



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

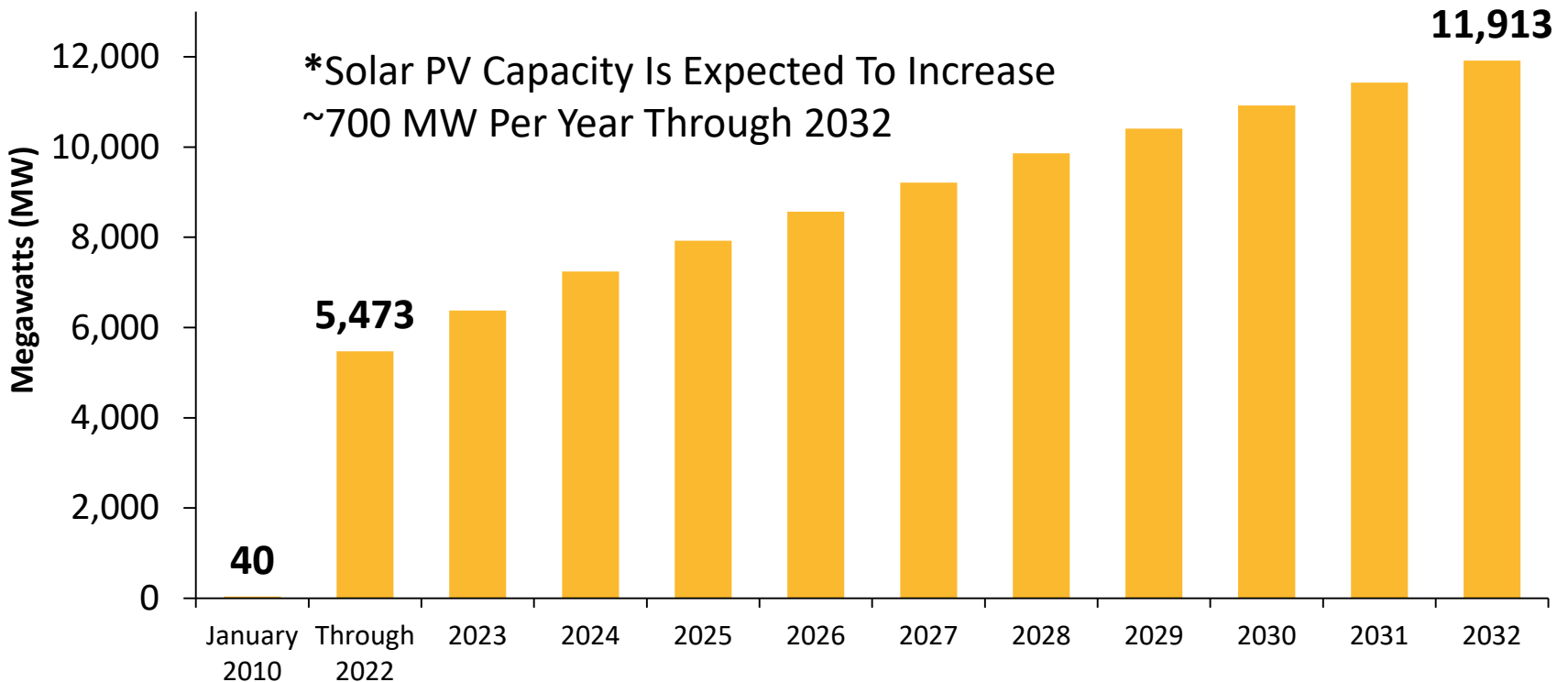
- ISO's deterministic winter scenario analysis shows limited exposure to energy shortfalls over the next two winters
- Factors significantly influencing the region's energy shortfall risk profile over the next two winters include ISO's expectations for:
 - Continued acceleration of behind-the-meter PV 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)

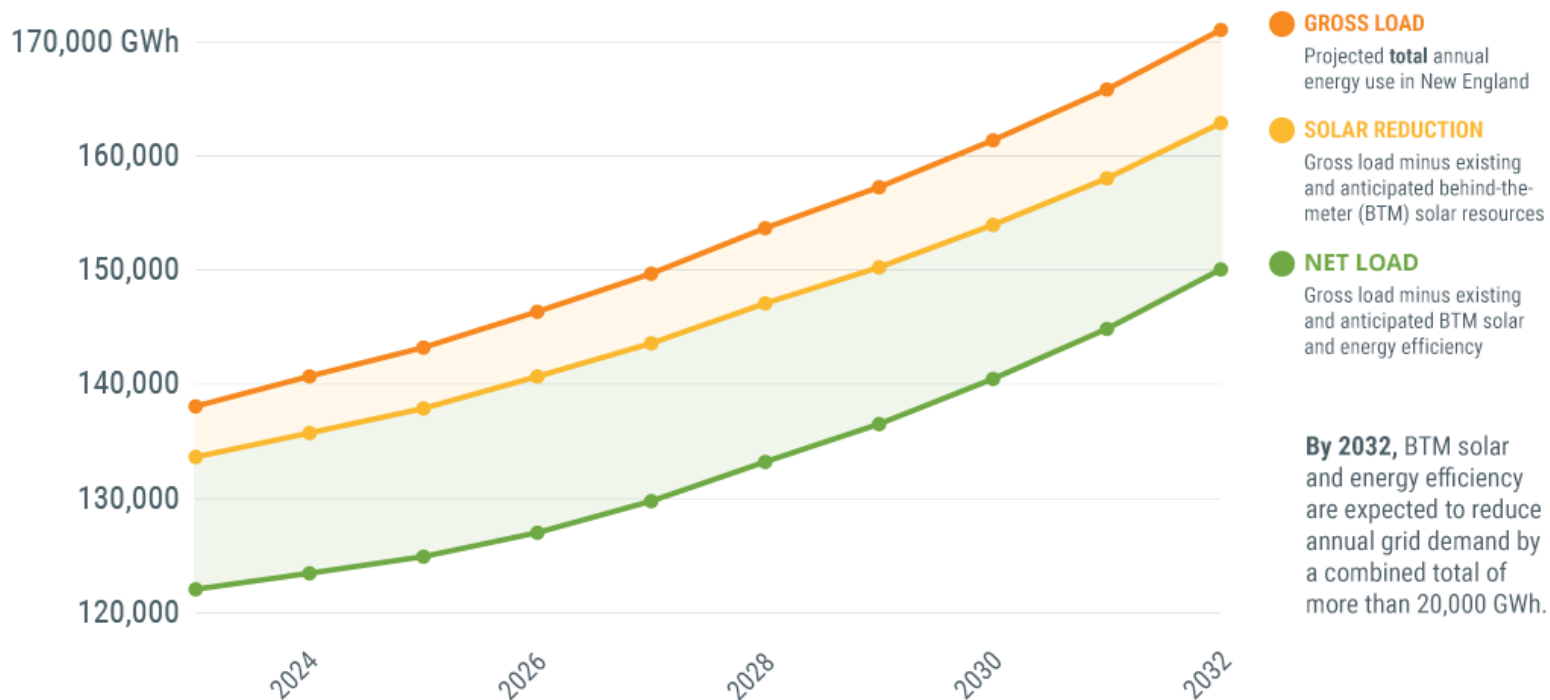


Note: The bar chart reflects the ISO's projections for nameplate capacity from PV resources participating in the region's wholesale electricity markets, as well as those connected "behind the meter." The forecast does not include forward-looking PV projects > 5 MW in nameplate capacity. Source: [ISO 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.



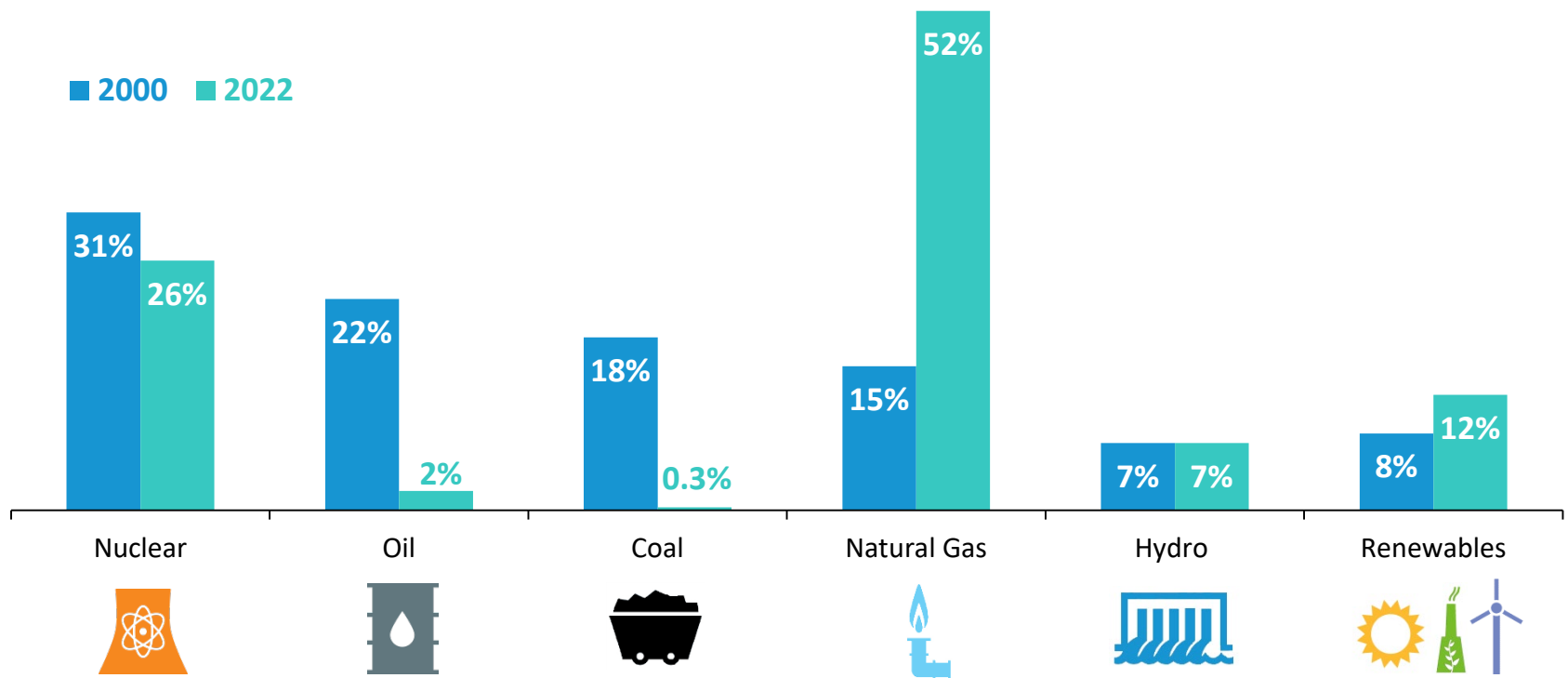
Energy from BTM PV Is Expected to Reduce Regional Energy Usage by 4.4 GWh in 2023

Projected annual energy use in New England, 2023–2032



The Region Continues to Produce Most of its Energy with Natural Gas

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

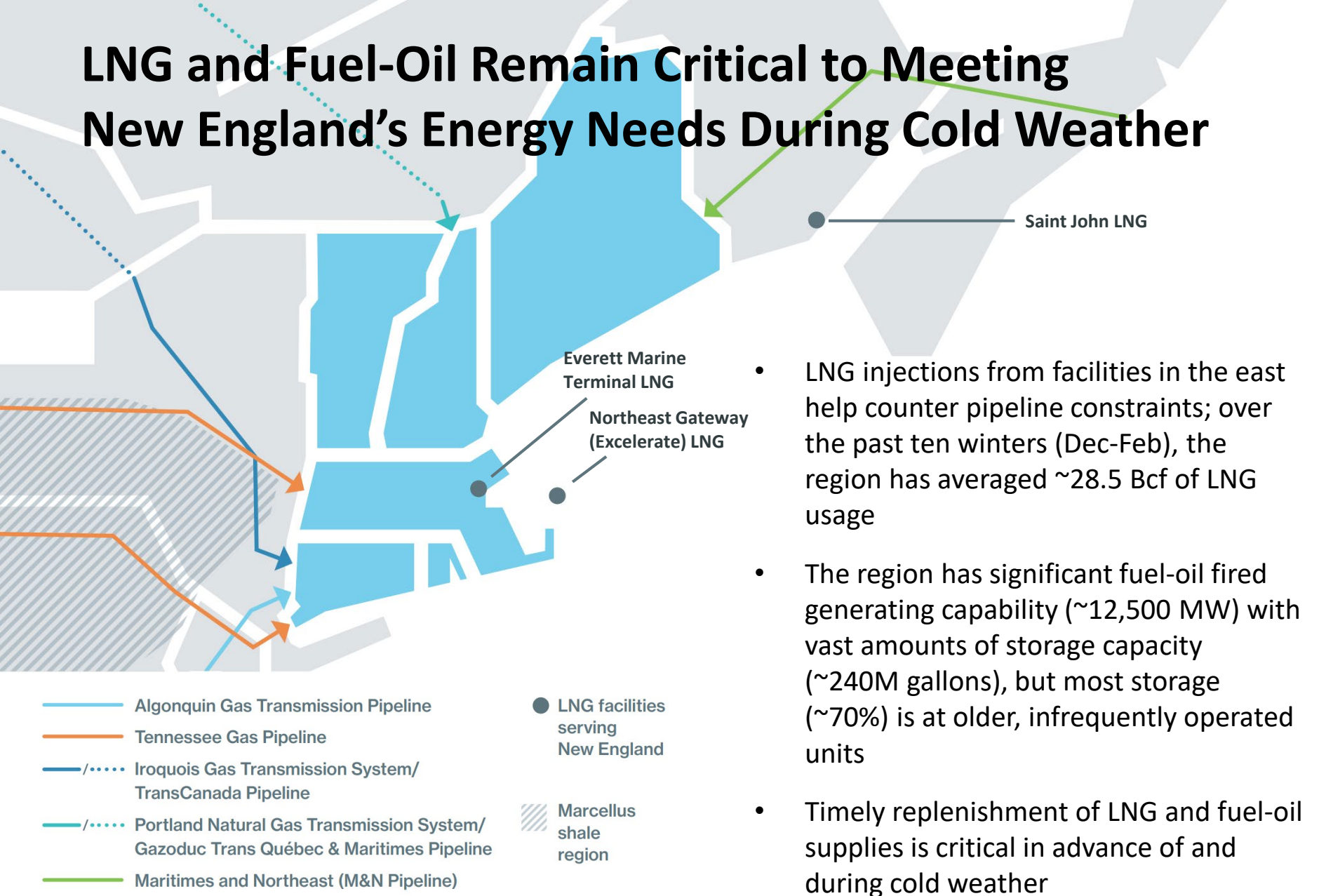


Source: ISO New England [Net Energy and Peak Load by Source](#); data for 2022 is preliminary and subject to resettlement

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



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

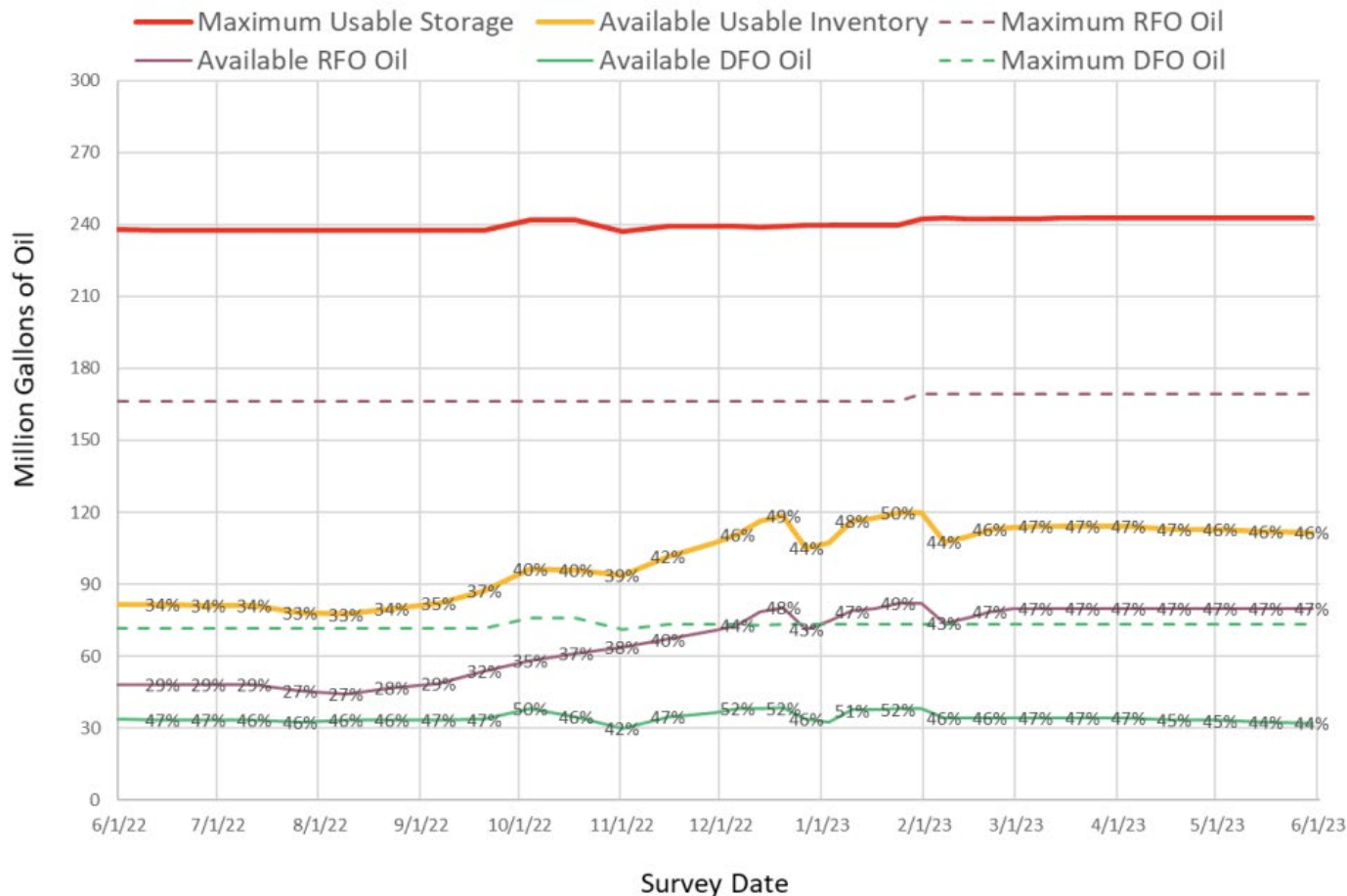
*This estimate is on the lower end of expected incremental fuel



Significant Fuel-Oil Replenishment Occurred Prior to Last Winter

Aggregate Fuel-Oil Inventories Are Close To Pre-Winter 2022/2023 Levels

Percentages indicate % of Maximum Usable Storage



ISO Public

Source: ISO New England



2023/2024 Winter Scenario Analysis

Scenario Descriptions & Results

Scenario:	Moderate	Severe
Similar Winter	Winter 2017/2018	Winter 2013/2014
Observed Weather Conditions	Milder than normal; two-week span of significantly below normal temps	Colder than normal; six cold snaps of four or more days; one stretch of ten consecutive days below freezing
Peak Load Modeled	19,600 MW	20,300 MW
Total Winter Energy Demand Modeled	29,200 GWh	31,100 GWh
Results:	Sufficient capacity and energy to meet peak loads and energy demands	Capacity deficiency actions across a few days; energy shortfall unlikely

Assumptions

Imports	Vary between 3000 - 4000 MW/hr when $\geq 20^{\circ}\text{F}$; 1500 MW/hr when $< 20^{\circ}\text{F}$
Incremental Contributions from IEP	Incremental additions of 3 Bcf of LNG and 10M gallons of fuel-oil
Behind-the-Meter PV Capacity	6400 MW nameplate
No significant or long-duration generator or transmission contingencies	

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

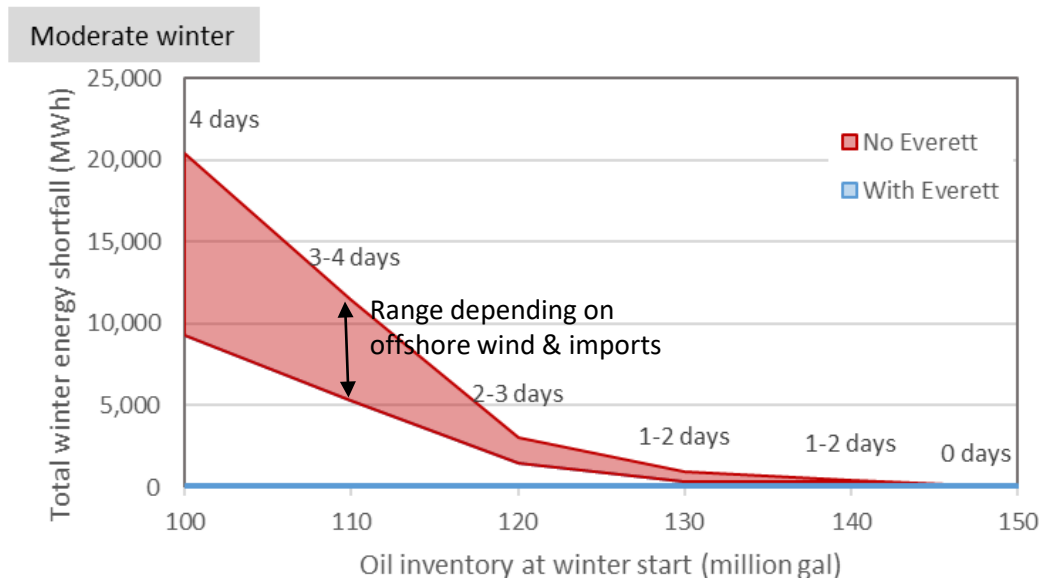
Scenario:	Moderate	Severe
Similar Winter	Winter 2017/2018	Winter 2013/2014
Observed Weather Conditions	Milder than normal; two-week span of significantly below normal temps	Colder than normal; six cold snaps of four or more days; one stretch of ten consecutive days below freezing
Peak Load Modeled	19,900 MW	20,600 MW
Total Winter Energy Demand Modeled	29,500 GWh	31,500 GWh
Results:	No energy shortfall in cases with Everett; in cases without Everett, energy shortfall is fully mitigated with increased fuel-oil inventory	No energy shortfall in cases with Everett; in cases without Everett, energy shortfall is mostly mitigated with increased fuel-oil inventory

Scenario Assumptions

Imports	Vary between 3000 - 4000 MW/hr when $\geq 20^{\circ}\text{F}$; 1500 MW/hr when $< 20^{\circ}\text{F}$
Incremental Contributions from IEP	Incremental additions of 3 Bcf of LNG and 10M gallons of fuel-oil
Behind-the-Meter PV Capacity	7280 MW nameplate
Maximum LNG Injection Capability	0.8 Bcf/day with Everett, 1.2 Bcf/day without Everett
No significant or long-duration generator or transmission contingencies	

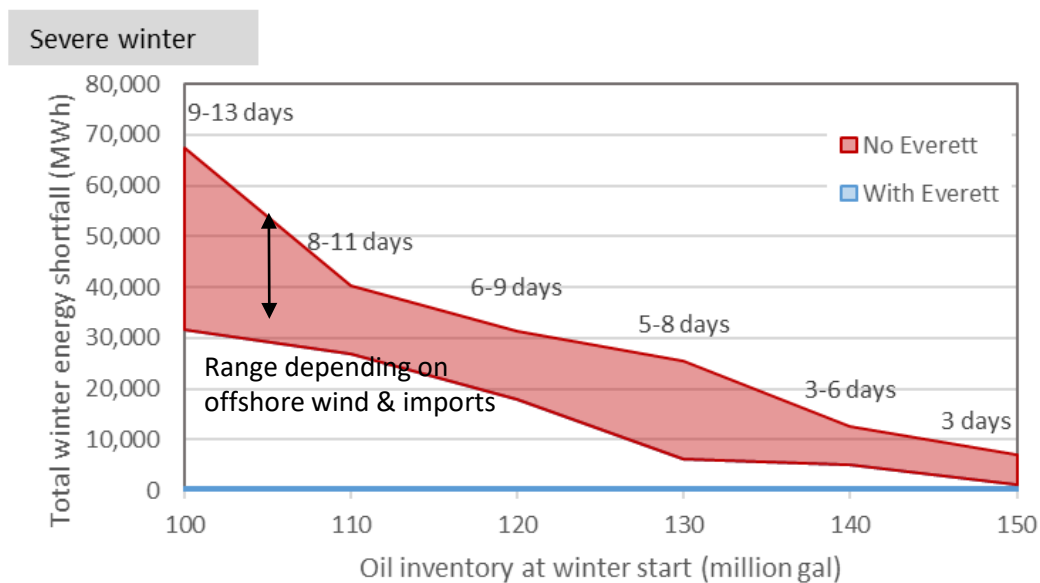
Without Everett in Moderate Winter, Energy Shortfall is Fully Mitigated with Increased Fuel-Oil Inventory

- 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