



Transformation of the New England Electric Grid and Impacts on Energy Affordability and Reliability

The Energy Council of Rhode Island

Energy Reliability and Affordability in New England Forum

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ISO New England (ISO) Has Two Decades of Experience Overseeing the Region's Restructured Electric Power System

- **Regulated** by the Federal Energy Regulatory Commission
- **Reliability Coordinator** for New England under the North American Electric Reliability Corporation
- **Independent** of companies in the marketplace and **neutral** on technology



ISO New England Performs Three Critical Roles to Ensure Reliable Electricity at Competitive Prices

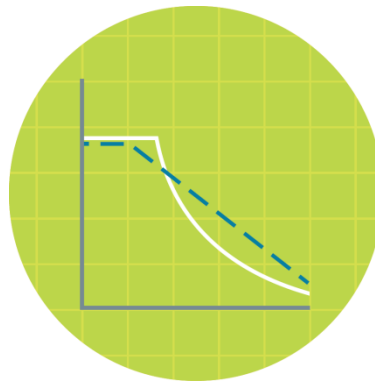
Grid Operation

Coordinate and direct the flow of electricity over the region's high-voltage transmission system



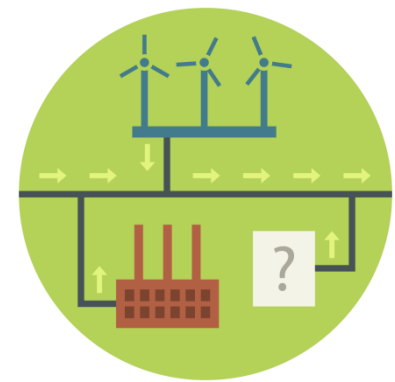
Market Administration

Design, run, and oversee the markets where wholesale electricity is bought and sold



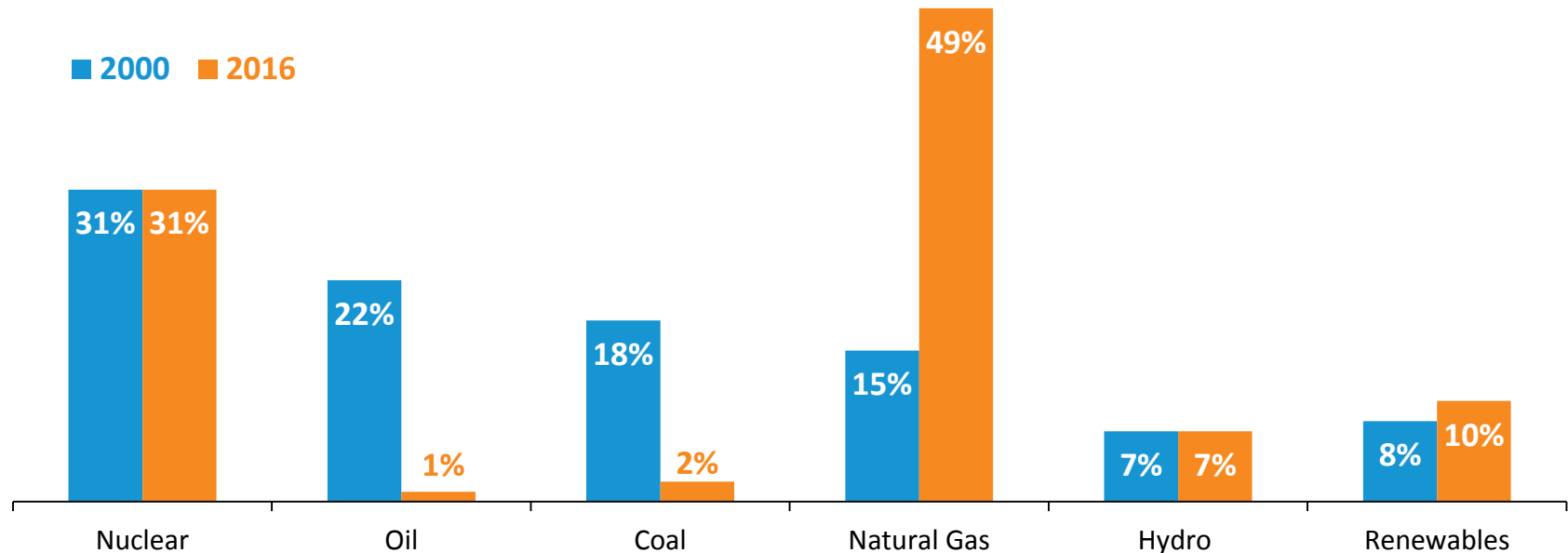
Power System Planning

Study, analyze, and plan to make sure New England's electricity needs will be met over the next 10 years



New England Has Seen Dramatic Changes in the Energy Mix: *From Coal and Oil to Natural Gas*

Percent of Total **Electric Energy** Production by Fuel Type
(2000 vs. 2016)

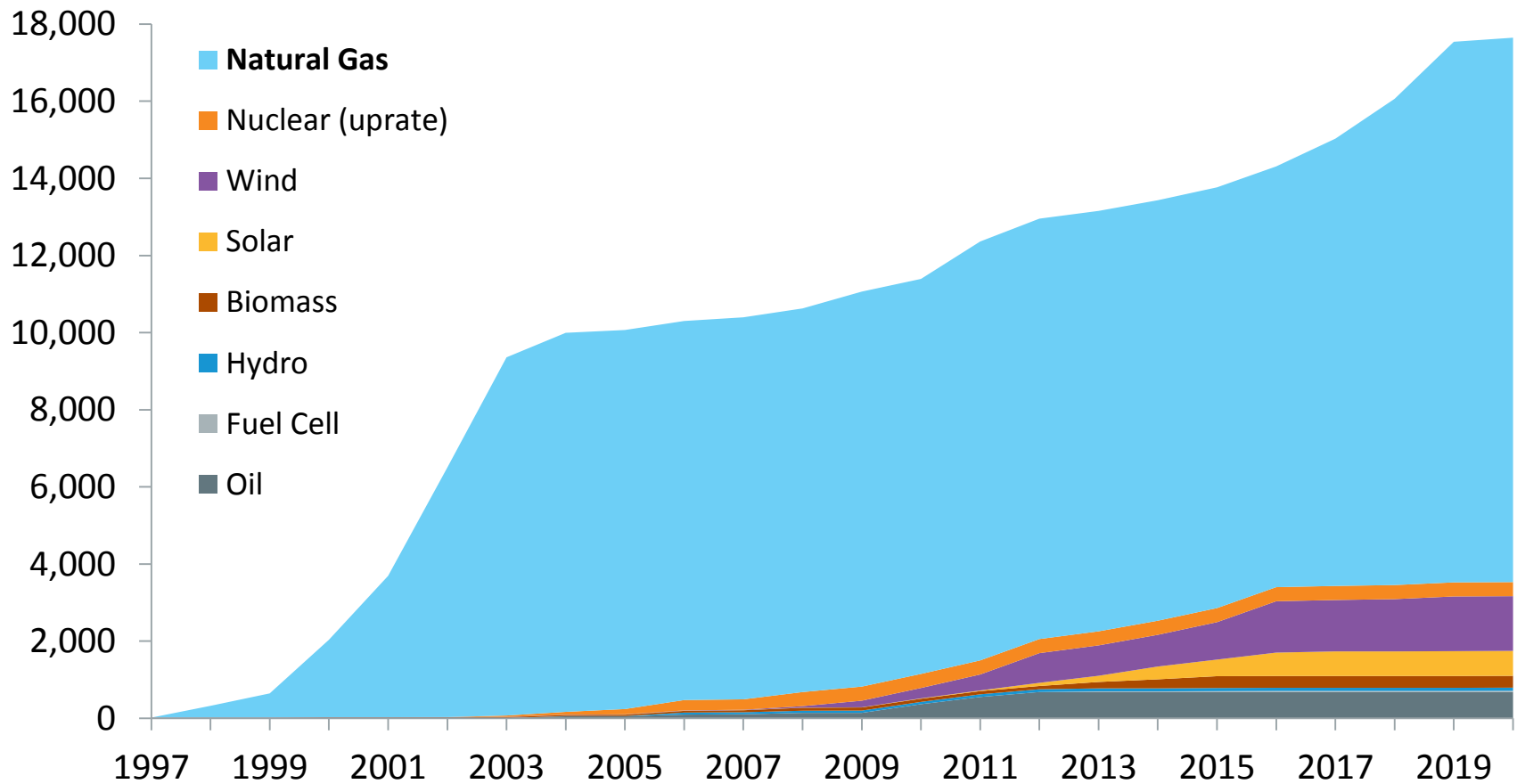


Source: ISO New England [Net Energy and Peak Load by Source](#)

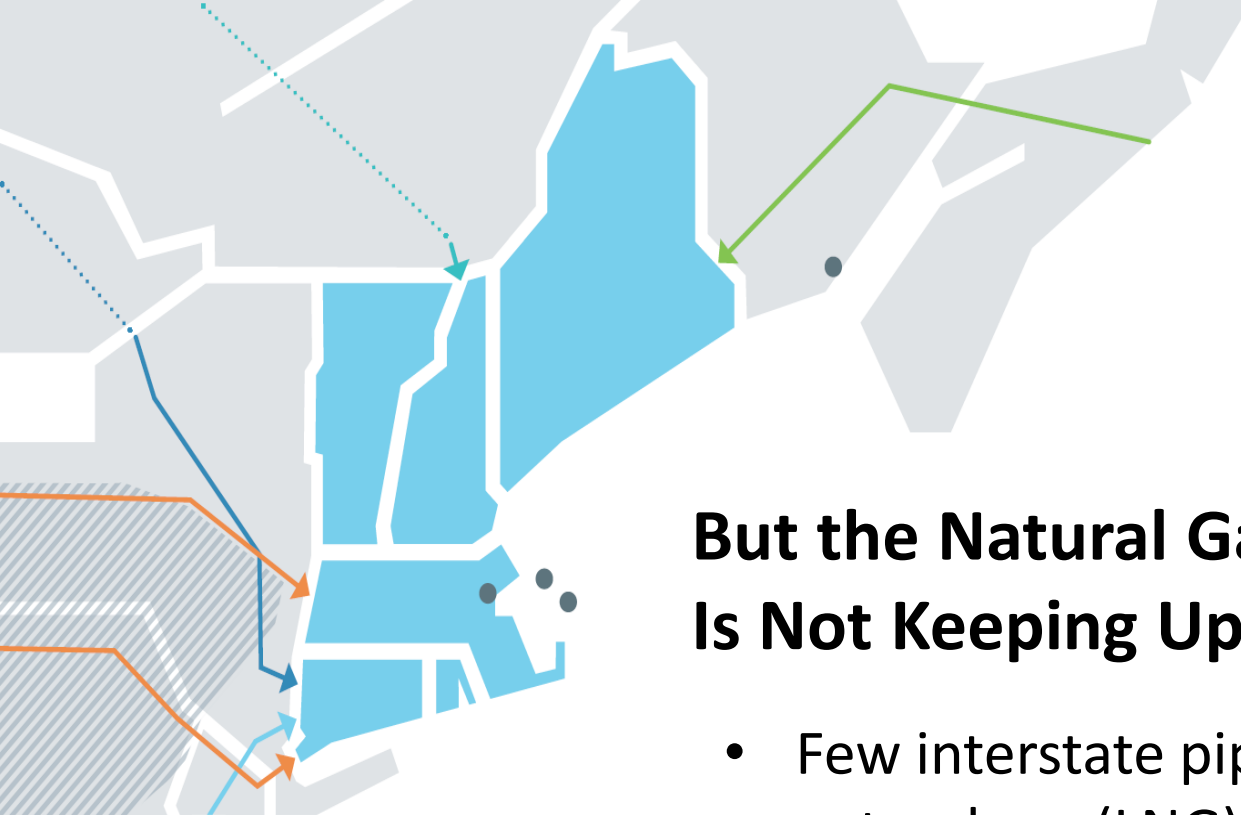
Renewables include landfill gas, biomass, other biomass gas, wind, solar, municipal solid waste, and miscellaneous fuels

Natural Gas Has Been the Dominant Fuel Source for New Generating Capacity in New England

Cumulative New Generating Capacity in New England (MW)



Note: New generating capacity for years 2017 – 2020 includes resources clearing in recent Forward Capacity Auctions.



Source: ISO New England

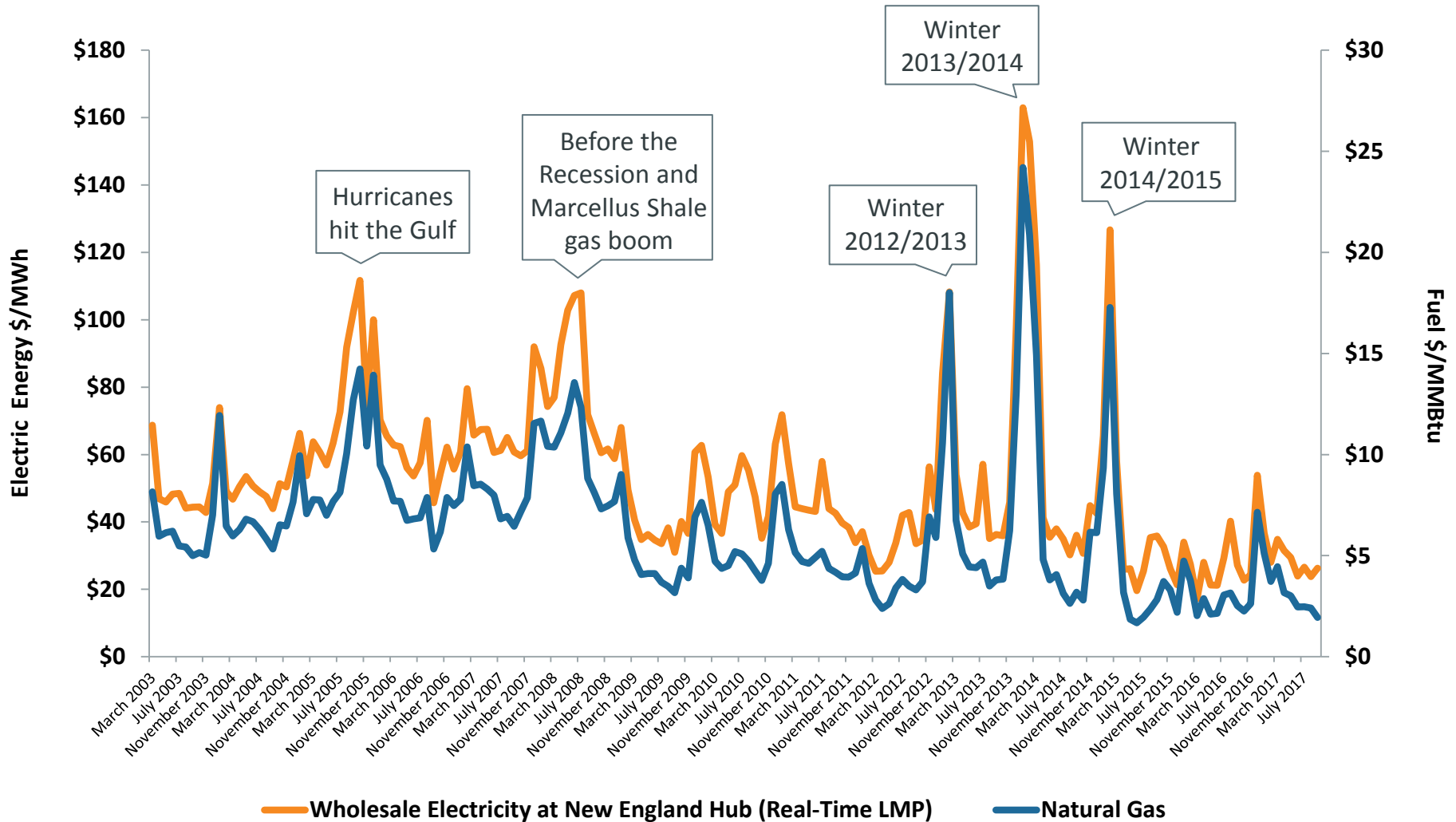
But the Natural Gas Delivery System Is Not Keeping Up with Demand

- Few interstate pipelines and liquefied natural gas (LNG) delivery points
- Regional pipelines are:
 - Built to serve heating demand, not power generation
 - Running at or near maximum capacity during winter



Natural Gas and Wholesale Electricity Prices Are Linked

Monthly average natural gas and wholesale electricity prices at the New England hub



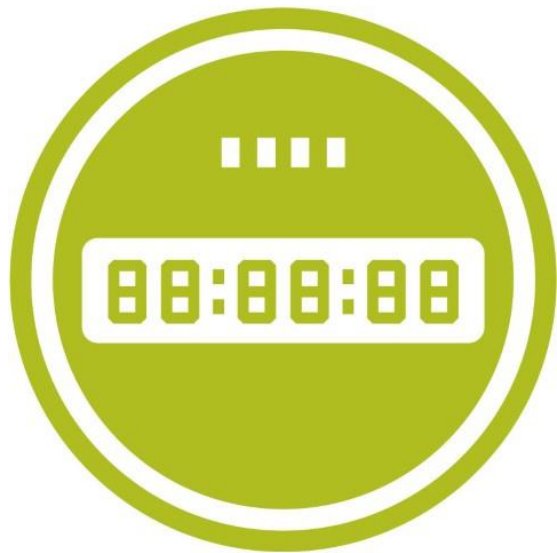
The Region Has Lost—and *Is at Risk of Losing*—Substantial Non-Gas Resources

Major Generator Retirements:

- **Salem Harbor Station (749 MW)**
 - 4 units (coal & oil)
- **Norwalk Harbor Station (342 MW)**
 - 3 units (oil)
- **Mount Tom Station (143 MW)**
 - 1 unit (coal)
- **Vermont Yankee Station (604 MW)**
 - 1 unit (nuclear)
- **Brayton Point Station (1,535 MW)**
 - 4 units (coal & oil)
- **Pilgrim Nuclear Power Station (677 MW)**
 - 1 unit (nuclear)
- **Bridgeport Harbor Station (564 MW)**
 - 2 units (coal & oil)
- *Additional retirements are looming*



The Forward Capacity Market Is Attracting New Resources Amid Retirements



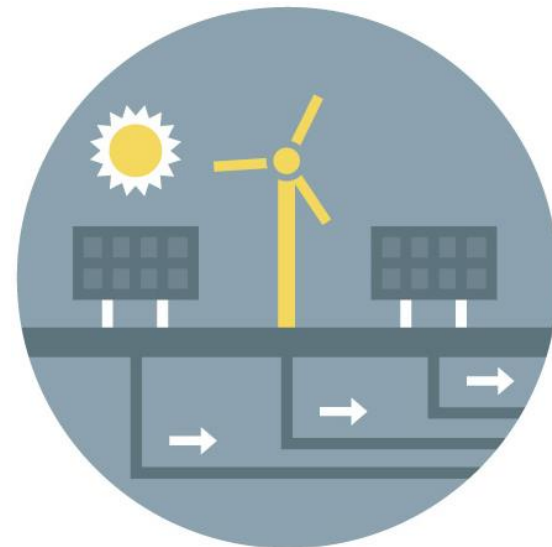
Demand Resources

energy-efficiency and active demand response resources



Natural Gas Resources

efficient and fast-starting gas resources, many with dual-fuel capability

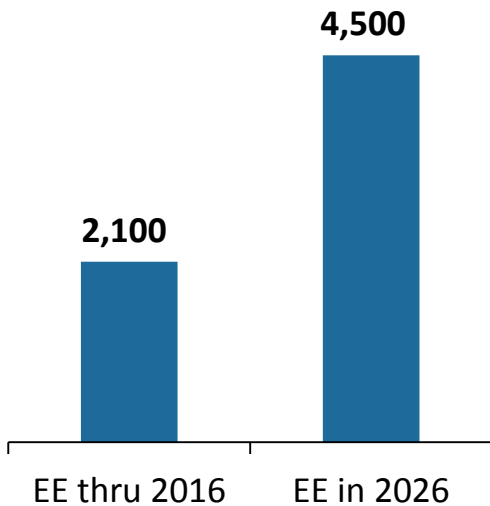


Renewable Resources

onshore and offshore wind, solar photovoltaics, and fuel cells

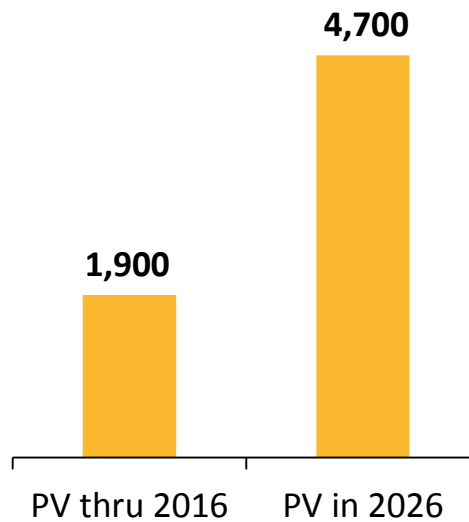
Energy-Efficiency and Renewable Resources Are Trending Up in New England

Energy Efficiency
(MW)



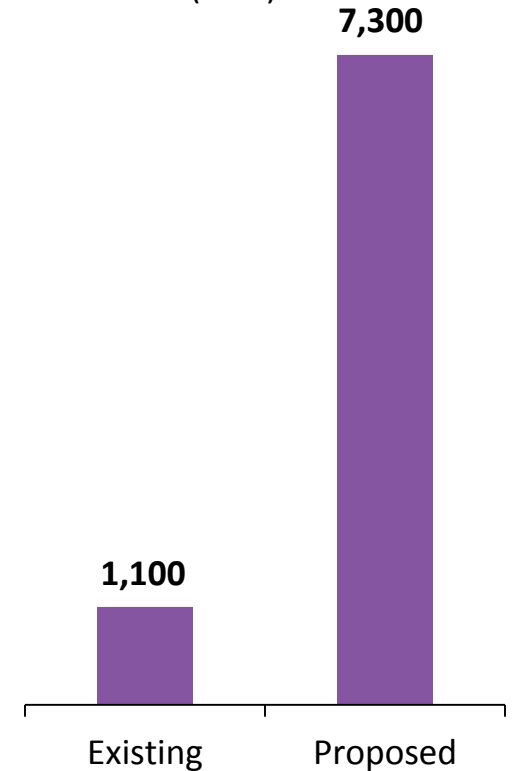
Final 2017 CELT Report, EE through 2016 includes EE resources participating in the Forward Capacity Market (FCM). EE in 2026 includes an ISO-NE forecast of incremental EE beyond the FCM.

Solar
(MW)



Final 2017 ISO-NE PV Forecast, AC nameplate capacity from PV resources participating in the region's wholesale electricity markets, as well as those connected "behind the meter."

Wind
(MW)



Nameplate capacity of existing wind resources and proposals in the ISO-NE Generator Interconnection Queue; some wind proposals include battery storage.

A “Hybrid Grid” Is Emerging

The region is changing how it generates, delivers, and uses electricity

- Large grid-connected power resources + thousands of small “behind-the-meter” resources
- Changes in how much grid energy people use and when they use it
- Significant amounts of variable generation and some battery storage
- Two-way grid communications



ISO New England Is Focused on Developing Solutions to Today's Grid Challenges

Integrating Markets and Public Policy

Accommodating the states' clean energy goals while maintaining competitively based capacity pricing for other resources



Addressing Fuel Security

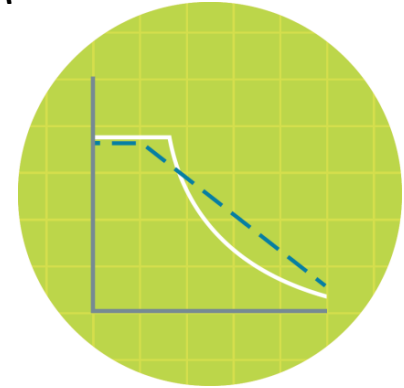
Ensuring the region's generators have adequate fuel to produce electricity, particularly in the wintertime



ISO New England Has Proposed a Near-Term Solution to Integrate Markets and Public Policy

Competitive Auctions with Sponsored Policy Resources or “CASPR”

- The ISO’s capacity market design approach:
 - **Accommodates** sponsored policy resources into the Forward Capacity Market over time, and
 - **Preserves** competitively based capacity pricing for other resources
- Likely to help the New England states achieve their renewable energy and greenhouse gas reduction goals as older, higher-emitting (traditional) units are likely to retire sooner
- The ISO sought feedback from stakeholders through the NEPOOL stakeholder process
 - The ISO plans to file tariff revisions in December 2017/January 2018, in time for FCA #13, which will be run in February 2019



Note: Additional materials can be found on the ISO’s [Wholesale Markets and State Public Policy Initiative](#) website

ISO New England Is Conducting a Study of Fuel Security Challenges

- Fuel security refers to the ability of power plants to have or obtain the fuel required to generate electricity, especially during the **winter peak season**
- The study is examining more than 20 cases of generating resource and fuel-mix combinations during the 2024-2025 winter, and will quantify each case's **fuel security risk**
- Fuel security risk will be measured by the **number** and **duration** of energy shortfalls that could occur and that would require implementation of emergency procedures to maintain reliability



ISO New England Will Work With Stakeholders to Address Region's Fuel Security Risks

- The study is **not** focused on the effects of expanded access to natural gas and will not identify needs for new or expanded pipeline capacity or natural gas infrastructure
- The preliminary results will be presented to regional stakeholders for full discussion and input
- The ISO will work with stakeholders to determine whether further **operational** or **market design measures** will be needed to address the fuel security risk



U.S. Department of Energy Proposes Grid Resiliency Pricing Rule

- On **September 28**, the U.S. Department of Energy (DOE) issued a Notice of Proposed Rulemaking (NOPR) directing FERC to take final action on a “grid resiliency” pricing rule
- The proposal directs FERC to impose rules on Commission-approved ISOs and RTOs “to ensure that the reliability and resiliency attributes of generation with **on-site fuel supplies** are fully valued”
- The ISO has delayed finalization of its fuel security analysis pending **resolution** of the U.S. DOE NOPR



ISO New England Opposes Adoption of DOE NOPR

- On **October 23**, ISO New England submitted comments to FERC objecting to the DOE NOPR on the basis that it will significantly **undermine** the efficient and effective wholesale electricity markets that, with FERC's guidance, the New England region has built over the last two decades
- The NOPR shifts away from the **numerous benefits** markets have achieved, including improvements in electric reliability, lower emissions, and reductions in wholesale electricity costs
- The NOPR does not address New England's **biggest challenge**, which is fuel security and availability of natural gas for power generation in the winter



Identification of Solutions to Future “Resilience” Needs Will Require Deliberative Stakeholder Process

- “Resilience” is an **amorphous concept** that is difficult to describe precisely or quantify—likely means something different to different regions
- NOPR-directed timeframe for adoption of market rules is inadequate for **time-tested regional stakeholder process**
- Should additional reliability measures be needed, the region should be permitted to design **market-based solutions** through the stakeholder process that are targeted to meet New England’s specific needs



Questions

