New England Winter Gas-Electric Forum

Opening Presentation: Winters 2023/2024 and 2024/2025 in New England and the Role of Everett

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Key Takeaways

• ISO’s deterministic winter scenario analysis shows limited exposure to energy shortfalls over the next two winters

• Factors significantly influencing the region’s energy shortfall risk profile over the next two winters include ISO’s expectations for:
  – Continued acceleration of behind-the-meter PV growth
  – Growth of operational offshore wind
  – Some limited growth of load/energy demand
  – Incremental stored fuel in 2023/2024 and 2024/2025 as a result of the Inventoried Energy Program

• Winter energy concerns are highest in scenarios when stored fuels are rapidly depleted; during these periods timely replenishment is critical to minimizing the potential for energy shortfalls
  – ISO’s 21-day energy forecast is intended to identify these types of scenarios

• ISO’s winter scenario analysis provides no clear quantitative evidence of the need to retain Everett for electric system reliability, though several qualitative factors warrant consideration in an evaluation of Everett’s impact in the region
NEW ENGLAND’S RESOURCE MIX AND DEMAND PROFILE IS EVOLVING

Behind-the-meter (BTM) solar photovoltaic (PV) resources are significantly impacting demand-side profiles while the region’s generation fleet continues to evolve toward higher penetrations of renewable resources, but LNG and fuel-oil remain critical sources of energy for the region.
Over a Typical Winter Season, 700 MW of Solar PV Capacity* Provides the Energy Equivalent to ~7-10 M Gallons of Fuel-Oil or ~1.0-1.5 Bcf of Natural Gas

Cumulative Growth in Solar PV through 2032 (MW)

*Solar PV Capacity Is Expected To Increase ~700 MW Per Year Through 2032

Note: The bar chart reflects the ISO’s projections for nameplate capacity from PV resources participating in the region’s wholesale electricity markets, as well as those connected “behind the meter.” The forecast does not include forward-looking PV projects > 5 MW in nameplate capacity. Source: ISO New England 2023-2032 Forecast Report of Capacity, Energy, Loads, and Transmission (2023 CELT Report) (May 2023); MW values are AC nameplate. State specific details are available in the final report.
Energy from BTM PV Is Expected to Reduce Regional Energy Usage by 4.4 GWh in 2023

Projected annual energy use in New England, 2023–2032

GROSS LOAD
Projected total annual energy use in New England

SOLAR REDUCTION
Gross load minus existing and anticipated behind-the-meter (BTM) solar resources

NET LOAD
Gross load minus existing and anticipated BTM solar and energy efficiency

By 2032, BTM solar and energy efficiency are expected to reduce annual grid demand by a combined total of more than 20,000 GWh.
The Region Continues to Produce Most of its Energy with Natural Gas

Percent of Total Electric Energy Production by Fuel Type (2000 vs. 2022)

Source: ISO New England Net Energy and Peak Load by Source; data for 2022 is preliminary and subject to resettlement.
Renewables include landfill gas, biomass, other biomass gas, wind, grid-scale solar, municipal solid waste, and miscellaneous fuels.
This data represents electric generation within New England; it does not include imports or behind-the-meter (BTM) resources, such as BTM solar.
LNG and Fuel-Oil Remain Critical to Meeting New England’s Energy Needs During Cold Weather

- LNG injections from facilities in the east help counter pipeline constraints; over the past ten winters (Dec-Feb), the region has averaged ~28.5 Bcf of LNG usage
- The region has significant fuel-oil fired generating capability (~12,500 MW) with vast amounts of storage capacity (~240M gallons), but most storage (~70%) is at older, infrequently operated units
- Timely replenishment of LNG and fuel-oil supplies is critical in advance of and during cold weather
NEW ENGLAND WINTER OUTLOOK
2023/2024

Deterministic scenario analysis of Winter 2023/2024 quantifies ISO’s operational expectations during moderate and severe conditions
Expectations and Preparations for the Next Two Winters

• Cost-of-service for Mystic 8&9 runs through Winter 2023/2024

• Inventoried Energy Program (IEP) runs for two winters, starting with Winter 2023/2024
  – ISO anticipates incremental fuel of ~3 Bcf LNG and ~10M gallons of fuel-oil from IEP*

• For Winter 2023/2024, ISO anticipates an additional ~500MW of dual-fuel generating capability following completion of recent commissioning efforts

• ISO will continue its robust communication protocol with stakeholders, states, and federal agencies in advance of the winter seasons

• ISO’s 21-day energy forecast will signal any potential energy emergencies, thereby alerting the market to procure necessary fuel replenishments, both to meet their obligation and to protect against scarcity

*This estimate is on the lower end of expected incremental fuel
Significant Fuel-Oil Replenishment Occurred Prior to Last Winter

*Aggregate Fuel-Oil Inventories Are Close To Pre-Winter 2022/2023 Levels*
## 2023/2024 Winter Scenario Analysis

### Scenario Descriptions & Results

<table>
<thead>
<tr>
<th>Scenario:</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed Weather Conditions</td>
<td>Milder than normal; two-week span of significantly below normal temps</td>
<td>Colder than normal; six cold snaps of four or more days; one stretch of ten consecutive days below freezing</td>
</tr>
<tr>
<td>Peak Load Modeled</td>
<td>19,600 MW</td>
<td>20,300 MW</td>
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<td>Total Winter Energy Demand Modeled</td>
<td>29,200 GWh</td>
<td>31,100 GWh</td>
</tr>
<tr>
<td>Results:</td>
<td>Sufficient capacity and energy to meet peak loads and energy demands</td>
<td>Capacity deficiency actions across a few days; energy shortfall unlikely</td>
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### Assumptions

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<td>Imports</td>
<td>Vary between 3000 - 4000 MW/hr when ≥ 20°F; 1500 MW/hr when &lt; 20°F</td>
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<td>Incremental Contributions from IEP</td>
<td>Incremental additions of 3 Bcf of LNG and 10M gallons of fuel-oil</td>
</tr>
<tr>
<td>Behind-the-Meter PV Capacity</td>
<td>6400 MW nameplate</td>
</tr>
<tr>
<td></td>
<td>No significant or long-duration generator or transmission contingencies</td>
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NEW ENGLAND WINTER OUTLOOK
2024/2025

Deterministic scenario analysis of Winter 2024/2025 quantifies ISO’s operational expectations during moderate and severe conditions with and without the Everett LNG facility
# 2024/2025 Winter Scenario Analysis

## Scenario Descriptions

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<td>Total Winter Energy Demand Modeled</td>
<td>29,500 GWh</td>
<td>31,500 GWh</td>
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## Results:

**Scenario: Moderate**
- No energy shortfall in cases with Everett; in cases without Everett, energy shortfall is fully mitigated with increased fuel-oil inventory.

**Scenario: Severe**
- No energy shortfall in cases with Everett; in cases without Everett, energy shortfall is mostly mitigated with increased fuel-oil inventory.

## Scenario Assumptions

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<td>Behind-the-Meter PV Capacity</td>
<td>7280 MW nameplate</td>
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<tr>
<td>Maximum LNG Injection Capability</td>
<td>0.8 Bcf/day with Everett, 1.2 Bcf/day without Everett</td>
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Without Everett in Moderate Winter, Energy Shortfall is Fully Mitigated with Increased Fuel-Oil Inventory

- With Everett, no energy shortfall occurs in moderate winter cases
- Without Everett, assuming lower fuel-oil inventory of ~100M gallons, energy shortfall ranges from ~10,000 to ~20,000 MWh distributed over 4 days
Without Everett in Severe Winter, Energy Shortfall is Mostly Mitigated with Increased Fuel-Oil Inventory

• With Everett, no energy shortfall occurs in severe winter cases
• Without Everett, assuming lower fuel-oil inventory of ~100M gallons, energy shortfall ranges from ~30,000 to ~67,000 MWh distributed over 9-13 days
  – Regional energy demand on a cold winter day is ~400,000 MWh; estimated energy shortfall is ~0.6-1.8% of daily energy across the 9-13 days
Considerations Related to the Everett Marine Terminal

• ISO does not have the expertise to assess the impacts of Everett’s retirement on the operational capability of the regional natural gas pipeline system
  – ISO is relying on the gas pipeline operators and local distribution companies (LDCs) to identify any gas system operational concerns

• More generally, ISO has broadly shared its concerns about the retirement of existing infrastructure (including Everett) before new infrastructure is in-service

• ISO continues to believe that the region would be prudent to retain its limited gas infrastructure in the mid-term, especially given:
  – The region’s continued reliance on a constrained natural gas system in the winter coupled with a limited number of LNG import facilities
  – A rapidly evolving resource mix, including the potential for retirements of resources with significant stored fuel capacity
  – Expectation for significant winter load growth due to electrification