capacity over the study period is shown for all Base load scenarios in Figure 3 and for all Electrification load scenarios in Figure 4. Additions for each scenario are broken out by technology type. Retirements are shown in the aggregate. More detail on technology-specific retirements is shown in Figure 5 and Figure 6.

BTM Solar and import additions are identical for the two load cases across each resource case. In contrast, energy efficiency additions are varied across the two load cases but are held constant for the five scenarios. As previously noted, the largest disparities across load cases include higher levels of additions in scenarios under the Electrification load case, particularly OSW additions, and lower levels of retirements for Electrification load scenarios. Increasing planning reserve requirements in the Electrification load scenarios required that the capacity expansion built additional battery storage and reduced retirements relative to the corresponding Base load scenarios.

EXHIBIT 9

February 26, 2021

VIA ELECTRONIC FILING

The Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: ISO New England Inc., Docket No. ER21-___-000
Forward Capacity Auction Results Filing
April 12, 2021 COMMENT DATE REQUIRED BY REGULATION

Dear Secretary Bose:

Pursuant to Section 205 of the Federal Power Act ("FPA")[1] and Section III.13.8.2 of the ISO New England Transmission, Markets and Services Tariff (the "Tariff"),[2] ISO New England Inc. (the "ISO") submits this Forward Capacity Auction Results Filing ("FCA Results Filing") for the fifteenth Forward Capacity Auction ("FCA").[3] Section III.13.8.2 (a) of the Tariff requires the ISO to file the results of the FCA with the Federal Energy Regulatory Commission ("Commission" or "FERC") as soon as practicable after the FCA is complete. The fifteenth FCA was held on February 8, 2021 for the June 1, 2024 through May 31, 2025 Capacity Commitment Period. The ISO submits this filing in accordance with the Tariff.

Pursuant to Section III.13.8.2 (c) of the Tariff, any objection to the FCA results must be filed with the Commission within 45 days from the date of the FCA Results Filing. **Accordingly, any objections must be filed on or before April 12, 2021, and the ISO requests that the Commission issue a notice setting an April 12, 2021 comment date.** As discussed below, the ISO requests an effective date of June 26, 2021, which is 120 days from the date of this submission.

In accordance with Section III.13.8.2 of the Tariff, this submission contains the results of the fifteenth FCA, including the Capacity Zones in the auction; the Capacity Clearing Price in each of those Capacity Zones; a list of which resources received Capacity Supply Obligations in each Capacity Zone; and the amount of those Capacity Supply

[1] 16 U.S.C. § 824d.

[2] The rules governing the Forward Capacity Market ("FCM Rules") are primarily contained in Section III.13 of the Tariff, but also may include other provisions, including portions of Section III.12.

[3] Capitalized terms used but not defined in this filing are intended to have the meaning given to such terms in the Tariff.

Obligations.[4] Pursuant to Section III.12.4 of the Tariff, the Capacity Zones for the fifteenth FCA were the Southeast New England Capacity Zone ("SENE"), the Northern New England Capacity Zone ("NNE"), the Maine Capacity Zone ("Maine") and the Rest-of-Pool ("ROP") Capacity Zone. The SENE Capacity Zone included the Southeastern Massachusetts, Rhode Island and Northeastern Massachusetts/Boston energy load zones. The SENE Capacity Zone was modeled as an import-constrained Capacity Zone. The NNE Capacity Zone included the New Hampshire, Vermont, and Maine Load Zones. NNE was modeled as an export-constrained Capacity Zone. The Maine Load Zone was modeled as a separate nested export-constrained Capacity Zone within NNE. The ROP Capacity Zone included the Connecticut and Western/Central Massachusetts Load Zones.

Section III.13.8.2 (b) of the Tariff requires the ISO to provide documentation regarding the competitiveness of the FCA. The documentation may include certification from the auctioneer and the ISO that: (i) all resources offering and bidding in the FCA were properly qualified in accordance with the provisions of Section III.13.1; and (ii) the FCA was conducted in accordance with the provisions of Section III.13. To meet the requirement of Section III.13.8.2 (b) of the Tariff, the ISO has included the Testimony of Robert G. Ethier, Vice President of System Planning at the ISO ("Ethier Testimony"); the Testimony of Alan McBride, Director of Transmission Services and Resource Qualification at the ISO ("McBride Testimony"); and the Testimony of Lawrence M. Ausubel, the auctioneer ("Ausubel Testimony").

The ISO tenders the instant filing in compliance with Section III.13.8.2 of its Tariff pursuant to Section 205 of the FPA, and the ISO requests that the Commission find that the ISO conducted the fifteenth FCA in accordance with its FERC-approved Tariff.

I. COMMUNICATIONS

All correspondence and communications in this proceeding should be addressed to the undersigned as follows:

[4] Section III.13.8.2 of the Tariff requires the ISO to include in the FCA Results Filing the substitution auction clearing prices and the total amount of payments associated with any demand bids cleared at a substitution auction clearing price above their demand bid prices. However, as explained below and in the Ethier Testimony, the substitution auction was not conducted in the fifteenth FCA because there were no active demand bids. For that reason, this FCA Results Filing does not include substitution auction clearing prices or total amount of payments associated with any demand bids cleared at a substitution auction clearing price above their demand bid prices.

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II. STANDARD OF REVIEW

The ISO tenders the instant filing in compliance with Section III.13.8.2 of its Tariff and pursuant to Section 205 of the FPA.[5] The ISO respectfully requests that the Commission find that the fifteenth FCA Results Filing meets the standard of Section 205, in that the results are just and reasonable rates derived from the auction that was conducted in accordance with the ISO's FERC-approved Tariff.

III. REQUESTED EFFECTIVE DATE

The ISO respectfully requests that the Commission accept the fifteenth FCA Results Filing, confirming that the auction was conducted in conformance with the ISO's Commission-approved Tariff, to be effective June 26, 2021, which is 120 days after the date of submission. Under the Tariff, parties have 45 days to file with the Commission an objection to the FCA Results Filing.[6] An effective date of 120 days from the date of submission gives interested parties an opportunity to respond to any objections and provides the Commission time to review the FCA Results Filing and associated pleadings.

IV. SPECIFIC FCA RESULTS

A. Capacity Zones Resulting from the Auction

Section III.13.8.2 (a) of the Tariff requires the ISO to provide the Capacity Zones resulting from the FCA. The Capacity Zones for the fifteenth FCA were SENE, NNE, Maine, and ROP. The Capacity Zones determined under Section III.13.2.3.4 of the Tariff are the same Capacity Zones that were modeled pursuant to Section III.12.4 of the Tariff.

[5] It should be noted that the Commission has consistently held that the matters that may properly be in dispute in the annual FCA results filing are the results of the FCA and not the underlying market design or rules. *See, e.g., ISO New England Inc.*, 130 FERC ¶ 61,145 at P 33 (2010) (finding that challenges to the Forward Capacity Market ("FCM") market design are outside the scope of the proceeding evaluating the FCA results filing).

[6] Tariff Section III.13.8.2 (c).

B. Capacity Clearing Prices

The Tariff requires the ISO to provide the Capacity Clearing Price in each Capacity Zone (and, pursuant to Section III.13.2.3.3 (d), the Capacity Clearing Price associated with certain imports, if applicable).[7] For the fifteenth FCA, the descending clock auction starting price in each Capacity Zone was $13.932/kW-month. As explained in the Ethier Testimony, the auction resulted in the Capacity Clearing Price of $3.980/kW-month for the SENE Capacity Zone, $2.477/kW-month for NNE and Maine Capacity Zones, and $2.611/kW-month for the ROP Capacity Zone.[8]

Imports over the New York AC Ties external interface, totaling 684.059 MW, imports over the Hydro-Quebec Highgate external interface, totaling 60.000 MW, imports over the New Brunswick external interface, totaling 226.000 MW, and imports over the Phase I/II HQ Excess external interface, totaling 517.000 MW, will also receive a Capacity Clearing Price. The New York AC Ties and Phase I/II HQ Excess will receive $2.611/kW-month. Hydro-Quebec Highgate and New Brunswick will receive $2.477/kw-month.

C. Substitution Auction Clearing Prices and Total Amount of Payments Associated with any Demand Bids Cleared at a Substitution Auction Clearing Price Above Their Demand Bid Prices

Section III.13.8.2 (a) of the Tariff requires the ISO to provide the clearing prices and total amount of payments associated with any demand bids cleared at the substitution auction clearing price above their demand bid prices. In the fifteenth FCA, there were no active demand bids for the substitution auction and, accordingly, the substitution auction was not conducted.

D. Capacity Supply Obligations

The Tariff requires the ISO to specify in the FCA Results Filing the resources that received Capacity Supply Obligations in each Capacity Zone.[9] This information is provided in Attachment A.

The Tariff also requires the ISO to list which resources cleared as Conditional Qualified New Generating Capacity Resources and to provide certain information relating to Long Lead Time Facilities.[10] No resources cleared as Conditional Qualified New Generating Capacity Resources in the fifteenth FCA. In addition, there were no Long Lead Time Facilities that secured a Queue

[7] Tariff Section III.13.8.2 (a).

[8] Ethier Testimony at 8-13.

[9] Tariff Section III.13.8.2 (a).

[10] *Id.*

Position to participate as a New Generating Capacity Resource in the fifteenth FCA; as such, there were no resources with a lower queue priority that were selected in the FCA subject to a Long Lead Time Facility with a higher queue priority.

E. De-List Bids Reviewed for Reliability Purposes

Prior to the fifteenth FCA, pursuant to Section III.13.2.5.2.5 of the Tariff, the ISO reviewed each submitted Retirement De-List Bid, Permanent De-List Bid, and Static De-List Bid[11] to determine if the capacity associated with each such bid was needed for reliability reasons. During the FCA, also pursuant to Section III.13.2.5.2.5, the ISO reviewed a sufficient quantity of Dynamic De-List Bids associated with reaching the Capacity Clearing Price to determine if the capacity associated with each such bid was needed for reliability reasons. The capacity is deemed to be needed for reliability reasons if a violation of any North American Electric Reliability Corporation, Northeast Power Coordinating Council, or ISO criteria would occur in the absence of the capacity. The ISO's review of de-list bids considered the availability of all existing supply resources in the FCM, including Demand Capacity Resources. The ISO's process for performing the reliability review of de-list bids pursuant to Section III.13.2.5.2.5 of the Tariff is described in that provision, and in Section 7 of ISO New England Planning Procedure No. 10 — Planning Procedure to Support the Forward Capacity Market.

Section III.13.8.2 (a) of the Tariff requires that, in the FCA Results Filing, the ISO enumerate de-list bids rejected for reliability reasons pursuant to Section III.13.2.5.2.5, and the reasons for those rejections. As explained in the McBride Testimony, in the fifteenth FCA, the ISO did not reject any bids for reliability reasons pursuant to Section III.13.2.5.2.5 of the Tariff.

V. DOCUMENTATION REQUIRED PURSUANT TO SECTION III.13.8.2 (b) OF THE TARIFF

Section III.13.8.2 (b) of the Tariff requires the ISO to provide documentation regarding the competitiveness of the FCA, and states that the documentation may include certification from the auctioneer and the ISO that: (i) all resources offering and bidding in the FCA were properly qualified in accordance with the provisions of Section III.13.1 of the Tariff; and (ii) the FCA was conducted in accordance with the provisions of Section III.13 of the Tariff. In this regard, the ISO has included the Ethier Testimony, the McBride Testimony, and the Ausubel Testimony.

[11] No Export De-List Bids or Administrative Export De-List Bids were submitted for the fifteenth FCA.

In his testimony, Dr. Ethier certifies that all resources offering and bidding in the fifteenth FCA were qualified in accordance with Section III.13.1 of the Tariff.[12] Dr. Ethier also explains the prices resulting from the auction and how the prices were determined.[13]

In his testimony, Mr. McBride testifies that he oversaw the reliability review of de-list bids for the fifteenth FCA pursuant to Section III.13.2.5.2.5 of the Tariff.

Dr. Ausubel, the auctioneer, and chairman and founder of Power Auctions LLC, the company that helped implement and administer the FCA, certifies that the auction was conducted in accordance with Section III.13.2 of the Tariff.[14] Dr. Ausubel's certification is based on his vast experience in conducting energy auctions.

VI. ADDITIONAL SUPPORTING INFORMATION

The ISO tenders the instant filing in compliance with Section III.13.8.2 of its Tariff pursuant to Section 205 of the FPA.[15] Section 35.13 of the Commission's regulations generally requires public utilities to file certain cost and other information related to an examination of cost-of-service rates.[16] However, the results of the FCA are not traditional "rates" and the ISO is not a traditional investor-owned utility. Therefore, to the extent necessary, the ISO requests waiver of Section 35.13 of the Commission's regulations. Notwithstanding its request for waiver, the ISO submits the following additional information in compliance with the identified filing regulations of the Commission applicable to Section 205.

35.13(b)(1) - Materials included herewith are as follows:

- This transmittal letter;
- Attachment A: List of Capacity Supply Obligations;
- Attachment B: Testimony of Robert G. Ethier;

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[12] Ethier Testimony at 2.

[13] *Id.* at 8-13.

[14] Ausubel Testimony at 4.

[15] As noted above, the Commission has consistently held that the scope of the proceeding evaluating the annual FCA results filing is limited to the results of the FCA. *See e.g.*, *ISO New England Inc.*, 130 FERC ¶ 61,145 at P 33 (2010) (finding that challenges to the FCM market design are outside the scope of the proceeding evaluating the FCA results filing).

[16] 18 C.F.R. § 35.13 (2020).

- Attachment C: Testimony of Alan McBride;

- Attachment D: Testimony of Lawrence M. Ausubel; and

- Attachment E: List of governors and utility regulatory agencies in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont to which a copy of this filing has been mailed.

35.13(b)(2) - The ISO respectfully requests that the Commission accept this filing to become effective on June 26, 2021, which is 120 days after the submission of this FCA Results Filing.

35.13(b)(3) - Pursuant to Section 17.11 (e) of the Participants Agreement, Governance Participants are being served electronically rather than by paper copy. The names and addresses of the Governance Participants are posted on the ISO's website at https://www.iso-ne.com/participate/participant-asset-listings/directory?id=1&type=committee. An electronic copy of this transmittal letter and the accompanying materials have also been emailed to the governors and electric utility regulatory agencies for the six New England states which comprise the New England Control Area, and to the New England Conference of Public Utility Commissioners, Inc. The names and addresses of these governors and regulatory agencies are shown in Attachment E.

35.13(b)(4) - A description of the materials submitted pursuant to this filing is contained in the transmittal letter;

35.13(b)(5) - The reasons for this filing are discussed in this transmittal letter; and

35.13 (b)(7) - The ISO has no knowledge of any relevant expenses or cost of service that have been alleged or judged in any administrative or judicial proceeding to be illegal, duplicative, or unnecessary costs that are demonstrably the product of discriminatory employment practices.

VII. CONCLUSION

In this FCA Results Filing, the ISO has presented all of the information required by the Tariff. The ISO has demonstrated that the fifteenth FCA was conducted in accordance with the Tariff, as found just and reasonable by the Commission. The ISO has specified the Capacity Zones that were used in the auction. The ISO has also provided the Capacity Clearing Price for each of the Capacity Zones and external interfaces, and it has provided a list of resources that received Capacity Supply Obligations. Finally, the ISO has provided documentation, in the form of testimony, regarding the outcome of the fifteenth FCA. Accordingly, the ISO requests that the Commission accept the results of the fifteenth FCA within 120 days of this filing.

Respectfully submitted,

By: *<u>/s/ Margoth Caley</u>*

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cc: Governance Participants (electronically) and entities listed in Attachment E.

Attachment A

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
253	TURNKEY L	Generator	8505	Northern N	NH	NH	Existing	0.688	0.688	0.688	0.688	0.698	0.698	0.698	0.698	0.698	0.698	0.698	0.698
321	MANCHEST	Generator	8506	Southeast I	RI	RI	Existing	157	157	157	157	157	157	157	157	157	157	157	157
322	MANCHEST	Generator	8506	Southeast I	RI	RI	Existing	157	157	157	157	157	157	157	157	157	157	157	157
323	MANCHEST	Generator	8506	Southeast I	RI	RI	Existing	154	154	154	154	154	154	154	154	154	154	154	154
326	ALTRESCO	Generator	8500	Rest-of-Po	MA	WCMA	Existing	149.115	149.115	149.115	149.115	149.115	149.115	149.115	149.115	149.115	149.115	149.115	149.115
327	AMOSKEAG	Generator	8505	Northern N	NH	NH	Existing	3.442	3.442	3.442	3.442	13.239	13.239	13.239	13.239	13.239	13.239	13.239	13.239
328	GULF ISLAN	Generator	8503	Maine	ME	ME	Existing	33.44	33.44	33.44	33.44	33.44	33.44	33.44	33.44	33.44	33.44	33.44	33.44
329	ASCUTNEY	Generator	8505	Northern N	VT	VT	Existing	8.322	8.322	8.322	8.322	8.322	8.322	8.322	8.322	8.322	8.322	8.322	8.322
330	AYERS ISLA	Generator	8505	Northern N	NH	NH	Existing	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29
331	AZISCOHOS	Generator	8503	Maine	ME	ME	Existing	6.645	6.645	6.645	6.645	6.645	6.645	6.645	6.645	6.645	6.645	6.645	6.645
335	BELLOWS F	Generator	8505	Northern N	NH	NH	Existing	47.216	47.216	47.216	47.216	47.216	47.216	47.216	47.216	47.216	47.216	47.216	47.216
336	BERLIN 1 G	Generator	8505	Northern N	VT	VT	Existing	40.956	40.956	40.956	40.956	40.956	40.956	40.956	40.956	40.956	40.956	40.956	40.956
337	BETHLEHEI	Generator	8505	Northern N	NH	NH	Existing	15.264	15.264	15.264	15.264	15.264	15.264	15.264	15.264	15.264	15.264	15.264	15.264
346	BOLTON FA	Generator	8505	Northern N	VT	VT	Existing	1.01	1.01	1.01	1.01	2.791	2.791	2.791	2.791	2.791	2.791	2.791	2.791
348	BOOT MILL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	5.012	5.012	5.012	5.012	11.262	11.262	11.262	11.262	11.262	11.262	11.262	11.262
349	WHEELABR	Generator	8500	Rest-of-Po	CT	CT	Existing	58.488	58.488	58.488	58.488	58.488	58.488	58.488	58.488	58.488	58.488	58.488	58.488
355	BRANFORD	Generator	8500	Rest-of-Po	CT	CT	Existing	15.84	15.84	15.84	15.84	15.84	15.84	15.84	15.84	15.84	15.84	15.84	15.84
356	BRISTOL RE	Generator	8500	Rest-of-Po	CT	CT	Existing	12.764	12.764	12.764	12.764	12.834	12.834	12.834	12.834	12.834	12.834	12.834	12.834
357	BRIDGEWA	Generator	8505	Northern N	NH	NH	Existing	14.155	14.155	14.155	14.155	14.155	14.155	14.155	14.155	14.155	14.155	14.155	14.155
358	BRUNSWIC	Generator	8503	Maine	ME	ME	Existing	5.354	5.354	5.354	5.354	12.965	12.965	12.965	12.965	12.965	12.965	12.965	12.965
359	J. COCKWE	Generator	8500	Rest-of-Po	MA	WCMA	Existing	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5
360	J. COCKWE	Generator	8500	Rest-of-Po	MA	WCMA	Existing	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5	331.5
362	BULLS BRID	Generator	8500	Rest-of-Po	CT	CT	Existing	1.287	1.287	1.287	1.287	4.394	4.394	4.394	4.394	4.394	4.394	4.394	4.394
363	BURLINGTO	Generator	8505	Northern N	VT	VT	Existing	18.007	18.007	18.007	18.007	18.007	18.007	18.481	18.481	18.481	18.481	18.007	18.007
365	CANAL 1	Generator	8506	Southeast I	MA	SEMA	Existing	565.08	565.08	565.08	565.08	565.08	565.08	565.08	565.08	565.08	565.08	565.08	565.08
366	CANAL 2	Generator	8506	Southeast I	MA	SEMA	Existing	558.75	558.75	558.75	558.75	558.75	558.75	558.75	558.75	558.75	558.75	558.75	558.75
367	CAPE GT 4	Generator	8503	Maine	ME	ME	Existing	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75
368	CAPE GT 5	Generator	8503	Maine	ME	ME	Existing	15.822	15.822	15.822	15.822	15.822	15.822	15.822	15.822	15.822	15.822	15.822	15.822
369	CATARACT	Generator	8503	Maine	ME	ME	Existing	7.373	7.373	7.373	7.373	7.373	7.373	7.373	7.373	7.373	7.373	7.373	7.373
370	COS COB 1	Generator	8500	Rest-of-Po	CT	CT	Existing	18.932	18.932	18.932	18.932	18.932	18.932	18.932	18.932	18.932	18.932	18.932	18.932
371	COS COB 1	Generator	8500	Rest-of-Po	CT	CT	Existing	18.724	18.724	18.724	18.724	18.724	18.724	18.724	18.724	18.724	18.724	18.724	18.724
372	COS COB 1	Generator	8500	Rest-of-Po	CT	CT	Existing	18.66	18.66	18.66	18.66	18.66	18.66	18.66	18.66	18.66	18.66	18.66	18.66
375	CLEARY 9 9	Generator	8506	Southeast I	MA	SEMA	Existing	104.931	104.931	104.931	104.931	104.931	104.931	104.931	104.931	104.931	104.931	104.931	104.931
379	COBBLE M	Generator	8500	Rest-of-Po	MA	WCMA	Existing	26.52	26.52	26.52	26.52	26.52	26.52	26.52	26.52	26.52	26.52	26.52	26.52
380	COMERFOI	Generator	8505	Northern N	NH	NH	Existing	166.135	166.135	166.135	166.135	166.135	166.135	166.135	166.135	166.135	166.135	166.135	166.135
382	MERRIMAC	Generator	8505	Northern N	NH	NH	Existing	16.826	16.826	16.826	16.826	16.826	16.826	16.826	16.826	16.826	16.826	16.826	16.826
383	MERRIMAC	Generator	8505	Northern N	NH	NH	Existing	16.804	16.804	16.804	16.804	16.804	16.804	16.804	16.804	16.804	16.804	16.804	16.804
388	DARTMOU	Generator	8506	Southeast I	MA	SEMA	Existing	61.45	61.45	61.45	61.45	61.45	61.45	61.45	61.45	61.45	61.45	61.45	61.45
389	DERBY DAI	Generator	8500	Rest-of-Po	CT	CT	Existing	0.716	0.716	0.716	0.716	5.477	5.477	5.477	5.477	5.477	5.477	5.477	5.477
392	DEXTER	Generator	8500	Rest-of-Po	CT	CT	Existing	44.502	44.502	44.502	44.502	44.502	44.502	44.502	44.502	44.502	44.502	44.502	44.502
393	DEERFIELD	Generator	8500	Rest-of-Po	MA	WCMA	Existing	13.965	13.965	13.965	13.965	13.99	13.99	13.99	13.99	13.99	13.99	13.99	13.99
395	DOREEN	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	2	2	2	2	0	0
396	DEVON 10	Generator	8500	Rest-of-Po	CT	CT	Existing	14.407	14.407	14.407	14.407	14.407	14.407	14.407	14.407	14.407	14.407	14.407	14.407
397	DEVON 11	Generator	8500	Rest-of-Po	CT	CT	Existing	29.299	29.299	29.299	29.299	29.299	29.299	29.299	29.299	29.299	29.299	29.299	29.299
398	DEVON 12	Generator	8500	Rest-of-Po	CT	CT	Existing	29.227	29.227	29.227	29.227	29.227	29.227	29.227	29.227	29.227	29.227	29.227	29.227
399	DEVON 13	Generator	8500	Rest-of-Po	CT	CT	Existing	29.967	29.967	29.967	29.967	29.967	29.967	29.967	29.967	29.967	29.967	29.967	29.967
400	DEVON 14	Generator	8500	Rest-of-Po	CT	CT	Existing	29.704	29.704	29.704	29.704	29.704	29.704	29.704	29.704	29.704	29.704	29.704	29.704
401	EASTMAN	Generator	8505	Northern N	NH	NH	Existing	1.531	1.531	1.531	1.531	3.596	3.596	3.596	3.596	3.596	3.596	3.596	3.596
405	ELLSWORT	Generator	8503	Maine	ME	ME	Existing	8.711	8.711	8.711	8.711	8.711	8.711	8.711	8.711	8.711	8.711	8.711	8.711
410	ESSEX 19 H	Generator	8505	Northern N	VT	VT	Existing	2.559	2.559	2.559	2.559	4.77	4.77	4.77	4.77	4.77	4.77	4.77	4.77
412	FALLS VILLA	Generator	8500	Rest-of-Po	CT	CT	Existing	0.507	0.507	0.507	0.507	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11
413	FIFE BROO	Generator	8500	Rest-of-Po	MA	WCMA	Existing	2.282	2.282	2.282	2.282	5.499	5.499	5.499	5.499	5.499	5.499	5.499	5.499
417	FRAMINGH	Generator	8506	Southeast I	MA	NEMA	Existing	10.145	10.145	10.145	10.145	10.145	10.145	10.145	10.145	10.145	10.145	10.145	10.145
418	FRAMINGH	Generator	8506	Southeast I	MA	NEMA	Existing	10.189	10.189	10.189	10.189	10.189	10.189	10.189	10.189	10.189	10.189	10.189	10.189

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
419	FRAMINGH	Generator	8506	Southeast	MA	NEMA	Existing	11.045	11.045	11.045	11.045	11.045	11.045	11.045	11.045	11.045	11.045	11.045	11.045
420	FRANKLIN	Generator	8500	Rest-of-Po	CT	CT	Existing	15.417	15.417	15.417	15.417	15.417	15.417	15.417	15.417	15.417	15.417	15.417	15.417
421	FRONT STR	Generator	8500	Rest-of-Po	MA	WCMA	Existing	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7
424	GREAT LAK	Generator	8503	Maine	ME	ME	Existing	106	106	106	106	106	106	106	106	106	106	106	106
426	GORGE 1 D	Generator	8505	Northern N	VT	VT	Existing	8.012	8.012	8.012	8.012	8.012	8.012	8.012	8.012	8.012	8.012	8.012	8.012
427	GORHAM	Generator	8505	Northern N	NH	NH	Existing	0.701	0.701	0.701	0.701	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
432	HARRIS 1	Generator	8503	Maine	ME	ME	Existing	16.776	16.776	16.776	16.776	16.776	16.776	16.776	16.776	16.776	16.776	16.776	16.776
433	HARRIS 2	Generator	8503	Maine	ME	ME	Existing	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5
434	HARRIS 3	Generator	8503	Maine	ME	ME	Existing	33.905	33.905	33.905	33.905	33.905	33.905	33.905	33.905	33.905	33.905	33.905	33.905
435	HARRIMAN	Generator	8500	Rest-of-Po	MA	WCMA	Existing	38.765	38.765	38.765	38.765	38.471	38.471	38.471	38.471	38.471	38.471	38.471	38.471
436	HEMPHILL	Generator	8505	Northern N	NH	NH	Existing	16.873	16.873	16.873	16.873	16.873	16.873	16.873	16.873	16.873	16.873	16.873	16.873
440	HIRAM	Generator	8503	Maine	ME	ME	Existing	10.067	10.067	10.067	10.067	10.067	10.067	10.067	10.067	10.067	10.067	10.067	10.067
445	COVANTA	Generator	8503	Maine	ME	ME	Existing	20.461	20.461	20.461	20.461	20.461	20.461	20.461	20.461	20.461	20.461	20.461	20.461
446	COVANTA	Generator	8503	Maine	ME	ME	Existing	20.226	20.226	20.226	20.226	20.226	20.226	20.226	20.226	20.226	20.226	20.226	20.226
449	JACKMAN	Generator	8505	Northern N	NH	NH	Existing	3.459	3.459	3.459	3.459	3.459	3.459	3.459	3.459	3.459	3.459	3.459	3.459
452	KENDALL J	Generator	8506	Southeast	MA	NEMA	Existing	18	18	18	18	18	18	18	18	18	18	18	18
457	LAWRENCE	Generator	8500	Rest-of-Po	MA	WCMA	Existing	4.449	4.449	4.449	4.449	10.492	10.492	10.492	10.492	10.492	10.492	10.492	10.492
460	LOCKWOO	Generator	8503	Maine	ME	ME	Existing	2.947	2.947	2.947	2.947	3.981	3.981	3.981	3.981	3.981	3.981	3.981	3.981
462	LISBON RE	Generator	8500	Rest-of-Po	CT	CT	Existing	13.127	13.127	13.127	13.127	13.099	13.099	13.099	13.099	13.099	13.099	13.099	13.099
463	AEI LIVERM	Generator	8503	Maine	ME	ME	Existing	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3	35.3
464	LOST NATI	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0	0	0	0	0	0	0	0
465	DEERFIELD	Generator	8500	Rest-of-Po	MA	WCMA	Existing	18.58	18.58	18.58	18.58	18.667	18.667	18.667	18.667	18.667	18.667	18.667	18.667
467	MARBLEHE	Generator	8506	Southeast	MA	NEMA	Existing	5	5	5	5	5	5	5	5	5	5	5	5
468	MARSHFIE	Generator	8505	Northern N	VT	VT	Existing	4.405	4.405	4.405	4.405	4.405	4.405	4.405	4.405	4.405	4.405	4.405	4.405
472	M STREET	Generator	8506	Southeast	MA	NEMA	Existing	47	47	47	47	47	47	47	47	47	47	47	47
473	MCINDOES	Generator	8505	Northern N	NH	NH	Existing	10.17	10.17	10.17	10.17	10.17	10.17	10.17	10.17	10.17	10.17	10.17	10.17
474	J C MCNEIL	Generator	8505	Northern N	VT	VT	Existing	52	52	52	52	52	52	52	52	52	52	52	52
478	MIDDLETO	Generator	8500	Rest-of-Po	CT	CT	Existing	15.515	15.515	15.515	15.515	15.515	15.515	15.515	15.515	15.515	15.515	15.515	15.515
480	MIDDLETO	Generator	8500	Rest-of-Po	CT	CT	Existing	344.153	344.153	344.153	344.153	344.153	344.153	344.153	344.153	344.153	344.153	344.153	344.153
482	MIDDLETO	Generator	8500	Rest-of-Po	CT	CT	Existing	399.923	399.923	399.923	399.923	399.923	399.923	399.923	399.923	399.923	399.923	399.923	399.923
484	MILLSTONE	Generator	8500	Rest-of-Po	CT	CT	Existing	856.515	856.515	856.515	856.515	856.515	856.515	856.515	856.515	856.515	856.515	856.515	856.515
485	MILLSTONE	Generator	8500	Rest-of-Po	CT	CT	Existing	1220.424	1220.424	1220.424	1220.424	1220.424	1220.424	1220.424	1220.424	1220.424	1220.424	1220.424	1220.424
486	MILFORD P	Generator	8506	Southeast	MA	SEMA	Existing	202	202	202	202	202	202	202	202	202	202	202	202
487	Worumbo	Generator	8503	Maine	ME	ME	Existing	5.072	5.072	5.072	5.072	11.764	11.764	11.764	11.764	11.764	11.764	11.764	11.764
489	MERRIMAC	Generator	8505	Northern N	NH	NH	Existing	108	108	108	108	108	108	108	108	108	108	108	108
490	MERRIMAC	Generator	8505	Northern N	NH	NH	Existing	330	330	330	330	330	330	330	330	330	330	330	330
492	MONTVILL	Generator	8500	Rest-of-Po	CT	CT	Existing	5.296	5.296	5.296	5.296	5.296	5.296	5.296	5.296	5.296	5.296	5.296	5.296
493	MONTVILL	Generator	8500	Rest-of-Po	CT	CT	Existing	81	81	81	81	81	81	81	81	81	81	81	81
494	MONTVILL	Generator	8500	Rest-of-Po	CT	CT	Existing	400.401	400.401	400.401	400.401	400.401	400.401	400.401	400.401	400.401	400.401	400.401	400.401
495	MONTY	Generator	8503	Maine	ME	ME	Existing	26.96	26.96	26.96	26.96	26.96	26.96	26.96	26.96	26.96	26.96	26.96	26.96
496	MOORE	Generator	8505	Northern N	NH	NH	Existing	193.632	193.632	193.632	193.632	193.632	193.632	193.632	193.632	193.632	193.632	193.632	193.632
497	MASS POW	Generator	8500	Rest-of-Po	MA	WCMA	Existing	110	110	110	110	110	110	110	110	110	110	110	110
507	NEA BELLIN	Generator	8506	Southeast	MA	SEMA	Existing	282.865	282.865	282.865	282.865	282.865	282.865	282.865	282.865	282.865	282.865	282.865	282.865
508	NEWINGTO	Generator	8505	Northern N	NH	NH	Existing	400.2	400.2	400.2	400.2	400.2	400.2	400.2	400.2	400.2	400.2	400.2	400.2
513	NEW HAVE	Generator	8500	Rest-of-Po	CT	CT	Existing	447.894	447.894	447.894	447.894	439.585	439.585	439.585	439.585	439.585	439.585	439.585	439.585
515	NORWICH	Generator	8500	Rest-of-Po	CT	CT	Existing	15.255	15.255	15.255	15.255	15.255	15.255	15.255	15.255	15.255	15.255	15.255	15.255
527	OGDEN-MA	Generator	8506	Southeast	MA	NEMA	Existing	39.123	39.123	39.123	39.123	42.638	42.638	42.638	42.638	42.638	42.638	42.638	42.638
528	OCEAN ST	Generator	8506	Southeast	RI	RI	Existing	270.901	270.901	270.901	270.901	270.901	270.901	270.901	270.901	270.901	270.901	270.901	270.901
529	OCEAN ST	Generator	8506	Southeast	RI	RI	Existing	0	0	0	0	0	0	0	0	0	0	0	0
532	PEJEPSCOT	Generator	8503	Maine	ME	ME	Existing	3.931	3.931	3.931	3.931	7.469	7.469	7.469	7.469	7.469	7.469	7.469	7.469
536	PERC-ORRI	Generator	8503	Maine	ME	ME	Existing	16.819	16.819	16.819	16.819	18.207	18.207	18.207	18.207	18.207	18.207	18.207	18.207
539	PONTOOK	Generator	8505	Northern N	NH	NH	Existing	3.694	3.694	3.694	3.694	7.02	7.02	7.02	7.02	7.02	7.02	7.02	7.02
540	POTTER 2	Generator	8506	Southeast	MA	SEMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
541	PROCTOR	Generator	8505	Northern N	VT	VT	Existing	2.189	2.189	2.189	2.189	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
542	ECO MAIN	Generator	8503	Maine	ME	ME	Existing	10.658	10.658	10.658	10.658	10.356	10.356	10.356	10.356	10.356	10.356	10.356	10.356
546	RESCO SAU	Generator	8506	Southeast	MA	NEMA	Existing	30.114	30.114	30.114	30.114	30.114	30.114	30.114	30.114	30.114	30.114	30.114	30.114
547	WHEELABR	Generator	8506	Southeast	MA	NEMA	Existing	29.664	29.664	29.664	29.664	29.664	29.664	29.664	29.664	29.664	29.664	29.664	29.664
549	RUTLAND	Generator	8505	Northern N	VT	VT	Existing	7.919	7.919	7.919	7.919	7.919	7.919	7.919	7.919	7.919	7.919	7.919	7.919
555	SEABROOK	Generator	8505	Northern N	NH	NH	Existing	1249.075	1249.075	1249.075	1249.075	1249.075	1249.075	1249.075	1249.075	1249.075	1249.075	1249.075	1249.075
556	SCHILLER 4	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0	0	0	0	0	0	0	0
557	SCHILLER 5	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0	0	0	0	0	0	0	0
558	SCHILLER 6	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0	0	0	0	0	0	0	0
559	SCHILLER C	Generator	8505	Northern N	NH	NH	Existing	17.621	17.621	17.621	17.621	17.621	17.621	17.621	17.621	17.621	17.621	17.621	17.621
561	SEARSBUR	Generator	8500	Rest-of-Po	MA	WCMA	Existing	4.451	4.451	4.451	4.451	4.567	4.567	4.567	4.567	4.567	4.567	4.567	4.567
562	SECREC-PR	Generator	8500	Rest-of-Po	CT	CT	Existing	15.983	15.983	15.983	15.983	16.027	16.027	16.027	16.027	16.027	16.027	16.027	16.027
563	SEMASS 1	Generator	8506	Southeast	MA	SEMA	Existing	46.102	46.102	46.102	46.102	48.446	48.446	48.446	48.446	48.446	48.446	48.446	48.446
564	SEMASS 2	Generator	8506	Southeast	MA	SEMA	Existing	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
565	SHELDON S	Generator	8505	Northern N	VT	VT	Existing	2.145	2.145	2.145	2.145	7.813	7.813	7.813	7.813	7.813	7.813	7.813	7.813
566	SHEPAUG	Generator	8500	Rest-of-Po	CT	CT	Existing	41.511	41.511	41.511	41.511	41.511	41.511	41.511	41.511	41.511	41.511	41.511	41.511
567	SHERMAN	Generator	8500	Rest-of-Po	MA	WCMA	Existing	6.154	6.154	6.154	6.154	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22
569	SKELTON	Generator	8503	Maine	ME	ME	Existing	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
570	SMITH	Generator	8505	Northern N	NH	NH	Existing	8.35	8.35	8.35	8.35	15.258	15.258	15.258	15.258	15.258	15.258	15.258	15.258
580	SO. MEAD	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0	0	0	0	0	0	0	0
581	SO. MEAD	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0	0	0	0	0	0	0	0
583	STONY BR	Generator	8500	Rest-of-Po	MA	WCMA	Existing	66.993	66.993	66.993	66.993	66.993	66.993	77.392	77.392	77.392	77.392	66.993	66.993
584	STONY BR	Generator	8500	Rest-of-Po	MA	WCMA	Existing	64.994	64.994	64.994	64.994	64.994	64.994	75.393	75.393	75.393	75.393	64.994	64.994
587	STEVENSO	Generator	8500	Rest-of-Po	CT	CT	Existing	28.311	28.311	28.311	28.311	28.311	28.311	28.311	28.311	28.311	28.311	28.311	28.311
590	BORALEX S	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0	0	0	0	0	0	0	0
592	TAMWORT	Generator	8505	Northern N	NH	NH	Existing	19.541	19.541	19.541	19.541	19.541	19.541	19.541	19.541	19.541	19.541	19.541	19.541
595	TORRINGT	Generator	8500	Rest-of-Po	CT	CT	Existing	15.638	15.638	15.638	15.638	15.638	15.638	15.638	15.638	15.638	15.638	15.638	15.638
596	TUNNEL 10	Generator	8500	Rest-of-Po	CT	CT	Existing	16.339	16.339	16.339	16.339	16.339	16.339	16.339	16.339	16.339	16.339	16.339	16.339
598	VERGENNE	Generator	8505	Northern N	VT	VT	Existing	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94
599	VERNON	Generator	8500	Rest-of-Po	MA	WCMA	Existing	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9	34.9
612	WATERS RI	Generator	8506	Southeast	MA	NEMA	Existing	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974
613	WATERS RI	Generator	8506	Southeast	MA	NEMA	Existing	29.97	29.97	29.97	29.97	29.97	29.97	29.97	29.97	29.97	29.97	29.97	29.97
614	WATERBU	Generator	8505	Northern N	VT	VT	Existing	0.214	0.214	0.214	0.214	2.048	2.048	2.048	2.048	2.048	2.048	2.048	2.048
616	WEST ENFI	Generator	8503	Maine	ME	ME	Existing	7.454	7.454	7.454	7.454	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49
617	WESTON	Generator	8503	Maine	ME	ME	Existing	7.148	7.148	7.148	7.148	10.897	10.897	10.897	10.897	10.897	10.897	10.897	10.897
618	DG WHITE	Generator	8505	Northern N	NH	NH	Existing	13.074	13.074	13.074	13.074	13.074	13.074	13.074	13.074	13.074	13.074	13.074	13.074
619	WHITE LAK	Generator	8505	Northern N	NH	NH	Existing	4	4	4	4	4	4	4	4	4	4	4	4
620	WILDER	Generator	8505	Northern N	NH	NH	Existing	40.674	40.674	40.674	40.674	40.674	40.674	40.674	40.674	40.674	40.674	40.674	40.674
621	WILLIAMS	Generator	8503	Maine	ME	ME	Existing	14.855	14.855	14.855	14.855	14.855	14.855	14.855	14.855	14.855	14.855	14.855	14.855
622	WINOOSKI	Generator	8505	Northern N	VT	VT	Existing	1.585	1.585	1.585	1.585	3.453	3.453	3.453	3.453	3.453	3.453	3.453	3.453
624	WMI MILL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	39.811	39.811	39.811	39.811	39.811	39.811	39.811	39.811	39.811	39.811	39.811	39.811
625	WEST MED	Generator	8506	Southeast	MA	NEMA	Existing	42	42	42	42	42	42	42	42	42	42	42	42
626	WEST MED	Generator	8506	Southeast	MA	NEMA	Existing	39.848	39.848	39.848	39.848	39.848	39.848	39.848	39.848	39.848	39.848	39.848	39.848
627	WEST MED	Generator	8506	Southeast	MA	SEMA	Existing	42.001	42.001	42.001	42.001	42.001	42.001	42.001	42.001	42.001	42.001	42.001	42.001
628	WOODLAN	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	2	2	2	2	0	0
630	WEST SPRI	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	3.174	3.174	3.174	3.174	0	0
633	WEST SPRI	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
636	WYMAN H	Generator	8503	Maine	ME	ME	Existing	29.014	29.014	29.014	29.014	29.014	29.014	29.014	29.014	29.014	29.014	29.014	29.014
637	WYMAN H	Generator	8503	Maine	ME	ME	Existing	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
638	WYMAN H	Generator	8503	Maine	ME	ME	Existing	28.944	28.944	28.944	28.944	28.944	28.944	28.944	28.944	28.944	28.944	28.944	28.944
641	YARMOUT	Generator	8503	Maine	ME	ME	Existing	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4
642	YARMOUT	Generator	8503	Maine	ME	ME	Existing	600.85	600.85	600.85	600.85	600.85	600.85	600.85	600.85	600.85	600.85	600.85	600.85
715	ROCHESTE	Generator	8505	Northern N	NH	NH	Existing	2.055	2.055	2.055	2.055	2.055	2.055	2.055	2.055	2.055	2.055	2.055	2.055
737	SIMPSON	Generator	8505	Northern N	VT	VT	Existing	2.054	2.054	2.054	2.054	3.144	3.144	3.144	3.144	3.144	3.144	3.144	3.144
739	ROCKY RIV	Generator	8500	Rest-of-Po	CT	CT	Existing	28.127	28.127	28.127	28.127	28.127	28.127	28.127	28.127	28.127	28.127	28.127	28.127

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
755	BONNY EA	Generator	8503	Maine	ME	ME	Existing	2.63	2.63	2.63	2.63	9.229	9.229	9.229	9.229	9.229	9.229	9.229	9.229
757	HARRIS 4	Generator	8503	Maine	ME	ME	Existing	1.249	1.249	1.249	1.249	1.249	1.249	1.249	1.249	1.249	1.249	1.249	1.249
759	MESSALON	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44
760	NORTH GO	Generator	8503	Maine	ME	ME	Existing	0.979	0.979	0.979	0.979	1.283	1.283	1.283	1.283	1.283	1.283	1.283	1.283
761	SHAWMUT	Generator	8503	Maine	ME	ME	Existing	3.864	3.864	3.864	3.864	6.536	6.536	6.536	6.536	6.536	6.536	6.536	6.536
766	CABOT TU	Generator	8500	Rest-of-Po	MA	WCMA	Existing	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2
767	SES CONC	Generator	8505	Northern N	NH	NH	Existing	11.988	11.988	11.988	11.988	12.217	12.217	12.217	12.217	12.217	12.217	12.217	12.217
768	GARVINS H	Generator	8505	Northern N	NH	NH	Existing	2.33	2.33	2.33	2.33	6.39	6.39	6.39	6.39	6.39	6.39	6.39	6.39
769	HADLEY FA	Generator	8500	Rest-of-Po	MA	WCMA	Existing	5.271	5.271	5.271	5.271	25.822	25.822	25.822	25.822	25.822	25.822	25.822	25.822
774	LOWER LA	Generator	8505	Northern N	VT	VT	Existing	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8
781	WEST DAN	Generator	8505	Northern N	VT	VT	Existing	0	0	0	0	0.243	0.243	0.243	0.243	0.243	0.243	0.243	0.243
786	KEZAR LED	Generator	8503	Maine	ME	ME	Existing	0.09	0.09	0.09	0.09	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
789	CEC 002 PA	Generator	8506	Southeast	RI	RI	Existing	0.168	0.168	0.168	0.168	0.675	0.675	0.675	0.675	0.675	0.675	0.675	0.675
792	CENTENNI	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.238	0.238	0.238	0.238	0.596	0.596	0.596	0.596	0.596	0.596	0.596	0.596
793	METHUEN	Generator	8506	Southeast	MA	NEMA	Existing	0.002	0.002	0.002	0.002	0.173	0.173	0.173	0.173	0.173	0.173	0.173	0.173
794	MINIWAW	Generator	8505	Northern N	NH	NH	Existing	0.145	0.145	0.145	0.145	0.644	0.644	0.644	0.644	0.644	0.644	0.644	0.644
795	RIVER MIL	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
796	GOODWIN	Generator	8500	Rest-of-Po	CT	CT	Existing	3	3	3	3	3	3	3	3	3	3	3	3
797	CEC 003 W	Generator	8500	Rest-of-Po	CT	CT	Existing	0.234	0.234	0.234	0.234	1.633	1.633	1.633	1.633	1.633	1.633	1.633	1.633
798	COLEBROO	Generator	8500	Rest-of-Po	CT	CT	Existing	0.457	0.457	0.457	0.457	0.516	0.516	0.516	0.516	0.516	0.516	0.516	0.516
800	KINNEYTO	Generator	8500	Rest-of-Po	CT	CT	Existing	0.053	0.053	0.053	0.053	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478
801	WILLIMAN	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
802	WILLIMAN	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
803	TOUTANT	Generator	8500	Rest-of-Po	CT	CT	Existing	0.028	0.028	0.028	0.028	0.261	0.261	0.261	0.261	0.261	0.261	0.261	0.261
804	PUTNAM	Generator	8500	Rest-of-Po	CT	CT	Existing	0.084	0.084	0.084	0.084	0.431	0.431	0.431	0.431	0.431	0.431	0.431	0.431
806	MECHANIC	Generator	8500	Rest-of-Po	CT	CT	Existing	0.053	0.053	0.053	0.053	0.193	0.193	0.193	0.193	0.193	0.193	0.193	0.193
807	CEC 004 DA	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
808	SANDY HO	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039
810	QUINEBAU	Generator	8500	Rest-of-Po	CT	CT	Existing	0.205	0.205	0.205	0.205	0.966	0.966	0.966	0.966	0.966	0.966	0.966	0.966
811	BANTAM	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
813	TUNNEL	Generator	8500	Rest-of-Po	CT	CT	Existing	0.127	0.127	0.127	0.127	1.466	1.466	1.466	1.466	1.466	1.466	1.466	1.466
824	BATH ELEC	Generator	8505	Northern N	NH	NH	Existing	0.145	0.145	0.145	0.145	0.204	0.204	0.204	0.204	0.204	0.204	0.204	0.204
827	SEARSBUR	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.147	0.147	0.147	0.147	1.142	1.142	1.142	1.142	1.142	1.142	1.142	1.142
841	MORETOW	Generator	8505	Northern N	VT	VT	Existing	0.083	0.083	0.083	0.083	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234
849	CRESCENT	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.203	0.203	0.203	0.203	0.607	0.607	0.607	0.607	0.607	0.607	0.607	0.607
850	GLENDALE	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.235	0.235	0.235	0.235	0.635	0.635	0.635	0.635	0.635	0.635	0.635	0.635
851	GARDNER	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.106	0.106	0.106	0.106	0.588	0.588	0.588	0.588	0.588	0.588	0.588	0.588
852	SOUTH BA	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.01	0.01	0.01	0.01	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
854	ORANGE H	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.016	0.016	0.016	0.016	0.107	0.107	0.107	0.107	0.107	0.107	0.107	0.107
855	ORANGE H	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.07	0.07	0.07	0.07	0.156	0.156	0.156	0.156	0.156	0.156	0.156	0.156
856	HUNT'S PO	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.009	0.009	0.009	0.009	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
857	OAKDALE	Generator	8500	Rest-of-Po	MA	WCMA	Existing	2.437	2.437	2.437	2.437	0	0	0	0	0	0	0	0
859	BOATLOCK	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.405	1.405	1.405	1.405	2.088	2.088	2.088	2.088	2.088	2.088	2.088	2.088
860	BRIAR HYD	Generator	8505	Northern N	NH	NH	Existing	0.258	0.258	0.258	0.258	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74
861	CANAAN	Generator	8505	Northern N	NH	NH	Existing	0.55	0.55	0.55	0.55	0.876	0.876	0.876	0.876	0.876	0.876	0.876	0.876
862	CHEMICAL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.344	0.344	0.344	0.344	0.312	0.312	0.312	0.312	0.312	0.312	0.312	0.312
863	CLEMENT	Generator	8505	Northern N	NH	NH	Existing	0.483	0.483	0.483	0.483	1.266	1.266	1.266	1.266	1.266	1.266	1.266	1.266
864	DWIGHT	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.245	0.245	0.245	0.245	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
865	ERROL	Generator	8505	Northern N	NH	NH	Existing	1.646	1.646	1.646	1.646	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
866	GREGGS	Generator	8505	Northern N	NH	NH	Existing	0.221	0.221	0.221	0.221	1.308	1.308	1.308	1.308	1.308	1.308	1.308	1.308
867	INDIAN OR	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0.905	0.905	0.905	0.905	0.905	0.905	0.905	0.905
868	MILTON M	Generator	8505	Northern N	NH	NH	Existing	0.141	0.141	0.141	0.141	1.083	1.083	1.083	1.083	1.083	1.083	1.083	1.083
869	MINE FALL	Generator	8505	Northern N	NH	NH	Existing	0.356	0.356	0.356	0.356	1.416	1.416	1.416	1.416	1.416	1.416	1.416	1.416
870	PEMBROKE	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	1.336	1.336	1.336	1.336	1.336	1.336	1.336	1.336

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
871	PENNACOO	Generator	8505	Northern N	NH	NH	Existing	0.661	0.661	0.661	0.661	3.001	3.001	3.001	3.001	3.001	3.001	3.001	3.001
872	PENNACOO	Generator	8505	Northern N	NH	NH	Existing	0.394	0.394	0.394	0.394	2.121	2.121	2.121	2.121	2.121	2.121	2.121	2.121
873	PUTTS BRII	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.46	0.46	0.46	0.46	2.371	2.371	2.371	2.371	2.371	2.371	2.371	2.371
874	RED BRIDG	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.149	0.149	0.149	0.149	1.661	1.661	1.661	1.661	1.661	1.661	1.661	1.661
875	RIVER BEN	Generator	8505	Northern N	NH	NH	Existing	0.508	0.508	0.508	0.508	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972
877	SCOTLAND	Generator	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0.404	0.404	0.404	0.404	0.404	0.404	0.404	0.404
878	SKINNER	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
879	TAFTVILLE	Generator	8500	Rest-of-Po	CT	CT	Existing	0.153	0.153	0.153	0.153	0.792	0.792	0.792	0.792	0.792	0.792	0.792	0.792
882	FRANKLIN	Generator	8505	Northern N	NH	NH	Existing	0.329	0.329	0.329	0.329	0.484	0.484	0.484	0.484	0.484	0.484	0.484	0.484
883	SALMON F	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.497
884	SWANS FA	Generator	8505	Northern N	NH	NH	Existing	0.182	0.182	0.182	0.182	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269
886	COCHECO	Generator	8505	Northern N	NH	NH	Existing	0.018	0.018	0.018	0.018	0.251	0.251	0.251	0.251	0.251	0.251	0.251	0.251
887	CHINA MIL	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.377	0.377	0.377	0.377	0.377	0.377	0.377	0.377
888	NEWFOUN	Generator	8505	Northern N	NH	NH	Existing	0.109	0.109	0.109	0.109	0.726	0.726	0.726	0.726	0.726	0.726	0.726	0.726
889	SUNAPEE H	Generator	8505	Northern N	NH	NH	Existing	0.055	0.055	0.055	0.055	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291
890	NASHUA H	Generator	8505	Northern N	NH	NH	Existing	0.079	0.079	0.079	0.079	0.655	0.655	0.655	0.655	0.655	0.655	0.655	0.655
891	HILLSBORO	Generator	8505	Northern N	NH	NH	Existing	0.009	0.009	0.009	0.009	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
892	LAKEPORT	Generator	8505	Northern N	NH	NH	Existing	0.17	0.17	0.17	0.17	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286
893	WEST HOP	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335
894	LISBON HY	Generator	8505	Northern N	NH	NH	Existing	0.171	0.171	0.171	0.171	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
895	LOWER RO	Generator	8505	Northern N	NH	NH	Existing	0.199	0.199	0.199	0.199	0.579	0.579	0.579	0.579	0.579	0.579	0.579	0.579
897	OLD NASH	Generator	8505	Northern N	NH	NH	Existing	0.009	0.009	0.009	0.009	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084
898	SUGAR RIV	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
900	GREAT FAL	Generator	8505	Northern N	NH	NH	Existing	0.029	0.029	0.029	0.029	0.527	0.527	0.527	0.527	0.527	0.527	0.527	0.527
902	HOSIERY M	Generator	8505	Northern N	NH	NH	Existing	0.144	0.144	0.144	0.144	0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.488
903	WYANDOT	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
904	LOCHMERE	Generator	8505	Northern N	NH	NH	Existing	0.258	0.258	0.258	0.258	0.448	0.448	0.448	0.448	0.448	0.448	0.448	0.448
905	ASHUELOT	Generator	8505	Northern N	NH	NH	Existing	0.21	0.21	0.21	0.21	0.571	0.571	0.571	0.571	0.571	0.571	0.571	0.571
906	ROLLINSFO	Generator	8505	Northern N	NH	NH	Existing	0.022	0.022	0.022	0.022	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849
908	OTIS MILL	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
909	STEELS PO	Generator	8505	Northern N	NH	NH	Existing	0.054	0.054	0.054	0.054	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361
910	CAMPTON	Generator	8505	Northern N	NH	NH	Existing	0.019	0.019	0.019	0.019	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116
911	KELLEYS FA	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292
913	GOODRICH	Generator	8505	Northern N	NH	NH	Existing	0.058	0.058	0.058	0.058	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247
915	MONADNO	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
919	HOPKINTO	Generator	8505	Northern N	NH	NH	Existing	0.07	0.07	0.07	0.07	0.166	0.166	0.166	0.166	0.166	0.166	0.166	0.166
925	OTTER LAN	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
926	PETERBOR	Generator	8505	Northern N	NH	NH	Existing	0.026	0.026	0.026	0.026	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
928	SALMON B	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
931	AVERY DAN	Generator	8505	Northern N	NH	NH	Existing	0.162	0.162	0.162	0.162	0.202	0.202	0.202	0.202	0.202	0.202	0.202	0.202
932	WATSON D	Generator	8505	Northern N	NH	NH	Existing	0.012	0.012	0.012	0.012	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165
933	WESTON D	Generator	8505	Northern N	NH	NH	Existing	0.165	0.165	0.165	0.165	0.306	0.306	0.306	0.306	0.306	0.306	0.306	0.306
935	SUNNYBRO	Generator	8505	Northern N	NH	NH	Existing	0.01	0.01	0.01	0.01	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
941	PETERBOR	Generator	8505	Northern N	NH	NH	Existing	0.024	0.024	0.024	0.024	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
943	FOUR HILLS	Generator	8505	Northern N	NH	NH	Existing	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932
948	PEPPERELL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.215	0.215	0.215	0.215	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843
950	LP ATHOL -	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
951	BALTIC MIL	Generator	8505	Northern N	NH	NH	Existing	0.004	0.004	0.004	0.004	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
957	HG&E HYD	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.661	0.661	0.661	0.661	0.605	0.605	0.605	0.605	0.605	0.605	0.605	0.605
969	POWDER M	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0.073	0.073	0.073	0.073	0.073	0.073	0.073	0.073
970	DUDLEY HY	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066
978	NEW MILF	Generator	8500	Rest-of-Po	CT	CT	Existing	0.867	0.867	0.867	0.867	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
1005	BG DIGHTO	Generator	8506	Southeast	MA	SEMA	Existing	164.052	164.052	164.052	164.052	164.052	164.052	164.052	164.052	164.052	164.052	164.052	164.052
1030	OAK BLUFF	Generator	8506	Southeast	MA	SEMA	Existing	7.471	7.471	7.471	7.471	7.471	7.471	7.471	7.471	7.471	7.471	7.471	7.471

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
1031	WEST TISB	Generator	8506	Southeast N	MA	SEMA	Existing	5.005	5.005	5.005	5.005	5.005	5.005	5.005	5.005	5.005	5.005	5.005	5.005
1032	BRIDGEPOR	Generator	8500	Rest-of-Poo	CT	CT	Existing	551	551	551	551	586.037	586.037	586.037	586.037	586.037	586.037	586.037	586.037
1034	RIVERSIDE	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.75	1.75	1.75	1.75	1.681	1.681	1.681	1.681	1.681	1.681	1.681	1.681
1035	RIVERSIDE	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	2.622	2.622	2.622	2.622	2.945	2.945	2.945	2.945	2.945	2.945	2.945	2.945
1047	FAIRFAX	Generator	8505	Northern N	VT	VT	Existing	1.033	1.033	1.033	1.033	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1048	WARE HYD	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.075	0.075	0.075	0.075	0.687	0.687	0.687	0.687	0.687	0.687	0.687	0.687
1049	COLLINS HY	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.231	0.231	0.231	0.231	0.629	0.629	0.629	0.629	0.629	0.629	0.629	0.629
1050	CHICOPEE	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.303	0.303	0.303	0.303	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889
1054	BLACKSTON	Generator	8506	Southeast N	RI	RI	Existing	0	0	0	0	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152
1057	BLACKSTON	Generator	8506	Southeast N	RI	RI	Existing	0.175	0.175	0.175	0.175	0.472	0.472	0.472	0.472	0.472	0.472	0.472	0.472
1061	MASCOMA	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.391	0.391	0.391	0.391	0.391	0.391	0.391	0.391
1062	MWRA COS	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.743	0.743	0.743	0.743	0.269	0.269	0.269	0.269	0.269	0.269	0.269	0.269
1086	BERKSHIRE	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	229.279	229.279	229.279	229.279	229.279	229.279	229.279	229.279	229.279	229.279	229.279	229.279
1109	MMWAC	Generator	8503	Maine	ME	ME	Existing	1.762	1.762	1.762	1.762	2.033	2.033	2.033	2.033	2.033	2.033	2.033	2.033
1113	BRASSUA H	Generator	8503	Maine	ME	ME	Existing	4.203	4.203	4.203	4.203	4.203	4.203	4.203	4.203	4.203	4.203	4.203	4.203
1114	MADISON	Generator	8503	Maine	ME	ME	Existing	10.177	10.177	10.177	10.177	19.119	19.119	19.119	19.119	19.119	19.119	19.119	19.119
1117	GREAT WO	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
1119	KENNEBAG	Generator	8503	Maine	ME	ME	Existing	0.121	0.121	0.121	0.121	0.416	0.416	0.416	0.416	0.416	0.416	0.416	0.416
1122	CASCADE-D	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.006	0.006	0.006	0.006	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208
1185	STONY BRO	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	100	100	100	100	100	100	103.95	103.95	103.95	103.95	100	100
1186	STONY BRO	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	97	97	97	97	97	97	104.272	104.272	104.272	104.272	97	97
1187	STONY BRO	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	100	100	100	100	100	100	105.312	105.312	105.312	105.312	100	100
1209	CRRA HART	Generator	8500	Rest-of-Poo	CT	CT	Existing	0	0	0	0	0	0	0	0	0	0	0	0
1210	MILLENNIU	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
1216	MAINE IND	Generator	8503	Maine	ME	ME	Existing	492.658	492.658	492.658	492.658	492.658	492.658	492.658	492.658	492.658	492.658	492.658	492.658
1221	ESSEX DIES	Generator	8505	Northern N	VT	VT	Existing	7.215	7.215	7.215	7.215	7.215	7.215	7.215	7.215	7.215	7.215	7.215	7.215
1226	TIVERTON	Generator	8506	Southeast N	RI	RI	Existing	275	275	275	275	298.115	298.115	298.115	298.115	298.115	298.115	298.115	298.115
1255	RUMFORD	Generator	8503	Maine	ME	ME	Existing	257	257	257	257	257	257	257	257	257	257	257	257
1258	BHE SMALL	Generator	8503	Maine	ME	ME	Existing	0.284	0.284	0.284	0.284	1.442	1.442	1.442	1.442	1.442	1.442	1.442	1.442
1270	SYSKO STO	Generator	8503	Maine	ME	ME	Existing	0.01	0.01	0.01	0.01	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
1273	AUTOMATI	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.237	0.237	0.237	0.237	0.237	0.237	0.237	0.237
1286	ANP-BLACK	Generator	8506	Southeast N	MA	SEMA	Existing	247.846	247.846	247.846	247.846	247.846	247.846	247.846	247.846	247.846	247.846	247.846	247.846
1287	ANP-BLACK	Generator	8506	Southeast N	MA	SEMA	Existing	248.712	248.712	248.712	248.712	248.712	248.712	272.199	272.199	272.199	272.199	248.712	248.712
1288	BUCKSPOR	Generator	8503	Maine	ME	ME	Existing	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3	160.3
1342	LAKE ROAD	Generator	8500	Rest-of-Poo	CT	CT	Existing	265.526	265.526	265.526	265.526	265.526	265.526	265.526	265.526	265.526	265.526	265.526	265.526
1343	LAKE ROAD	Generator	8500	Rest-of-Poo	CT	CT	Existing	273.984	273.984	273.984	273.984	273.984	273.984	273.984	273.984	273.984	273.984	273.984	273.984
1344	LAKE ROAD	Generator	8500	Rest-of-Poo	CT	CT	Existing	278.822	278.822	278.822	278.822	278.822	278.822	278.822	278.822	278.822	278.822	278.822	278.822
1345	WESTBROO	Generator	8503	Maine	ME	ME	Existing	530	530	530	530	530	530	530	530	530	530	530	530
1368	ROCKY GOR	Generator	8503	Maine	ME	ME	Existing	0.05	0.05	0.05	0.05	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
1376	PPL WALLIN	Generator	8500	Rest-of-Poo	CT	CT	Existing	47.286	47.286	47.286	47.286	47.286	47.286	49.286	49.286	49.286	49.286	47.286	47.286
1377	PPL WALLIN	Generator	8500	Rest-of-Poo	CT	CT	Existing	47.286	47.286	47.286	47.286	47.286	47.286	49.286	49.286	49.286	49.286	47.286	47.286
1378	PPL WALLIN	Generator	8500	Rest-of-Poo	CT	CT	Existing	47.286	47.286	47.286	47.286	47.286	47.286	49.286	49.286	49.286	49.286	47.286	47.286
1379	PPL WALLIN	Generator	8500	Rest-of-Poo	CT	CT	Existing	47.286	47.286	47.286	47.286	47.286	47.286	49.286	49.286	49.286	49.286	47.286	47.286
1380	PPL WALLIN	Generator	8500	Rest-of-Poo	CT	CT	Existing	47.286	47.286	47.286	47.286	47.286	47.286	49.286	49.286	49.286	49.286	47.286	47.286
1385	Milford Pow	Generator	8500	Rest-of-Poo	CT	CT	Existing	267.7	267.7	267.7	267.7	267.7	267.7	267.7	267.7	267.7	267.7	267.7	267.7
1386	MILFORD P	Generator	8500	Rest-of-Poo	CT	CT	Existing	266.67	266.67	266.67	266.67	266.67	266.67	266.67	266.67	266.67	266.67	266.67	266.67
1412	ANP-BELLIN	Generator	8506	Southeast N	MA	SEMA	Existing	263.456	263.456	263.456	263.456	263.456	263.456	279.004	279.004	279.004	279.004	263.456	263.456
1415	ANP-BELLIN	Generator	8506	Southeast N	MA	SEMA	Existing	259.165	259.165	259.165	259.165	259.165	259.165	259.165	259.165	259.165	259.165	259.165	259.165
1432	GRS-FALL R	Generator	8506	Southeast N	MA	SEMA	Existing	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
1572	GRANBY SA	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.135	1.135	1.135	1.135	1.578	1.578	1.578	1.578	1.578	1.578	1.578	1.578
1625	GRANITE R	Generator	8505	Northern N	NH	NH	Existing	665.888	665.888	665.888	665.888	665.888	665.888	665.888	665.888	665.888	665.888	665.888	665.888
1630	RISEP	Generator	8506	Southeast N	RI	RI	Existing	551.668	551.668	551.668	551.668	571.105	571.105	573.395	573.395	573.395	573.395	571.105	571.105
1649	EP Newingt	Generator	8505	Northern N	NH	NH	Existing	559.5	559.5	559.5	559.5	559.5	559.5	559.5	559.5	559.5	559.5	559.5	559.5
1656	HULL WIND	Generator	8506	Southeast N	MA	SEMA	Existing	0.033	0.033	0.033	0.033	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
1672	KENDALL C	Generator	8506	Southeast	MA	NEMA	Existing	181.799	181.799	181.799	181.799	181.799	181.799	181.799	181.799	181.799	181.799	181.799	181.799
1691	FORE RIVEI	Generator	8506	Southeast	MA	SEMA	Existing	708	708	708	708	741	741	806	806	806	806	741	741
1693	WEST SPRI	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	5.763	5.763	7.983	7.983	7.983	7.983	5.763	5.763
1694	WEST SPRI	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	6.104	6.104	8.558	8.558	8.558	8.558	6.104	6.104
2278	BARKER LO	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.677	0.677	0.677	0.677	0.677	0.677	0.677	0.677
2279	BARKER UP	Generator	8503	Maine	ME	ME	Existing	0.013	0.013	0.013	0.013	0.648	0.648	0.648	0.648	0.648	0.648	0.648	0.648
2280	BENTON FA	Generator	8503	Maine	ME	ME	Existing	0.295	0.295	0.295	0.295	1.642	1.642	1.642	1.642	1.642	1.642	1.642	1.642
2281	BROWNS M	Generator	8503	Maine	ME	ME	Existing	0.054	0.054	0.054	0.054	0.438	0.438	0.438	0.438	0.438	0.438	0.438	0.438
2282	DAMARISC	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284
2283	EUSTIS HYD	Generator	8503	Maine	ME	ME	Existing	0.054	0.054	0.054	0.054	0.149	0.149	0.149	0.149	0.149	0.149	0.149	0.149
2284	GARDINER	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929
2285	GREENVILL	Generator	8503	Maine	ME	ME	Existing	0.026	0.026	0.026	0.026	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302
2286	HACKETT M	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
2287	MECHANIC	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314
2288	NORWAY H	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
2290	PITTSFIELD	Generator	8503	Maine	ME	ME	Existing	0.041	0.041	0.041	0.041	0.661	0.661	0.661	0.661	0.661	0.661	0.661	0.661
2292	YORK HYDR	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.623	0.623	0.623	0.623	0.623	0.623	0.623	0.623
2425	SPRINGFIEL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
2426	Hydro Kenr	Generator	8503	Maine	ME	ME	Existing	4.751	4.751	4.751	4.751	9.225	9.225	9.225	9.225	9.225	9.225	9.225	9.225
2431	DODGE FAI	Generator	8505	Northern N	VT	VT	Existing	2.006	2.006	2.006	2.006	4.004	4.004	4.004	4.004	4.004	4.004	4.004	4.004
2432	HUNTINGT	Generator	8505	Northern N	VT	VT	Existing	0.818	0.818	0.818	0.818	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
2433	RYEGATE 1	Generator	8505	Northern N	VT	VT	Existing	19	19	19	19	19	19	19	19	19	19	19	19
2462	PLAINVILLE	Generator	8506	Southeast	MA	SEMA	Existing	1.562	1.562	1.562	1.562	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
2466	CHERRY 7	Generator	8500	Rest-of-Po	MA	WCMA	Existing	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
2467	CHERRY 8	Generator	8500	Rest-of-Po	MA	WCMA	Existing	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
2468	CHERRY 10	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
2469	CHERRY 11	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
2470	CHERRY 12	Generator	8500	Rest-of-Po	MA	WCMA	Existing	4.999	4.999	4.999	4.999	4.999	4.999	4.999	4.999	4.999	4.999	4.999	4.999
9100	CL&P Conn	Demand	8500	Rest-of-Po	CT	CT	Existing	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32
9105	PSNH CORE	Demand	8505	Northern N	NH	NH	Existing	0.206	0.206	0.206	0.206	0.206	0.206	0.206	0.206	0.206	0.206	0.206	0.206
9114	ngrid nh od	Demand	8505	Northern N	NH	NH	Existing	0.629	0.629	0.629	0.629	0.629	0.629	0.629	0.629	0.629	0.629	0.629	0.629
9115	CL&P Dist (	Demand	8500	Rest-of-Po	CT	CT	Existing	0.293	0.293	0.293	0.293	0.293	0.293	0.293	0.293	0.293	0.293	0.293	0.293
9116	ngrid ri odr	Demand	8506	Southeast	RI	RI	Existing	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
9120	ngrid sema	Demand	8506	Southeast	MA	SEMA	Existing	1.759	1.759	1.759	1.759	1.759	1.759	1.759	1.759	1.759	1.759	1.759	1.759
9121	ngrid wcma	Demand	8500	Rest-of-Po	MA	WCMA	Existing	1.119	1.119	1.119	1.119	1.119	1.119	1.119	1.119	1.119	1.119	1.119	1.119
9122	ngrid nema	Demand	8506	Southeast	MA	NEMA	Existing	1.498	1.498	1.498	1.498	1.498	1.498	1.498	1.498	1.498	1.498	1.498	1.498
9123	NSTAR SEM	Demand	8506	Southeast	MA	SEMA	Existing	0.202	0.202	0.202	0.202	0.202	0.202	0.202	0.202	0.202	0.202	0.202	0.202
9129	UMass Am	Demand	8500	Rest-of-Po	MA	WCMA	Existing	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
10106	Citizens Gr	Demand	8505	Northern N	VT	VT	Existing	5.076	5.076	5.076	5.076	5.076	5.076	5.076	5.076	5.076	5.076	5.076	5.076
10361	BOC Kittery	Demand	8503	Maine	ME	ME	Existing	9.396	9.396	9.396	9.396	9.396	9.396	9.396	9.396	9.396	9.396	9.396	9.396
10401	CELLEY MIL	Generator	8505	Northern N	NH	NH	Existing	0.007	0.007	0.007	0.007	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
10403	EASTMAN	Generator	8505	Northern N	NH	NH	Existing	0.003	0.003	0.003	0.003	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032
10406	LOWER VA	Generator	8505	Northern N	NH	NH	Existing	0.033	0.033	0.033	0.033	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061
10409	SWEETWAT	Generator	8505	Northern N	NH	NH	Existing	0.058	0.058	0.058	0.058	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181
10424	Great Lakes	Generator	8505	Northern N	NH	NH	Existing	4.109	4.109	4.109	4.109	9.799	9.799	9.799	9.799	9.799	9.799	9.799	9.799
10770	WEST SPRI	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.215	0.215	0.215	0.215	0.861	0.861	0.861	0.861	0.861	0.861	0.861	0.861
11052	GRTR NEW	Generator	8506	Southeast	MA	SEMA	Existing	2.081	2.081	2.081	2.081	2.224	2.224	2.224	2.224	2.224	2.224	2.224	2.224
11126	NORTH HA	Generator	8505	Northern N	VT	VT	Existing	0.613	0.613	0.613	0.613	1.713	1.713	1.713	1.713	1.713	1.713	1.713	1.713
11408	HULL WIND	Generator	8506	Southeast	MA	SEMA	Existing	0.051	0.051	0.051	0.051	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241
11424	RUMFORD	Generator	8503	Maine	ME	ME	Existing	22.742	22.742	22.742	22.742	32.824	32.824	32.824	32.824	32.824	32.824	32.824	32.824
11842	WATERSIDI	Generator	8500	Rest-of-Po	CT	CT	Existing	69.362	69.362	69.362	69.362	69.362	69.362	69.362	69.362	69.362	69.362	69.362	69.362
11925	BROCKTON	Generator	8506	Southeast	MA	SEMA	Existing	0.105	0.105	0.105	0.105	0	0	0	0	0	0	0	0
12108	FIEC DIESEL	Generator	8503	Maine	ME	ME	Existing	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
12450	NYPA - CM	Import	8500	Rest-of-Pool			Existing	68	68	68	68	68	68	68	68	68	68	68	68

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
12451	NYPA - VT	Import	8500	Rest-of-Pool			Existing	14	14	14	14	14	14	14	14	14	14	14	14
12500	Thomas A.	Generator	8506	Southeast I	MA	SEMA	Existing	105.2	105.2	105.2	105.2	105.2	105.2	105.2	105.2	105.2	105.2	105.2	105.2
12504	Devon 15-1	Generator	8500	Rest-of-Po	CT	CT	Existing	187.589	187.589	187.589	187.589	187.589	187.589	187.589	187.589	187.589	187.589	187.589	187.589
12505	Middletow	Generator	8500	Rest-of-Po	CT	CT	Existing	187.6	187.6	187.6	187.6	187.6	187.6	187.6	187.6	187.6	187.6	187.6	187.6
12509	UNH Powe	Generator	8505	Northern N	NH	NH	Existing	2	2	2	2	2	2	2	2	2	2	2	2
12510	Swanton G	Generator	8505	Northern N	VT	VT	Existing	19.304	19.304	19.304	19.304	19.304	19.304	19.304	19.304	19.304	19.304	19.304	19.304
12511	Swanton G	Generator	8505	Northern N	VT	VT	Existing	19.349	19.349	19.349	19.349	19.349	19.349	19.349	19.349	19.349	19.349	19.349	19.349
12521	Lowell Pow	Generator	8500	Rest-of-Po	MA	WCMA	Existing	74	74	74	74	74	74	74	74	74	74	74	74
12524	Cos Cob 13	Generator	8500	Rest-of-Po	CT	CT	Existing	36	36	36	36	36	36	36	36	36	36	36	36
12526	Pierce	Generator	8500	Rest-of-Po	CT	CT	Existing	74.085	74.085	74.085	74.085	74.085	74.085	76.085	76.085	76.085	76.085	74.085	74.085
12530	Sheffield W	Generator	8505	Northern N	VT	VT	Existing	3.175	3.175	3.175	3.175	10.062	10.062	10.062	10.062	10.062	10.062	10.062	10.062
12551	Kibby Wind	Generator	8503	Maine	ME	ME	Existing	14.5	14.5	14.5	14.5	27.568	27.568	27.568	27.568	27.568	27.568	27.568	27.568
12564	Waterbury	Generator	8500	Rest-of-Po	CT	CT	Existing	93.079	93.079	93.079	93.079	93.079	93.079	93.079	93.079	93.079	93.079	93.079	93.079
12581	CL&P - Con	Demand	8500	Rest-of-Po	CT	CT	Existing	467.922	467.922	467.922	467.922	467.922	467.922	471.542	471.542	471.542	471.542	467.922	467.922
12583	CL&P Distri	Demand	8500	Rest-of-Po	CT	CT	Existing	34.232	34.232	34.232	34.232	34.232	34.232	34.232	34.232	34.232	34.232	34.232	34.232
12590	Ameresco (	Demand	8500	Rest-of-Po	CT	CT	Existing	1.605	1.605	1.605	1.605	1.605	1.605	1.605	1.605	1.605	1.605	1.605	1.605
12597	Cambridge	Demand	8506	Southeast I	MA	NEMA	Existing	0.653	0.653	0.653	0.653	0.653	0.653	0.653	0.653	0.653	0.653	0.653	0.653
12598	Cambridge	Demand	8506	Southeast I	MA	NEMA	Existing	4.736	4.736	4.736	4.736	4.736	4.736	4.736	4.736	4.736	4.736	4.736	4.736
12600	UI Conserv	Demand	8500	Rest-of-Po	CT	CT	Existing	89.081	89.081	89.081	89.081	89.081	89.081	89.081	89.081	89.081	89.081	89.081	89.081
12657	Unitil CORE	Demand	8500	Rest-of-Po	MA	WCMA	Existing	8.452	8.452	8.452	8.452	8.452	8.452	8.452	8.452	8.452	8.452	8.452	8.452
12670	ngrid_nem	Demand	8506	Southeast I	MA	NEMA	Existing	178.356	178.356	178.356	178.356	178.356	178.356	178.356	178.356	178.356	178.356	178.356	178.356
12671	ngrid_nh_f	Demand	8505	Northern N	NH	NH	Existing	8.929	8.929	8.929	8.929	8.929	8.929	8.929	8.929	8.929	8.929	8.929	8.929
12672	ngrid_ri_fc	Demand	8506	Southeast I	RI	RI	Existing	251.499	251.499	251.499	251.499	251.499	251.499	251.499	251.499	251.499	251.499	251.499	251.499
12673	ngrid_sema	Demand	8506	Southeast I	MA	SEMA	Existing	275.625	275.625	275.625	275.625	275.625	275.625	275.625	275.625	275.625	275.625	275.625	275.625
12674	ngrid_wcm	Demand	8500	Rest-of-Po	MA	WCMA	Existing	327.302	327.302	327.302	327.302	327.302	327.302	327.302	327.302	327.302	327.302	327.302	327.302
12684	NSTAR EE N	Demand	8506	Southeast I	MA	NEMA	Existing	452.202	452.202	452.202	452.202	452.202	452.202	452.202	452.202	452.202	452.202	452.202	452.202
12685	NSTAR EE S	Demand	8506	Southeast I	MA	SEMA	Existing	91.287	91.287	91.287	91.287	91.287	91.287	91.287	91.287	91.287	91.287	91.287	91.287
12693	PSNH CORE	Demand	8505	Northern N	NH	NH	Existing	100.98	100.98	100.98	100.98	100.98	100.98	100.98	100.98	100.98	100.98	100.98	100.98
12694	Acushnet C	Demand	8506	Southeast I	MA	SEMA	Existing	2.111	2.111	2.111	2.111	2.111	2.111	2.111	2.111	2.111	2.111	2.111	2.111
12696	7.9 MW CH	Demand	8505	Northern N	NH	NH	Existing	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
12705	Cape Light	Demand	8506	Southeast I	MA	SEMA	Existing	57.05	57.05	57.05	57.05	57.05	57.05	57.05	57.05	57.05	57.05	57.05	57.05
12749	Bridgewate	Demand	8506	Southeast I	MA	SEMA	Existing	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412	1.412
12753	MA SEMA s	Demand	8506	Southeast I	MA	SEMA	Existing	0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.147
12754	Tewksbury	Demand	8500	Rest-of-Po	MA	WCMA	Existing	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517	0.517
12757	NHEC Ener	Demand	8505	Northern N	NH	NH	Existing	0.704	0.704	0.704	0.704	0.704	0.704	0.704	0.704	0.704	0.704	0.704	0.704
12779	CPLN CT Or	Demand	8500	Rest-of-Po	CT	CT	Existing	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989	4.989
12786	CSG Aggreg	Demand	8506	Southeast I	MA	NEMA	Existing	12.318	12.318	12.318	12.318	12.318	12.318	12.318	12.318	12.318	12.318	12.318	12.318
12790	CSG Aggreg	Demand	8506	Southeast I	RI	RI	Existing	0.217	0.217	0.217	0.217	0.217	0.217	0.217	0.217	0.217	0.217	0.217	0.217
12791	CSG Aggreg	Demand	8506	Southeast I	MA	SEMA	Existing	1.517	1.517	1.517	1.517	1.517	1.517	1.517	1.517	1.517	1.517	1.517	1.517
12799	CSG Aggreg	Demand	8500	Rest-of-Po	MA	WCMA	Existing	2.106	2.106	2.106	2.106	2.106	2.106	2.106	2.106	2.106	2.106	2.106	2.106
12801	UES CORE E	Demand	8505	Northern N	NH	NH	Existing	7.748	7.748	7.748	7.748	7.748	7.748	7.748	7.748	7.748	7.748	7.748	7.748
12802	University (	Demand	8500	Rest-of-Po	MA	WCMA	Existing	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26
12806	WMECO - (	Demand	8500	Rest-of-Po	MA	WCMA	Existing	3.616	3.616	3.616	3.616	3.616	3.616	3.616	3.616	3.616	3.616	3.616	3.616
12822	Burlington	Demand	8505	Northern N	VT	VT	Existing	6.837	6.837	6.837	6.837	6.837	6.837	6.363	6.363	6.363	6.363	6.837	6.837
12832	CPLN MA N	Demand	8506	Southeast I	MA	NEMA	Existing	9.266	9.266	9.266	9.266	9.266	9.266	8.721	8.721	8.721	8.721	9.266	9.266
12835	CPLN MA S	Demand	8506	Southeast I	MA	SEMA	Existing	4.983	4.983	4.983	4.983	4.983	4.983	3.848	3.848	3.848	3.848	4.983	4.983
12838	CPLN MA W	Demand	8500	Rest-of-Po	MA	WCMA	Existing	10.299	10.299	10.299	10.299	10.299	10.299	10.299	10.299	10.299	10.299	10.299	10.299
12843	CPLN RI OP	Demand	8506	Southeast I	RI	RI	Existing	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44
12845	Vermont Ef	Demand	8505	Northern N	VT	VT	Existing	99.96	99.96	99.96	99.96	99.96	99.96	99.96	99.96	99.96	99.96	99.96	99.96
13669	Mancheste	Generator	8500	Rest-of-Po	CT	CT	Existing	0.127	0.127	0.127	0.127	0	0	0	0	0	0	0	0
13673	MATEP (DI	Generator	8506	Southeast I	MA	NEMA	Existing	11.08	11.08	11.08	11.08	11.08	11.08	11.08	11.08	11.08	11.08	11.08	11.08
13675	MATEP (CC	Generator	8506	Southeast I	MA	NEMA	Existing	46.785	46.785	46.785	46.785	46.785	46.785	46.785	46.785	46.785	46.785	46.785	46.785
13703	Verso VCG1	Generator	8503	Maine	ME	ME	Existing	47.223	47.223	47.223	47.223	47.223	47.223	55.461	55.461	55.461	55.461	47.223	47.223
13704	Verso VCG2	Generator	8503	Maine	ME	ME	Existing	43.475	43.475	43.475	43.475	43.475	43.475	56.321	56.321	56.321	56.321	43.475	43.475

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
13705	Verso VCG	Generator	8503	Maine	ME	ME	Existing	41.752	41.752	41.752	41.752	41.752	41.752	54.668	54.668	54.668	54.668	41.752	41.752
13975	Corriveau	Generator	8503	Maine	ME	ME	Existing	0	0	0	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
14087	MAT3	Generator	8506	Southeast	MA	NEMA	Existing	16.86	16.86	16.86	16.86	16.86	16.86	16.86	16.86	16.86	16.86	16.86	16.86
14217	NORTHFIEL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	292	292	292	292	292	292	292	292	292	292	292	292
14218	NORTHFIEL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	292	292	292	292	292	292	292	292	292	292	292	292
14219	NORTHFIEL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	292	292	292	292	292	292	292	292	292	292	292	292
14220	NORTHFIEL	Generator	8500	Rest-of-Po	MA	WCMA	Existing	292	292	292	292	292	292	292	292	292	292	292	292
14271	Ameresco	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
14595	Granite Re	Generator	8505	Northern N	NH	NH	Existing	12.826	12.826	12.826	12.826	27.641	27.641	27.641	27.641	27.641	27.641	27.641	27.641
14599	Rhode Islar	Generator	8506	Southeast	RI	RI	Existing	25.819	25.819	25.819	25.819	25.269	25.269	25.269	25.269	25.269	25.269	25.269	25.269
14610	Princeton	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.122	0.122	0.122	0.122	0.392	0.392	0.392	0.392	0.392	0.392	0.392	0.392
14614	Kleen Ener	Generator	8500	Rest-of-Po	CT	CT	Existing	620	620	620	620	620	620	620	620	620	620	620	620
14623	Valley Hydı	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.246	0.246	0.246	0.246	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136
14660	Lempster V	Generator	8505	Northern N	NH	NH	Existing	2.676	2.676	2.676	2.676	8.079	8.079	8.079	8.079	8.079	8.079	8.079	8.079
14661	Berkshire V	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.537	1.537	1.537	1.537	6.207	6.207	6.207	6.207	6.207	6.207	6.207	6.207
14663	WMRE Cro	Generator	8503	Maine	ME	ME	Existing	2.806	2.806	2.806	2.806	2.806	2.806	2.806	2.806	2.806	2.806	2.806	2.806
14665	Record Hill	Generator	8503	Maine	ME	ME	Existing	5.732	5.732	5.732	5.732	12.08	12.08	12.08	12.08	12.08	12.08	12.08	12.08
14706	Kimberly-C	Generator	8500	Rest-of-Po	CT	CT	Existing	13.063	13.063	13.063	13.063	13.063	13.063	13.063	13.063	13.063	13.063	13.063	13.063
15415	Dartmouth	Generator	8506	Southeast	MA	SEMA	Existing	19.578	19.578	19.578	19.578	19.578	19.578	19.578	19.578	19.578	19.578	19.578	19.578
15477	New Haver	Generator	8500	Rest-of-Po	CT	CT	Existing	128.838	128.838	128.838	128.838	128.838	128.838	128.838	128.838	128.838	128.838	128.838	128.838
15509	Plainfield R	Generator	8500	Rest-of-Po	CT	CT	Existing	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
15586	Gardner W	Demand	8500	Rest-of-Po	MA	WCMA	Existing	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318
16296	Milford Hy	Generator	8503	Maine	ME	ME	Existing	3.754	3.754	3.754	3.754	5.332	5.332	5.332	5.332	5.332	5.332	5.332	5.332
16523	Stillwater	Generator	8503	Maine	ME	ME	Existing	1.313	1.313	1.313	1.313	1.239	1.239	1.239	1.239	1.239	1.239	1.239	1.239
16525	Medway	Generator	8503	Maine	ME	ME	Existing	3.427	3.427	3.427	3.427	2.869	2.869	2.869	2.869	2.869	2.869	2.869	2.869
16547	UI C&LM P	Demand	8500	Rest-of-Po	CT	CT	Existing	3.493	3.493	3.493	3.493	3.493	3.493	3.493	3.493	3.493	3.493	3.493	3.493
16631	Victory Roa	Generator	8506	Southeast	MA	NEMA	Existing	0.316	0.316	0.316	0.316	0	0	0	0	0	0	0	0
16640	Hilldale Av	Generator	8506	Southeast	MA	NEMA	Existing	0.27	0.27	0.27	0.27	0	0	0	0	0	0	0	0
16642	Railroad St	Generator	8506	Southeast	MA	NEMA	Existing	0.245	0.245	0.245	0.245	0	0	0	0	0	0	0	0
16643	Rover Stree	Generator	8506	Southeast	MA	NEMA	Existing	0.168	0.168	0.168	0.168	0	0	0	0	0	0	0	0
16644	Main Stree	Generator	8506	Southeast	MA	SEMA	Existing	0.28	0.28	0.28	0.28	0	0	0	0	0	0	0	0
16651	Efficiency	Demand	8503	Maine	ME	ME	Existing	27.093	27.093	27.093	27.093	27.093	27.093	0	0	0	0	27.093	27.093
16653	Berlin Biop	Generator	8505	Northern N	NH	NH	Existing	65.38	65.38	65.38	65.38	65.38	65.38	65.38	65.38	65.38	65.38	65.38	65.38
16659	Ipswich Wi	Generator	8506	Southeast	MA	NEMA	Existing	0.166	0.166	0.166	0.166	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315
16688	Nor1	Generator	8500	Rest-of-Po	CT	CT	Existing	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
16737	DFC-ERG H	Generator	8500	Rest-of-Po	CT	CT	Existing	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
16738	BFCP Fuel	Generator	8500	Rest-of-Po	CT	CT	Existing	12.635	12.635	12.635	12.635	12.635	12.635	12.635	12.635	12.635	12.635	12.635	12.635
16750	Norden #2	Generator	8500	Rest-of-Po	CT	CT	Existing	1.765	1.765	1.765	1.765	1.765	1.765	1.765	1.765	1.765	1.765	1.765	1.765
16752	Norden #3	Generator	8500	Rest-of-Po	CT	CT	Existing	1.753	1.753	1.753	1.753	1.753	1.753	1.753	1.753	1.753	1.753	1.753	1.753
16790	WCMA Pro	Demand	8500	Rest-of-Po	MA	WCMA	Existing	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
17359	Sugar River	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.104	0.104	0.104	0.104	0.104	0.104	0.104	0.104
35442	Seaman En	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
35453	Efficiency	Demand	8503	Maine	ME	ME	Existing	7.404	7.404	7.404	7.404	7.404	7.404	0.497	0.497	0.497	0.497	7.404	7.404
35485	Fitchburg-I	Generator	8500	Rest-of-Po	MA	WCMA	Existing	4.127	4.127	4.127	4.127	4.127	4.127	4.127	4.127	4.127	4.127	4.127	4.127
35555	GMCW	Generator	8505	Northern N	VT	VT	Existing	0.785	0.785	0.785	0.785	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93
35593	Fiske Hydro	Generator	8505	Northern N	NH	NH	Existing	0.077	0.077	0.077	0.077	0.113	0.113	0.113	0.113	0.113	0.113	0.113	0.113
35594	Spaulding	Generator	8505	Northern N	NH	NH	Existing	0	0	0	0	0.104	0.104	0.104	0.104	0.104	0.104	0.104	0.104
35656	Rainbow_2	Generator	8500	Rest-of-Po	CT	CT	Existing	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
35657	Shrewsbur	Generator	8500	Rest-of-Po	MA	WCMA	Existing	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65
35658	Rainbow_1	Generator	8500	Rest-of-Po	CT	CT	Existing	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
35693	Spruce Mo	Generator	8503	Maine	ME	ME	Existing	2.495	2.495	2.495	2.495	6.988	6.988	6.988	6.988	6.988	6.988	6.988	6.988
35728	Moretown	Generator	8505	Northern N	VT	VT	Existing	1.447	1.447	1.447	1.447	1.447	1.447	1.447	1.447	1.447	1.447	1.447	1.447
35979	Kingdom C	Generator	8505	Northern N	VT	VT	Existing	9.173	9.173	9.173	9.173	19.976	19.976	19.976	19.976	19.976	19.976	19.976	19.976
37040	KENDALL S	Generator	8506	Southeast	MA	NEMA	Existing	21.967	21.967	21.967	21.967	21.967	21.967	21.967	21.967	21.967	21.967	21.967	21.967

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
37050	Groton Wi	Generator	8505	Northern N	NH	NH	Existing	5.431	5.431	5.431	5.431	11.853	11.853	11.853	11.853	11.853	11.853	11.853	11.853
37072	Beaver_Rid	Generator	8503	Maine	ME	ME	Existing	0.474	0.474	0.474	0.474	1.255	1.255	1.255	1.255	1.255	1.255	1.255	1.255
37077	Woronoco	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.269	0.269	0.269	0.269	0.768	0.768	0.768	0.768	0.768	0.768	0.768	0.768
37105	Blue Sky W	Generator	8503	Maine	ME	ME	Existing	19.776	19.776	19.776	19.776	65.96	65.96	65.96	65.96	65.96	65.96	65.96	65.96
37112	Efficiency N	Demand	8503	Maine	ME	ME	Existing	1.698	1.698	1.698	1.698	1.698	1.698	1.698	1.698	1.698	1.698	1.698	1.698
37120	Thundermi	Generator	8506	Southeast I	RI	RI	Existing	0	0	0	0	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
37855	Hess DR No	Demand	8505	Northern N	VT	VT	Existing	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
37929	RTDR_5078	Demand	8500	Rest-of-Po	MA	WCMA	Existing	2.601	2.601	2.601	2.601	2.601	2.601	2.601	2.601	2.601	2.601	2.601	2.601
37930	RTDR_5078	Demand	8500	Rest-of-Po	CT	CT	Existing	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
37931	RTDR_5078	Demand	8506	Southeast I	MA	SEMA	Existing	2.239	2.239	2.239	2.239	2.239	2.239	2.239	2.239	2.239	2.239	2.239	2.239
37933	RTDR_5078	Demand	8505	Northern N	NH	NH	Existing	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15
37934	RTDR_5078	Demand	8506	Southeast I	MA	NEMA	Existing	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682
37935	RTDR_5078	Demand	8500	Rest-of-Po	CT	CT	Existing	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45
37936	RTDR_5078	Demand	8500	Rest-of-Po	CT	CT	Existing	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014
37937	RTDR_5078	Demand	8503	Maine	ME	ME	Existing	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
37938	RTDR_5078	Demand	8506	Southeast I	RI	RI	Existing	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
37939	RTDR_5078	Demand	8506	Southeast I	MA	SEMA	Existing	1.318	1.318	1.318	1.318	1.318	1.318	1.318	1.318	1.318	1.318	1.318	1.318
37940	RTDR_5078	Demand	8505	Northern N	NH	NH	Existing	0.336	0.336	0.336	0.336	0.336	0.336	0.336	0.336	0.336	0.336	0.336	0.336
37941	RTDR_5078	Demand	8500	Rest-of-Po	MA	WCMA	Existing	2.343	2.343	2.343	2.343	2.343	2.343	2.343	2.343	2.343	2.343	2.343	2.343
37942	RTDR_5078	Demand	8505	Northern N	VT	VT	Existing	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893	0.893
37943	RTDR_5078	Demand	8500	Rest-of-Po	CT	CT	Existing	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52
37944	RTDR_5078	Demand	8500	Rest-of-Po	MA	WCMA	Existing	1.826	1.826	1.826	1.826	1.826	1.826	1.826	1.826	1.826	1.826	1.826	1.826
38057	Efficiency N	Demand	8503	Maine	ME	ME	Existing	179.083	179.083	179.083	179.083	179.083	179.083	179.083	179.083	179.083	179.083	179.083	179.083
38078	NFM Solar	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.507	0.507	0.507	0.507	0	0	0	0	0	0	0	0
38089	Footprint C	Generator	8506	Southeast I	MA	NEMA	Existing	674	674	674	674	674	674	674	674	674	674	674	674
38114	East Bridge	Generator	8506	Southeast I	MA	SEMA	Existing	0.713	0.713	0.713	0.713	0	0	0	0	0	0	0	0
38115	Harrington	Generator	8500	Rest-of-Po	MA	WCMA	Existing	4.767	4.767	4.767	4.767	0	0	0	0	0	0	0	0
38173	Saddleback	Generator	8503	Maine	ME	ME	Existing	3.75	3.75	3.75	3.75	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23
38178	Southbridg	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
38181	Westford S	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.8	1.8	1.8	1.8	0	0	0	0	0	0	0	0
38206	Bridgeport	Generator	8500	Rest-of-Po	CT	CT	Existing	500.783	500.783	500.783	500.783	509.092	509.092	514.782	514.782	514.782	514.782	509.092	509.092
38210	RTDR_5068	Demand	8506	Southeast I	MA	NEMA	Existing	9.454	9.454	9.454	9.454	9.454	9.454	9.454	9.454	9.454	9.454	9.454	9.454
38216	WCMA CHP	Demand	8500	Rest-of-Po	MA	WCMA	Existing	14.294	14.294	14.294	14.294	14.294	14.294	14.294	14.294	14.294	14.294	14.294	14.294
38217	RI CHP	Demand	8506	Southeast I	RI	RI	Existing	11.953	11.953	11.953	11.953	11.953	11.953	11.953	11.953	11.953	11.953	11.953	11.953
38219	WMECO EE	Demand	8500	Rest-of-Po	MA	WCMA	Existing	83.863	83.863	83.863	83.863	83.863	83.863	83.863	83.863	83.863	83.863	83.863	83.863
38249	Silver lake	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.496	0.496	0.496	0.496	0	0	0	0	0	0	0	0
38250	Indian Orch	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.68	0.68	0.68	0.68	0	0	0	0	0	0	0	0
38252	Indian Rive	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.099	0.099	0.099	0.099	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372
38278	Wallingford	Generator	8500	Rest-of-Po	CT	CT	Existing	94.072	94.072	94.072	94.072	94.072	94.072	94.072	94.072	94.072	94.072	94.072	94.072
38287	WMA Ches	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.904	1.904	1.904	1.904	0	0	0	0	0	0	0	0
38289	Medway Pe	Generator	8506	Southeast I	MA	SEMA	Existing	194.8	194.8	194.8	194.8	194.8	194.8	194.8	194.8	194.8	194.8	194.8	194.8
38297	CPV_Towar	Generator	8500	Rest-of-Po	CT	CT	Existing	790	790	790	790	790	790	790	790	790	790	790	790
38302	Fisher Road	Generator	8506	Southeast I	MA	SEMA	Existing	1.92	1.92	1.92	1.92	0	0	0	0	0	0	0	0
38310	Canal 3	Generator	8506	Southeast I	MA	SEMA	Existing	333	333	333	333	333	333	333	333	333	333	333	333
38311	NEMA CHP	Demand	8506	Southeast I	MA	NEMA	Existing	3.107	3.107	3.107	3.107	3.107	3.107	3.107	3.107	3.107	3.107	3.107	3.107
38322	DRCR_Cent	Demand	8500	Rest-of-Po	MA	WCMA	Existing	14.599	14.599	14.599	14.599	14.599	14.599	14.599	14.599	14.599	14.599	14.599	14.599
38324	DRCR_Low	Demand	8506	Southeast I	MA	SEMA	Existing	6.818	6.818	6.818	6.818	6.818	6.818	6.818	6.818	6.818	6.818	6.818	6.818
38331	DRCR_Rhod	Demand	8506	Southeast I	RI	RI	Existing	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
38334	DRCR_SEM	Demand	8506	Southeast I	MA	SEMA	Existing	20.934	20.934	20.934	20.934	20.934	20.934	20.934	20.934	20.934	20.934	20.934	20.934
38360	DRCR_Bost	Demand	8506	Southeast I	MA	NEMA	Existing	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
38372	Dartmouth	Generator	8506	Southeast I	MA	SEMA	Existing	1.43	1.43	1.43	1.43	0	0	0	0	0	0	0	0
38373	Holliston	Generator	8506	Southeast I	MA	SEMA	Existing	1.367	1.367	1.367	1.367	0	0	0	0	0	0	0	0
38374	Plymouth	Generator	8506	Southeast I	MA	SEMA	Existing	1.9	1.9	1.9	1.9	0	0	0	0	0	0	0	0
38375	Uxbridge	Generator	8506	Southeast I	MA	SEMA	Existing	1.23	1.23	1.23	1.23	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
38376	Landcraft	Generator	8506	Southeast	MA	SEMA	Existing	1.339	1.339	1.339	1.339	0	0	0	0	0	0	0	0
38378	LSRHS	Generator	8506	Southeast	MA	NEMA	Existing	0.42	0.42	0.42	0.42	0	0	0	0	0	0	0	0
38380	Treasure V	Generator	8500	Rest-of-Po	MA	WCMA	Existing	2.07	2.07	2.07	2.07	0	0	0	0	0	0	0	0
38381	Belchertow	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.53	0.53	0.53	0.53	0	0	0	0	0	0	0	0
38387	CSG Aggreg	Demand	8506	Southeast	MA	NEMA	Existing	16.592	16.592	16.592	16.592	16.592	16.592	16.592	16.592	16.592	16.592	16.592	16.592
38388	CSG Aggreg	Demand	8506	Southeast	MA	SEMA	Existing	4.808	4.808	4.808	4.808	4.808	4.808	4.808	4.808	4.808	4.808	4.808	4.808
38389	CSG Aggreg	Demand	8500	Rest-of-Po	MA	WCMA	Existing	6.841	6.841	6.841	6.841	6.841	6.841	6.841	6.841	6.841	6.841	6.841	6.841
38393	RTDR_513	Demand	8503	Maine	ME	ME	Existing	39.96	39.96	39.96	39.96	39.96	39.96	39.96	39.96	39.96	39.96	39.96	39.96
38421	Jericho Pov	Generator	8505	Northern N	NH	NH	Existing	0.828	0.828	0.828	0.828	2.185	2.185	2.185	2.185	2.185	2.185	2.185	2.185
38437	Ipswich Wi	Generator	8506	Southeast	MA	NEMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
38438	Deerfield V	Generator	8505	Northern N	VT	VT	Existing	8.1	8.1	8.1	8.1	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6
38440	Cottage St	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.501	1.501	1.501	1.501	0	0	0	0	0	0	0	0
38441	UI RCP BGP	Generator	8500	Rest-of-Po	CT	CT	Existing	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
38442	UI RCP NH	Generator	8500	Rest-of-Po	CT	CT	Existing	2.461	2.461	2.461	2.461	2.461	2.461	2.461	2.461	2.461	2.461	2.461	2.461
38447	Boston_Pe	Demand	8506	Southeast	MA	NEMA	Existing	15.66	15.66	15.66	15.66	15.66	15.66	15.66	15.66	15.66	15.66	15.66	15.66
38468	Norfolk-Wa	Demand	8506	Southeast	MA	SEMA	Existing	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296
38475	Hoosac Wi	Generator	8500	Rest-of-Po	MA	WCMA	Existing	3.942	3.942	3.942	3.942	9.104	9.104	9.104	9.104	9.104	9.104	9.104	9.104
38480	Hubbardsto	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.295	1.295	1.295	1.295	0	0	0	0	0	0	0	0
38483	Ngrid_SEM	Demand	8506	Southeast	MA	SEMA	Existing	1.692	1.692	1.692	1.692	1.692	1.692	1.692	1.692	1.692	1.692	1.692	1.692
38494	24 Boutilie	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.248	0.248	0.248	0.248	0	0	0	0	0	0	0	0
38495	Deepwater	Generator	8506	Southeast	RI	RI	Existing	5.774	5.774	5.774	5.774	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
38500	Mass Mid-S	Generator	8500	Rest-of-Po	MA	WCMA	Existing	6.916	6.916	6.916	6.916	0	0	0	0	0	0	0	0
38510	City of Gar	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.384	0.384	0.384	0.384	0	0	0	0	0	0	0	0
38527	Grafton WI	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.669	0.669	0.669	0.669	0	0	0	0	0	0	0	0
38528	29 Oxford	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.266	0.266	0.266	0.266	0	0	0	0	0	0	0	0
38530	Mattapoise	Generator	8506	Southeast	MA	SEMA	Existing	0.307	0.307	0.307	0.307	0	0	0	0	0	0	0	0
38531	Mattapoise	Generator	8506	Southeast	MA	SEMA	Existing	0.316	0.316	0.316	0.316	0	0	0	0	0	0	0	0
38532	Leominster	Generator	8506	Southeast	MA	NEMA	Existing	1.324	1.324	1.324	1.324	0	0	0	0	0	0	0	0
38533	Berlin 1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.338	0.338	0.338	0.338	0	0	0	0	0	0	0	0
38534	Millbury So	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.165	1.165	1.165	1.165	0	0	0	0	0	0	0	0
38538	Groton Roa	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.298	0.298	0.298	0.298	0	0	0	0	0	0	0	0
38539	40 Auburn	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.171	0.171	0.171	0.171	0	0	0	0	0	0	0	0
38543	Carpenter	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.253	0.253	0.253	0.253	0	0	0	0	0	0	0	0
38544	17 Kelly Rd	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.31	0.31	0.31	0.31	0	0	0	0	0	0	0	0
38545	90 River Rd	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.36	0.36	0.36	0.36	0	0	0	0	0	0	0	0
38548	Fall River- (	Generator	8506	Southeast	MA	SEMA	Existing	0.509	0.509	0.509	0.509	0	0	0	0	0	0	0	0
38551	Fasll River	Generator	8506	Southeast	MA	SEMA	Existing	1.502	1.502	1.502	1.502	0	0	0	0	0	0	0	0
38553	Antrim Win	Generator	8505	Northern N	NH	NH	Existing	5	5	5	5	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
38555	Berlin 2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.325	0.325	0.325	0.325	0	0	0	0	0	0	0	0
38556	Berlin 3	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.323	0.323	0.323	0.323	0	0	0	0	0	0	0	0
38558	Fall River- U	Generator	8506	Southeast	MA	SEMA	Existing	1.428	1.428	1.428	1.428	0	0	0	0	0	0	0	0
38559	Berlin 4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.347	0.347	0.347	0.347	0	0	0	0	0	0	0	0
38560	Grafton	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.848	0.848	0.848	0.848	0	0	0	0	0	0	0	0
38561	True North	Generator	8506	Southeast	MA	NEMA	Existing	1.958	1.958	1.958	1.958	0	0	0	0	0	0	0	0
38562	Franklin 1	Generator	8506	Southeast	MA	SEMA	Existing	1.305	1.305	1.305	1.305	0	0	0	0	0	0	0	0
38565	Franklin 2	Generator	8506	Southeast	MA	SEMA	Existing	1.904	1.904	1.904	1.904	0	0	0	0	0	0	0	0
38567	Billerica	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.916	1.916	1.916	1.916	0	0	0	0	0	0	0	0
38574	Route 57	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.736	0.736	0.736	0.736	0	0	0	0	0	0	0	0
38575	Agawam So	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.691	0.691	0.691	0.691	0	0	0	0	0	0	0	0
38576	Whately	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.617	0.617	0.617	0.617	0	0	0	0	0	0	0	0
38577	Holiday Hil	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.784	0.784	0.784	0.784	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
38579	Rehoboth	Generator	8506	Southeast	MA	SEMA	Existing	1.043	1.043	1.043	1.043	0	0	0	0	0	0	0	0
38580	Amesbury	Generator	8506	Southeast	MA	NEMA	Existing	2.312	2.312	2.312	2.312	0	0	0	0	0	0	0	0
38581	Tyngsboro	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.042	1.042	1.042	1.042	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
38582	Norton MA	Generator	8506	Southeast I	MA	SEMA	Existing	0.675	0.675	0.675	0.675	0	0	0	0	0	0	0	0
38583	Agawam II	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.804	0.804	0.804	0.804	0	0	0	0	0	0	0	0
38584	Bridgewate	Generator	8506	Southeast I	MA	SEMA	Existing	0.462	0.462	0.462	0.462	0	0	0	0	0	0	0	0
38655	Barrett Dis	Generator	8506	Southeast I	MA	SEMA	Existing	0.23	0.23	0.23	0.23	0	0	0	0	0	0	0	0
38657	Heliovaas -	Generator	8506	Southeast I	MA	NEMA	Existing	0.545	0.545	0.545	0.545	0	0	0	0	0	0	0	0
38661	Heliovaas -	Generator	8506	Southeast I	MA	NEMA	Existing	0.562	0.562	0.562	0.562	0	0	0	0	0	0	0	0
38663	Killingly En	Generator	8500	Rest-of-Po	CT	CT	Existing	631.955	631.955	631.955	631.955	631.955	631.955	631.955	631.955	631.955	631.955	631.955	631.955
38669	Future Gen	Generator	8506	Southeast I	MA	SEMA	Existing	1.385	1.385	1.385	1.385	1.904	1.904	1.904	1.904	1.904	1.904	1.904	1.904
38689	Bloom Ene	Demand	8500	Rest-of-Po	CT	CT	Existing	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18	9.18
38692	MMWEC Si	Generator	8506	Southeast I	MA	NEMA	Existing	57.967	57.967	57.967	57.967	57.967	57.967	57.967	57.967	57.967	57.967	57.967	57.967
38694	RTDR_Mair	Demand	8503	Maine	ME	ME	Existing	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066
38696	Blossom Ro	Generator	8506	Southeast I	MA	SEMA	Existing	0.414	0.414	0.414	0.414	0	0	0	0	0	0	0	0
38698	Blossom Ro	Generator	8506	Southeast I	MA	SEMA	Existing	0.417	0.417	0.417	0.417	0	0	0	0	0	0	0	0
38699	Groveland	Generator	8506	Southeast I	MA	SEMA	Existing	0.39	0.39	0.39	0.39	0	0	0	0	0	0	0	0
38700	Stafford St	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.228	0.228	0.228	0.228	0	0	0	0	0	0	0	0
38701	Onset East	Generator	8506	Southeast I	MA	SEMA	Existing	0.494	0.494	0.494	0.494	0	0	0	0	0	0	0	0
38702	Onset Wes	Generator	8506	Southeast I	MA	SEMA	Existing	0.486	0.486	0.486	0.486	0	0	0	0	0	0	0	0
38704	Richardson	Generator	8506	Southeast I	MA	SEMA	Existing	0.418	0.418	0.418	0.418	0	0	0	0	0	0	0	0
38706	Old Upton	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.228	0.228	0.228	0.228	0	0	0	0	0	0	0	0
38707	Main St Dig	Generator	8506	Southeast I	MA	SEMA	Existing	0.266	0.266	0.266	0.266	0	0	0	0	0	0	0	0
38708	Groton Sch	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.359	0.359	0.359	0.359	0	0	0	0	0	0	0	0
38709	Frank Moss	Generator	8506	Southeast I	MA	SEMA	Existing	0.214	0.214	0.214	0.214	0	0	0	0	0	0	0	0
38738	Canton Mo	Generator	8503	Maine	ME	ME	Existing	2.21	2.21	2.21	2.21	4.687	4.687	4.687	4.687	4.687	4.687	4.687	4.687
38757	WOODBRID	Generator	8500	Rest-of-Po	CT	CT	Existing	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
38758	CT Small G	Demand	8500	Rest-of-Po	CT	CT	Existing	1.944	1.944	1.944	1.944	1.944	1.944	1.944	1.944	1.944	1.944	1.944	1.944
38760	Norwich W	Generator	8500	Rest-of-Po	CT	CT	Existing	2	2	2	2	2	2	2	2	2	2	2	2
38787	CT On-Peak	Demand	8500	Rest-of-Po	CT	CT	Existing	33.059	33.059	33.059	33.059	33.059	33.059	10.249	10.249	10.249	10.249	33.059	33.059
38795	Hadley 2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.82	0.82	0.82	0.82	0	0	0	0	0	0	0	0
38800	DRCR_Wes	Demand	8500	Rest-of-Po	MA	WCMA	Existing	14	14	14	14	14	14	14	14	14	14	14	14
38803	DRCR_Sprii	Demand	8500	Rest-of-Po	MA	WCMA	Existing	7.805	7.805	7.805	7.805	7.805	7.805	7.805	7.805	7.805	7.805	7.805	7.805
38813	DRCR_New	Demand	8505	Northern N	NH	NH	Existing	14.394	14.394	14.394	14.394	14.394	14.394	14.394	14.394	14.394	14.394	14.394	14.394
38815	Hubbardsto	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.96	0.96	0.96	0.96	0	0	0	0	0	0	0	0
38823	Coolidge So	Generator	8505	Northern N	VT	VT	Existing	6.85	6.85	6.85	6.85	0	0	0	0	0	0	0	0
38824	Nutmeg So	Generator	8500	Rest-of-Po	CT	CT	Existing	5.647	5.647	5.647	5.647	0	0	0	0	0	0	0	0
38825	Sanford Air	Generator	8503	Maine	ME	ME	Existing	13.516	13.516	13.516	13.516	0	0	0	0	0	0	0	0
38826	Quinebaug	Generator	8500	Rest-of-Po	CT	CT	Existing	11.071	11.071	11.071	11.071	0	0	0	0	0	0	0	0
38831	Montague	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.28	1.28	1.28	1.28	0	0	0	0	0	0	0	0
38833	DGSC PV40	Generator	8506	Southeast I	RI	RI	Existing	0.137	0.137	0.137	0.137	0	0	0	0	0	0	0	0
38834	DGSC PV16	Generator	8506	Southeast I	RI	RI	Existing	0.873	0.873	0.873	0.873	0	0	0	0	0	0	0	0
38835	Lee Site 31	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.375	0.375	0.375	0.375	0	0	0	0	0	0	0	0
38836	Pittsfield 4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.197	0.197	0.197	0.197	0	0	0	0	0	0	0	0
38838	Farmingtor	Generator	8503	Maine	ME	ME	Existing	21.359	21.359	21.359	21.359	0	0	0	0	0	0	0	0
38841	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	1.5	1.5	1.5	1.5	0	0	0	0	0	0	0	0
38842	DGSC PV30	Generator	8506	Southeast I	RI	RI	Existing	1.359	1.359	1.359	1.359	0	0	0	0	0	0	0	0
38843	DGSC PV20	Generator	8506	Southeast I	RI	RI	Existing	0.892	0.892	0.892	0.892	0	0	0	0	0	0	0	0
38848	Constitutio	Generator	8500	Rest-of-Po	CT	CT	Existing	5.157	5.157	5.157	5.157	0	0	0	0	0	0	0	0
38853	DGSC PV40	Generator	8506	Southeast I	RI	RI	Existing	0.211	0.211	0.211	0.211	0	0	0	0	0	0	0	0
38855	DGSC PV50	Generator	8506	Southeast I	RI	RI	Existing	0.162	0.162	0.162	0.162	0	0	0	0	0	0	0	0
38858	DGSC PV12	Generator	8506	Southeast I	RI	RI	Existing	0.555	0.555	0.555	0.555	0	0	0	0	0	0	0	0
38860	DGSC PV45	Generator	8506	Southeast I	RI	RI	Existing	0.197	0.197	0.197	0.197	0	0	0	0	0	0	0	0
38861	DGSC PV22	Generator	8506	Southeast I	RI	RI	Existing	0.122	0.122	0.122	0.122	0	0	0	0	0	0	0	0
38862	DGSC PV45	Generator	8506	Southeast I	RI	RI	Existing	0.198	0.198	0.198	0.198	0	0	0	0	0	0	0	0
38863	Syncarpha	Generator	8506	Southeast I	MA	NEMA	Existing	0.71	0.71	0.71	0.71	0	0	0	0	0	0	0	0
38864	DGSC PV25	Generator	8506	Southeast I	RI	RI	Existing	0.126	0.126	0.126	0.126	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
38865	DGSC PV85	Generator	8506	Southeast I	RI	RI	Existing	0.433	0.433	0.433	0.433	0	0	0	0	0	0	0	0
38867	DGSC PV30	Generator	8506	Southeast I	RI	RI	Existing	0.085	0.085	0.085	0.085	0	0	0	0	0	0	0	0
38868	DGSC PV13	Generator	8506	Southeast I	RI	RI	Existing	0.455	0.455	0.455	0.455	0	0	0	0	0	0	0	0
38869	DGSC PV49	Generator	8506	Southeast I	RI	RI	Existing	0.202	0.202	0.202	0.202	0	0	0	0	0	0	0	0
38879	CT - RW	Demand	8500	Rest-of-Po	CT	CT	Existing	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88	11.88
38881	DGSC PV49	Generator	8506	Southeast I	RI	RI	Existing	0.2	0.2	0.2	0.2	0	0	0	0	0	0	0	0
38883	DGSC PV11	Generator	8506	Southeast I	RI	RI	Existing	0.471	0.471	0.471	0.471	0	0	0	0	0	0	0	0
38884	DGSC PV91	Generator	8506	Southeast I	RI	RI	Existing	0.434	0.434	0.434	0.434	0	0	0	0	0	0	0	0
38885	DGSC PV10	Generator	8506	Southeast I	RI	RI	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
38888	Patterson F	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.432	0.432	0.432	0.432	0	0	0	0	0	0	0	0
38889	Patterson F	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.229	0.229	0.229	0.229	0	0	0	0	0	0	0	0
38904	NEMA DG	Demand	8506	Southeast I	MA	NEMA	Existing	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
38905	Connecticu	Demand	8500	Rest-of-Po	CT	CT	Existing	3.402	3.402	3.402	3.402	3.402	3.402	3.402	3.402	3.402	3.402	3.402	3.402
38943	Athens Ene	Generator	8503	Maine	ME	ME	Existing	7	7	7	7	7	7	7	7	7	7	7	7
38944	Barre I	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.723	0.723	0.723	0.723	0	0	0	0	0	0	0	0
38945	Gill	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.147	1.147	1.147	1.147	0	0	0	0	0	0	0	0
38949	RE Growth	Generator	8506	Southeast I	RI	RI	Existing	0.095	0.095	0.095	0.095	0	0	0	0	0	0	0	0
38950	RE Growth	Generator	8506	Southeast I	RI	RI	Existing	0.099	0.099	0.099	0.099	0	0	0	0	0	0	0	0
38956	CentralMA	Demand	8500	Rest-of-Po	MA	WCMA	Existing	3.132	3.132	3.132	3.132	3.132	3.132	3.132	3.132	3.132	3.132	3.132	3.132
38961	Fitchburg S	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.234	0.234	0.234	0.234	0	0	0	0	0	0	0	0
38962	Ashby 1 So	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.374	0.374	0.374	0.374	0	0	0	0	0	0	0	0
38963	Ashby 2 So	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.422	0.422	0.422	0.422	0	0	0	0	0	0	0	0
38964	NorthernCT	Demand	8500	Rest-of-Po	CT	CT	Existing	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
38968	DR_Wester	Demand	8500	Rest-of-Po	CT	CT	Existing	17.079	17.079	17.079	17.079	17.079	17.079	17.079	17.079	17.079	17.079	17.079	17.079
38970	Barre II	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.715	0.715	0.715	0.715	0	0	0	0	0	0	0	0
38971	Seacoast_1	Demand	8505	Northern N	NH	NH	Existing	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86
38972	CPLN MA N	Demand	8506	Southeast I	MA	NEMA	Existing	0.725	0.725	0.725	0.725	0.725	0.725	0	0	0	0	0.725	0.725
38973	Partners He	Generator	8506	Southeast I	MA	SEMA	Existing	0.356	0.356	0.356	0.356	0	0	0	0	0	0	0	0
38974	CPLN RI Sol	Demand	8506	Southeast I	RI	RI	Existing	2.29	2.29	2.29	2.29	2.29	2.29	0	0	0	0	2.29	2.29
40594	SEMA Solar	Demand	8506	Southeast I	MA	SEMA	Existing	5.026	5.026	5.026	5.026	5.026	5.026	0	0	0	0	5.026	5.026
40595	Southwick	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.826	1.826	1.826	1.826	0	0	0	0	0	0	0	0
40596	CPLN MA V	Demand	8500	Rest-of-Po	MA	WCMA	Existing	7.174	7.174	7.174	7.174	7.174	7.174	0	0	0	0	7.174	7.174
40597	DRCR_Nort	Demand	8505	Northern N	VT	VT	Existing	7.323	7.323	7.323	7.323	7.323	7.323	7.323	7.323	7.323	7.323	7.323	7.323
40598	S - NEMA S	Demand	8506	Southeast I	MA	NEMA	Existing	1.232	1.232	1.232	1.232	1.232	1.232	0	0	0	0	1.232	1.232
40599	Duxbury Ch	Generator	8506	Southeast I	MA	SEMA	Existing	0.09	0.09	0.09	0.09	0	0	0	0	0	0	0	0
40600	S - SEMA So	Demand	8506	Southeast I	MA	SEMA	Existing	0.6	0.6	0.6	0.6	0.6	0.6	0	0	0	0	0.6	0.6
40601	S - WCMA S	Demand	8500	Rest-of-Po	MA	WCMA	Existing	0.168	0.168	0.168	0.168	0.168	0.168	0	0	0	0	0.168	0.168
40602	DRCR_Verr	Demand	8505	Northern N	VT	VT	Existing	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74
40613	Fusion Sola	Generator	8500	Rest-of-Po	CT	CT	Existing	7.44	7.44	7.44	7.44	0	0	0	0	0	0	0	0
40615	Hatfield So	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.63	0.63	0.63	0.63	0	0	0	0	0	0	0	0
40616	Pawcatuck	Generator	8500	Rest-of-Po	CT	CT	Existing	9	9	9	9	0	0	0	0	0	0	0	0
40617	Sunderland	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.175	0.175	0.175	0.175	0	0	0	0	0	0	0	0
40618	Greenfield	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.376	0.376	0.376	0.376	0	0	0	0	0	0	0	0
40619	Southampt	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.347	0.347	0.347	0.347	0	0	0	0	0	0	0	0
40620	Savoy Solar	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.359	0.359	0.359	0.359	0	0	0	0	0	0	0	0
40621	Hampden S	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.59	0.59	0.59	0.59	0	0	0	0	0	0	0	0
40622	Springfield	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.712	0.712	0.712	0.712	0	0	0	0	0	0	0	0
40623	East Longm	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.842	0.842	0.842	0.842	0	0	0	0	0	0	0	0
40624	East Spring	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.261	0.261	0.261	0.261	0	0	0	0	0	0	0	0
40625	Ludlow Site	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.264	0.264	0.264	0.264	0	0	0	0	0	0	0	0
40626	Plymouth S	Generator	8506	Southeast I	MA	SEMA	Existing	0.229	0.229	0.229	0.229	0	0	0	0	0	0	0	0
40627	New Bedfo	Generator	8506	Southeast I	MA	SEMA	Existing	0.169	0.169	0.169	0.169	0	0	0	0	0	0	0	0
40629	Wareham S	Generator	8506	Southeast I	MA	SEMA	Existing	0.553	0.553	0.553	0.553	0	0	0	0	0	0	0	0
40630	Hinsdale So	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.365	0.365	0.365	0.365	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
40631	Southwick	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.823	0.823	0.823	0.823	0	0	0	0	0	0	0	0
40632	RI_23_DGS	Generator	8506	Southeast I	RI	RI	Existing	0.413	0.413	0.413	0.413	0	0	0	0	0	0	0	0
40641	RI_25_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.121	0.121	0.121	0.121	0	0	0	0	0	0	0	0
40642	RI_26_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.086	0.086	0.086	0.086	0	0	0	0	0	0	0	0
40644	RI_27_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.083	0.083	0.083	0.083	0	0	0	0	0	0	0	0
40647	RI_28_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.084	0.084	0.084	0.084	0	0	0	0	0	0	0	0
40653	Madison B	Generator	8503	Maine	ME	ME	Existing	4.99	4.99	4.99	4.99	4.99	4.99	4.99	4.99	4.99	4.99	4.99	4.99
40654	RI_29_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.176	0.176	0.176	0.176	0	0	0	0	0	0	0	0
40655	RI_33_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.288	0.288	0.288	0.288	0	0	0	0	0	0	0	0
40656	RI_34_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.941	0.941	0.941	0.941	0	0	0	0	0	0	0	0
40658	Vineyard W	Generator	8506	Southeast I	MA	SEMA	Existing	155.618	155.618	155.618	155.618	278.063	278.063	278.063	278.063	278.063	278.063	278.063	278.063
40659	RI_36_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.375	0.375	0.375	0.375	0	0	0	0	0	0	0	0
40664	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.67	0.67	0.67	0.67	0	0	0	0	0	0	0	0
40667	RI_42_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.464	0.464	0.464	0.464	0	0	0	0	0	0	0	0
40675	RI_50_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0
40676	RI_52_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0
40695	RI_31_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.082	0.082	0.082	0.082	0	0	0	0	0	0	0	0
40696	RI_32_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.082	0.082	0.082	0.082	0	0	0	0	0	0	0	0
40698	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1	1	1	1	0	0	0	0	0	0	0	0
40700	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.36	1.36	1.36	1.36	0	0	0	0	0	0	0	0
40716	Chinook So	Generator	8505	Northern N	NH	NH	Existing	9.181	9.181	9.181	9.181	0	0	0	0	0	0	0	0
40718	RI_30_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.082	0.082	0.082	0.082	0	0	0	0	0	0	0	0
40732	Three Corn	Generator	8503	Maine	ME	ME	Existing	77.1	77.1	77.1	77.1	0	0	0	0	0	0	0	0
40736	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.6	1.6	1.6	1.6	0	0	0	0	0	0	0	0
40744	RI_43_RE C	Generator	8506	Southeast I	RI	RI	Existing	0.298	0.298	0.298	0.298	0	0	0	0	0	0	0	0
40746	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.8	0.8	0.8	0.8	0	0	0	0	0	0	0	0
40747	Cranston S	Generator	8506	Southeast I	RI	RI	Existing	3.011	3.011	3.011	3.011	0	0	0	0	0	0	0	0
40749	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.8	0.8	0.8	0.8	0	0	0	0	0	0	0	0
40750	TRS Fuel Ce	Generator	8500	Rest-of-Po	CT	CT	Existing	1.614	1.614	1.614	1.614	1.614	1.614	1.614	1.614	1.614	1.614	1.614	1.614
40751	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.4	0.4	0.4	0.4	0	0	0	0	0	0	0	0
40765	CVEC EDGA	Generator	8506	Southeast I	MA	SEMA	Existing	0.423	0.423	0.423	0.423	0	0	0	0	0	0	0	0
40766	CVEC BARN	Generator	8506	Southeast I	MA	SEMA	Existing	0.155	0.155	0.155	0.155	0	0	0	0	0	0	0	0
40767	CVEC DY HI	Generator	8506	Southeast I	MA	SEMA	Existing	0.391	0.391	0.391	0.391	0	0	0	0	0	0	0	0
40768	CVEC EAST	Generator	8506	Southeast I	MA	SEMA	Existing	0.18	0.18	0.18	0.18	0	0	0	0	0	0	0	0
40769	CVEC MAR	Generator	8506	Southeast I	MA	SEMA	Existing	0.295	0.295	0.295	0.295	0	0	0	0	0	0	0	0
40770	CVEC MAR	Generator	8506	Southeast I	MA	SEMA	Existing	1.415	1.415	1.415	1.415	0	0	0	0	0	0	0	0
40771	CVEC WEST	Generator	8506	Southeast I	MA	SEMA	Existing	0.165	0.165	0.165	0.165	0	0	0	0	0	0	0	0
40772	CVEC VINE	Generator	8506	Southeast I	MA	SEMA	Existing	0.312	0.312	0.312	0.312	0	0	0	0	0	0	0	0
40773	CVEC ORLE	Generator	8506	Southeast I	MA	SEMA	Existing	0.14	0.14	0.14	0.14	0	0	0	0	0	0	0	0
40774	CVEC HYAN	Generator	8506	Southeast I	MA	SEMA	Existing	2.294	2.294	2.294	2.294	0	0	0	0	0	0	0	0
40775	CVEC CHAT	Generator	8506	Southeast I	MA	SEMA	Existing	0.669	0.669	0.669	0.669	0	0	0	0	0	0	0	0
40776	CVEC BREW	Generator	8506	Southeast I	MA	SEMA	Existing	0.422	0.422	0.422	0.422	0	0	0	0	0	0	0	0
40777	CVEC HARV	Generator	8506	Southeast I	MA	SEMA	Existing	1.732	1.732	1.732	1.732	0	0	0	0	0	0	0	0
40778	CVEC EDGA	Generator	8506	Southeast I	MA	SEMA	Existing	0.418	0.418	0.418	0.418	0	0	0	0	0	0	0	0
40779	Springfield	Demand	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
40783	CT RESI On	Demand	8500	Rest-of-Po	CT	CT	Existing	22.356	22.356	22.356	22.356	22.356	22.356	0	0	0	0	22.356	22.356
40785	Vermont So	Demand	8505	Northern N	VT	VT	Existing	1.188	1.188	1.188	1.188	1.188	1.188	0	0	0	0	1.188	1.188
40786	Cambridge	Generator	8506	Southeast I	MA	NEMA	Existing	0.186	0.186	0.186	0.186	0	0	0	0	0	0	0	0
40789	Maxwell Gr	Generator	8506	Southeast I	MA	NEMA	Existing	0.104	0.104	0.104	0.104	0	0	0	0	0	0	0	0
40796	Charles Mc	Generator	8506	Southeast I	MA	SEMA	Existing	0.116	0.116	0.116	0.116	0	0	0	0	0	0	0	0
40797	Holliston F	Generator	8506	Southeast I	MA	SEMA	Existing	0.12	0.12	0.12	0.12	0	0	0	0	0	0	0	0
40800	Hayden Ro	Generator	8506	Southeast I	MA	SEMA	Existing	0.098	0.098	0.098	0.098	0	0	0	0	0	0	0	0
40804	NH-LR	Demand	8505	Northern N	NH	NH	Existing	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972	0.972
40809	SR Aggrega	Demand	8505	Northern N	VT	VT	Existing	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
40811	SR Aggrega	Demand	8505	Northern N	NH	NH	Existing	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
40815	SR Aggrega	Demand	8506	Southeast I	MA	NEMA	Existing	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
40817	SR Aggrega	Demand	8506	Southeast I	MA	SEMA	Existing	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
40822	SR Aggrega	Demand	8506	Southeast I	RI	RI	Existing	1	1	1	1	1	1	1	1	1	1	1	1
40837	ADCR_113	Demand	8506	Southeast I	MA	NEMA	Existing	18.713	18.713	18.713	18.713	18.713	18.713	18.713	18.713	18.713	18.713	18.713	18.713
40838	ADCR_122	Demand	8506	Southeast I	MA	NEMA	Existing	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
40839	ADCR_122	Demand	8506	Southeast I	MA	NEMA	Existing	4.104	4.104	4.104	4.104	4.104	4.104	4.104	4.104	4.104	4.104	4.104	4.104
40841	ADCR_122	Demand	8506	Southeast I	MA	SEMA	Existing	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
40842	ADCR_122	Demand	8500	Rest-of-Po	MA	WCMA	Existing	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
40843	ADCR_514	Demand	8506	Southeast I	MA	NEMA	Existing	15.391	15.391	15.391	15.391	15.391	15.391	15.391	15.391	15.391	15.391	15.391	15.391
40844	ADCR_514	Demand	8500	Rest-of-Po	CT	CT	Existing	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
40845	ADCR_514	Demand	8500	Rest-of-Po	MA	WCMA	Existing	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296
40846	ADCR_871	Demand	8503	Maine	ME	ME	Existing	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43
40847	ADCR_871	Demand	8506	Southeast I	MA	NEMA	Existing	20.59	20.59	20.59	20.59	20.59	20.59	20.59	20.59	20.59	20.59	20.59	20.59
40848	ADCR_871	Demand	8500	Rest-of-Po	MA	WCMA	Existing	17.828	17.828	17.828	17.828	17.828	17.828	17.828	17.828	17.828	17.828	17.828	17.828
40849	ADCR_871	Demand	8500	Rest-of-Po	CT	CT	Existing	30.639	30.639	30.639	30.639	30.639	30.639	30.643	30.643	30.643	30.643	30.639	30.639
40850	ADCR_871	Demand	8506	Southeast I	MA	SEMA	Existing	6.254	6.254	6.254	6.254	6.254	6.254	6.254	6.254	6.254	6.254	6.254	6.254
40851	ADCR_871	Demand	8503	Maine	ME	ME	Existing	52.299	52.299	52.299	52.299	52.299	52.299	52.299	52.299	52.299	52.299	52.299	52.299
40852	ADCR_871	Demand	8505	Northern N	NH	NH	Existing	15.877	15.877	15.877	15.877	15.877	15.877	15.877	15.877	15.877	15.877	15.877	15.877
40853	ADCR_871	Demand	8506	Southeast I	MA	NEMA	Existing	3.219	3.219	3.219	3.219	3.219	3.219	3.219	3.219	3.219	3.219	3.219	3.219
40854	ADCR_871	Demand	8500	Rest-of-Po	CT	CT	Existing	39.55	39.55	39.55	39.55	39.55	39.55	39.55	39.55	39.55	39.55	39.55	39.55
40855	ADCR_871	Demand	8505	Northern N	VT	VT	Existing	24.622	24.622	24.622	24.622	24.622	24.622	24.622	24.622	24.622	24.622	24.622	24.622
40856	ADCR_871	Demand	8500	Rest-of-Po	CT	CT	Existing	3.078	3.078	3.078	3.078	3.078	3.078	3.078	3.078	3.078	3.078	3.078	3.078
40857	ADCR_871	Demand	8503	Maine	ME	ME	Existing	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11
40858	ADCR_871	Demand	8506	Southeast I	RI	RI	Existing	16.991	16.991	16.991	16.991	16.991	16.991	16.991	16.991	16.991	16.991	16.991	16.991
40859	ADCR_871	Demand	8506	Southeast I	MA	SEMA	Existing	12.102	12.102	12.102	12.102	12.102	12.102	12.102	12.102	12.102	12.102	12.102	12.102
40860	ADCR_871	Demand	8505	Northern N	NH	NH	Existing	5.991	5.991	5.991	5.991	5.991	5.991	5.991	5.991	5.991	5.991	5.991	5.991
40861	ADCR_871	Demand	8500	Rest-of-Po	MA	WCMA	Existing	12.689	12.689	12.689	12.689	12.689	12.689	12.689	12.689	12.689	12.689	12.689	12.689
40862	ADCR_871	Demand	8505	Northern N	VT	VT	Existing	5.81	5.81	5.81	5.81	5.81	5.81	6.998	6.998	6.998	6.998	5.81	5.81
40863	ADCR_871	Demand	8500	Rest-of-Po	CT	CT	Existing	30.433	30.433	30.433	30.433	30.433	30.433	30.433	30.433	30.433	30.433	30.433	30.433
40864	ADCR_871	Demand	8500	Rest-of-Po	MA	WCMA	Existing	19.166	19.166	19.166	19.166	19.166	19.166	19.166	19.166	19.166	19.166	19.166	19.166
40865	CT East	Demand	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0	0	0	0	0	0	0	0
40866	CT North	Demand	8500	Rest-of-Po	CT	CT	Existing	0	0	0	0	0	0	0	0	0	0	0	0
40867	CT West	Demand	8500	Rest-of-Po	CT	CT	Existing	8.35	8.35	8.35	8.35	8.35	8.35	8.35	8.35	8.35	8.35	8.35	8.35
40868	NEMA Bost	Demand	8506	Southeast I	MA	NEMA	Existing	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
40869	NEMA NS	Demand	8506	Southeast I	MA	NEMA	Existing	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.205	0.205
40870	RI 1 ADCR	Demand	8506	Southeast I	RI	RI	Existing	0.745	0.745	0.745	0.745	0.745	0.745	0.745	0.745	0.745	0.745	0.745	0.745
40871	SEMA 1 AD	Demand	8506	Southeast I	MA	SEMA	Existing	0.877	0.877	0.877	0.877	0.877	0.877	0.877	0.877	0.877	0.877	0.877	0.877
40872	WCMA Cer	Demand	8500	Rest-of-Po	MA	WCMA	Existing	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
40886	Methuen_	Generator	8506	Southeast I	MA	NEMA	Existing	0.622	0.622	0.622	0.622	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
40889	RoxWind	Generator	8503	Maine	ME	ME	Existing	1.556	1.556	1.556	1.556	2.667	2.667	2.667	2.667	2.667	2.667	2.667	2.667
40896	BWC Frenc	Generator	8500	Rest-of-Po	MA	WCMA	Existing	2.682	2.682	2.682	2.682	0	0	0	0	0	0	0	0
40901	Western M	Demand	8500	Rest-of-Po	MA	WCMA	Existing	2.916	2.916	2.916	2.916	2.916	2.916	2.916	2.916	2.916	2.916	2.916	2.916
40925	ENA Grove	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.555	0.555	0.555	0.555	0	0	0	0	0	0	0	0
40932	ENA Wood	Generator	8506	Southeast I	MA	SEMA	Existing	0.885	0.885	0.885	0.885	0	0	0	0	0	0	0	0
40933	Huxley Bat	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754
40936	ENA Grove	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.642	1.642	1.642	1.642	1.642	1.642	1.642	1.642	1.642	1.642	1.642	1.642
40942	ENA Wood	Generator	8506	Southeast I	MA	SEMA	Existing	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314
40946	Oakham_S	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.84	0.84	0.84	0.84	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
40947	BigelowRd	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.4	0.4	0.4	0.4	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178
40948	Plainfield_	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.354	0.354	0.354	0.354	0	0	0	0	0	0	0	0
40949	Wales_Sola	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.827	0.827	0.827	0.827	0.591	0.591	0.591	0.591	0.591	0.591	0.591	0.591
40950	Hadley_No	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.534	0.534	0.534	0.534	0.401	0.401	0.401	0.401	0.401	0.401	0.401	0.401
40951	Hadley_So	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.711	0.711	0.711	0.711	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
40952	Montague	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.263	1.263	1.263	1.263	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
40953	Webster Re	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.36	0.36	0.36	0.36	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
40954	Winchendo	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.387	0.387	0.387	0.387	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
40957	Winchendo	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.378	0.378	0.378	0.378	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
40960	Fitchburg S	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.387	1.387	1.387	1.387	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
40964	Palmer Sola	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.77	1.77	1.77	1.77	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987
40970	Granby Sol	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.245	1.245	1.245	1.245	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395
40996	MA_12_2 F	Generator	8506	Southeast I	MA	SEMA	Existing	0.483	0.483	0.483	0.483	0	0	0	0	0	0	0	0
40999	Charlton PV	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.587	0.587	0.587	0.587	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
41001	Spring Stre	Generator	8506	Southeast I	MA	SEMA	Existing	1.894	1.894	1.894	1.894	1	1	1	1	1	1	1	1
41002	MA_13_2 F	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.407	0.407	0.407	0.407	0	0	0	0	0	0	0	0
41003	MA_16_2 F	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.476	0.476	0.476	0.476	0	0	0	0	0	0	0	0
41006	Syncarpha	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.695	0.695	0.695	0.695	0	0	0	0	0	0	0	0
41007	Syncarpha	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334
41009	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742	0.742
41012	Borr - Broo	Generator	8506	Southeast I	MA	SEMA	Existing	0.885	0.885	0.885	0.885	0	0	0	0	0	0	0	0
41013	Borr - Broo	Generator	8506	Southeast I	MA	SEMA	Existing	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334
41015	Borr - Pleas	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.971	1.971	1.971	1.971	1.971	1.971	1.971	1.971	1.971	1.971	1.971	1.971
41020	Bemis Road	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.112	1.112	1.112	1.112	0.592	0.592	0.592	0.592	0.592	0.592	0.592	0.592
41021	Oakhurst R	Generator	8506	Southeast I	MA	SEMA	Existing	0.338	0.338	0.338	0.338	0.196	0.196	0.196	0.196	0.196	0.196	0.196	0.196
41025	Douglas PV	Generator	8506	Southeast I	MA	SEMA	Existing	1.32	1.32	1.32	1.32	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
41029	Ludlow PV	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.014	1.014	1.014	1.014	0.592	0.592	0.592	0.592	0.592	0.592	0.592	0.592
41030	Rehoboth F	Generator	8506	Southeast I	MA	SEMA	Existing	1.094	1.094	1.094	1.094	0.792	0.792	0.792	0.792	0.792	0.792	0.792	0.792
41032	MA_139_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.063	0.063	0.063	0.063	0	0	0	0	0	0	0	0
41035	MA_285_1	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.24	0.24	0.24	0.24	0	0	0	0	0	0	0	0
41036	MA_332_0	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.071	0.071	0.071	0.071	0	0	0	0	0	0	0	0
41037	MA_18_2 F	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.435	0.435	0.435	0.435	0	0	0	0	0	0	0	0
41038	MA_299_0	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.075	0.075	0.075	0.075	0	0	0	0	0	0	0	0
41040	MA_19_1.9	Generator	8506	Southeast I	MA	SEMA	Existing	0.444	0.444	0.444	0.444	0	0	0	0	0	0	0	0
41041	MA_320_1	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.267	0.267	0.267	0.267	0	0	0	0	0	0	0	0
41043	MA_335_1	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.24	0.24	0.24	0.24	0	0	0	0	0	0	0	0
41044	MA_323_2	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.318	0.318	0.318	0.318	0	0	0	0	0	0	0	0
41045	MA_20_1.8	Generator	8506	Southeast I	MA	SEMA	Existing	0.384	0.384	0.384	0.384	0	0	0	0	0	0	0	0
41047	MA_324_1	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.262	0.262	0.262	0.262	0	0	0	0	0	0	0	0
41048	MA_25_1.5	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.255	0.255	0.255	0.255	0	0	0	0	0	0	0	0
41050	MA_325_2	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.299	0.299	0.299	0.299	0	0	0	0	0	0	0	0
41051	Dalton PV	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.467	1.467	1.467	1.467	0.791	0.791	0.791	0.791	0.791	0.791	0.791	0.791
41053	MA_329_1	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.493	0.493	0.493	0.493	0	0	0	0	0	0	0	0
41054	MA_36_1 F	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.234	0.234	0.234	0.234	0	0	0	0	0	0	0	0
41056	MA_37_1 F	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.247	0.247	0.247	0.247	0	0	0	0	0	0	0	0
41059	MA_40_1 F	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.243	0.243	0.243	0.243	0	0	0	0	0	0	0	0
41060	MA_133_0	Generator	8506	Southeast I	MA	NEMA	Existing	0.089	0.089	0.089	0.089	0	0	0	0	0	0	0	0
41061	MA_41_1 F	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.215	0.215	0.215	0.215	0	0	0	0	0	0	0	0
41062	MA_59_0.9	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.216	0.216	0.216	0.216	0	0	0	0	0	0	0	0
41063	MA_69_0.8	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.164	0.164	0.164	0.164	0	0	0	0	0	0	0	0
41064	MA_75_0.7	Generator	8506	Southeast I	MA	SEMA	Existing	0.164	0.164	0.164	0.164	0	0	0	0	0	0	0	0
41065	Borr - Blodg	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.485	0.485	0.485	0.485	0	0	0	0	0	0	0	0
41067	Borr - Blodg	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.708	1.708	1.708	1.708	1.708	1.708	1.708	1.708	1.708	1.708	1.708	1.708
41072	Revere Bat	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754	1.754
41078	MA_77_0.4	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.115	0.115	0.115	0.115	0	0	0	0	0	0	0	0
41080	MA_78_0.5	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.096	0.096	0.096	0.096	0	0	0	0	0	0	0	0
41081	MA_80_0.5	Generator	8500	Rest-of-Poo	MA	WCMA	Existing	0.102	0.102	0.102	0.102	0	0	0	0	0	0	0	0
41082	MA_122_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.12	0.12	0.12	0.12	0	0	0	0	0	0	0	0
41083	MA_22_1.6	Generator	8506	Southeast I	MA	SEMA	Existing	0.412	0.412	0.412	0.412	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
41084	MA_90_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.124	0.124	0.124	0.124	0	0	0	0	0	0	0	0
41085	MA_118_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0
41086	MA_336_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.486	0.486	0.486	0.486	0	0	0	0	0	0	0	0
41087	MA_341_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.094	0.094	0.094	0.094	0	0	0	0	0	0	0	0
41088	MA_342_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.109	0.109	0.109	0.109	0	0	0	0	0	0	0	0
41089	MA_347_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.066	0.066	0.066	0.066	0	0	0	0	0	0	0	0
41090	MA_353_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.223	0.223	0.223	0.223	0	0	0	0	0	0	0	0
41091	MA_361_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.153	0.153	0.153	0.153	0	0	0	0	0	0	0	0
41092	MA_362_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.157	0.157	0.157	0.157	0	0	0	0	0	0	0	0
41093	MA_442_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.088	0.088	0.088	0.088	0	0	0	0	0	0	0	0
41097	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
41098	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778
41104	MA_21_1.1	Generator	8506	Southeast I	MA	SEMA	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
41105	MA_3_4.89	Generator	8506	Southeast I	MA	SEMA	Existing	0.849	0.849	0.849	0.849	0	0	0	0	0	0	0	0
41107	MA_61_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.246	0.246	0.246	0.246	0	0	0	0	0	0	0	0
41108	MA_88_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.095	0.095	0.095	0.095	0	0	0	0	0	0	0	0
41110	MA_94_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.121	0.121	0.121	0.121	0	0	0	0	0	0	0	0
41111	MA_95_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.114	0.114	0.114	0.114	0	0	0	0	0	0	0	0
41112	MA_108_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.112	0.112	0.112	0.112	0	0	0	0	0	0	0	0
41113	MA_201_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.353	0.353	0.353	0.353	0	0	0	0	0	0	0	0
41117	MA_14_2 I	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.447	0.447	0.447	0.447	0	0	0	0	0	0	0	0
41120	MA_110_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.121	0.121	0.121	0.121	0	0	0	0	0	0	0	0
41121	MA_109_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.118	0.118	0.118	0.118	0	0	0	0	0	0	0	0
41123	MA_131_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.05	0.05	0.05	0.05	0	0	0	0	0	0	0	0
41125	MA_15_2 I	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.416	0.416	0.416	0.416	0	0	0	0	0	0	0	0
41126	MA_30_1 I	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.213	0.213	0.213	0.213	0	0	0	0	0	0	0	0
41128	MA_31_1 I	Generator	8506	Southeast I	MA	SEMA	Existing	0.185	0.185	0.185	0.185	0	0	0	0	0	0	0	0
41129	MA_33_1 I	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.277	0.277	0.277	0.277	0	0	0	0	0	0	0	0
41130	MA_89_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.056	0.056	0.056	0.056	0	0	0	0	0	0	0	0
41131	MA_91_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.125	0.125	0.125	0.125	0	0	0	0	0	0	0	0
41132	MA_103_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.109	0.109	0.109	0.109	0	0	0	0	0	0	0	0
41133	WhatelyPV	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.205	0.205	0.205	0.205	0	0	0	0	0	0	0	0
41134	MA_143_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.048	0.048	0.048	0.048	0	0	0	0	0	0	0	0
41135	MA_225_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.322	0.322	0.322	0.322	0	0	0	0	0	0	0	0
41136	MA_226_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
41137	WhatelySto	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222
41139	MA_288_4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.95	0.95	0.95	0.95	0	0	0	0	0	0	0	0
41140	MA_290_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.218	0.218	0.218	0.218	0	0	0	0	0	0	0	0
41141	MA_305_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.16	0.16	0.16	0.16	0	0	0	0	0	0	0	0
41142	MA_100_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.097	0.097	0.097	0.097	0	0	0	0	0	0	0	0
41143	MA_306_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.145	0.145	0.145	0.145	0	0	0	0	0	0	0	0
41144	MA_310_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.199	0.199	0.199	0.199	0	0	0	0	0	0	0	0
41145	MA_337_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.388	0.388	0.388	0.388	0	0	0	0	0	0	0	0
41146	MA_101_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.086	0.086	0.086	0.086	0	0	0	0	0	0	0	0
41147	MA_339_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.226	0.226	0.226	0.226	0	0	0	0	0	0	0	0
41148	MA_349_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.152	0.152	0.152	0.152	0	0	0	0	0	0	0	0
41149	MA_113_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.106	0.106	0.106	0.106	0	0	0	0	0	0	0	0
41150	MA_354_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.078	0.078	0.078	0.078	0	0	0	0	0	0	0	0
41151	MA_355_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.055	0.055	0.055	0.055	0	0	0	0	0	0	0	0
41152	MA_378_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.449	0.449	0.449	0.449	0	0	0	0	0	0	0	0
41153	MA_134_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.063	0.063	0.063	0.063	0	0	0	0	0	0	0	0
41154	MA_385_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.542	0.542	0.542	0.542	0	0	0	0	0	0	0	0
41155	Plainfield_	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.401	0.401	0.401	0.401	0.401	0.401	0.401	0.401	0.401	0.401	0.401	0.401
41159	MA_202_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.112	0.112	0.112	0.112	0	0	0	0	0	0	0	0

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41160	MA_296_3	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.616	0.616	0.616	0.616	0	0	0	0	0	0	0	0
41162	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.619	0.619	0.619	0.619	0	0	0	0	0	0	0	0
41164	MA_308_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.184	0.184	0.184	0.184	0	0	0	0	0	0	0	0
41173	MA_312_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.12	0.12	0.12	0.12	0	0	0	0	0	0	0	0
41174	MA_313_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.118	0.118	0.118	0.118	0	0	0	0	0	0	0	0
41175	MA_314_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.116	0.116	0.116	0.116	0	0	0	0	0	0	0	0
41176	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889
41177	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
41179	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778
41181	MA_315_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.103	0.103	0.103	0.103	0	0	0	0	0	0	0	0
41182	MA_338_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.464	0.464	0.464	0.464	0	0	0	0	0	0	0	0
41183	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	0.879	0.879	0.879	0.879	0	0	0	0	0	0	0	0
41184	MA_363_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.264	0.264	0.264	0.264	0	0	0	0	0	0	0	0
41185	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334	1.334
41186	MA_402_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.081	0.081	0.081	0.081	0	0	0	0	0	0	0	0
41187	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
41188	MA_403_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.063	0.063	0.063	0.063	0	0	0	0	0	0	0	0
41189	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778
41190	MA_404_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.052	0.052	0.052	0.052	0	0	0	0	0	0	0	0
41191	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
41192	MA_434_1	Generator	8506	Southeast I	MA	NEMA	Existing	0.443	0.443	0.443	0.443	0	0	0	0	0	0	0	0
41193	Syncarpha	Generator	8506	Southeast I	MA	SEMA	Existing	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778	1.778
41194	DWW Sola	Generator	8500	Rest-of-Po	CT	CT	Existing	6.118	6.118	6.118	6.118	0	0	0	0	0	0	0	0
41195	MA_287_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.099	0.099	0.099	0.099	0	0	0	0	0	0	0	0
41196	Syncarpha	Generator	8506	Southeast I	MA	NEMA	Existing	0.542	0.542	0.542	0.542	0	0	0	0	0	0	0	0
41197	MA_292_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.06	0.06	0.06	0.06	0	0	0	0	0	0	0	0
41198	MA_357_2	Generator	8506	Southeast I	MA	SEMA	Existing	0.466	0.466	0.466	0.466	0	0	0	0	0	0	0	0
41199	MA_298_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.198	0.198	0.198	0.198	0	0	0	0	0	0	0	0
41200	Syncarpha	Generator	8506	Southeast I	MA	NEMA	Existing	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889
41201	MA_303_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.642	0.642	0.642	0.642	0	0	0	0	0	0	0	0
41202	MA_352_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.164	0.164	0.164	0.164	0	0	0	0	0	0	0	0
41203	MA_317_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.479	0.479	0.479	0.479	0	0	0	0	0	0	0	0
41204	MA_358_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.255	0.255	0.255	0.255	0	0	0	0	0	0	0	0
41207	MA_364_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.083	0.083	0.083	0.083	0	0	0	0	0	0	0	0
41209	MA_318_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.257	0.257	0.257	0.257	0	0	0	0	0	0	0	0
41211	MA_368_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.094	0.094	0.094	0.094	0	0	0	0	0	0	0	0
41213	MA_390_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.22	0.22	0.22	0.22	0	0	0	0	0	0	0	0
41214	MA_319_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.305	0.305	0.305	0.305	0	0	0	0	0	0	0	0
41216	MA_400_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.076	0.076	0.076	0.076	0	0	0	0	0	0	0	0
41217	MA_334_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.237	0.237	0.237	0.237	0	0	0	0	0	0	0	0
41218	MA_410_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.577	0.577	0.577	0.577	0	0	0	0	0	0	0	0
41219	MA_417_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.111	0.111	0.111	0.111	0	0	0	0	0	0	0	0
41220	MA_423_1	Generator	8506	Southeast I	MA	NEMA	Existing	0.307	0.307	0.307	0.307	0	0	0	0	0	0	0	0
41221	MA_425_0	Generator	8506	Southeast I	MA	NEMA	Existing	0.108	0.108	0.108	0.108	0	0	0	0	0	0	0	0
41222	MA_431_0	Generator	8506	Southeast I	MA	NEMA	Existing	0.118	0.118	0.118	0.118	0	0	0	0	0	0	0	0
41225	TJA Shoem	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.885	0.885	0.885	0.885	0	0	0	0	0	0	0	0
41226	TJA Shoem	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314
41228	MA_32_1 F	Generator	8506	Southeast I	MA	SEMA	Existing	0.221	0.221	0.221	0.221	0	0	0	0	0	0	0	0
41231	MA_7_3.7	Generator	8506	Southeast I	MA	SEMA	Existing	0.825	0.825	0.825	0.825	0	0	0	0	0	0	0	0
41234	MA_9_3.0	Generator	8506	Southeast I	MA	SEMA	Existing	0.221	0.221	0.221	0.221	0	0	0	0	0	0	0	0
41237	MA_395_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.756	0.756	0.756	0.756	0	0	0	0	0	0	0	0
41238	MA_440_2	Generator	8506	Southeast I	MA	NEMA	Existing	0.431	0.431	0.431	0.431	0	0	0	0	0	0	0	0
41241	MA_47_0.	Generator	8506	Southeast I	MA	NEMA	Existing	0.225	0.225	0.225	0.225	0	0	0	0	0	0	0	0
41242	MA_48_0.	Generator	8506	Southeast I	MA	SEMA	Existing	0.267	0.267	0.267	0.267	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
41244	MA_53_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.21	0.21	0.21	0.21	0	0	0	0	0	0	0	0
41245	MA_62_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.156	0.156	0.156	0.156	0	0	0	0	0	0	0	0
41246	MA_63_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.148	0.148	0.148	0.148	0	0	0	0	0	0	0	0
41248	MA_66_0.8	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.141	0.141	0.141	0.141	0	0	0	0	0	0	0	0
41249	MA_67_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.166	0.166	0.166	0.166	0	0	0	0	0	0	0	0
41250	MA_82_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.078	0.078	0.078	0.078	0	0	0	0	0	0	0	0
41251	MA_92_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.096	0.096	0.096	0.096	0	0	0	0	0	0	0	0
41254	MA_316_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.233	0.233	0.233	0.233	0	0	0	0	0	0	0	0
41256	MA_17_3.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.455	0.455	0.455	0.455	0	0	0	0	0	0	0	0
41257	MA_43_1 P	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.197	0.197	0.197	0.197	0	0	0	0	0	0	0	0
41258	MA_44_1 P	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.189	0.189	0.189	0.189	0	0	0	0	0	0	0	0
41259	MA_50_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.222	0.222	0.222	0.222	0	0	0	0	0	0	0	0
41260	MA_102_0	Generator	8506	Southeast	MA	SEMA	Existing	0.118	0.118	0.118	0.118	0	0	0	0	0	0	0	0
41261	MA_51_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.225	0.225	0.225	0.225	0	0	0	0	0	0	0	0
41262	MA_54_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.224	0.224	0.224	0.224	0	0	0	0	0	0	0	0
41263	MA_55_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.222	0.222	0.222	0.222	0	0	0	0	0	0	0	0
41264	MA_200_4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.036	1.036	1.036	1.036	0	0	0	0	0	0	0	0
41265	MA_56_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.152	0.152	0.152	0.152	0	0	0	0	0	0	0	0
41266	MA_280_6	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.355	0.355	0.355	0.355	0	0	0	0	0	0	0	0
41267	MA_57_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.148	0.148	0.148	0.148	0	0	0	0	0	0	0	0
41268	MA_58_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.24	0.24	0.24	0.24	0	0	0	0	0	0	0	0
41269	MA_289_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.148	0.148	0.148	0.148	0	0	0	0	0	0	0	0
41270	MA_65_0.9	Generator	8506	Southeast	MA	SEMA	Existing	0.149	0.149	0.149	0.149	0	0	0	0	0	0	0	0
41271	MA_72_0.6	Generator	8506	Southeast	MA	SEMA	Existing	0.11	0.11	0.11	0.11	0	0	0	0	0	0	0	0
41272	MA_291_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.084	0.084	0.084	0.084	0	0	0	0	0	0	0	0
41273	MA_74_0.7	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.173	0.173	0.173	0.173	0	0	0	0	0	0	0	0
41274	MA_293_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.294	0.294	0.294	0.294	0	0	0	0	0	0	0	0
41275	MA_84_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.116	0.116	0.116	0.116	0	0	0	0	0	0	0	0
41276	MA_85_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.104	0.104	0.104	0.104	0	0	0	0	0	0	0	0
41277	MA_294_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.25	0.25	0.25	0.25	0	0	0	0	0	0	0	0
41278	MA_86_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.103	0.103	0.103	0.103	0	0	0	0	0	0	0	0
41279	MA_87_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.108	0.108	0.108	0.108	0	0	0	0	0	0	0	0
41280	MA_321_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.185	0.185	0.185	0.185	0	0	0	0	0	0	0	0
41281	MA_326_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.109	0.109	0.109	0.109	0	0	0	0	0	0	0	0
41282	MA_327_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.112	0.112	0.112	0.112	0	0	0	0	0	0	0	0
41283	MA_328_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.107	0.107	0.107	0.107	0	0	0	0	0	0	0	0
41291	Sheffield B	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0	0	0	0	0	0	0	0	0	0	0	0
41295	MA_436_1	Generator	8506	Southeast	MA	NEMA	Existing	0.171	0.171	0.171	0.171	0	0	0	0	0	0	0	0
41297	MA_437_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.089	0.089	0.089	0.089	0	0	0	0	0	0	0	0
41298	MA_432_0	Generator	8506	Southeast	MA	NEMA	Existing	0.162	0.162	0.162	0.162	0	0	0	0	0	0	0	0
41299	MA_382_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.112	0.112	0.112	0.112	0	0	0	0	0	0	0	0
41300	MA_383_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.108	0.108	0.108	0.108	0	0	0	0	0	0	0	0
41301	MA_392_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.248	0.248	0.248	0.248	0	0	0	0	0	0	0	0
41302	MA_412_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.233	0.233	0.233	0.233	0	0	0	0	0	0	0	0
41306	Happy Holl	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.423	1.423	1.423	1.423	1.423	1.423	1.423	1.423	1.423	1.423	1.423	1.423
41309	MA_4_4.99	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.107	1.107	1.107	1.107	0	0	0	0	0	0	0	0
41311	MA_68_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.189	0.189	0.189	0.189	0	0	0	0	0	0	0	0
41312	Happy Holl	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.778	0.778	0.778	0.778	0	0	0	0	0	0	0	0
41313	MA_70_0.9	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.193	0.193	0.193	0.193	0	0	0	0	0	0	0	0
41314	Kear - S Ma	Generator	8506	Southeast	MA	NEMA	Existing	0.569	0.569	0.569	0.569	0	0	0	0	0	0	0	0
41315	Kear - S Ma	Generator	8506	Southeast	MA	NEMA	Existing	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667
41316	MA_356_0	Generator	8506	Southeast	MA	SEMA	Existing	0.08	0.08	0.08	0.08	0	0	0	0	0	0	0	0
41317	MA_359_2	Generator	8506	Southeast	MA	SEMA	Existing	0.418	0.418	0.418	0.418	0	0	0	0	0	0	0	0
41318	MA_360_0	Generator	8506	Southeast	MA	SEMA	Existing	0.134	0.134	0.134	0.134	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
41319	MA_365_2	Generator	8506	Southeast I	MA	SEMA	Existing	0.35	0.35	0.35	0.35	0	0	0	0	0	0	0	0
41320	MA_399_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.436	0.436	0.436	0.436	0	0	0	0	0	0	0	0
41321	MA_401_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.144	0.144	0.144	0.144	0	0	0	0	0	0	0	0
41322	MA_405_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.377	0.377	0.377	0.377	0	0	0	0	0	0	0	0
41324	MA_406_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.22	0.22	0.22	0.22	0	0	0	0	0	0	0	0
41326	MA_411_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.099	0.099	0.099	0.099	0	0	0	0	0	0	0	0
41327	Ldstr - Pulp	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889	0.889
41328	MA_375_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.06	0.06	0.06	0.06	0	0	0	0	0	0	0	0
41329	MA_413_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.116	0.116	0.116	0.116	0	0	0	0	0	0	0	0
41330	MA_414_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.17	0.17	0.17	0.17	0	0	0	0	0	0	0	0
41332	MA_379_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.238	0.238	0.238	0.238	0	0	0	0	0	0	0	0
41333	MA_415_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.241	0.241	0.241	0.241	0	0	0	0	0	0	0	0
41334	MA_384_3	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.715	0.715	0.715	0.715	0	0	0	0	0	0	0	0
41335	MA_418_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.116	0.116	0.116	0.116	0	0	0	0	0	0	0	0
41336	MA_386_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.095	0.095	0.095	0.095	0	0	0	0	0	0	0	0
41337	MA_391_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.219	0.219	0.219	0.219	0	0	0	0	0	0	0	0
41338	MA_420_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.593	0.593	0.593	0.593	0	0	0	0	0	0	0	0
41339	MA_52_0.9	Generator	8506	Southeast I	MA	SEMA	Existing	0.197	0.197	0.197	0.197	0	0	0	0	0	0	0	0
41340	MA_393_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.247	0.247	0.247	0.247	0	0	0	0	0	0	0	0
41341	MA_422_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.113	0.113	0.113	0.113	0	0	0	0	0	0	0	0
41342	MA_96_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.116	0.116	0.116	0.116	0	0	0	0	0	0	0	0
41343	MA_97_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.111	0.111	0.111	0.111	0	0	0	0	0	0	0	0
41345	MA_433_3	Generator	8506	Southeast I	MA	NEMA	Existing	0.753	0.753	0.753	0.753	0	0	0	0	0	0	0	0
41346	MA_443_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.191	0.191	0.191	0.191	0	0	0	0	0	0	0	0
41347	MA_301_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.387	0.387	0.387	0.387	0	0	0	0	0	0	0	0
41348	MA_302_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.225	0.225	0.225	0.225	0	0	0	0	0	0	0	0
41349	MA_322_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.173	0.173	0.173	0.173	0	0	0	0	0	0	0	0
41350	MA_8_3.72	Generator	8506	Southeast I	MA	SEMA	Existing	0.525	0.525	0.525	0.525	0	0	0	0	0	0	0	0
41351	MA_330_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.267	0.267	0.267	0.267	0	0	0	0	0	0	0	0
41352	MA_340_3	Generator	8506	Southeast I	MA	SEMA	Existing	0.733	0.733	0.733	0.733	0	0	0	0	0	0	0	0
41353	MA_331_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.173	0.173	0.173	0.173	0	0	0	0	0	0	0	0
41354	MA_333_3	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.61	0.61	0.61	0.61	0	0	0	0	0	0	0	0
41355	MA_83_0.4	Generator	8506	Southeast I	MA	SEMA	Existing	0.109	0.109	0.109	0.109	0	0	0	0	0	0	0	0
41356	MA_297_4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.061	1.061	1.061	1.061	0	0	0	0	0	0	0	0
41357	MA_98_0.4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.111	0.111	0.111	0.111	0	0	0	0	0	0	0	0
41358	MA_99_0.5	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.108	0.108	0.108	0.108	0	0	0	0	0	0	0	0
41359	MA_300_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.484	0.484	0.484	0.484	0	0	0	0	0	0	0	0
41360	MA_304_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.626	0.626	0.626	0.626	0	0	0	0	0	0	0	0
41361	MA_213_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.195	0.195	0.195	0.195	0	0	0	0	0	0	0	0
41363	MA_311_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.293	0.293	0.293	0.293	0	0	0	0	0	0	0	0
41364	MA_222_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.12	0.12	0.12	0.12	0	0	0	0	0	0	0	0
41366	MA_286_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.232	0.232	0.232	0.232	0	0	0	0	0	0	0	0
41367	MA_348_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.354	0.354	0.354	0.354	0	0	0	0	0	0	0	0
41368	MA_295_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.501	0.501	0.501	0.501	0	0	0	0	0	0	0	0
41370	MA_343_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.088	0.088	0.088	0.088	0	0	0	0	0	0	0	0
41371	MA_344_3	Generator	8506	Southeast I	MA	SEMA	Existing	0.707	0.707	0.707	0.707	0	0	0	0	0	0	0	0
41372	MA_346_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.136	0.136	0.136	0.136	0	0	0	0	0	0	0	0
41374	MA_350_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.499	0.499	0.499	0.499	0	0	0	0	0	0	0	0
41376	MA_351_3	Generator	8506	Southeast I	MA	SEMA	Existing	0.67	0.67	0.67	0.67	0	0	0	0	0	0	0	0
41377	Norfolk Wa	Demand	8506	Southeast I	MA	SEMA	Existing	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296	1.296
41378	MA_376_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.095	0.095	0.095	0.095	0	0	0	0	0	0	0	0
41380	MA_377_1	Generator	8506	Southeast I	MA	SEMA	Existing	0.153	0.153	0.153	0.153	0	0	0	0	0	0	0	0
41383	MA_396_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.232	0.232	0.232	0.232	0	0	0	0	0	0	0	0
41384	MA_397_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.241	0.241	0.241	0.241	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
41385	MA_398_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.237	0.237	0.237	0.237	0	0	0	0	0	0	0	0
41387	MA_427_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.153	0.153	0.153	0.153	0	0	0	0	0	0	0	0
41389	MA_435_1	Generator	8506	Southeast I	MA	NEMA	Existing	0.321	0.321	0.321	0.321	0	0	0	0	0	0	0	0
41393	MA_441_0	Generator	8506	Southeast I	MA	NEMA	Existing	0.049	0.049	0.049	0.049	0	0	0	0	0	0	0	0
41395	MA_281_4	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.007	1.007	1.007	1.007	0	0	0	0	0	0	0	0
41396	WCMA Res	Demand	8500	Rest-of-Po	MA	WCMA	Existing	0.896	0.896	0.896	0.896	0.896	0.896	0	0	0	0	0.896	0.896
41397	SEMA Resi	Demand	8506	Southeast I	MA	SEMA	Existing	2.678	2.678	2.678	2.678	2.678	2.678	0	0	0	0	2.678	2.678
41398	NEMA Resi	Demand	8506	Southeast I	MA	NEMA	Existing	1.08	1.08	1.08	1.08	1.08	1.08	0	0	0	0	1.08	1.08
41406	Rear Some	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.712	1.712	1.712	1.712	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027
41407	Nugen PV -	Generator	8506	Southeast I	RI	RI	Existing	0.854	0.854	0.854	0.854	0	0	0	0	0	0	0	0
41409	MA_388_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.249	0.249	0.249	0.249	0	0	0	0	0	0	0	0
41413	MA_380_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.355	0.355	0.355	0.355	0	0	0	0	0	0	0	0
41417	MA_381_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.191	0.191	0.191	0.191	0	0	0	0	0	0	0	0
41419	MA_421_3	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.771	0.771	0.771	0.771	0	0	0	0	0	0	0	0
41420	MA_389_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.241	0.241	0.241	0.241	0	0	0	0	0	0	0	0
41421	MA_424_2	Generator	8506	Southeast I	MA	NEMA	Existing	0.189	0.189	0.189	0.189	0	0	0	0	0	0	0	0
41422	MA_416_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.47	0.47	0.47	0.47	0	0	0	0	0	0	0	0
41423	MA_419_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.057	0.057	0.057	0.057	0	0	0	0	0	0	0	0
41424	MA_430_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.055	0.055	0.055	0.055	0	0	0	0	0	0	0	0
41425	MA_439_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.648	0.648	0.648	0.648	0	0	0	0	0	0	0	0
41427	MA_282_0	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.122	0.122	0.122	0.122	0	0	0	0	0	0	0	0
41429	MA_366_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.055	0.055	0.055	0.055	0	0	0	0	0	0	0	0
41430	MA_387_1	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.232	0.232	0.232	0.232	0	0	0	0	0	0	0	0
41434	MA_116_0	Generator	8506	Southeast I	MA	SEMA	Existing	0.093	0.093	0.093	0.093	0	0	0	0	0	0	0	0
41435	MA_371_2	Generator	8506	Southeast I	MA	SEMA	Existing	0.576	0.576	0.576	0.576	0	0	0	0	0	0	0	0
41436	MA_372_2	Generator	8506	Southeast I	MA	SEMA	Existing	0.583	0.583	0.583	0.583	0	0	0	0	0	0	0	0
41438	MA_2_4.96	Generator	8506	Southeast I	MA	NEMA	Existing	0.951	0.951	0.951	0.951	0	0	0	0	0	0	0	0
41476	MA_394_2	Generator	8500	Rest-of-Po	MA	WCMA	Existing	0.272	0.272	0.272	0.272	0	0	0	0	0	0	0	0
41477	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	Existing	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156
480	MIDDLETO	Generator	8500	Rest-of-Po	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
528	OCEAN ST I	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
529	OCEAN ST I	Generator	8506	Southeast I	RI	RI	New	334	334	334	334	334	334	334	334	334	334	334	334
12657	Unitil CORE	Demand	8500	Rest-of-Po	MA	WCMA	New	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
12671	ngrid_nh_f	Demand	8505	Northern N	NH	NH	New	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711	0.711
12672	ngrid_ri_fc	Demand	8506	Southeast I	RI	RI	New	38.624	38.624	38.624	38.624	38.624	38.624	38.624	38.624	38.624	38.624	38.624	38.624
12693	PSNH CORE	Demand	8505	Northern N	NH	NH	New	3.664	3.664	3.664	3.664	3.664	3.664	0.044	0.044	0.044	0.044	3.664	3.664
12705	Cape Light	Demand	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	2	2	2	2	0	0
12757	NHEC Ener	Demand	8505	Northern N	NH	NH	New	0.627	0.627	0.627	0.627	0.627	0.627	0.627	0.627	0.627	0.627	0.627	0.627
12779	CPLN CT Or	Demand	8500	Rest-of-Po	CT	CT	New	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.304
12801	UES CORE I	Demand	8505	Northern N	NH	NH	New	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926	0.926
12822	Burlington	Demand	8505	Northern N	VT	VT	New	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
12845	Vermont Ef	Demand	8505	Northern N	VT	VT	New	10.584	10.584	10.584	10.584	10.584	10.584	10.584	10.584	10.584	10.584	10.584	10.584
38057	Efficiency N	Demand	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
38210	RTDR_5068	Demand	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38311	NEMA CHP	Demand	8506	Southeast I	MA	NEMA	New	3.373	3.373	3.373	3.373	3.373	3.373	3.373	3.373	3.373	3.373	3.373	3.373
38322	DRCR_Cent	Demand	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38324	DRCR_Low	Demand	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38331	DRCR_Rho	Demand	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
38334	DRCR_SEM	Demand	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38360	DRCR_Bost	Demand	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38388	CSG Aggreg	Demand	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38800	DRCR_Wes	Demand	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38803	DRCR_Spri	Demand	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
38813	DRCR_New	Demand	8505	Northern N	NH	NH	New	0	0	0	0	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
38964	NorthernCT	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
38965	DRCR_East	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
38966	DRCR_Nor	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
38968	DR_Wester	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
38969	CPLN ME S	Demand	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
38972	CPLN MA N	Demand	8506	Southeast I	MA	NEMA	New	3.56	3.56	3.56	3.56	3.56	3.56	0	0	0	0	3.56	3.56
40594	SEMA Solar	Demand	8506	Southeast I	MA	SEMA	New	2.98	2.98	2.98	2.98	2.98	2.98	0	0	0	0	2.98	2.98
40596	CPLN MA V	Demand	8500	Rest-of-Poo	MA	WCMA	New	1.45	1.45	1.45	1.45	1.45	1.45	0	0	0	0	1.45	1.45
40597	DRCR_Nort	Demand	8505	Northern N	VT	VT	New	0	0	0	0	0	0	0	0	0	0	0	0
40602	DRCR_Verr	Demand	8505	Northern N	VT	VT	New	0	0	0	0	0	0	0	0	0	0	0	0
40658	Vineyard W	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40666	Cranberry I	Generator	8506	Southeast I	MA	SEMA	New	150	150	150	150	150	150	150	150	150	150	150	150
40668	Georges Ri	Generator	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
40729	Ballston Gr	Generator	8500	Rest-of-Poo	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40747	Cranston S	Generator	8506	Southeast I	RI	RI	New	0.53	0.53	0.53	0.53	0	0	0	0	0	0	0	0
40783	CT RESI On	Demand	8500	Rest-of-Poo	CT	CT	New	62.284	62.284	62.284	62.284	62.284	62.284	0	0	0	0	62.284	62.284
40785	Vermont S	Demand	8505	Northern N	VT	VT	New	0	0	0	0	0	0	0	0	0	0	0	0
40804	NH-LR	Demand	8505	Northern N	NH	NH	New	0	0	0	0	0	0	0	0	0	0	0	0
40843	ADCR_514	Demand	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40865	CT East	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
40866	CT North	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
40867	CT West	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
40868	NEMA Bost	Demand	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40869	NEMA NS	Demand	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40870	RI 1 ADCR	Demand	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
40871	SEMA 1 AD	Demand	8506	Southeast I	MA	SEMA	New	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52
40872	WCMA Cen	Demand	8500	Rest-of-Poo	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40883	KCE CT 1	Generator	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
40884	KCE CT 2	Generator	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
40885	Sanford BE	Generator	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
40886	Methuen_I	Generator	8506	Southeast I	MA	NEMA	New	0.11	0.11	0.11	0.11	0.085	0.085	0.085	0.085	0.085	0.085	0.085	0.085
40887	Lower SEM	Demand	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40888	NW Vermo	Demand	8505	Northern N	VT	VT	New	0	0	0	0	0	0	0	0	0	0	0	0
40889	RoxWind	Generator	8503	Maine	ME	ME	New	1.944	1.944	1.944	1.944	3.333	3.333	3.333	3.333	3.333	3.333	3.333	3.333
40893	Rose Hill La	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
40894	Town Plain	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
40896	BWC Frenc	Generator	8500	Rest-of-Poo	MA	WCMA	New	0.497	0.497	0.497	0.497	0	0	0	0	0	0	0	0
40897	Vermont	Demand	8505	Northern N	VT	VT	New	0	0	0	0	0	0	0	0	0	0	0	0
40898	NH Seacoa	Demand	8505	Northern N	NH	NH	New	0	0	0	0	0	0	0	0	0	0	0	0
40900	Portland M	Demand	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
40901	Western M	Demand	8500	Rest-of-Poo	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40902	Springfield	Demand	8500	Rest-of-Poo	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40903	Norwalk St	Demand	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
40904	Maine	Demand	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
40905	Rumford B	Generator	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
40906	Bloom Cold	Generator	8500	Rest-of-Poo	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
40907	Cross Road	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40912	South Portl	Generator	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
40915	Medway G	Generator	8506	Southeast I	MA	SEMA	New	250	250	250	250	250	250	250	250	250	250	250	250
40919	Resource C	Generator	8503	Maine	ME	ME	New	175	175	175	175	175	175	175	175	175	175	175	175
40923	ENA Cranb	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40925	ENA Grove	Generator	8500	Rest-of-Poo	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40927	ENA Lake S	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40928	ENA Old Fa	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
40930	ENA Old Pi	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40934	ENA Cranb	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40936	ENA Grove	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40938	ENA Lake S	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40939	ENA Old Fa	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40940	ENA Old Pi	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40943	Cahoon Gr	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
40947	BigelowRd	Generator	8500	Rest-of-Po	MA	WCMA	New	0.085	0.085	0.085	0.085	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
40948	Plainfield_	Generator	8500	Rest-of-Po	MA	WCMA	New	0.078	0.078	0.078	0.078	0	0	0	0	0	0	0	0
40949	Wales_Sola	Generator	8500	Rest-of-Po	MA	WCMA	New	0.165	0.165	0.165	0.165	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
40950	Hadley_No	Generator	8500	Rest-of-Po	MA	WCMA	New	0.197	0.197	0.197	0.197	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084
40951	Hadley_So	Generator	8500	Rest-of-Po	MA	WCMA	New	0.166	0.166	0.166	0.166	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084
40952	Montague	Generator	8500	Rest-of-Po	MA	WCMA	New	0.245	0.245	0.245	0.245	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
40953	Webster Re	Generator	8500	Rest-of-Po	MA	WCMA	New	0.078	0.078	0.078	0.078	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
40957	Winchendo	Generator	8500	Rest-of-Po	MA	WCMA	New	0.083	0.083	0.083	0.083	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
40960	Fitchburg S	Generator	8500	Rest-of-Po	MA	WCMA	New	0.368	0.368	0.368	0.368	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169
40964	Palmer Sol	Generator	8500	Rest-of-Po	MA	WCMA	New	0.355	0.355	0.355	0.355	0.213	0.213	0.213	0.213	0.213	0.213	0.213	0.213
40999	Charlton P	Generator	8500	Rest-of-Po	MA	WCMA	New	0.114	0.114	0.114	0.114	0.085	0.085	0.085	0.085	0.085	0.085	0.085	0.085
41001	Spring Stre	Generator	8506	Southeast I	MA	SEMA	New	0.436	0.436	0.436	0.436	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
41006	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41007	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41008	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0.014	0.014	0.014	0.014	0	0	0	0	0	0	0	0
41009	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41013	Borr - Broo	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41015	Borr - Pleas	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41020	Bemis Road	Generator	8500	Rest-of-Po	MA	WCMA	New	0.434	0.434	0.434	0.434	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
41021	Oakhurst R	Generator	8506	Southeast I	MA	SEMA	New	0.086	0.086	0.086	0.086	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
41025	Douglas PV	Generator	8506	Southeast I	MA	SEMA	New	0.516	0.516	0.516	0.516	0.367	0.367	0.367	0.367	0.367	0.367	0.367	0.367
41029	Ludlow PV	Generator	8500	Rest-of-Po	MA	WCMA	New	0.248	0.248	0.248	0.248	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
41030	Rehoboth I	Generator	8506	Southeast I	MA	SEMA	New	0.46	0.46	0.46	0.46	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
41046	Granby Ra	Generator	8500	Rest-of-Po	MA	WCMA	New	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211	0.211
41051	Dalton PV	Generator	8500	Rest-of-Po	MA	WCMA	New	0.391	0.391	0.391	0.391	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
41067	Borr - Blod	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41097	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41098	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41100	WCMA Sto	Demand	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41119	NEMA C&I	Demand	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41155	Plainfield_	Generator	8500	Rest-of-Po	MA	WCMA	New	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084	0.084
41177	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41179	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41183	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41185	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41187	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41189	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41191	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41193	Syncarpha	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41194	DWW Sola	Generator	8500	Rest-of-Po	CT	CT	New	1.077	1.077	1.077	1.077	0	0	0	0	0	0	0	0
41196	Syncarpha	Generator	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41200	Syncarpha	Generator	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41285	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41314	Kear - S Ma	Generator	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41315	Kear - S Ma	Generator	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41327	Ldstr - Pulp	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41396	WCMA Res	Demand	8500	Rest-of-Po	MA	WCMA	New	12.904	12.904	12.904	12.904	12.904	12.904	0	0	0	0	12.904	12.904

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
41397	SEMA Resi	Demand	8506	Southeast I	MA	SEMA	New	13.4	13.4	13.4	13.4	13.4	13.4	0	0	0	0	13.4	13.4
41398	NEMA Resi	Demand	8506	Southeast I	MA	NEMA	New	7.906	7.906	7.906	7.906	7.906	7.906	0	0	0	0	7.906	7.906
41407	Nugen PV -	Generator	8506	Southeast I	RI	RI	New	0.15	0.15	0.15	0.15	0	0	0	0	0	0	0	0
41477	Syncarpha	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41495	DRCR_Mai	Demand	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
41497	DRCR_Port	Demand	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
41515	NY_2024-2	Import	8500	Rest-of-Pool			New	2	2	2	2	2	2	2	2	2	2	2	2
41516	WODS	Generator	8500	Rest-of-Po	CT	CT	New	1.498	1.498	1.498	1.498	0	0	0	0	0	0	0	0
41519	Altus New	Generator	8500	Rest-of-Po	MA	WCMA	New	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141
41520	NY_2024-2	Import	8500	Rest-of-Pool			New	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
41527	NY_2024-2	Import	8500	Rest-of-Pool			New	27	27	27	27	27	27	27	27	27	27	27	27
41528	NY_2024-2	Import	8500	Rest-of-Pool			New	28	28	28	28	28	28	28	28	28	28	28	28
41534	Seneca_Gr	Import	8500	Rest-of-Pool			New	40	40	40	40	40	40	40	40	40	40	40	40
41535	FGE Solarw	Generator	8500	Rest-of-Po	MA	WCMA	New	0.072	0.072	0.072	0.072	0	0	0	0	0	0	0	0
41536	Kearsarge I	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
41537	Kearsarge V	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
41538	Kearsarge I	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
41539	Kearsarge V	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
41540	Kearsarge T	Generator	8506	Southeast I	RI	RI	New	0	0	0	0	0	0	0	0	0	0	0	0
41546	Kearsarge (	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41547	Kearsarge I	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41548	Kearsarge I	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41549	Kearsarge I	Generator	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41550	Kearsarge I	Generator	8506	Southeast I	MA	NEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41551	Kearsarge V	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41552	Kearsarge V	Generator	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41554	Candlewoo	Generator	8500	Rest-of-Po	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
41555	Alton Brad	Generator	8506	Southeast I	RI	RI	New	0.724	0.724	0.724	0.724	0	0	0	0	0	0	0	0
41557	Hope Farm	Generator	8506	Southeast I	RI	RI	New	0.683	0.683	0.683	0.683	0	0	0	0	0	0	0	0
41558	Bethlehem	Import	8500	Rest-of-Pool			New	0	0	0	0	0	0	0	0	0	0	0	0
41559	Carr Street	Import	8500	Rest-of-Pool			New	0	0	0	0	0	0	0	0	0	0	0	0
41560	Erie Boulev	Import	8500	Rest-of-Pool			New	174.927	174.927	174.927	174.927	174.927	174.927	174.927	174.927	174.927	174.927	174.927	174.927
41561	LIEVRE RIV	Import	8500	Rest-of-Pool			New	45	45	45	45	12	12	12	12	12	12	12	12
41563	Gravel Pit S	Generator	8500	Rest-of-Po	CT	CT	New	1.409	1.409	1.409	1.409	0	0	0	0	0	0	0	0
41564	Steel Mill S	Generator	8505	Northern N	VT	VT	New	1.163	1.163	1.163	1.163	0	0	0	0	0	0	0	0
41565	Old Mill So	Generator	8503	Maine	ME	ME	New	1.562	1.562	1.562	1.562	0	0	0	0	0	0	0	0
41566	Great Lake	Generator	8503	Maine	ME	ME	New	20	20	20	20	20	20	20	20	20	20	20	20
41573	Milford Gri	Generator	8500	Rest-of-Po	CT	CT	New	0	0	0	0	0	0	0	0	0	0	0	0
41575	HQ_HG_Ye	Import	8505	Northern New England			New	60	60	60	60	60	60	60	60	60	60	60	60
41577	HQ_NB_Ye	Import	8503	Maine			New	136	136	136	136	136	136	136	136	136	136	136	136
41580	HQ_NY_Ye	Import	8500	Rest-of-Pool			New	266	266	266	266	266	266	266	266	266	266	266	266
41581	HQ_PII_Yea	Import	8500	Rest-of-Pool			New	472	472	472	472	472	472	472	472	472	472	472	472
41589	GB LSEMA	Demand	8506	Southeast I	MA	SEMA	New	0	0	0	0	0	0	0	0	0	0	0	0
41590	NY_2024-2	Import	8500	Rest-of-Pool			New	2.032	2.032	2.032	2.032	2.032	2.032	2.032	2.032	2.032	2.032	2.032	2.032
41593	Berkshire V	Generator	8500	Rest-of-Po	MA	WCMA	New	0.918	0.918	0.918	0.918	2.175	2.175	2.175	2.175	2.175	2.175	2.175	2.175
44103	Breckenrid	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
44104	Williamsvil	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
44108	REC Solar A	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
44109	REC Solar A	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
44110	Clark Road	Generator	8500	Rest-of-Po	MA	WCMA	New	0.702	0.702	0.702	0.702	0.423	0.423	0.423	0.423	0.423	0.423	0.423	0.423
44111	Brockelma	Generator	8500	Rest-of-Po	MA	WCMA	New	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141
44113	Control Are	Import	8503	Maine			New	90	90	90	90	90	90	90	90	90	90	90	90
44115	Lunenburg	Generator	8500	Rest-of-Po	MA	WCMA	New	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141
44116	NuGen PV	Generator	8506	Southeast I	RI	RI	New	0.281	0.281	0.281	0.281	0	0	0	0	0	0	0	0

ID	Name	Type	Capacity Zone ID	Capacity Zone Name	State	Load Zone	Status	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25
44117	Dartmouth	Generator	8506	Southeast I	MA	SEMA	New	0.321	0.321	0.321	0.321	0.321	0.321	0.321	0.321	0.321	0.321	0.321	0.321
44119	Wendell So	Generator	8500	Rest-of-Po	MA	WCMA	New	0.393	0.393	0.393	0.393	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
44122	Rensselaer	Import	8500	Rest-of-Pool			New	60	60	60	60	60	60	60	60	60	60	60	60
44127	Northbridg	Generator	8506	Southeast I	MA	SEMA	New	0.413	0.413	0.413	0.413	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
44128	Conway So	Generator	8500	Rest-of-Po	MA	WCMA	New	0.62	0.62	0.62	0.62	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
44130	Agilitas Lei	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
44131	Agilitas Lei	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
44140	Deerfield S	Generator	8500	Rest-of-Po	MA	WCMA	New	0.289	0.289	0.289	0.289	0.177	0.177	0.177	0.177	0.177	0.177	0.177	0.177
44142	Topsfield S	Generator	8506	Southeast I	MA	NEMA	New	0.467	0.467	0.467	0.467	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
44152	Roseton Ge	Import	8500	Rest-of-Pool			New	0	0	0	0	0	0	0	0	0	0	0	0
44157	Roseton Ge	Import	8500	Rest-of-Pool			New	0	0	0	0	0	0	0	0	0	0	0	0
44160	Far Rockaw	Import	8500	Rest-of-Pool			New	0	0	0	0	0	0	0	0	0	0	0	0
44162	Far Rockaw	Import	8500	Rest-of-Pool			New	0	0	0	0	0	0	0	0	0	0	0	0
44164	Ldstr - Pulp	Generator	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0
44172	RJOL Hydro	Generator	8503	Maine	ME	ME	New	0	0	0	0	0	0	0	0	0	0	0	0
44173	S.V. - CT So	Demand	8500	Rest-of-Po	CT	CT	New	2	2	2	2	2	2	0	0	0	0	2	2
44174	Heron Cros	Generator	8506	Southeast I	MA	SEMA	New	0.282	0.282	0.282	0.282	0.141	0.141	0.141	0.141	0.141	0.141	0.141	0.141
44192	BoxBoroug	Demand	8500	Rest-of-Po	MA	WCMA	New	0	0	0	0	0	0	0	0	0	0	0	0

Attachment B

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

ISO New England Inc.) **Docket No. ER21-___-000**

TESTIMONY OF ROBERT G. ETHIER
ON BEHALF OF ISO NEW ENGLAND INC.

Q: PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A: My name is Robert G. Ethier. I am employed by ISO New England Inc. (the "ISO") as Vice President of System Planning. My business address is One Sullivan Road, Holyoke, Massachusetts 01040.

Q: PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A: I have a Bachelor of Arts degree in Economics from Yale University, a Masters in Resource Economics from Cornell University, and a Ph.D. in Resource Economics from Cornell University. Since 2000, I have worked at the ISO in various roles. I was responsible for Market Monitoring for nearly four years and Resource Adequacy for more than two years before becoming Vice President of Market Development in July 2008. In July 2014, I became Vice President of Market Operations and in November of 2019, I became Vice President of System Planning. Before 2000, I was a Senior Associate at Stratus Consulting with responsibility for energy market modeling.

Q: WHAT ARE THE PURPOSES OF YOUR TESTIMONY?

A: My testimony has two purposes. The first purpose of my testimony is to certify that resources participating in the fifteenth Forward Capacity Auction ("FCA"), which was held on February 8, 2021, were properly qualified in accordance with Section III.13.1 of the ISO New England Transmission, Markets, and Services Tariff (the "Tariff"). Section III.13.8.2 (b) of the Tariff requires that documentation regarding the competitiveness of the FCA be filed with the Commission. Section III.13.8.2 (b) states that such documentation may include a certification from the ISO that all entities offering and bidding in the FCA were properly qualified in accordance with Section III.13.1 of the Tariff. My testimony provides such certification. The second purpose of my testimony is to explain the auction prices resulting from the fifteenth FCA.

Q: WERE ALL RESOURCES OFFERING AND BIDDING IN THE FIFTEENTH FCA HELD ON FEBRUARY 8, 2021 PROPERLY QUALIFIED IN ACCORDANCE WITH TARIFF SECTION III.13.1?

A: Yes. Section III.13.1 of the Tariff sets forth the process for qualification in the FCA. I was responsible for overseeing the qualification of all resources in the fifteenth FCA held on February 8, 2021. I certify that, to the best of my knowledge, all resources offering and bidding in the fifteenth FCA were properly qualified in accordance with Section III.13.1 of the Tariff. In a November 10, 2020 informational filing with the Commission, the ISO provided resources qualified to participate in the fifteenth FCA.[1]

Q: WHAT WAS YOUR ROLE IN THE DEVELOPMENT OF THE LIST OF RESOURCES THAT RECEIVED CAPACITY SUPPLY OBLIGATIONS IN THE FIFTEENTH FCA?

A: Section III.13.8.2 (a) of the Tariff requires the ISO to provide a list of resources that received Capacity Supply Obligations in each Capacity Zone and the size of the Capacity Supply Obligations. The ISO has provided this information in Attachment A to this filing. As the Vice President of System Planning, Attachment A was developed under my supervision and direction.

Q: WHAT CAPACITY ZONES WERE MODELED IN THE FIFTEENTH FCA?

A: Four Capacity Zones were modeled in the fifteenth FCA: the Southeastern New England ("SENE") Capacity Zone, the Northern New England ("NNE") Capacity Zone, the Maine Capacity Zone ("Maine") and the Rest-of-Pool ("ROP") Capacity Zone. The SENE Capacity Zone included Northeastern Massachusetts/Boston, Southeastern Massachusetts, and Rhode Island. The NNE Capacity Zone included Maine, New Hampshire, and Vermont. The Maine Capacity Zone included Maine and was nested within the NNE Capacity Zone.

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[1] *ISO New England Inc.*, Informational Filing for Qualification in the Forward Capacity Market, Docket No. ER21-372-000 (filed November 10, 2020) ("Informational Filing").

The ROP Capacity Zone included Connecticut and Western/Central Massachusetts. As detailed in the ISO's Informational Filing for the fifteenth FCA, the Local Sourcing Requirement for the import-constrained SENE Capacity Zone was 10,305 MW.[2] For the export-constrained NNE Capacity Zone, the Maximum Capacity Limit was 8,680 MW.[3] For the export-constrained Maine Capacity Zone, the Maximum Capacity Limit was 4,145 MW.[4] Under Section III.13.2.2 of the Tariff, the total amount of capacity cleared in the FCA is determined using the System-Wide Capacity Demand Curve and Capacity Zone Demand Curves.

Q: PLEASE PROVIDE GRAPHS OF THE DEMAND CURVES THAT THE ISO CALCULATED FOR THE FIFTEENTH FCA.

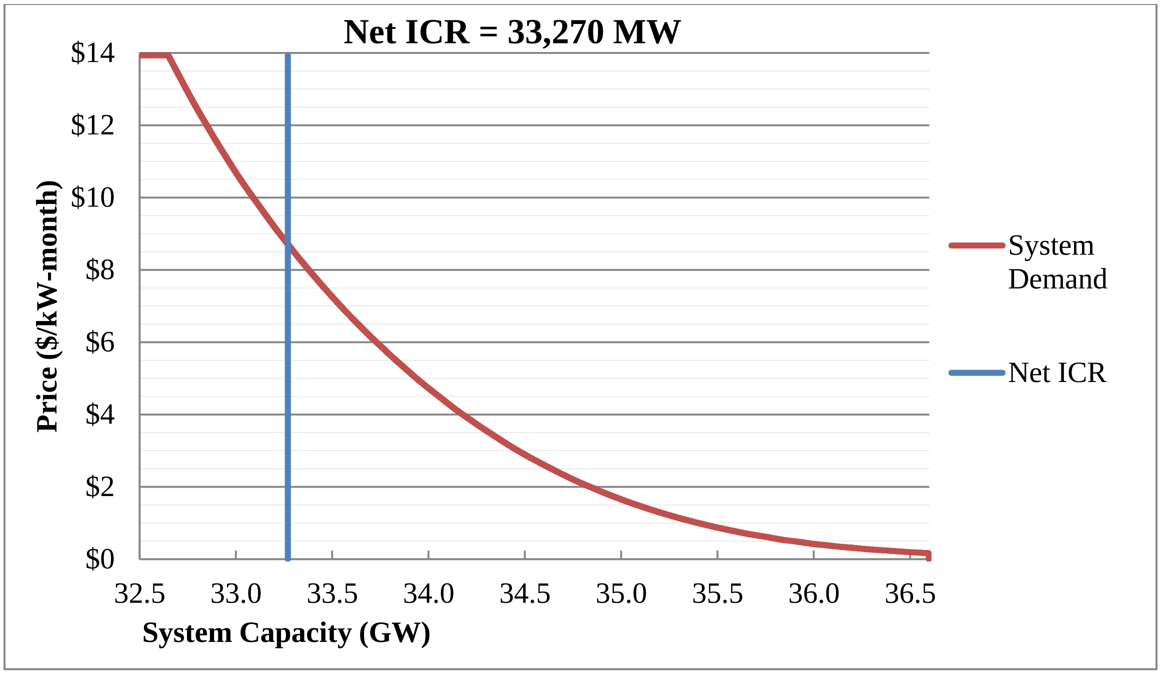
A: As required under Section III.12 of the Tariff, the ISO calculated the following Demand Curves for the fifteenth FCA:

1. System-Wide Capacity Demand Curve

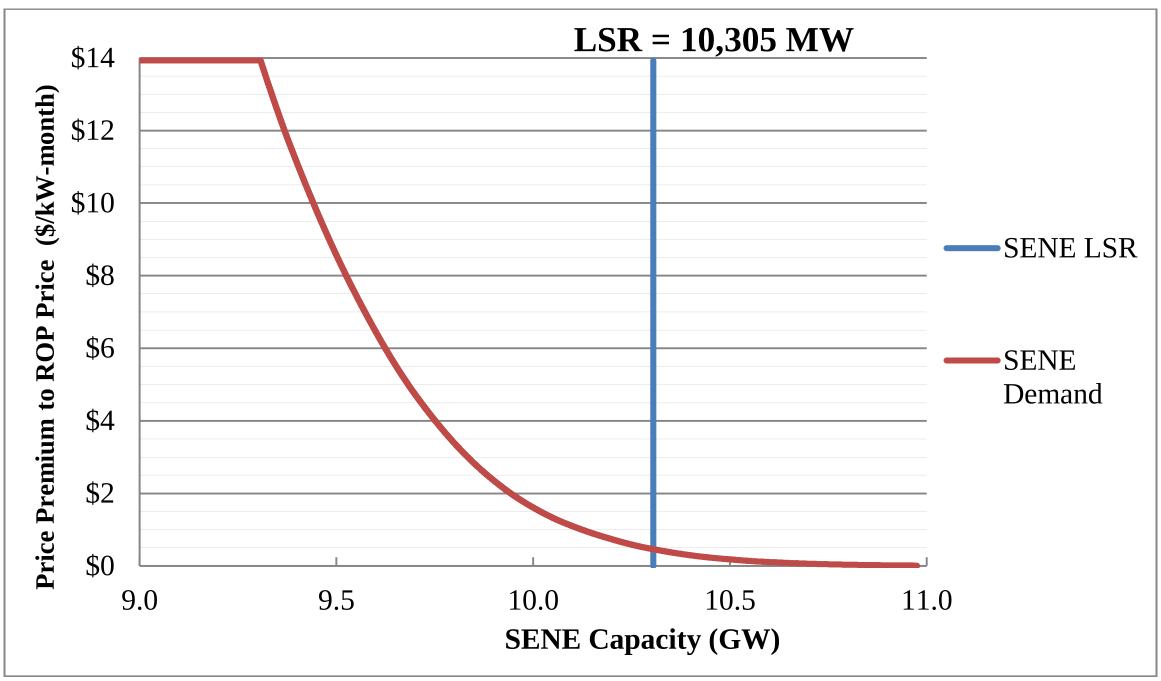
[2] Informational Filing at 9.

[3] *Id.*

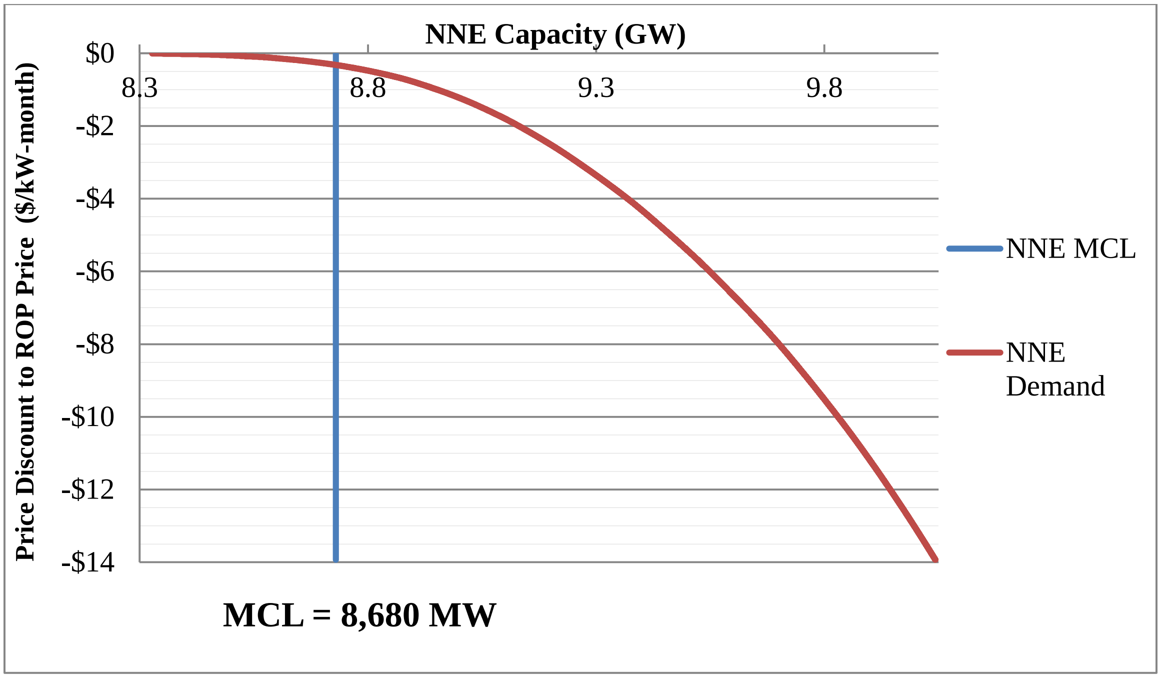
[4] *Id.*



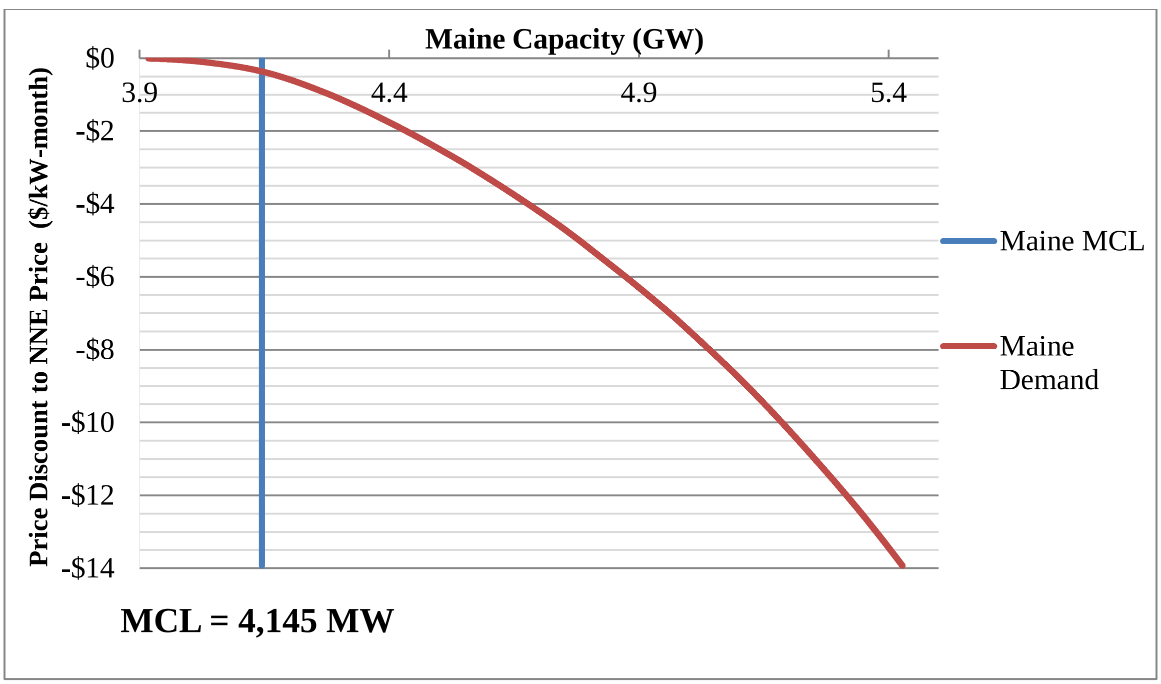
2. Import-constrained Capacity Zone Demand Curve for the SENE Capacity Zone



3. Export-constrained Capacity Zone Demand Curve for the NNE Capacity Zone

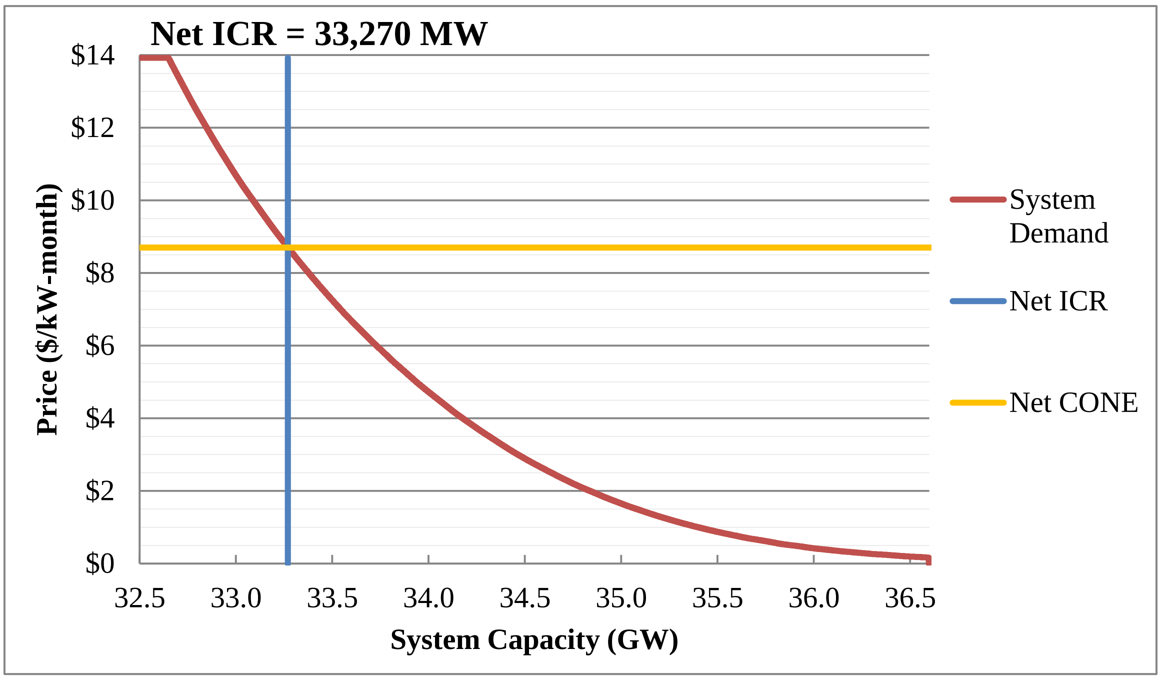


4. Export-constrained Capacity Zone Demand Curve for the Maine Capacity Zone



Q: CAN YOU PROVIDE A GRAPH OF THE SYSTEM-WIDE CAPACITY DEMAND CURVE ALONG WITH THE NET INSTALLED CAPACITY REQUIREMENT ("NET ICR") AND NET COST OF NEW ENTRY ("NET CONE") FOR THE FIFTEENTH FCA?

A: Yes. Below is a graph of the System-Wide Capacity Demand Curve, Net CONE, and Net ICR:



Q: WHAT CAUSED THE DESCENDING CLOCK AUCTION TO CLOSE?

A: The descending clock auction commenced with a starting price of $13.932/kW-month. The descending clock auction closed for the SENE Capacity Zone after the fourth round of bidding when an offer withdrawal resulted in zonal supply falling short of zonal demand in the SENE Capacity Zone.

The descending clock auction closed for the ROP Capacity Zone after the fifth round of bidding when a Dynamic De-List Bid resulted in system-wide supply falling short of system-wide demand.

The descending clock auction closed for both the NNE Capacity Zone and the Maine Capacity Zone after the fifth round of bidding when a Dynamic De-List Bid in the NNE Capacity Zone resulted in its zonal supply falling short of its zonal demand. At the same price, the Maine Capacity Zone's supply was less than its zonal demand. Therefore, the Maine Capacity Zone closed contemporaneously with the NNE Capacity Zone.

For each of the four Capacity Zones, the descending clock auction closed below the Dynamic De-List Bid Threshold.

Q: WHAT WERE THE FORWARD CAPACITY AUCTION CLEARING PRICES FOR THE CAPACITY ZONES?

A: Resources in the SENE Capacity Zone will be paid at the Capacity Clearing Price set pursuant to the SENE Capacity Demand Curve, which is \$3.980/kW-month.[5] Resources in the ROP Capacity Zone will be paid at the Capacity Clearing Price set pursuant to the System-Wide Capacity Demand Curve, which Is \$2.611/kW-month.[6] Resources in the NNE Capacity Zone and resources in the Maine

[5] Existing Capacity Resources with multi-year obligations from previous auctions will be paid based on the Capacity Clearing Price in the auction in which they originally cleared. Self-supplied resources will not be paid through the FCM.

Capacity Zone will be paid at the Capacity Clearing Price set pursuant to the NNE Capacity Demand Curve, which is $2.477/kW-month.[6]

Q: WHY WAS THE CAPACITY CLEARING PRICE $3.980/KW-MONTH IN THE SENE CAPACITY ZONE?

A: In the SENE Capacity Zone, at prices at and above $3.980/kW-month, zonal supply was greater than zonal demand. At prices below $3.980/kW-month, zonal supply was less than zonal demand. The withdrawal of a non-rationable offer at $3.979/kW-month caused zonal supply to fall short of zonal demand. Pursuant to the FCM rules, many offers from new capacity and many de-list bids from existing capacity are non-rationable (sometimes called indivisible). That is, the entire offer segment must clear or not clear. Under Section III.13.2.7.4 of the Tariff, where non-rationable offers prohibit the descending clock auction from clearing the precise amount of capacity required, the auctioneer analyzes the aggregate supply curve "to determine cleared capacity offers and Capacity Clearing Prices that seek to maximize social surplus for the associated Capacity Commitment Period. The clearing algorithm may result in offers below the Capacity Clearing Price not clearing, and in de-list bids below the Capacity Clearing Price clearing."

The ISO utilizes a clearing engine to solve a mixed-integer quadratic programming problem to identify the optimal combination of offers to clear, which is the combination of offers that maximizes social surplus. Social surplus (sometimes called social welfare) is, in this case, the sum of consumer surplus (the difference between the amount that consumers would be willing to pay as defined by the Demand Curve and the amount they actually pay) and producer surplus (the difference between the amount that suppliers are actually paid and the amount that they would have been willing to accept) minus deadweight loss.

With exclusively rationable (sometimes called divisible) offers and bids, the marginal offer can be partially cleared in order for supply to precisely meet demand, preventing any deadweight loss. Therefore, where all offers are rationable, social surplus is maximized when all supply to the left of the intersection with demand is cleared. However, non-rationable offers can prevent a clearing solution at the precise intersection of supply and demand. When this occurs, a decision must be made to either clear less supply than demanded at the clearing price (which generates less consumer surplus and producer surplus but no deadweight loss), or to clear more supply than demanded at the clearing price (which generates more consumer surplus and producer surplus, but also deadweight loss). The optimal solution identifies the combination of cleared supply offers that maximizes social surplus.

With the $3.980/kW-month offer selected, zonal cleared supply exceeded zonal demand at the Capacity Clearing Price of $3.980/kW-month by 43.141 MW. Although the non-rationable offer in SENE at $3.980/kW-month resulted in deadweight loss due to clearing more supply than was demanded at that price, clearing the offer contributed to social surplus. To better match zonal supply to zonal demand, the clearing engine simultaneously searched in the SENE Capacity Zone at prices below $3.980/kW-month for offers to exclude from clearing and de-list bids to include in clearing which would result in greater social surplus. However, the clearing engine did not find any such offers or de-list bids because each offer priced below $3.980/kW-month increased social surplus when cleared. And, each de-list bid priced below $3.980/kW-month decreased social surplus when cleared.

The Capacity Clearing Price was $3.980/kW-month because this was the lowest price at which the marginal resource satisfying SENE demand was willing to accept a Capacity Supply Obligation.[6]

Q: WHY WAS THE CAPACITY CLEARING PRICE $2.611/KW-MONTH IN THE ROP CAPACITY ZONE WHILE THE CAPACITY CLEARING PRICE WAS $2.477/KW-MONTH IN BOTH THE NNE AND MAINE CAPACITY ZONES?

A: Across the New England Control Area, at prices at and above $2.611/kW-month, system-wide supply was greater than system-wide demand. At prices below

[6] For more information on the mechanics and implications of clearing non-rationable offers, please see my testimony for the ninth and tenth Forward Capacity Auctions. Forward Capacity Auctions Results, *ISO New England Inc*., Docket No. ER15-1137-000 (Feb. 27, 2015), available at https://www.iso-ne.com/static-assets/documents/2015/02/er15-___-000_2-27-15_fca_9_results_filing.pdf; Forward Capacity Auctions Results, *ISO New England Inc*., Docket No. ER16-1041-000 (Feb. 29, 2016), available at https://www.iso-ne.com/static-assets/documents/2016/02/er16-___-000_2-29-16_fca_10_results_filing.pdf

$2.611/kW-month, system-wide supply was less than system-wide demand. A Dynamic De-List Bid at $2.610/kW-month set the Capacity Clearing Price at $2.611/kW-month in the ROP Capacity Zone. Dynamic De-List Bids can be rationed, which means that they can be taken in part or in full, subject to the resource's Rationing Minimum Limit. The price-setting de-list bid was rationed to the greatest extent possible, while honoring the resource's Rationing Minimum Limit, resulting in the resource receiving a Capacity Supply Obligation quantity equal to its Rationing Minimum Limit, and in system-wide supply exceeding system-wide demand at the ROP Capacity Clearing Price. Although system-wide supply still exceeded system-wide demand at the ROP Capacity Clearing Price after rationing this Dynamic De-List Bid, selecting it to clear contributed to social surplus. The Capacity Clearing Price in the ROP Capacity Zone was $2.611/kW-month because this was the lowest price at which the marginal resource satisfying system-wide demand was willing to accept a Capacity Supply Obligation.

In the NNE Capacity Zone, which includes the Maine Capacity Zone, at prices at and above $2.468/kW-month, offered zonal supply was greater than zonal demand. At prices below $2.468/kW-month, offered zonal supply was less than zonal demand.

To better match system supply to system demand, the clearing engine simultaneously searched for inframarginal offers to exclude from clearing or inframarginal de-list bids to include in clearing which would result in greater social surplus. The clearing engine found two Dynamic De-List Bids in the NNE Capacity Zone, both priced below $2.468/kW-month, that contributed to social surplus by clearing (that is, by not receiving a Capacity Supply Obligation). While these Dynamic De-List Bids intuitively would not have cleared, social surplus was maximized by clearing them. As a result, cleared system-wide supply exceeded cleared system-wide demand at the ROP Capacity Clearing Price by 23.208 MW, and the NNE Capacity Zone Demand Curve set the Capacity Clearing Prices in the NNE Capacity Zone and the Maine Capacity Zone at $2.477/kW-month.[7]

Q: WHY DO THE CLEARING PRICES FOR THE ROP CAPACITY ZONE AND THE SENE CAPACITY ZONE NOT PRECISELY MATCH THOSE CALCULATED USING THE PUBLISHED DEMAND CURVES AND CLEARED QUANTITIES?

A: If the marginal de-list bid satisfying system-wide demand had been fully rationable, then the total cleared system-wide supply quantity would have precisely matched the quantity demanded pursuant to the System-Wide Capacity Demand Curve at the ROP Capacity Clearing Price. However, because the marginal de-list bid was not fully rationable, the total cleared system-wide supply quantity was 34,621.065 MW, including 23.208 MW of supply exceeding demand at the ROP Capacity Clearing Price. Subtracting 23.208 MW from this total

[7] For more information on the mechanics and implications of clearing non-rationable offers, please see my testimony for the ninth and tenth Forward Capacity Auctions. *See id.*

cleared system-wide supply quantity results in 34,597.857 MW, which corresponds to $2.611/kW-month on the System-Wide Capacity Demand Curve.

Likewise, if the marginal offer in the SENE Capacity Zone had been fully rationable, then the total cleared supply quantity in the SENE Capacity Zone would have precisely matched the quantity demanded pursuant to the SENE Capacity Demand Curve at the SENE Capacity Clearing Price. However, because the marginal offer in the SENE Capacity Zone was not fully rationable, the total cleared supply quantity in the SENE Capacity Zone was 10,084.808 MW, including 43.141 MW of supply exceeding demand at the SENE Capacity Clearing Price. Subtracting 43.141 MW from this total cleared supply quantity results in 10,041.667 MW, which corresponds to $1.369/kW-month on the SENE Capacity Demand Curve, and when added to the ROP Capacity Clearing Price of $2.611/kW-month, results in a total price of $3.980/kW-month.

Q: WHAT WERE THE CAPACITY CLEARING PRICES ON THE EXTERNAL INTERFACES?

A: Imports over the New York AC Ties external interface, totaling 684.059 MW, and imports over the Phase I/II HQ Excess external interface, totaling 517.000 MW, will receive $2.611/kW-month. Imports over the Hydro-Quebec Highgate external interface, totaling 60.000 MW, and imports over the New Brunswick external interface, totaling 226.000 MW, will receive $2.477/kW-month.

Q: FOLLOWING COMPLETION OF THE PRIMARY AUCTION-CLEARING PROCESS, WAS A SUBSTITUTION AUCTION ADMINISTERED? IF NOT, WHY?

A: A substitution auction was not administered because no demand bid met the requirements of a substitution auction demand bid, and at least one substitution auction demand bid is necessary in order to conduct the substitution auction. Specifically, in order for a demand bid to be submitted in the substitution auction, the demand bid must meet the following requirements: (1) the demand bid must have met all of the conditions to participate in the substitution auction as specified in Section III.13.2.8.3 of the Tariff; (2) the associated Existing Capacity Resource must have received a Capacity Supply Obligation in the primary auction-clearing process as described in Section III.13.2.8.3.1. of the Tariff; and (3) ninety percent of the associated Existing Capacity Resource's substitution auction test price must be at or below the Capacity Clearing Price as described in Section III.13.2.8.3.3 of the Tariff. However, no demand bids satisfied these criteria, and, for that reason, a substitution auction was not conducted. Accordingly, while Section III.13.8.2 of the Tariff requires the instant filing to include the substitution auction clearing prices and the total amount of payments associated with any demand bids cleared at a substitution auction clearing price above their demand bid prices, because a substitution auction was not conducted, that information is not included in this filing.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

I declare that the foregoing is true and correct.

Robert G. Ethier

February 26, 2021

Attachment C

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

ISO New England Inc.	**)**	**Docket No. ER21-___-000**

TESTIMONY OF ALAN MCBRIDE

Q: PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A: My name is Alan McBride. I am Director of Transmission Services and Resource Qualification with ISO New England Inc. (the "ISO"). My business address is One Sullivan Road, Holyoke, Massachusetts 01040.

Q: PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A: I joined the ISO in June 2006 and for the following four years my primary responsibility was as Project Manager of New Generation Qualification for the Forward Capacity Market.[1] In 2010, I became the Manager, Area Transmission Planning for northern New England, and continued in that position until 2015, when I became Director of Transmission Services. In that position, I have been responsible for the oversight of the ISO's interconnection process for new Generating Facilities and Elective Transmission Upgrades. In November 2019, my responsibilities were expanded to include the qualification of resources in the Forward Capacity Market ("FCM"). Accordingly, my current title is Director of Transmission Services and Resource Qualification.

[1] Capitalized terms used but not defined in this testimony are intended to have the meaning given to such terms in the ISO New England Inc. Transmission, Markets and Services Tariff.

Before joining the ISO, I worked at Dynegy Inc. and then at Calpine Corporation. At both companies, I supported various transmission-related activities associated with the development, interconnection, and commercial operation of merchant generation facilities. Prior to joining Dynegy, I worked at Power Technologies Incorporated (now a division of Siemens Industries), where I conducted various transmission analysis studies, including the system impact studies of several proposed generating facilities.

I have 23 years of experience in various aspects of power transmission system analysis and transmission services. I hold a B.S. degree in Electrical Engineering from University College Dublin, in Ireland, a Master's degree in Electric Power Engineering from Rensselaer Polytechnic Institute, and an M.B.A. degree from Purdue University.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A: The purpose of my testimony is to explain the ISO's reliability review of de-list bids submitted in the fifteenth Forward Capacity Auction ("FCA").

Q: WHAT WAS YOUR ROLE IN THE RELIABILITY REVIEW OF THE VARIOUS DE-LIST BIDS?

A: As the ISO's Director of Transmission Services and Resource Qualification, I oversaw the reliability review of all submitted de-list bids.

Q: WHAT TYPES OF DE-LIST BIDS DOES THE ISO REVIEW?

A: There are five different types of de-list bids that are reviewed for reliability: Permanent De-List Bids, Retirement De-List Bids, Static De-List Bids, Export De-List Bids, and Dynamic De-List Bids. With the exception of Dynamic De-List Bids,[2] all de-list bids are submitted and reviewed for reliability in advance of the FCA.

Q: HOW MANY TYPES OF REVIEW DOES THE ISO PERFORM ON DE-LIST BIDS?

A: The ISO performs two types of review on de-list bids. I explain each of those below.

Q: PLEASE EXPLAIN THE FIRST TYPE OF REVIEW THAT THE ISO PERFORMS ON DE-LIST BIDS.

A: Pursuant to Section III.13.1.2.3.2 of the Tariff, prior to the auction, the ISO's Internal Market Monitor ("IMM") reviews Export De-List Bids and Static De-List Bids submitted above the Dynamic De-List Bid threshold, which was set at $4.30/kW-month for the fifteenth FCA, to determine whether the bids are consistent with the resource's net risk-adjusted going forward and opportunity costs. This review is not performed for Dynamic De-List Bids, which are

[2] Dynamic De-List Bids are reviewed for reliability as a part of the real-time auction process. *See* Sections III.13.2.3.2 (d) and 13.2.5.2.5 of the Tariff.

submitted during the auction itself, if the price drops below the Dynamic De-List Bid threshold ($4.30/kW-month for the fifteenth FCA).

In addition, prior to the auction, the IMM reviews all submitted Permanent and Retirement De-List Bids regardless of price, and a filing was made on July 2, 2020 (Docket No. ER20-2317-000) indicating, on a confidential basis: (i) the IMM's determination with respect to each Permanent De-List Bid and Retirement De-List Bid, (ii) supporting documentation for each determination, (iii) the capacity that will permanently de-list or retire prior to the FCA, and (iv) whether capacity suppliers that submitted the bids have elected to conditionally or unconditionally retire the capacity pursuant to Section III.13.1.2.4.1.[3]

Q: PLEASE EXPLAIN THE SECOND TYPE OF REVIEW THAT THE ISO PERFORMS ON DE-LIST BIDS.

A: Pursuant to Section III.13.2.5.2.5 of the Tariff and ISO New England Planning Procedure No. 10 – Planning Procedure to Support the Forward Capacity Market, the ISO reviews each Retirement De-List Bid, Permanent De-List Bid, Export De-List Bid, Administrative Export De-List Bid, and Static De-List Bid to determine if the capacity associated with the bid is needed for local reliability during the Capacity Commitment Period associated with the FCA. The Tariff provides that capacity will be needed for local reliability if the absence of that capacity would

[3] The Commission accepted the filing on August 19, 2020. *See ISO New England Inc.*, Docket No. ER20-2317-000, (Delegated letter order Aug. 19, 2020).

result in violation of any NERC, NPCC, or ISO criteria.[4] If the capacity associated with the de-list bid is determined not to be needed for local reliability, and the auction price falls to or below the de-list bid price, then the capacity associated with the bid is removed from the auction.

Q: FOR THE FIFTEENTH FCA, HOW MANY DE-LIST BIDS DID THE ISO REVIEW FOR RELIABILITY?

A: The ISO reviewed one Permanent De-List Bid totaling approximately 42.590 MW and 11 Retirement De-List Bids totaling approximately 52.975 MW.[5] A total of 813.019 MW of pre-auction Static De-List Bids were submitted. However, pursuant to Tariff Section III.13.1.2.3.1.1, prior to the auction, participants elected to withdraw approximately 674 MW of their submitted Static De-List Bids. As a result, the ISO reviewed 139.019 MW of Static De-List Bids. Finally, no Export De-List Bids or Administrative Export De-List Bids were submitted for the fifteenth FCA.

During the fourth round of the auction where the price fell below $4.30/kW-month (*i.e.,* the threshold for submission of Dynamic De-List Bids prescribed for the fifteenth FCA), 36 Dynamic De-List Bids were submitted, seeking to delist

[4] Section III.13.2.5.2.5 of the Tariff.

[5] The totals noted above do not include two Retirement De-List Bid for resources that elected to not be reviewed for reliability.

approximately 677.522 MW.[6] All Dynamic De-List Bids submitted were reviewed for reliability.

During the fifth round of the auction, 126 Dynamic De-List Bids were submitted, seeking to delist approximately 2,811.526 MW. De-list bids are reviewed for reliability in descending price order. The ISO reviewed a sufficient quantity of Dynamic De-List Bids associated with reaching the closing price of the auction. In this case, during the auction, the ISO reviewed 27 of the Dynamic De-List Bids submitted in the fifth round, totaling 737.894 MW.

Q: DID THE ISO REVIEW SHOW THE NEED TO RETAIN FOR RELIABILITY ANY RESOURCES THAT SUBMITTED DE-LIST BIDS FOR THE FIFTEENTH FCA?

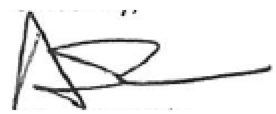
A: No. The ISO's review of de-list bids did not show the need to retain for reliability any resources that submitted de-list bids for the fifteenth FCA. Accordingly, the ISO did not reject any de-list bids that it studied for the fifteenth FCA.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

[6] The fourth round was the first round of the auction in which Dynamic De-List Bids could be submitted.

I declare that the foregoing is true and correct.



Alan McBride

February 26, 2021

Attachment D

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

ISO New England Inc.	)))	Docket No. ER21-___-000

TESTIMONY OF LAWRENCE M. AUSUBEL

Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A. My name is Lawrence M. Ausubel. I am the Founder and Chairman of Power Auctions LLC, the company that has helped to design, implement, and administer the Forward Capacity Auction ("FCA") for ISO New England Inc. (the "ISO"). I am also a Professor of Economics at the University of Maryland. My business address is 3333 K St. NW Suite 425, Washington, DC 20007.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A. I have an A.B. in Mathematics from Princeton University, an M.S. in Mathematics from Stanford University, an M.L.S. in Legal Studies from Stanford University, and a Ph.D. in Economics from Stanford University.

I am the Chairman of Power Auctions LLC, a provider of auction implementation services and software worldwide. I was also the President of Market Design Inc., an economics consultancy that (until its dissolution in 2016) offered services in the design of auction markets. I have played a lead role in the design and implementation of: electricity auctions in France, Germany, Spain, Belgium and the US; gas auctions in Germany, France, Hungary and Denmark; the world's first auction for greenhouse gas emission reductions in the UK; and a prototype airport slot auction in the US. I have advised the US Federal Communications Commission, Innovation Science and Economic Development Canada, and the Australian Communications and Media Authority on spectrum auctions. I have also advised BOEM (the US Bureau of Ocean Energy Management) and ICANN (the Internet Corporation for Assigned Names and Numbers) on auction design. I hold 23 U.S. patents related to auction technology and I have published numerous articles on auction design, bargaining, industrial organization and financial markets. My curriculum vitae, which includes a list of publications and other experience, is attached.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of this testimony is to certify that the fifteenth FCA, which was held on February 8, 2021, was conducted in accordance with the relevant provisions of the ISO New England Transmission, Markets, and Services Tariff ("Tariff") currently in effect. Section III.13.8.2 (b) of the Tariff requires that, after each FCA, documentation regarding the competitiveness of the FCA be filed with the Federal Energy Regulatory Commission ("Commission"). Section III.13.8.2 (b) states that such documentation may include certification from the auctioneer that the FCA was conducted in accordance with the provisions of Section III.13 of the Tariff. Section III.13.2 of the Tariff provides the rules relating to the mechanics of the FCA. My testimony certifies that the FCA was conducted in accordance with Section III.13.2 of the Tariff.

Q. PLEASE DESCRIBE POWER AUCTIONS LLC.

A. Power Auctions LLC designs, implements and conducts high-stakes electronic auctions utilizing proprietary software, processes, and other intellectual property. The PowerAuctions software platform designed by Power Auctions LLC has been used to implement over 300 auctions worldwide in the electricity, gas and resource sectors. In the electricity sector, the software platform was used to operate 42 quarterly EDF Generation Capacity Auctions in France. It was also used for the Endesa-Iberdola Virtual Power Plant Auctions in Spain, the Electrabel Virtual Power Plant Auctions in Belgium and the E.ON Virtual Power Plant Auction in Germany. Currently, our software platform is also used for implementing the UK's Capacity Market auctions and for implementing the US Department of Interior's auctions of offshore wind energy tracts. Further, Power Auctions LLC was part of the team that the US Federal Communications Commission assembled to design and implement the FCC Incentive Auction (2016–17), and it is prime contractor to the Governments of Australia, Canada and the US for the ongoing design and implementation of spectrum auctions.

Power Auctions LLC worked with the ISO to design and implement (on the PowerAuctions platform) the previous FCAs held on February 4-6, 2008; December 8-10, 2008; October 5-6, 2009; August 2-3, 2010; June 6-7, 2011; April 2-3, 2012; February 4-5, 2013; February 3, 2014; February 2, 2015;

February 8, 2016; February 6, 2017; February 5-6, 2018; February 4, 2019; and February 3, 2020.

Q. WHAT WAS POWER AUCTIONS LLC'S ROLE IN THE FIFTEENTH FCA HELD ON FEBRUARY 8, 2021?

A. The ISO retained Power Auctions LLC as the independent auction manager ("Auction Manager") for the fifteenth FCA. As the Auction Manager, Power Auctions LLC worked with the ISO to design and implement the FCA in conformance with the Tariff. By design, the Auction Manager conducted the auction independently, with limited involvement by the ISO. The auction was implemented using the PowerAuctions software platform.

Q. WAS THE FIFTEENTH FCA HELD ON FEBRUARY 8, 2021 CONDUCTED IN ACCORDANCE WITH SECTION III.13.2 OF THE TARIFF?

A. Yes. In accordance with Section III.13.8.2 (b) of the Tariff, I certify that, to the best of my knowledge, the fifteenth FCA held on February 8, 2021 was conducted in conformance with the provisions of Section III.13.2 of the Tariff.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

I declare that the foregoing is true and correct.

Executed on February 12, 2021

Lawrence Ausubel

Lawrence M. Ausubel

Curriculum Vitae

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Education

Ph.D. (1984)	Stanford University, Economics
M.L.S. (1984)	Stanford Law School, Legal Studies
M.S. (1982)	Stanford University, Mathematics
A.B. (1980)	Princeton University, Mathematics

Honors:
- Fellow of the Econometric Society
- Phi Beta Kappa
- Sigma Xi
- Magna cum laude in mathematics
- Stanford University Economics Department, graduate fellowship, 1982
- Stanford Law School, fellowship in law and economics, 1983

Fields of Concentration

Market Design
Auction Theory
Bargaining Theory
Microeconomic Theory and Game Theory
Credit Cards, Bankruptcy and Banking
Industrial Organization
Law and Economics

Professional Experience

Professor of Economics, University of Maryland (August 1992 – present).

Chairman and Founder, Power Auctions LLC (2003 – present).
Power Auctions LLC has been a technology provider of auction design, auction software, implementation services and intellectual property since 2003. The PowerAuctions™ software platform has been used for more than 300 high-stakes auctions on six continents, with total transaction values well in excess of $100 billion.

President, Market Design Inc. (2003 – 2016).
Until its dissolution in 2016, Market Design Inc. was a consultancy of leading economists and game theorists (Al Roth, Peter Cramton, R. Preston McAfee, Paul Milgrom, Robert Wilson, et al) that worked with governments and companies worldwide to design and implement state-of-the-art auctions and markets.

Assistant Professor of Managerial Economics and Decision Sciences, Kellogg School, Northwestern University (September 1984 – August 1992).

Visiting Assistant Professor, New York University (January 1990 – May 1990).

Recent Consulting Experience

Provided expert bidding advice to bidders in more than a dozen large spectrum auctions, including Bharti Airtel in India's 900/1800 MHz auction, Orange in Slovakia's Multi-Band spectrum auction, Three (Hutchison) in the UK 4G and PSSR auctions, Eircom in Ireland's 800/900/1800 MHz auction, Aircel in India's 3G/BWA auctions, Spain's Telefónica in the UK, German, Italian and Austrian UMTS/3G spectrum auctions, Ericsson in the US PCS spectrum auctions, MTN in the Nigerian spectrum auctions, MCI in the US Direct Broadcast Satellite auction, US Airwaves in the US C-Block Auction, Mobile Media in the US Narrowband Auction, and other confidential clients.

Advised the Secretería de Energía (SENER) by preparing an expert report on Mexico's first two capacity auctions and by providing advice for future auctions, 2016.

Provided expert bidding advice to a confidential client in India's 500 MW solar auction, 2015.

Advisor to the US government (Federal Communications Commission) on the design and implementation of the FCC Incentive Auction and all ongoing spectrum auctions and universal service fund auctions, 2011 – present.

Advisor to the Canadian government (Innovation, Science and Economic Development Canada) on the design and implementation of the 600 MHz, 700 MHz, 2.5 GHz, 3.5 GHz and mmWave spectrum auctions, 2010 – present.

Advisor to the Australian government (ACMA) on the design and implementation of the Australian Digital Dividend auction and all subsequent spectrum auctions, 2011 –

present.

Provided auction design advice to the IDA Singapore on their Auction of Public Cellular Mobile Telecommunication Services Spectrum Rights, 2007 – 2008.

Design and implementation of the Trinidad and Tobago GSM auction, 2005.

Design and implementation of the UK Capacity Market auction (electricity, 2014 – present).

Design and implementation of auctions for offshore wind energy tracts for the Bureau of Ocean Energy Management (BOEM), US Department of Interior (2010 – present).

Design and implementation of the Forward Capacity Auction for ISO New England (electricity, 2007 – present).

Design and implementation of the quarterly Electricité de France generation capacity auctions (2001 – 2011) and Long-Term Contract auctions (2008 – 2009).

Design and implementation of the quarterly Spanish Virtual Power Plant (VPP) auctions (electricity, 2007 – 2009).

Design and implementation of the E.ON VPP auction in Germany (2007).

Design and implementation of the quarterly Electrabel Virtual Power Plant (VPP) auctions in Belgium (2003 – 2005).

Design and implementation of auctions for new gTLDs for ICANN (Internet Corporation for Assigned Names and Numbers (2008 – present).

Design and implementation of rough diamond auctions for Okavango Diamond Company, Botswana (2013 – present).

Design and implementation of rough diamond auctions for BHP Billiton/Dominion Diamonds (2007 – 2014).

Design and implementation of the annual E.ON Földgáz Trading gas release programme auction in Hungary (2006 – 2013).

Design and implementation of the annual Danish Oil and Natural Gas (DONG Energy) gas release programme auction (2006 – 2011).

Design and implementation of the annual E.ON Ruhrgas gas release programme auction in Germany (2003 – 2008, 2010).

Design and implementation of the Gaz de France gas storage auction (2006).

Design and implementation of the Gaz de France gas release programme auction (2004).

Design and implementation of the Total gas release programme auction (2004).

Design and implementation of the UK Emissions Trading Scheme auction to procure greenhouse gas emission reductions for the UK Government (2002).

Design and implementation of a demonstration auction of landing and takeoff slots for LaGuardia Airport, for the US Federal Aviation Administration (2005, 2008).

Teaching

Econ 456	Law and Economics (Undergraduate; Maryland)
Econ 603	Microeconomic Analysis (Ph.D.; Maryland)
Econ 661	Industrial Organization (Ph.D.; Maryland)
Econ 704	Advanced Microeconomics: Market Design (Ph.D.; Maryland)
Mngrl Econ D30	Intermediate Microeconomics (M.B.A.; Northwestern)
Mngrl Econ D45	Regulation and Deregulation (M.B.A.; Northwestern)

Publications

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“An Efficient Ascending-Bid Auction for Multiple Objects,” *American Economic Review*, Vol. 94, No. 5, pp. 1452–1475, December 2004.

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“The Lovely but Lonely Vickrey Auction” (with Paul Milgrom), Chapter 1 of *Combinatorial Auctions* (P. Cramton, Y. Shoham, and R. Steinberg, eds.), pp. 17–40, Cambridge: MIT Press, 2006.

“Ascending Proxy Auctions” (with Paul Milgrom), Chapter 3 of *Combinatorial Auctions* (P. Cramton, Y. Shoham, and R. Steinberg, eds.), pp. 79–98, Cambridge: MIT Press, 2006.

“The Clock-Proxy Auction: A Practical Combinatorial Auction Design” (with Peter Cramton and Paul Milgrom), Chapter 5 of *Combinatorial Auctions* (P. Cramton, Y. Shoham, and R. Steinberg, eds.), pp. 115–138, Cambridge: MIT Press, 2006.

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“A Direct Mechanism Characterization of Sequential Bargaining with One-Sided Incomplete Information” (with R. Deneckere), *Journal of Economic Theory*, Vol. 48, No. 1, pp. 18–46, June 1989; reprinted as Chapter 15 in *Bargaining with Incomplete Information* (P. Linhart, R. Radner, and M. Satterthwaite, eds.), Academic Press, 1992.

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"One is Almost Enough for Monopoly" (with R. Deneckere), *Rand Journal of Economics*, Vol. 18, No. 2, pp. 255–274, Summer 1987.

Patents

"System and Method for Cryptographic Choice Mechanisms" (with Andrew Komo), U.S. Patent Number 10,872,487, issued December 22, 2020.

"System and Method for an Auction of Multiple Types of Items" (with Peter Cramton and Wynne P. Jones), U.S. Patent Number 8,762,222, issued June 24, 2014.

"System and Method for the Efficient Clearing of Spectrum Encumbrances" (with Peter Cramton and Paul Milgrom), U.S. Patent Number 8,744,924, issued June 3, 2014.

"System and Method for a Dynamic Auction with Package Bidding" (with Paul Milgrom), U.S. Patent Number 8,566,211, issued October 22, 2013.

"System and Method for an Efficient Dynamic Multi-Unit Auction," U.S. Patent Number 8,447,662, issued May 21, 2013.

"System and Method for a Hybrid Clock and Proxy Auction" (with Peter Cramton and Paul Milgrom), U.S. Patent Number 8,335,738, issued December 18, 2012.

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"System and Method for the Efficient Clearing of Spectrum Encumbrances" (with Peter Cramton and Paul Milgrom), U.S. Patent Number 8,145,555, issued March 27, 2012.

"Computer Implemented Methods and Apparatus for Auctions," U.S. Patent Number 8,065,224, issued November 22, 2011.

"Ascending Bid Auction for Multiple Objects," U.S. Patent Number 7,966,247, issued June 21, 2011.

"System and Method for an Auction of Multiple Types of Items" (with Peter Cramton and Wynne P. Jones), U.S. Patent Number 7,899,734, issued March 1, 2011.

"System and Method for an Efficient Dynamic Multi-Unit Auction," U.S. Patent Number 7,870,050, issued January 11, 2011.

"Computer Implemented Methods and Apparatus for Auctions," U.S. Patent Number 7,774,264, issued August 10, 2010.

"System and Method for a Hybrid Clock and Proxy Auction" (with Peter Cramton and Paul Milgrom), U.S. Patent Number 7,729,975, issued June 1, 2010.

"System and Method for an Efficient Dynamic Multi-Unit Auction," U.S. Patent Number 7,467,111, issued December 16, 2008.

"System and Method for an Efficient Dynamic Multi-Unit Auction," U.S. Patent Number 7,343,342, issued March 11, 2008.

"Ascending Bid Auction for Multiple Objects," U.S. Patent Number 7,337,139, issued February 26, 2008.

"Computer Implemented Methods and Apparatus for Auctions," U.S. Patent Number 7,249,027, issued July 24, 2007.

"System and Method for an Efficient Dynamic Multi-Unit Auction," U.S. Patent Number 7,165,046, issued January 16, 2007.

"System and Method for an Efficient Dynamic Multi-Unit Auction," U.S. Patent Number 7,062,461, issued June 13, 2006.

"System and Method for an Efficient Dynamic Auction for Multiple Objects," U.S. Patent Number 6,026,383, issued February 15, 2000.

"Computer Implemented Methods and Apparatus for Auctions," U.S. Patent Number 6,021,398, issued February 1, 2000.

"Computer Implemented Methods and Apparatus for Auctions," U.S. Patent Number 5,905,975, issued May 18, 1999.

Book Reviews and Encyclopedia Entries

"Auction Theory," *New Palgrave Dictionary of Economics*, Second Edition, Steven N. Durlauf and Lawrence E. Blume, eds., London: Macmillan, 2008.

"Credit Cards," *McGraw-Hill Encyclopedia of Economics*, McGraw-Hill, 1994.

"Book Review: The Credit Card Industry, by Lewis Mandell," *Journal of Economic Literature*, Vol. 30, No. 3, September 1992, pp. 1517-18.

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Working Papers

"Market Design and the FCC Incentive Auction" (with Christina Aperjis and Oleg V. Baranov), October 2017.

“The Combinatorial Clock Auction, Revealed Preference and Iterative Pricing” (with Oleg V. Baranov), February 2014.

“Penalty Interest Rates, Universal Default, and the Common Pool Problem of Credit Card Debt” (with Oleg V. Baranov and Amanda E. Dawsey), mimeo, University of Maryland, June 2010.

“A Troubled Asset Reverse Auction” (with Peter Cramton), working paper, University of Maryland, October 2008.

“Time Inconsistency in the Credit Card Market” (with Haiyan Shui), mimeo, University of Maryland, January 2005.

“Informal Bankruptcy” (with Amanda E. Dawsey), mimeo, University of Maryland, April 2004.

“Adverse Selection in the Credit Card Market,” mimeo, University of Maryland, June 1999.

“The Credit Card Market, Revisited,” mimeo, University of Maryland, July 1995.

“Walrasian Tâtonnement for Discrete Goods,” mimeo, University of Maryland, July 2005.

“Bidder Participation and Information in Currency Auctions” (with Rafael Romeu), Working Paper WP/05/157, International Monetary Fund, 2005.

“A Mechanism Generalizing the Vickrey Auction,” mimeo, University of Maryland, September 1999.

“The Ascending Auction Paradox” (with Jesse Schwartz), mimeo, University of Maryland, July 1999.

“The Optimality of Being Efficient” (with Peter Cramton), mimeo, University of Maryland, June 1999.

“Sequential Recontracting Under Incomplete Information” (with Arijit Sen), mimeo, University of Maryland, June 1995.

“Separation and Delay in Bargaining” (with Raymond Deneckere), mimeo, University of Maryland, April 1994.

“A Model of Managerial Discretion and Corporate Takeovers,” mimeo, University of Maryland, March 1993.

“Rigidity and Asymmetric Adjustment of Bank Interest Rates,” mimeo, University of Maryland, August 1992.

“Oligopoly When Market Share Matters,” mimeo, Stanford University, May 1984.

"Partially-Revealing Equilibria," Stanford University, Department of Economics, August 1984. Dissertation committee: Mordecai Kurz (principal advisor); Peter J. Hammond; Kenneth J. Arrow.

Works in Progress

"The Hungarian Auction" (with T. Morrill)

"Bargaining and Forward Induction" (with R. Deneckere)

Op-Eds

"Making Sense of the Aggregator Bank" (with Peter Cramton), *Economists' Voice*, Vol. 6, Issue 3, Article 2, February 2009.

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Research Grants

Principal Investigator, "Common-Value Auctions with Liquidity Needs" (with P. Cramton, E. Filiz-Ozbay and E. Ozbay), National Science Foundation Grant SES-09-24773, September 1, 2009 – August 31, 2013.

Principal Investigator, "Dynamic Matching Mechanisms" (with P. Cramton), National Science Foundation Grant SES-05-31254, August 15, 2005 – July 31, 2008.

Co-Principal Investigator, "Slot Auctions for U.S. Airports" (with M. Ball, P. Cramton and D. Lovell), Federal Aviation Administration, September 1, 2004 – August 31, 2005.

Co-Principal Investigator, "Rapid Response Electronic Markets for Time-Sensitive Goods" (with G. Anandalingam, P. Cramton, H. Lucas, M. Ball and V. Subrahmanian), National Science Foundation Grant IIS-02-05489, Aug 1, 2002 – July 31, 2005.

Principal Investigator, "Multiple Item Auctions" (with P. Cramton), National Science Foundation Grant SES-01-12906, July 15, 2001 – June 30, 2004.

Principal Investigator, "Auctions for Multiple Items" (with P. Cramton), National Science Foundation Grant SBR-97-31025, April 1, 1998 – March 31, 2001.

Co-Principal Investigator, "Auctions and Infrastructure Conference" (with P. Cramton), National Science Foundation, April 1, 1998 – March 31, 1999.

Principal Investigator, "Bargaining Power, Sequential Recontracting, and the Principal-Agent Problem" (with A. Sen), National Science Foundation Grant SBR-94-10545, October 15, 1994 – September 30, 1997.

Principal Investigator, "Insider Trading and Economic Efficiency," The Lynde and Harry Bradley Foundation, May 15, 1989 – May 14, 1992.

Principal Investigator, "Bargaining with One- and Two-Sided Incomplete Information" (with R. Deneckere), National Science Foundation Grant SES-86-19012, June 1, 1987 – May 31, 1989.

Principal Investigator, "Information Transmission in Bargaining and Markets" (with R. Deneckere), National Science Foundation Grant IST-86-09129, July 1, 1986 – June 30, 1987.

Conference Presentations

"On Generalizing the English Auction," Econometric Society Winter Meetings, Chicago, January 1998.

"The Optimality of Being Efficient," Maryland Auction Conference, Wye River, May 1998.

"Adverse Selection in the Credit Card Market," Western Finance Association, Monterey, June 1998.

"The Optimality of Being Efficient," Econometric Society Summer Meetings, Montreal, June 1998.

"Bargaining and Forward Induction," Northwestern Summer Microeconomics Conference, Evanston, IL, July 1998.

"Predicting Personal Bankruptcies," National Conference of Bankruptcy Judges, Dallas, October 1998.

"Adverse Selection in the Credit Card Market," NBER Behavioral Macroeconomics Conference, Boston, December 1998.

"The Ascending Auction Paradox," Econometric Society Summer Meetings, Madison, June 1999.

"Adverse Selection in the Credit Card Market," Econometric Society Summer Meetings, Madison, June 1999.

"Predicting Personal Bankruptcies," Meeting of the National Association of Chapter Thirteen Trustees, New York, July 1999.

"The Ascending Auction Paradox," Southeast Economic Theory Conference, Washington DC, November 1999.

"Adverse Selection in the Credit Card Market," Utah Winter Finance Conference, Salt Lake City, February 2000.

"An Efficient Dynamic Auction for Heterogeneous Commodities," Conference on Auctions and Market Structure, Heidelberg, Germany, July 2000.

"An Efficient Dynamic Auction for Heterogeneous Commodities," Conference on Multiunit Auctions, Stony Brook, NY, July 2000.

"A Mechanism Generalizing the Vickrey Auction," Econometric Society World Congress, Seattle, August 2000.

"Auctions for Financial E-Commerce," New York Federal Reserve Bank Conference on Financial E-Commerce, New York, February 2001.

"An Efficient Dynamic Auction for Heterogeneous Commodities," NSF General Equilibrium Conference, Providence, RI, April 2001.

"An Efficient Dynamic Auction for Heterogeneous Commodities," NSF/NBER Decentralization Conference, Evanston, IL, April 2001.

"Informal Bankruptcy," Association of American Law Schools Workshop on Bankruptcy, St. Louis, MO, May 2001.

"An Efficient Dynamic Auction for Heterogeneous Commodities," Econometric Society Summer Meetings, College Park, MD, June 2001.

"Ascending Auctions with Package Bidding," FCC, SIEPR and NSF Conference on Combinatorial Auctions, Wye River, MD, October 2001.

"The Electricité de France Generation Capacity Auctions," CORE-ECARES-LEA Workshop on Auctions, Brussels, Belgium, November 2001.

"Informal Bankruptcy," Utah Winter Finance Conference, Salt Lake City, February 2002.

"Defictionalizing the Walrasian Auctioneer," Conference on Market Design in Honor of Robert Wilson, Stanford, CA, May 2002.

"Adverse Selection in the Credit Card Market," Conference on the Economics of Payment Networks, Toulouse, France, June 2002.

"Ascending Auctions with Package Bidding," Econometric Society Summer Meetings, Los Angeles, June 2002.

"An Efficient Dynamic Auction for Heterogeneous Commodities," Conference in Honor of Mordecai Kurz, Stanford, CA, August 2002.

"Adverse Selection in the Credit Card Market," Conference on Credit, Trust and Calculation, San Diego, November 2002.

"Package Bidding for Spectrum Auctions," American Economic Association Meetings, Washington, DC, January 2003.

"Auctioning Many Divisible Goods," invited session, European Economic Association Annual Congress, Stockholm, August 2003.

"Spectrum Auctions with Package Bidding," TPRC Research Conference on Communication, Information and Internet Policy, Arlington, VA, September 2003.

"Defictionalizing the Walrasian Auctioneer," invited lecture, Conference on Auctions and Market Design: Theory, Evidence and Applications, Fondazione Eni Enrico Mattei, Milan, September 2003.

"Clock Auctions, Proxy Auctions, and Possible Hybrids," Workshop on Auction Theory and Practice, Pittsburgh, PA, November 2003.

"Clock Auctions, Proxy Auctions, and Possible Hybrids," FCC Combinatorial Bidding Conference, Wye River, MD, November 2003.

"Time Inconsistency in the Credit Card Market," Utah Winter Finance Conference, Salt Lake City, February 2004.

"The Clock-Proxy Auction: A Practical Combinatorial Auction Design," Conference on Auctions and Market Design: Theory, Evidence and Applications, Consip, Rome, Italy, September 2004.

"Bidder Participation and Information in Currency Auctions," Conference on Auctions and Market Design: Theory, Evidence and Applications, Consip, Rome, Italy, September 2004.

"The Clock-Proxy Auction: A Practical Combinatorial Auction Design," Market Design Conference, Stanford University, December 2004.

"Dynamic Matching Mechanisms," Econometric Society World Congress, London, August 2005.

"The Clock-Proxy Auction, with Recent Applications," SISL Workshop, Caltech, October 2005.

"Dynamic Matching Mechanisms," Conference on Matching and Two-Sided Markets, University of Bonn, May 2006.

"The Hungarian Auction," DIMACS Workshop on Auctions with Transaction Costs, Rutgers University, March 2007.

"The Hungarian Auction," PSE Lecture at the Paris School of Economics, June 2007.

“Time Inconsistency in the Credit Card Market,” John M. Olin Conference on Law and Economics of Consumer Credit, University of Virginia, February 2008.

“The Hungarian Auction,” 6th Annual International Industrial Organization Conference, Arlington, VA, May 2008.

“The Hungarian Auction,” Frontiers of Microeconomic Theory and Policy, Symposium in Honour of Ray Rees, University of Munich, July 2008.

“Common-Value Auctions with Liquidity Needs: An Experimental Test of a Troubled Assets Reverse Auction,” 2009 CAPCP Conference on Auctions and Procurement, Penn State University, March 2009.

“Market Design for Troubled Assets,” NBER Workshop on Market Design, Cambridge, MA, May 2009.

“Market Design for Troubled Assets,” Madrid Summer Workshop on Economic Theory, Universidad Carlos III de Madrid, June 2009.

“Virtual Power Plant Auctions,” (with Peter Cramton), Workshop: Designing Electricity Auctions, Research Institute of Industrial Economics, Stockholm, Sweden, September 2009.

“Using Forward Markets to Improve Electricity Market Design,” (with Peter Cramton), Workshop: Designing Electricity Auctions, Research Institute of Industrial Economics, Stockholm, Sweden, September 2009.

“Virtual Power Plant Auctions,” (with Peter Cramton), Market Design 2009 Conference, Stockholm, Sweden, September 2009.

“Using Forward Markets to Improve Electricity Market Design,” (with Peter Cramton), Market Design 2009 Conference, Stockholm, Sweden, September 2009.

“Auctions with Multiple Objects,” 2009 Erwin Plein Nemmers Prize in Economics, Conference in Honor of Paul Milgrom, Northwestern University, November 2009.

“Penalty Interest Rates, Universal Default, and the Common Pool Problem of Credit Card Debt” (with Oleg V. Baranov and Amanda E. Dawsey), Credit, Default and Bankruptcy Conference, University of California - Santa Barbara, June 2010.

“Core-Selecting Auctions with Incomplete Information” (with Oleg V. Baranov), World Congress of the Econometric Society, Shanghai, China, August 2010.

“Core-Selecting Auctions with Incomplete Information” (with Oleg V. Baranov), NBER Workshop on Market Design, Cambridge, MA, October 2010.

“Core-Selecting Auctions with Incomplete Information” (with Oleg V. Baranov), NSF/CEME Decentralization Conference, Ohio State University, April 2011

"Penalty Interest Rates, Universal Default, and the Common Pool Problem of Credit Card Debt" (with Oleg V. Baranov and Amanda E. Dawsey), Centre for Financial Analysis & Policy Conference on Consumer Credit and Bankruptcy, University of Cambridge, UK, April 2011.

"Core-Selecting Auctions with Incomplete Information" (with Oleg V. Baranov), Center for the Study of Auctions, Procurements and Competition Policy Conference, Penn State University, April 2011.

"Design Issues for Combinatorial Clock Auctions" (with Oleg V. Baranov), Annual Meeting of the Institute for Operations Research and the Management Sciences (INFORMS), Phoenix AZ, October 2012.

"An Enhanced Combinatorial Clock Auction" (with Oleg V. Baranov), SIEPR Conference on the FCC Incentive Auctions, Stanford University, February 2013.

"Enhancing the Combinatorial Clock Auction" (with Oleg V. Baranov), Ofcom Conference, Combinatorial Auctions for Spectrum, London School of Economics, September 2013.

"The Combinatorial Clock Auction, Revealed Preference and Iterative Pricing" (with Oleg V. Baranov), NBER Workshop on Market Design, Stanford University, October 2013.

"Market Design and the Evolution of the Combinatorial Clock Auction" (with Oleg V. Baranov), invited session in honor of the Nobel Prize in Economics awarded to Market Design, American Economic Association meetings, Philadelphia, January 2014.

"Revealed Preference in Bidding: Empirical Evidence from Recent Spectrum Auctions" (with Oleg V. Baranov), NBER Market Design Conference, Palo Alto, CA, June 2014.

"Enhancing the Combinatorial Clock Auction" (with Oleg V. Baranov), Industry Canada Retrospective on the Canadian 700 MHz Spectrum Auction, Ottawa, Canada, November 2014.

"Efficient Procurement Auctions with Increasing Returns" (with Oleg V. Baranov, Christina Aperjis and Thayer Morrill), Annual Meeting of the Institute for Operations Research and the Management Sciences (INFORMS), Philadelphia PA, November 2015.

"Efficient Procurement Auctions with Increasing Returns" (with Oleg V. Baranov, Christina Aperjis and Thayer Morrill), Workshop on Auction Design, University of Vienna, August 2016.

"Vickrey-Based Pricing in Iterative First-Price Auctions" (with Oleg V. Baranov), Workshop on Auction Design, University of Vienna, August 2016.

"Efficient Procurement Auctions with Increasing Returns" (with Oleg V. Baranov, Christina Aperjis and Thayer Morrill), NBER Market Design Conference, Palo Alto, CA, October 2016.

"Market Design and the FCC Incentive Auction" (with Christina Aperjis and Oleg V. Baranov), Tenth Bi-Annual Conference on Economic Design,, York, UK, June 2017.

"Market Design and the FCC Incentive Auction" (with Christina Aperjis and Oleg V. Baranov), NBER Market Design Conference, Cambridge, MA, October 2017.

"Market Design and the FCC Incentive Auction" (with Christina Aperjis and Oleg V. Baranov), New Perspectives on Spectrum Policy Workshop, U Penn Law School, April 2018.

"Revealed Preference and Activity Rules in Auctions" (with Oleg V. Baranov), keynote talk, York Annual Symposium on Game Theory 2018, York, UK, June 2018.

"Market Design and the FCC Incentive Auction" (with Christina Aperjis and Oleg V. Baranov), INFORMS Workshop on Mathematical Optimization in Market Design, Ithaca, NY, June 2018.

"Market Design and the FCC Incentive Auction" (with Christina Aperjis and Oleg V. Baranov), European Economic Association Annual Congress, Cologne, August 2018.

"Revealed Preference and Activity Rules in Auctions" (with Oleg Baranov), Society of Economic Design, Budapest, June 2019.

"VCG, the Core, and Assignment Stages in Auctions" (with Oleg Baranov), Society of Economic Design, Budapest, June 2019.

"Supply Reduction in the Broadcast Incentive Auction," (with Christina Aperjis and Oleg Baranov), NBER Market Design Conference, Cambridge, MA, October 2019.

"Supply Reduction in the Broadcast Incentive Auction," (with Christina Aperjis and Oleg Baranov), Econometric Society World Congress, Virtual Milan, August 2020.

"Supply Reduction in the Broadcast Incentive Auction," (with Christina Aperjis and Oleg Baranov), INFORMS Annual Meeting, Virtual Washington DC, November 2020.

Professional Service

Mentored the National Winner of the 2017-18 Siemens Competition in Math, Science and Technology (Andrew Komo of Bethesda, MD).

Member of working group for the design and implementation of the broadcast incentive auction for the US Federal Communications Commission, 2011–2017.

Bureau of Ocean Energy Management, US Department of Interior, for the design and implementation of offshore wind energy auctions, 2012–present.

Advisor to Innovation, Science and Economic Development Canada for the design and implementation of 600 MHz, 700 MHz and 2.5 GHz spectrum auctions, 2011 – present.

Advisor to the Australian Communications and Media Authority for the design and implementation of the Australian Digital Dividend Auction and future spectrum auctions, 2011 – present.

Congressional Briefing on "How Fundamental Economic Research Improves People's Lives," Rayburn House Office Building, March 2010.

Testified before the Committee on Banking, Housing and Urban Affairs of the US Senate, Hearing on "Modernizing Consumer Protection in the Financial Regulatory System: Strengthening Credit Card Protections," February 12, 2009.

Testified before the Subcommittee on Financial Institutions and Consumer Credit of the US House of Representatives, Hearing on "The Credit Cardholders' Bill of Rights: Providing New Protections for Consumers," March 13, 2008.

Member, National Science Foundation Economics Panel, 2004 – 2005.

Associate Editor, *Berkeley Electronic Journals of Theoretical Economics,* 2004 – present.

Guest Associate Editor, *Management Science*, issue on Electronic Auctions, 2003.

Program Chair of the 2001 North American Summer Meeting of the Econometric Society (with Peter Cramton), University of Maryland, June 21–24, 2001.

Program Committee of the North American Summer Meeting of the Econometric Society, UCLA, June 2002, and University of Pennsylvania, June 1991.

Organized Maryland Auction Conference (with Peter Cramton), Wye River Conference Center, May 1998, sponsored by the National Science Foundation, the World Bank, and the University of Maryland.

Spoke at a Forum on Bankruptcy of the Financial Services Committee of the United States House of Representatives, February 28, 2001.

Testified before the Subcommittee on Commercial and Administrative Law of the United States House of Representatives, Hearing on the Consumer Bankruptcy Issues in the Bankruptcy Reform Act of 1998, March 10, 1998.

Testified before the Subcommittee on Financial Institutions and Regulatory Relief of the United States Senate, Hearing on Bankruptcy Reform, February 11, 1998.

Testified before the National Bankruptcy Review Commission, January 1997.

Referee for: *American Economic Review*, *Econometrica*, *European Economic Review*, *Games and Economic Behavior, International Journal of Game Theory*, *International Journal of Industrial Organization*, *Journal of Banking and Finance*, *Journal of Business*, *Journal of Economic Theory, Journal of Financial Intermediation*, *Journal of Political Economy*, *Quarterly Journal of Economics*, *Rand Journal of Economics*, *Review of Economic Studies*, and the National Science Foundation.

Professional Organizations

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Attachment E

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