



ISO New England Update

Consumer Liaison Group Meeting

Anne George

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TODAY'S UPDATES

- Monthly Market Highlights
- Markets Update
- Operations Update
- System Planning Update
- Recent and Upcoming Events
- Consumer Liaison Group Resources

An Ongoing Dialogue: ISO's External Affairs Team



Eric Johnson
Director, External Affairs
New England



Carrick Heilferty
Policy Advisor
Federal Affairs



Kerry Schlichting
Senior State Policy Advisor
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Sarah Adams
State Policy Advisor
Vermont



Marissa Ribeiro Dahan
State Policy Advisor
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Melissa Winne
State Policy Advisor
Maine



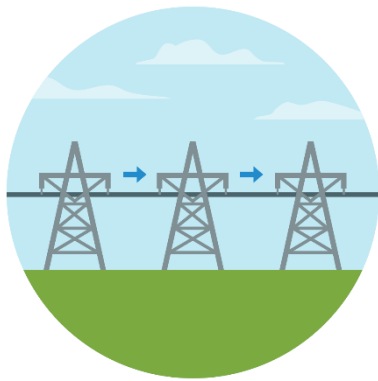
Nathan Raike
Associate State Policy Advisor
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ISO New England Performs Three Critical Roles to Ensure Reliable Electricity at Competitive Prices

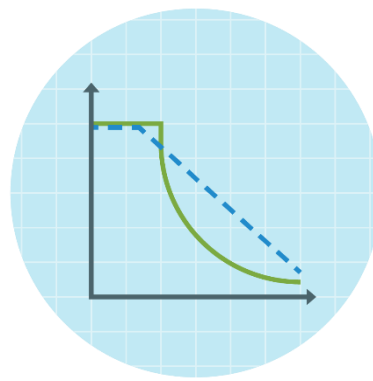
Grid Operation

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



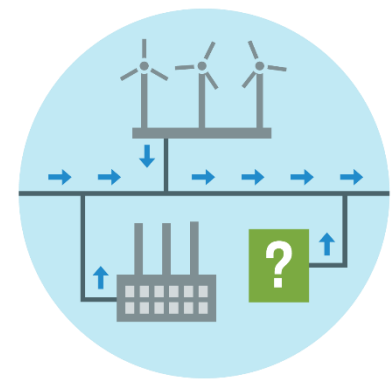
Market Administration

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



MONTHLY MARKET HIGHLIGHTS



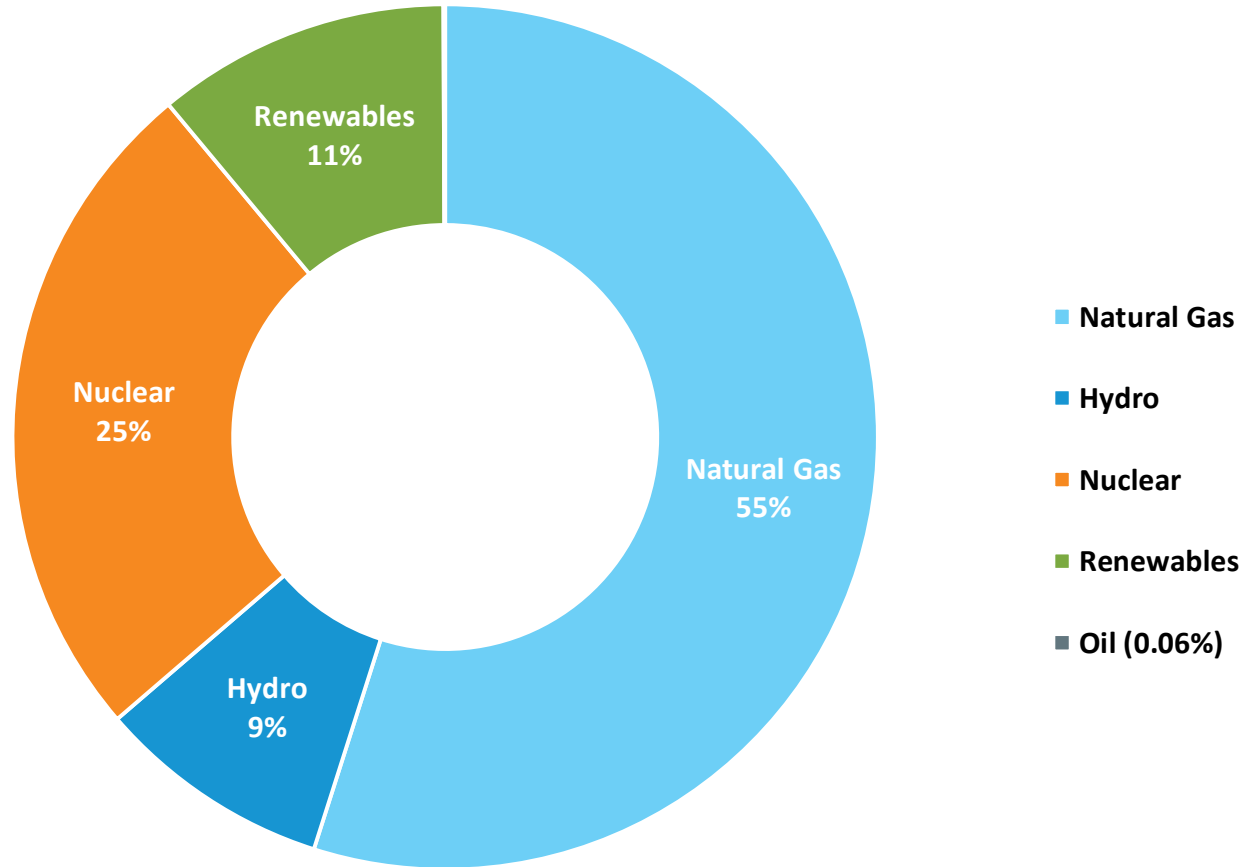
Monthly Wholesale Electricity Prices and Demand in New England, October 2023

October 2023 and Percent Change from October 2022 and September 2023	October 2023	October 2022	September 2023
Average Real-Time Electricity Price (\$/megawatt-hour)	\$24.29	-54%	-25%
Average Natural Gas Price (\$/MMBtu)	\$1.49	-70%	-13%
Peak Demand	16,507 MW	12%	-31%
Total Electricity Use	8,713 GWh	0.6%	-10%
Weather-Normalized Use*	8,685 GWh	-0.6%	-2%

*Weather-normalized demand indicates how much electricity would have been consumed if the weather had been the same as the average weather over the last 20 years.



October 2023 Generation in New England, by Source



Source: [2023 Net Energy and Peak Load by Source](#)

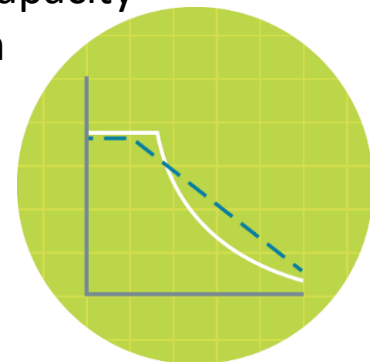


MARKETS UPDATE



ISO Submits Informational Filing and Installed Capacity Requirement for the Next Auction

- On November 7, ISO New England [submitted a filing](#) with FERC in support of Forward Capacity Auction 18 (FCA 18), which will commence on February 5, 2024
 - FCA 18 will procure the capacity resources needed to meet demand during the June 1, 2027 – May 31, 2028 capacity commitment period
- New England’s capacity market has **two main objectives**:
 1. Ensure sufficient resources to meet New England’s electricity demand and reliability standards, and
 2. Ensure that sufficient resources are procured in a cost-effective manner
- The Installed Capacity Requirement (ICR) is a measure of the installed resources that the ISO projects to be necessary to meet forecasted load requirements for the New England Control Area and maintain sufficient reserve capacity to meet reliability standards
- The filing outlines the total amount of resources qualified to participate in FCA 18, including existing resources (e.g., generation, imports, and demand capacity resources) and the capacity zones that the ISO will model based upon the topology of the transmission system
 - The ISO is proposing an ICR of **31,591 MW** for FCA 18
 - The ISO will model the same three capacity zones used in FCA 17:
 1. Northern New England Capacity Zone (“NNE”)
 2. Maine Capacity Zone (“Maine”) and,
 3. Rest-of-Pool Capacity Zone



FCA 19 Delay Filing

- ISO New England and the New England Power Pool (NEPOOL) are [seeking approval](#) from FERC to delay FCA 19 – currently scheduled for February 2025
 - FCA 19 will secure obligations from resources to be available during the 2028/2029 capacity year, with the qualification process beginning in early 2024
 - The delay would not affect the capacity commitment period, nor would it affect elimination of the Minimum Offer Price Rule
- Delaying FCA 19 by one year will allow ISO staff and stakeholders more time to complete the [Resource Capacity Accreditation \(RCA\) project](#)
 - FCA 19 is scheduled to be the first auction to include the updated capacity accreditation changes developed through the RCA project, but the discovery of a modeling issue has slowed the project's completion
 - The ISO expects to file its RCA proposal with FERC in August 2024
- The delay will also allow for continued discussions on revising the forward, annual capacity market [to a prompt and/or seasonal market](#)
 - ISO has [engaged Analysis Group](#) to draft a report looking at the tradeoffs associated with these options ahead of making a recommendation to stakeholders in 2024
- FCA 18 would not be affected by the delay



OPERATIONS UPDATE

Winter 2023/2024 Outlook

Operational Impact of Extreme Weather Events – Energy Adequacy Study

WINTER 2023/2024 OUTLOOK

FERC Winter Assessment

Actions by the ISO to Prepare for Winter

Winter Generator Readiness Seminar

Pre-winter Briefing for Government Officials

ISO Winter Outlook and Press Release

FERC 2023-2024 Winter Assessment

On November 16, FERC issued their [2023-2024 Winter Assessment](#)

Weather

- The National Oceanic and Atmospheric Administration is predicting a milder **than average winter in New England**
- A mild season **does not eliminate risk** of prolonged cold snaps
- Prolonged cold snaps **heighten risk** of the probability that the ISO would need to implement emergency procedures



Natural Gas

- Natural gas supply is expected to **remain constrained in New England**
- Pipeline constraints occur when there is **simultaneous demand** for natural gas for heating homes and operating electric generating plants
- **Heating customers are served first** and the remaining gas is available for electric generators
- The region uses other fuels (**oil or LNG**) when pipeline gas is unavailable or too costly

Reliability

- The assessment notes that NERC's preliminary data show that the ISO **expects to meet regional resource adequacy requirements** this winter period during normal conditions but may face challenges during an extreme winter event

ISO's High-Level Winter Assessment: Winter 2023/24

If this winter is similar to...

Winter 2022/23

Then...

The ISO anticipates that the system can be operated reliably with sufficient capacity and energy available to meet the expected peak loads and energy needs

Winter 2017/18

Then...

The ISO anticipates that the system can be operated reliably with sufficient capacity and energy available to meet the expected peak loads and energy needs

Winter 2013/14

Then...

Assuming persistent below-normal temperatures and several cold stretches, the ISO anticipates that the system can be operated reliably, but may require capacity deficiency actions across a few days; energy shortfall unlikely

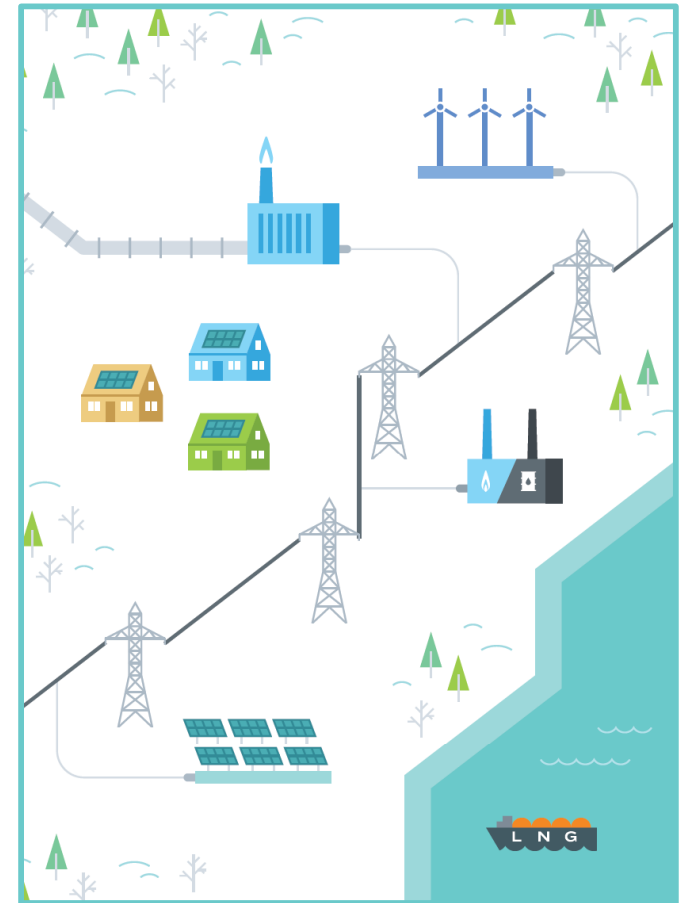
All three scenarios for this winter:

Assume no significant generation or transmission outages and *limited fuel replenishment*

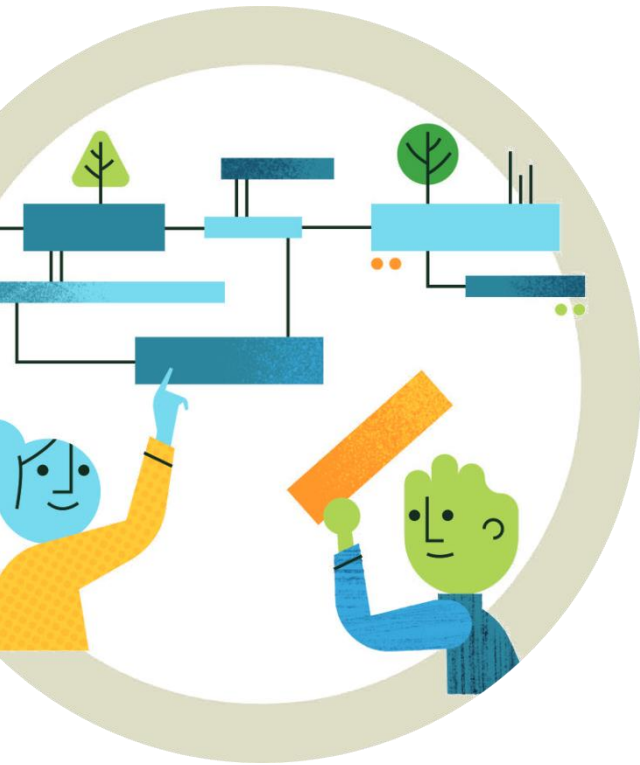
If the region has ***adequate fuel replenishment*** this winter the ISO anticipates that the system can be operated reliably without the need for emergency procedures

Actions by the ISO to Prepare for Winter

- Before and during the winter, ISO New England:
 - Evaluates region's winter supply outlook
 - Meets with generators, industry stakeholders, and governmental officials to review forecasts
 - Prepares short-term forecasts on a rolling 21-day basis to identify potential energy shortfalls
 - Can take emergency actions to prevent grid collapse
 - May request energy conservation over hours or days to minimize need for emergency actions



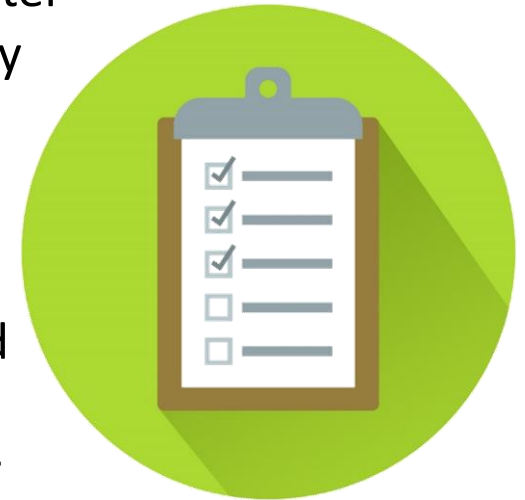
Winter Generator Readiness Seminar



- The ISO hosted its annual [winter generator readiness seminar](#) on **October 31** to give generators an outlook on the coming winter season
- The ISO's System Operations & Market Administration team reviewed changes to programs, procedures, and preparations that are in place to strengthen readiness for operations during cold weather in New England

Pre-Winter Briefing for Government Officials

- On **November 29**, the ISO hosted its annual pre-winter communications training for government emergency communications contacts
- The training is conducted by the ISO's Corporate Communications, External Affairs, and Operations Departments and previewed the winter outlook and reviewed the ISO's emergency procedures and communications processes in advance of the winter
- The session covered the types of system events that trigger communications with government officials, as well as when and how the ISO would initiate such communications
 - The presentation will be available on the ISO website



ISO New England Has Operating Procedures to Prepare for, and Respond to, Issues on the Grid



**Action During a
Capacity Deficiency
(OP-4)**



**Action in an
Emergency
(OP-7)**



**Cold Weather
Condition Operations
(SOP-RTMKTS.0050.0007)**

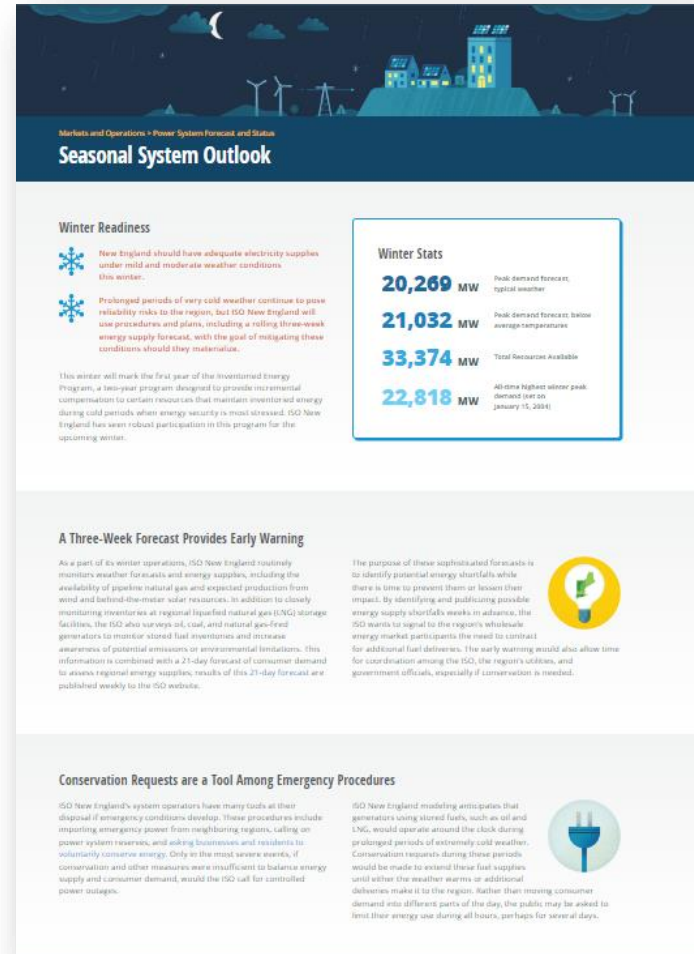


**Energy Inventory
Accounting and
Actions During an
Energy Emergency
(OP-21)**

ISO Outlines Power Grid Preparedness for Winter 2023/24


ISO's Winter Outlook Press Release Was Posted December 4


https://www.iso-ne.com/static-assets/documents/100006/2023124_pr_winteroutlook_2023.pdf



Markets and Operations • Power System Forecast and Status
Seasonal System Outlook

Winter Readiness

 New England should have adequate electricity supplies under mild and moderate weather conditions this winter.

 Prolonged periods of very cold weather continue to pose reliability risks to the region, but ISO New England will use procedures and plans, including a rolling three-week energy supply forecast, with the goal of mitigating these conditions should they materialize.


This winter will mark the first year of the Incentivized Energy Program, a two-year program designed to provide incremental compensation to certain resources that maintain operational readiness during cold periods, when energy security is most stressed. ISO New England has seen robust participation in this program for the upcoming winter.

Winter Stats	Notes
20,269 MW	Peak demand forecast, typical weather
21,032 MW	Peak demand forecast, below average temperature
33,374 MW	Total Resources Available
22,818 MW	All-time highest winter peak demand (set on January 15, 2014)

A Three-Week Forecast Provides Early Warning

As a part of its winter operations, ISO New England routinely monitors weather forecasts and energy supplies, including the availability of pipeline natural gas and expected production from wind and behind-the-meter solar resources. In addition to closely monitoring inventories at regional liquefied natural gas (LNG) storage facilities, the ISO also surveys oil, coal, and natural gas-fired generators to monitor stored fuel inventories and increase awareness of potential emissions or environmental limitations. This information is combined with a 21-day forecast of consumer demand to assess regional energy supplies; results of this 21-day forecast are published weekly to the ISO website.


The purpose of these sophisticated forecasts is to identify potential energy shortfalls while there is time to prevent them or lessen their impact. By identifying and publicizing possible energy supply shortfalls weeks in advance, the ISO wants to signal to the region's wholesale energy market participants the need to contract for additional fuel deliveries. The early warning would also allow time for coordination among the ISO, the region's utilities, and government officials, especially if conservation is needed.



Conservation Requests are a Tool Among Emergency Procedures

ISO New England's system operators have many tools at their disposal if emergency conditions develop. These procedures include importing emergency power from neighboring regions, calling on power system reserves, and asking businesses and residents to voluntarily conserve energy. Only in the most severe events, if conservation and other measures were insufficient to balance energy supply and consumer demand, would the ISO call for controlled power outages.

ISO New England modeling anticipates that generators using stored fuels, such as oil and LNG, would operate around the clock during prolonged periods of extremely cold weather. Conservation requests during these periods would be made to extend these fuel supplies until either the weather warms or additional deliveries make it to the region. Rather than moving consumer demand into different parts of the day, the public may be asked to limit their energy use during all hours, perhaps for several days.

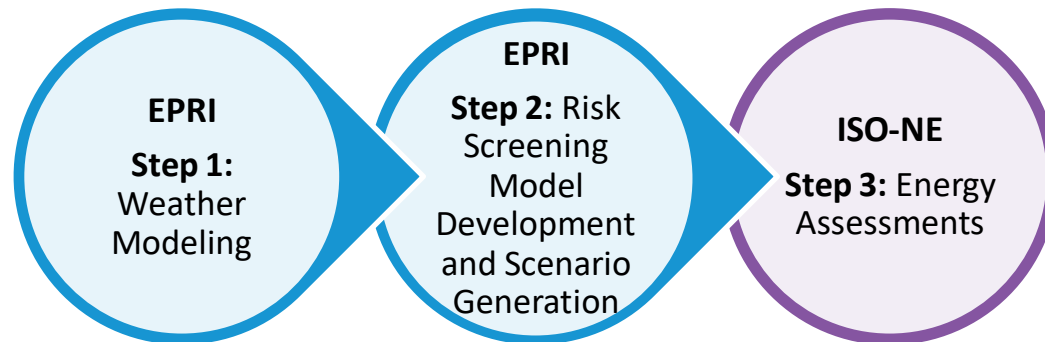


OPERATIONAL IMPACT OF EXTREME WEATHER EVENTS – ENERGY ADEQUACY STUDY

Operational Impact of Extreme Weather Events

– Energy Adequacy Study

- [Operational Impact of Extreme Weather Events](#) is a probabilistic energy-security study undertaken jointly by the ISO and the Electric Power Research Institute ([EPRI](#))
- The study seeks to inform the region about future energy adequacy risks and provide context for assessing solutions, is one of several [key projects](#) undertaken by the ISO to help New England prepare for tomorrow's greener grid
- The study is being undertaken in three major steps, with EPRI providing weather modeling and risk screening model development, and ISO completing the energy assessments, using the [21-day energy assessment tool](#)



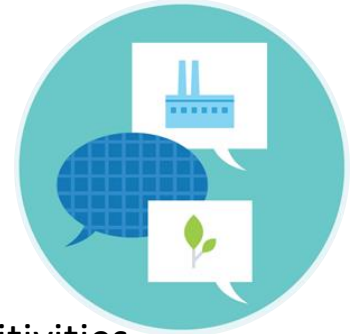
- The energy adequacy risk profile is dynamic and will be a function of the evolution of both supply and demand profiles

Energy Adequacy Study Key Takeaways

- Preliminary results of energy assessments for [2027 winter](#) & [summer](#) events, and [2032 winter](#) & [summer](#) events have been presented to the Reliability Committee
- Results reveal a range of energy shortfall risks and associated probabilities
- Results of preliminary studies reveal similar energy adequacy risk with and without the Everett Marine Terminal in-service
- Sensitivity analysis of 2032 worst-case scenarios indicate an increasing energy shortfall risk profile between 2027 and 2032
- Timely additions of BTM and Utility Scale PV, offshore wind, and incremental imports from NECEC are critical to mitigate energy shortfall risks that result from significant peak winter load growth and retirements
- The Probabilistic Energy Adequacy Tool (PEAT) study framework provides a much needed foundation to study the system as it continues to evolve



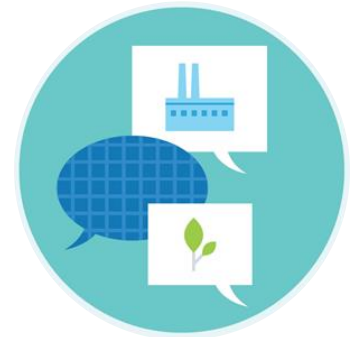
Energy Adequacy Study Stakeholder-Informed Sensitivities



- ISO welcomed stakeholder input regarding additional sensitivity analysis focused on the 2032 winter worst case
 - Stakeholder sensitivity requests reflected significant interest in sensitivities related to the impacts of additional renewables and generator retirements
- ISO performed analysis of 30 unique sensitivity requests and summarized results at the [November Reliability Committee meeting](#)
 - ISO performed 13 additional sensitivity analyses in order to help provide context for some stakeholder sensitivity requests
 - All sensitivity analysis was performed using ISO’s Jan 22, 1961 event “2032 FCA 17/2023 CELT” sensitivity study* as a baseline
 - All sensitivities include the NECEC in-service
 - Storage batteries are modeled as 2-hour duration resources as this best represents existing resources; future modeling enhancements will enable the incorporation of longer-duration storage

*For details on ISO’s “2032 FCA17/2023 CELT” sensitivity study, see slide 44 of the [“Operational Impact of Extreme Weather Events”](#) presentation given at the August 15, 2023 RC Meeting

Key Takeaways of Stakeholder-Informed Sensitivity Analysis



- Sensitivity analysis highlights the dynamic nature of the region's energy adequacy risk profile
- Sensitivities that evaluate resource retirements without replacement generally show increased energy shortfall risk as compared to the FCA 17 baseline
- Energy from resources that burn stored fuels will continue to be important in terms of minimizing energy shortfall as the region transitions to higher penetrations of renewable resources
- **Timely additions of BTM and utility-scale PV, offshore wind, and incremental imports from NECEC are critical to mitigate energy shortfall risks that result from significant winter load growth and retirements**

Next Steps

- ISO expects to release a final report that summarizes all aspects of the PEAT study framework and results in December
- ISO will present a proposed scope of work for developing a Regional Energy Shortfall Threshold (REST) at the December RC meeting
- Throughout 2024, using PEAT results, the ISO plans to work with regional stakeholders to establish a REST that determines the region's acceptable level of reliability risk; the ISO can then evaluate if meeting the REST requires development of specific regional solutions
 - Possible solutions could range from market designs to infrastructure investments to dynamic retail pricing and responsiveness by end-use consumers
 - Some solutions could be outside of the ISO's jurisdiction
- Further analysis of scope, timing, and feasibility of any such solutions would follow in 2024-2025, as needed

SYSTEM PLANNING UPDATE

2050 Transmission Study

FERC Order 2023

NESCOE Asset Condition Project Process Request

2050 TRANSMISSION STUDY

A High-Level Study for the Years 2035, 2040, and 2050

ISO Issues Draft 2050 Transmission Study Report

- On November 1, the ISO released a draft report summarizing findings from the landmark 2050 Transmission Study
 - Initial study scope and assumptions developed **in conjunction with the states**
 - Aims to **inform the region** of the amount, type, and high-level cost estimates of **transmission infrastructure** that would be *needed to cost-effectively and reliably serve peak loads*, including electrified transportation and heating, in a clean-energy future
 - Study looks beyond the ISO's typical 10-year horizon
- The results, driven by future resource mix and demand assumptions provided by the New England states, offer an overview of the regional transmission system investment needed to ensure reliability throughout the clean energy transition
- The report includes sets of potential solutions, or roadmaps, designed to assist stakeholders in their efforts to facilitate the clean energy transition



The most up-to-date information on the 2050 study is available at the [Planning Advisory Committee](#) and [Longer-Term Transmission Studies](#) webpages

2050 Transmission Study: Next Steps

- This study is meant to evaluate potential scenarios and sample transmission upgrades, and is **not** a recommendation to develop specific transmission or generation projects
- The ISO began stakeholder discussions on the second phase of the new study process last month
 - This phase would add a process to operationalize transmission investments resulting from the analyses, and will include a cost-allocation mechanism for those transmission improvements
 - Stakeholder discussions will continue through the first half of 2024

FERC ORDER 2023

FERC Order 2023

- In July FERC issued Order No. 2023 mandating significant reforms to generator interconnection procedures and agreements to ensure that interconnection customers can interconnect to the transmission system in a reliable, efficient, transparent, timely, and fair manner
 - The reforms are intended to address transmission interconnection queue backlogs, improve certainty, and prevent undue discrimination for new technologies as those resources proliferate.
- Primary elements of the Order include:
 - Implementing a first-ready, first-served cluster study process, eliminating New England's current serial first-come, first-served study process
 - Speeding up interconnection queue processing through improved processes, deadlines, and penalties
 - Incorporating technological advancements into the interconnection process, including modeling and performance standards for inverter-based resources
- The ISO is dedicating significant resources to developing its compliance proposal and bringing it through the stakeholder process to meet FERC's accelerated timeframe
 - After the ISO submits its compliance filing to FERC, a transition process will begin to aid the conversion to the new requirements

ASSET CONDITION PROJECTS

Asset Condition Projects

Process Enhancements

- The New England States Committee on Electricity (NESCOE) [submitted a letter](#) to the ISO's Planning Advisory Committee (PAC) in February requesting asset condition project and process improvements
 - Asset condition projects repair or replace aging or damaged equipment typically with like-sized equipment
- NESCOE continues to express interest in the ISO developing standards or guidelines for “right-sizing” future transmission projects, including asset condition projects
- ISO management met with NESCOE and the transmission owners (TOs) to discuss potential process improvements
 - Under existing operating arrangements, the TOs currently identify and manage the process for asset condition projects
 - Unlike the regional transmission planning process which is overseen by ISO-NE, the asset condition process is managed by the individual TOs with varying approaches to presenting relevant information
- The ISO has expressed support for improvements in forecasting and planning for upcoming asset condition projects
 - In addition, the ISO is working with the states and TOs on ways to incorporate “right-sizing” for future needs in the asset condition process.
 - On July 14, NESCOE submitted a [letter to PAC](#) suggesting asset condition project process improvements and follow-on discussions are ongoing through NEPOOL

RECENT AND UPCOMING EVENTS



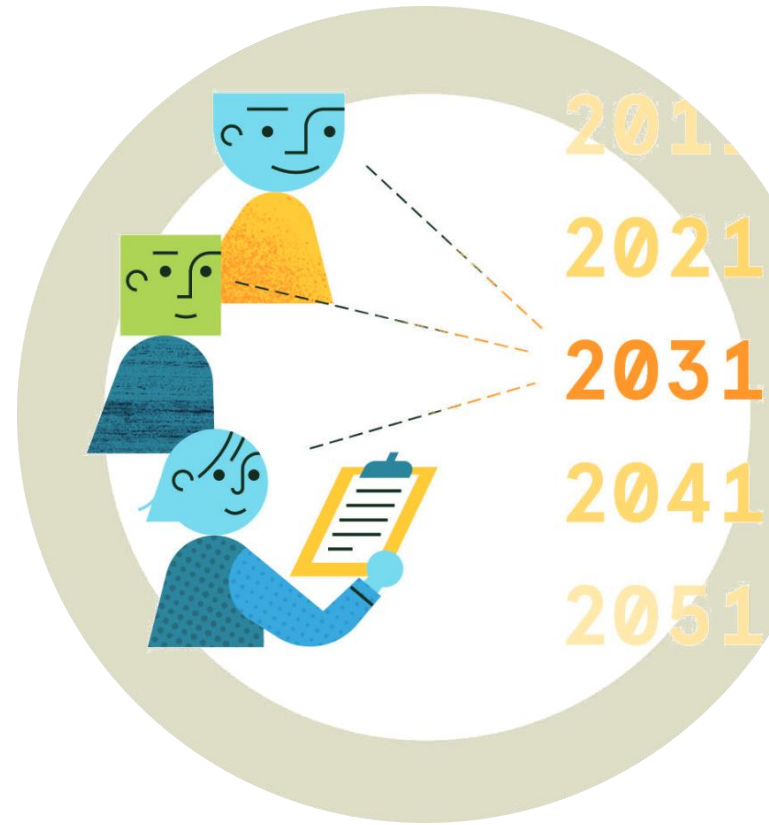
ISO New England Open Board Meeting



- The ISO-NE Board of Directors held the 2023 open board meeting on November 1 in Boston, and virtually via WebEx
 - The meeting also served as the public meeting for the 2023 Regional System Plan
 - A dozen people signed up to speak during the public comment period
- Meeting materials, including slides and a recording of the meeting, are posted on the [event webpage](#)
 - An article providing a summary of the meeting has also been published to the [ISO Newswire](#)
 - [Compiled comments received to date](#) are posted to the ISO website
 - The public can continue to provide written comments to the Board of Directors by email at legal@iso-ne.com

System Planning Webinar

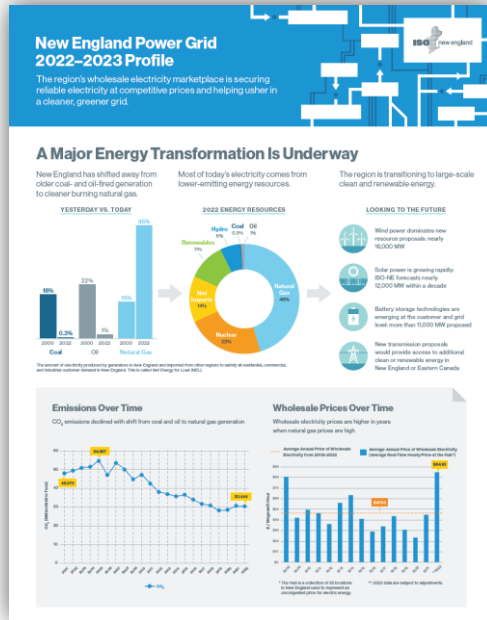
- ISO New England is hosting a public webinar on System Planning on December 14, 2023 at 11:00 a.m.
- The webinar is expected to run approximately 90 minutes, and will provide an overview of the ISO-NE system planning process, including system planning basics, resource adequacy, transmission planning, and long-term planning processes
 - This webinar is designed for a non-technical audience
- Registration is now open on [ISO-TEN](#)
- If you have questions about the webinar, please reach out to a member of the External Affairs team



CONSUMER LIAISON GROUP RESOURCES

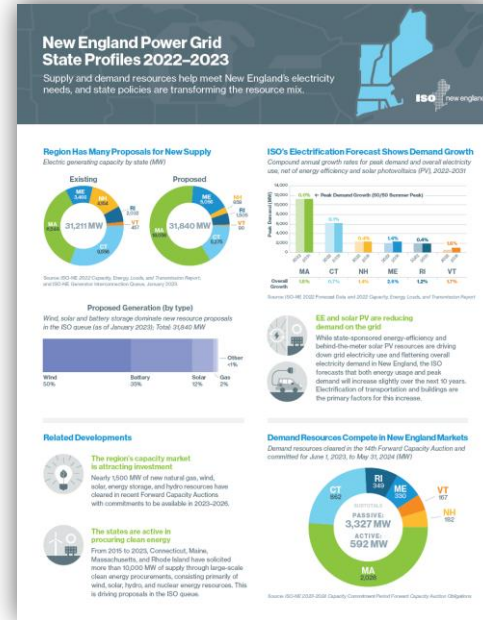


ISO New England Releases Several Publications



New England Power Grid Profile

Provides key grid and market stats on how New England's wholesale electricity markets are securing reliable electricity at competitive prices and helping usher in a cleaner, greener grid



New England State Profiles

Provides state-specific facts and figures relating to supply and demand resources tied into the New England electric grid and state policies transforming the resource mix in the region

Other ISO New England Publications and Resources

- [ISO Newswire](#)
 - a source for regular news about ISO New England and the wholesale electricity industry within the six-state region
- [ISO Press Releases](#)
 - Access current and archived press releases detailing significant developments at the ISO and in New England’s power system and wholesale electricity markets
- [Government and Industry Affairs Presentations, Speeches, Papers, and Other Materials](#)
 - Presentations and speeches delivered by our technical experts, senior management, and External Affairs team at industry events in New England and across the nation
 - Includes the monthly issues memo—a rundown of federal, regional, and state issues that the ISO provides to the New England Conference of Public Utilities Commissioners (NECPUC) and state consumer advocates



FOR MORE INFORMATION...



Subscribe to the *ISO Newswire*

[ISO Newswire](#) is your source for regular news about ISO New England and the wholesale electricity industry within the six-state region



Log on to ISO Express

[ISO Express](#) provides real-time data on New England's wholesale electricity markets and power system operations



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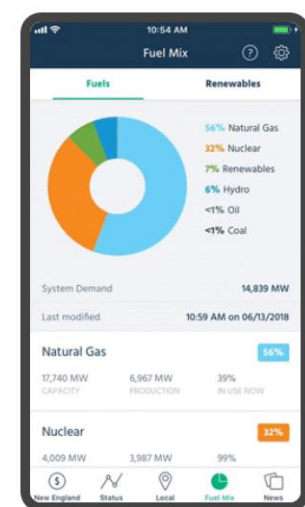
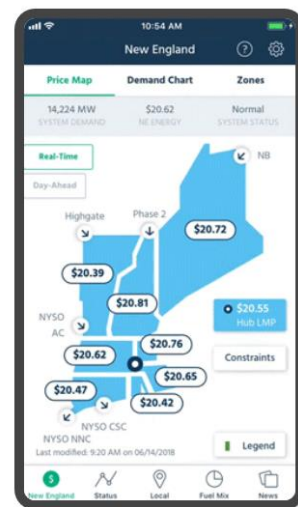


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Download the ISO to Go App

[ISO to Go](#) is a free mobile application that puts real-time wholesale electricity pricing and power grid information in the palm of your hand

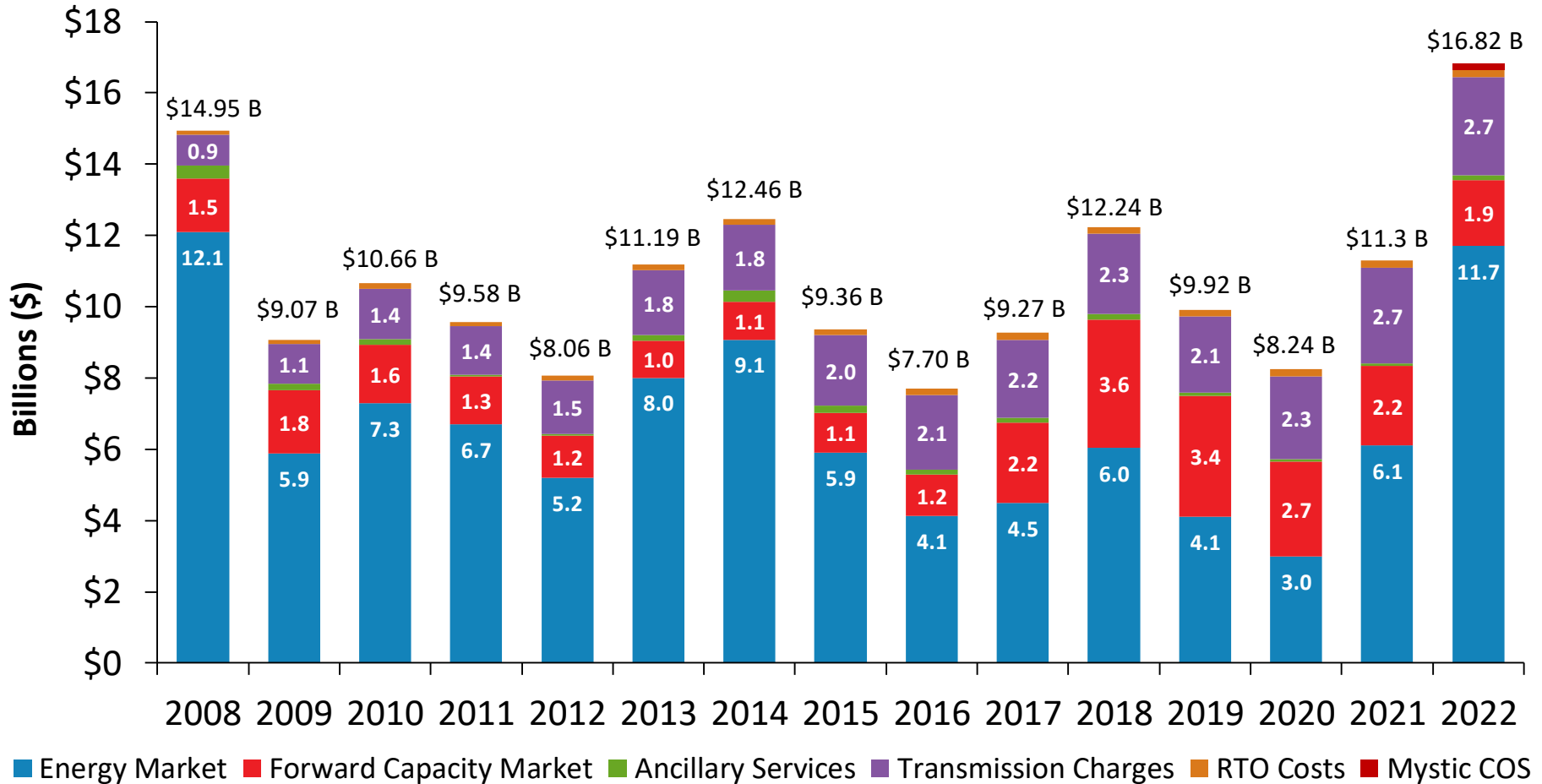


APPENDIX



New England Wholesale Electricity Costs*

Annual wholesale electricity costs have ranged from \$7.7 billion to \$16.8 billion



■ Energy Market ■ Forward Capacity Market ■ Ancillary Services ■ Transmission Charges ■ RTO Costs ■ Mystic COS

(The total costs for each year include Ancillary Services and RTO costs)

Source: 2022 Report of the Consumer Liaison Group; *2022 data is preliminary and subject to resettlement

Note: Forward Capacity Market values shown are based on auctions held roughly three years prior to each calendar year.

New England Wholesale Electricity Costs^(a)

	2017		2018		2019		2020		2021		2022**	
	\$ Mil.	¢/kWh	\$ Mil.	¢/kWh	\$ Mil.	¢/kWh	\$ Mil.	¢/kWh	\$ Mil.	¢/kWh	\$ Mil.	¢/kWh
Wholesale Market Costs												
Energy (LMPs)^(b)	\$4,498	3.5	\$6,041	4.7	\$4,105	3.3	\$2,996	2.4	\$6,101	4.8	\$11,698	9.0
Ancillaries^(c)	\$132	0.1	\$147	0.1	\$83	0.1	\$62	0.1	\$52	0.0	\$134	0.1
Capacity^(d)	\$2,245	1.8	\$3,606	2.8	\$3,401	2.7	\$2,662	2.2	\$2,243	1.8	\$1,864	1.4
Subtotal	\$6,875	5.4	\$9,794	7.6	\$7,589	6.0	\$5,720	4.7	\$8,404	6.6	\$13,697	10.6
Transmission charges^(e)	\$2,199	1.7	\$2,250	1.7	\$2,146	1.7	\$2,331	1.9	\$2,688	2.1	\$2,741	2.1
RTO costs^(f)	\$193	0.2	\$196	0.2	\$184	0.1	\$191	0.2	\$216	0.2	\$214	0.2
	Mystic Cost of Service Agreement										\$166	0.1
Total	\$9,267	7.3	\$12,240	9.4	\$9,918	7.9	\$8,242	6.7	\$11,308	8.9	\$16,819	13.0

(a) Average annual costs are based on the 12 months beginning January 1 and ending December 31. Costs in millions = the dollar value of the costs to New England wholesale market load servers for ISO-administered services. Cents/kWh = the value derived by dividing the dollar value (indicated above) by the real-time load obligation. These values are presented for illustrative purposes only and do not reflect actual charge methodologies. ***The wholesale values for 2022 are preliminary and subject to resettlement.**

(b) Energy values are derived from wholesale market pricing and represent the results of the Day-Ahead Energy Market plus deviations from the Day-Ahead Energy Market reflected in the Real-Time Energy Market.

(c) Ancillaries include first- and second-contingency Net Commitment-Period Compensation (NCPC), forward reserves, real-time reserves, regulation service, and a reduction for the Marginal Loss Revenue Fund.

(d) Capacity charges are those associated with the Forward Capacity Market (FCM).

(e) Transmission charges reflect the collection of transmission owners' revenue requirements and tariff-based reliability services, including black-start capability, voltage support, and FCM reliability.

(f) RTO costs are the costs to run and operate ISO New England and are based on actual collections, as determined under Section IV of the *ISO New England Inc. Transmission, Markets, and Services Tariff*.

** 2022 figures are preliminary