



ISO New England Update

Consumer Liaison Group Meeting

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TODAY'S UPDATES

- Forward Capacity Auction #17 Highlights
- Winter 2022/23 Operational Highlights
- 2022 Net Energy for Load and Preliminary Wholesale Market Costs
- Consumer Liaison Group Resources and ISO-NE Updates
- Appendix

FORWARD CAPACITY AUCTION NO. 17

Results and Highlights



ISO New England Administers Three Wholesale Markets

Energy Market Values Vary with Fuel Prices, While Capacity Market Values Vary with Changes in Supply

Energy Market

The Day-Ahead and Real-Time Energy Markets are forward and spot markets for trading **electric energy**

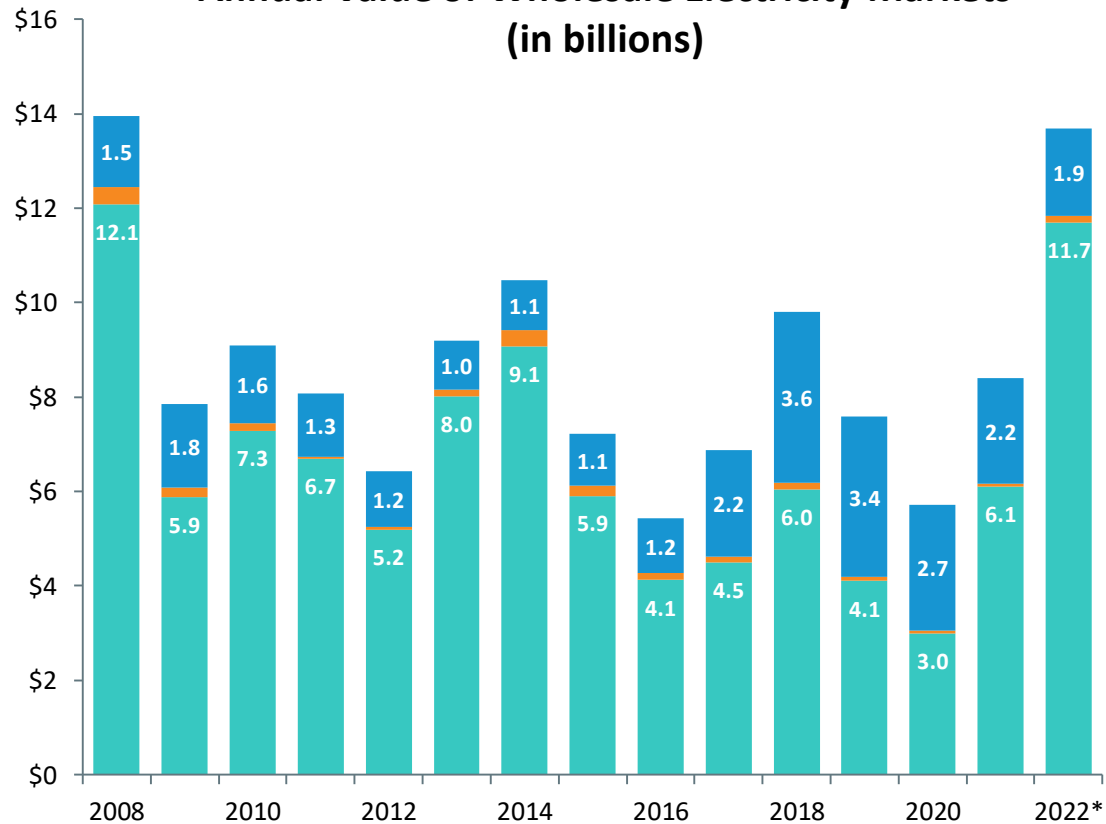
Ancillary Services

Resources provide **short-term reliability services**, as well as services needed to support the physical operation of the system (eg., regulation, voltage support)

Forward Capacity Market

Resources compete to sell **long-term reliability services** to the system in three years' time through annual Forward Capacity Auctions

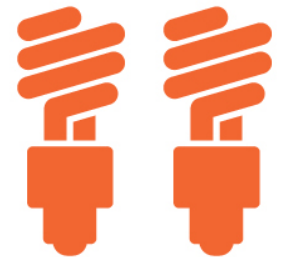
Annual Value of Wholesale Electricity Markets (in billions)



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

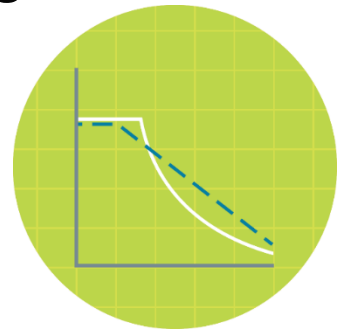
Forward Capacity Market Objectives and Results

- 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
- Capacity market aims to foster **competition** by creating a level playing field with respect to technology, investors, and existing versus new entrants
- Seventeen Forward Capacity Auctions have been conducted and twelve commitment periods completed
 - Market has generated participation from **diverse** types of resources, including demand-response, energy-efficiency, renewables and batteries
 - Lowest-cost resources have been developed and brought to market



ISO New England Administered the Seventeenth Forward Capacity Auction (FCA 17) in March 2023

- FCA 17 was held on March 6, 2023 to procure the capacity resources needed to meet demand for electricity, plus reserve requirements, during the **June 1, 2026 to May 31, 2027** capacity commitment period
- The auction concluded with **sufficient resources** to meet the installed capacity target of 30,305 MW
- **Clearing prices** in the auction ranged from \$2.55 to \$2.59 per kilowatt-month (kW-mo.), compared to last year's range of \$2.53 to \$2.64 per kW-mo.

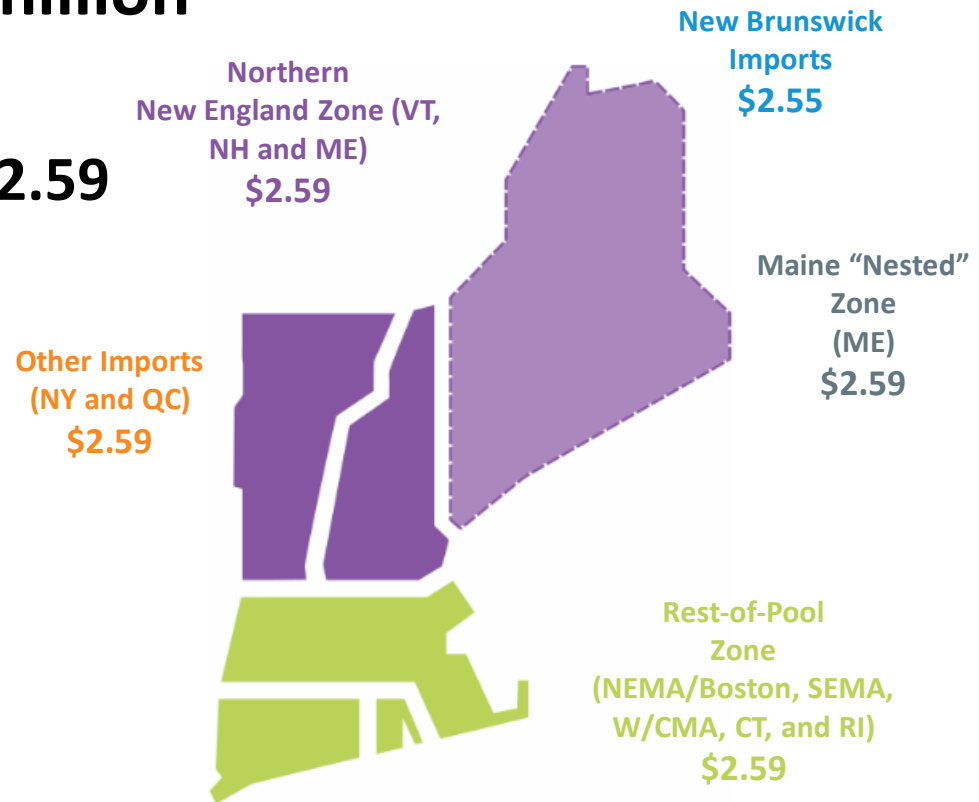


FCA 17 Prices Are the Same Across all Zones within New England

- Total value of the capacity market in 2026/2027 will be **approximately \$946 million***

- **Capacity prices by zone:**

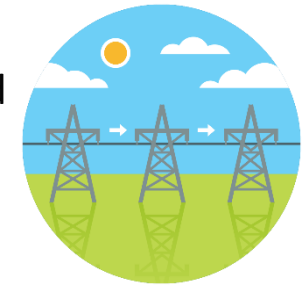
- Northern New England: **\$2.59**
 - Export-Constrained
- Maine “Nested”: **\$2.59**
 - Export-Constrained
- Rest-of-Pool Zone: **\$2.59**
 - Unconstrained
- Other Interfaces: **\$2.59**
 - Imports (NY and QC)
- New Brunswick: **\$2.55**
 - Imports



*This figure is preliminary and subject to change

FCA 17 Attracted and Retained a Variety of Resources to Ensure Resource Adequacy in 2026-2027

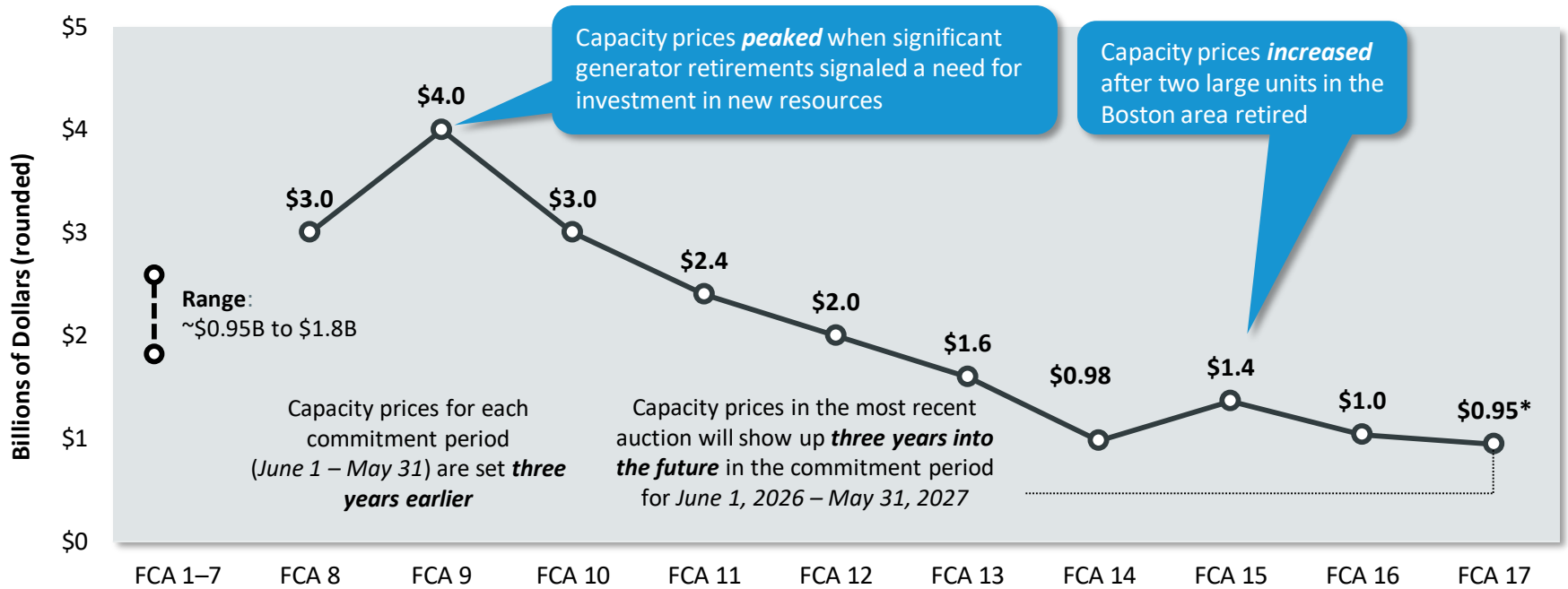
- The auction concluded with commitments from **31,370 MW** of capacity to be available during the 2026-2027 capacity commitment period
 - **27,864 MW** of generation, including:
 - Nearly **750 MW** of *new* renewable energy, battery storage, and demand-reducing resources secured obligations, including:
 - 130 MW of demand resources; and
 - 619 MW of renewables energy and storage
 - More than **350 MW** of new and existing wind generation cleared the auction
 - **2,940 MW** of energy-efficiency and demand-reduction measures
 - **567 MW** of total imports from New York, Québec and New Brunswick
- New and existing solar and wind generation, energy storage, and demand resources accounted for 16% of all capacity clearing the auction



Latest Prices Rank Among the Lowest in Auction History

As a “forward” market, consumers can anticipate future changes in capacity costs

Total Capacity Market Costs



Commitment periods:	2010–2017	2017–2018	2018–2019	2019–2020	2020–2021	2021–2022	2022–2023	2023–2024	2024–2025	2025–2026	2026–2027*
Auction years:	2008–2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Est. Dollars per kilowatt-month:	\$2.95 – \$4.50	\$7.03–\$15.00**	\$9.55–\$17.73**	\$7.03	\$5.30	\$4.63	\$3.80	\$2.00	\$2.48–\$3.98**	\$2.53–\$2.64**	\$2.55–\$2.59**

* Data is preliminary and subject to change. ** Prices are different across some capacity zones.

WINTER 2022/2023 OPERATIONS

December 24, 2022 Capacity Deficiency Event

February 3-4, 2023 Cold Weather Operations

DECEMBER 24, 2022

*Operating Procedure No. 4 Event and Capacity Scarcity
Condition*



Impact of Winter Storm Elliott in New England

- Given the geographic scope and severity of Winter Storm Elliot, a lot of attention was given to the events of December 24, 2022
- While severe cold weather conditions were impacting other regions of the country, New England was spared the brunt of the storm
 - PJM issued a request for conservation throughout its footprint, and filed a request for an Emergency Order Under Section 202(c) of the Federal Power Act with the U.S. Department of Energy
 - The Tennessee Valley Administration (TVA) and Duke Energy implemented targeted load-shedding to protect against uncontrolled outages
- Operating conditions in New England were not extraordinary
 - ISO has well-established tools to manage capacity shortfalls
 - ISO System Operations was in close communication with neighboring Reliability Coordinators, Balancing Areas, and Local Control Centers ahead of and throughout the severe cold weather
 - At no time was the ISO close to calling for controlled outages

Operating Conditions/OP-4 Capacity Deficiency

Saturday, December 24, 2022

- On the morning of December 24th, ISO expected a peak load forecast of 17,510 MW, and a capacity surplus of ~950 MW above load and operating reserve requirements
- Temperatures across the region were quite a bit colder than the previous day's forecast
 - Actual temperatures were colder than forecast by approximately three to six degrees throughout the day; peak hour temperatures were approximately four degrees lower than forecast
- Two primary factors led to the implementation of OP-4 and the Capacity Scarcity Condition
 - Generator outages and reductions totaling ~2,275 MW occurred across the operating day
 - Net imports were less than the quantity that cleared the Day-Ahead Energy Market (~1,100 MW less at the time OP-4 actions were implemented)
- **System conditions required the implementation of M/LCC 2 and OP-4**
 - M/LCC 2, Abnormal Conditions Alert: 16:00 – 21:00
 - OP-4, Actions 1, 2: 16:30 – 19:00
 - OP-4, Action 3: 16:45 – 19:00
 - OP-4, Action 5: 17:30 – 18:30

Unplanned Generator Outages and Reductions Occurred Prior to and During OP-4

- Throughout the day and prior to the declaration of M/LCC-2 at 16:00
 - Several generators experienced unplanned outages or reductions resulting in a net loss of ~1,000 MW of generating capacity
 - One resource (~275 MW) self-scheduled and ran through the peak hour
- Following declaration of M/LCC-2, and prior to the implementation of OP-4 at 16:30
 - Several additional generators experienced outages or reductions
 - ISO initiated the commitment of all remaining offline resources that were available to come online for the peak hour (~380 MW)
- Following the implementation OP-4, ~750 MW of additional generating capacity experienced outages or reductions



Types of Generator Reductions and Outages

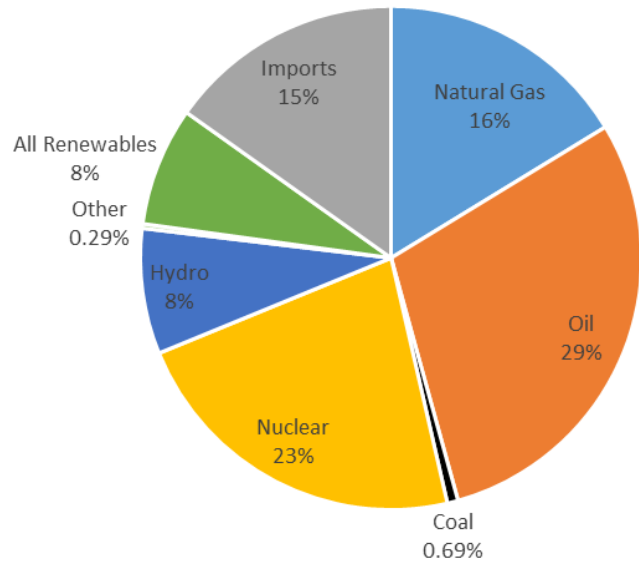
- Several types of generation technologies and fuel types experienced outages or reductions
 - Dual fuel generators, residual fuel oil (RFO) generators, natural gas-only generators, and distillate fuel oil (DFO) generators comprised ~33%, ~29%, ~15%, and ~13% of the generating capacity reductions (MWs) on that day
- A majority (~65%) of all generating capacity reductions were due to mechanical problems such as stuck valves, fuel pump failures, vibration, other unexpected equipment failures
- Other factors contributing to generator outages or reductions included gas scheduling issues (~15%), emissions-related restrictions (~7%)



Energy by Source, Daily and Peak Hour

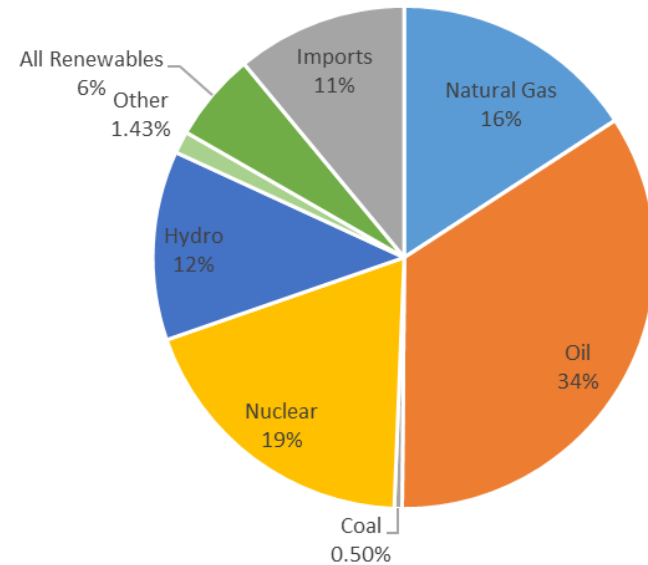
Energy Sources - Full Day

December 24, 2022



Energy Sources - Peak Hour

December 24, 2022



December 24 Pay-For-Performance Details

- Following the ISO's declaration of a capacity deficiency, a capacity scarcity condition was triggered. Under the Forward Capacity Market's Pay-for-Performance rules, resources that did not supply enough electricity or reserves to meet their capacity supply obligation are required to compensate the resources that made up the difference.
 - Underperforming resources will be penalized at a rate of **\$3,500 per megawatt-hour (MWh) for failing to meet their obligation** during the capacity scarcity conditions, while resources that **over-performed (including resources with no obligation) will receive \$3,500/MWh of additional revenue**
- Regardless of why they were unavailable, resources that did not supply enough electricity or reserves to meet their capacity supply obligation are subject to penalties under the region's Pay-for-Performance rules
 - Charges for underperformance are paid by the underperforming resources, not electricity ratepayers
- **Penalties for the Christmas Eve event are estimated to be approximately \$36 million, based on initial data***

*This data is preliminary and subject to change

Additional Questions and Inquiries into the December 24 event

- The ISO [sent a letter](#) formally responding to questions regarding the December 24th event from New England Senators on February 10
- On December 28, 2022, FERC and NERC [announced the opening](#) of a joint inquiry into the operations of the bulk power system during the extreme winter weather conditions that occurred during Winter Storm Elliot
 - The ISO looks forward to working with FERC, NERC, other federal agencies, state policymakers, and other stakeholder to identify issues that occurred during the storm and to craft solutions addressing those issues

FEBRUARY 3-4, 2023

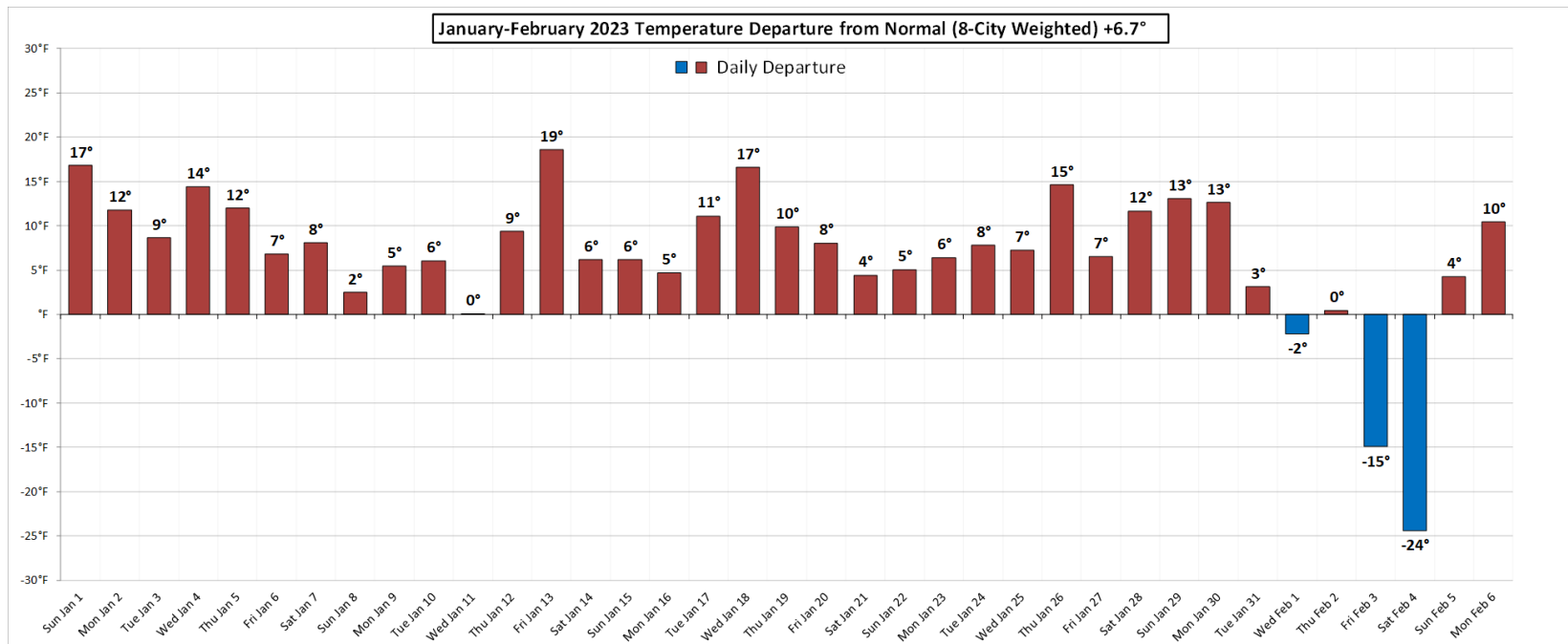
Cold Weather Operations

Short-Duration, Bitterly Cold Air Mass Affected The Region on February 3 and 4

- Bitterly cold air entered the region on the afternoon of Friday, February 3; the entire region experienced below zero temperatures on the morning of Saturday, February 4
 - High winds also accompanied the bitterly cold temperatures, resulting in most areas reporting wind chill values of 30° to 50° below zero
 - Southern New England locations including Boston (-10°F), Providence (-9°F), and Bridgeport (-4°F), experienced top-10 coldest temperatures since 1950
- For the February 3 operating day, ISO forecasted a peak load of 19,300 MW and a capacity surplus of ~4,200 MW
 - Actual peak load was 19,529 with a capacity surplus of ~2,900 MW
- For the February 4 operating day, ISO initially forecasted a peak load of 18,320 MW and a capacity surplus of ~3,000 MW
 - Based on lower than expected temperatures across the region, ISO revised the February 4 load forecast twice, first to 18,900 MW (in the early morning) and then to 19,600 MW (at approx. 1530 MW)
 - **Actual peak load was 19,349 with a capacity surplus of ~1,800 MW**

The Region Experienced The Coldest Temperature Departure From Normal Since 2016

- Prior to this cold snap, New England had experienced above normal temperatures for the entire month of January
- **Average temperatures were 15°F below normal on February 3, and dropped even further to 24°F below normal on February 4**



Generator Outages and Reductions, and Exports to Neighboring Control Area

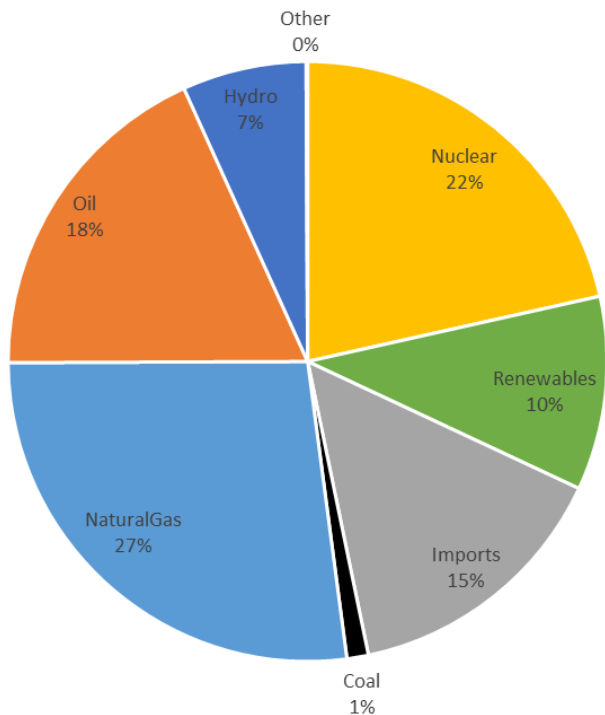
- Generators experienced outages and reductions at times throughout the cold snap
- In total, across the February 3-4 operating days, ~2,400 MW of generating capacity was unavailable during peak hours due to unexpected outages or reductions
- Outage and reduction causes varied; the primary reason was mechanical failures (vibrations, fan problems, other equipment issues etc.)
 - No generator outages or reductions were caused by natural gas pipeline issues or scheduling problems
- In addition, New England exported to Hydro-Quebec (HQ) across multiple interfaces during February 3-4
 - New England exported ~1,000 MW to HQ during the morning peak
 - This marked the first time New England has exported on Phase 2 since May 2016



Energy By Source, February 3 – 4 , cont.

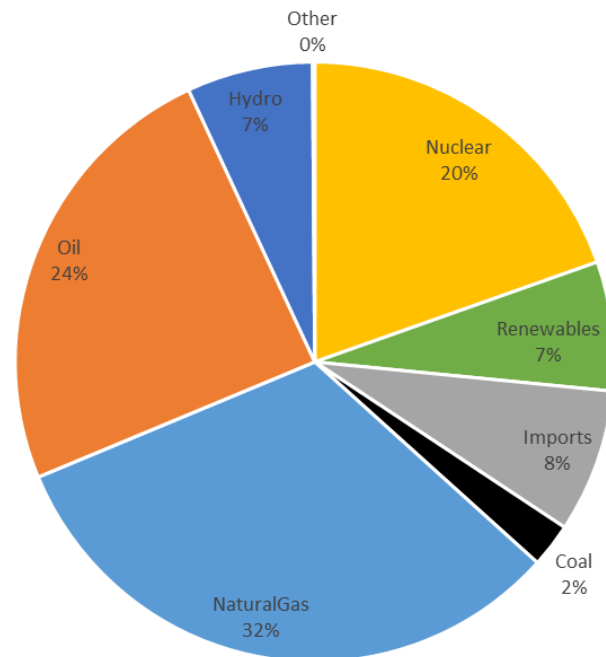
Energy Sources - Full Day

February 3, 2023



Energy Sources - Full Day

February 4, 2023



INITIAL 2022 WHOLESALE MARKET COSTS AND RESOURCE MIX

2022 Net Energy for Load Report

Preliminary 2022 Wholesale Market Costs

NET ENERGY FOR LOAD

2022 Report

ISO New England Publishes 2022 Net Energy for Load Report

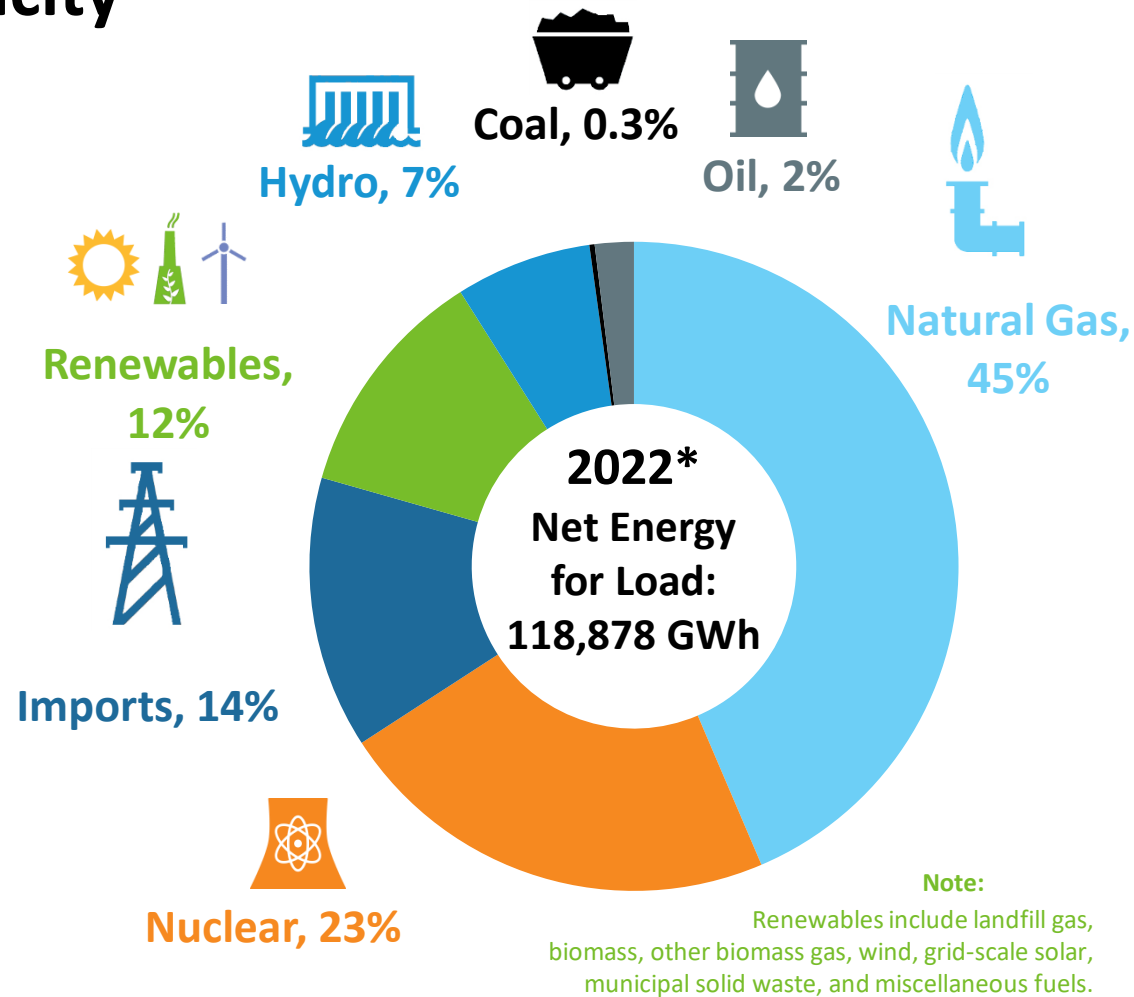
- The ISO [recently published](#) a breakdown of the amount of electricity produced by generators in New England and imported from other regions to satisfy demand in 2022
 - Total production for the year is known as net energy for load (NEL)
- Highlights of the NEL Report include*:
 - NEL amounted to **118,878 gigawatt-hours** in 2022 (+0.07% from 2021)
 - Output from solar installations increased by about a third from 2021 to 2022, **rising to 3,605 GWh or 3% of NEL.**
 - Oil played a larger role in 2022 than in 2021, reflecting rising prices for the region's main energy fuel, natural gas, that made oil more economical at certain times of the year
 - **Oil accounted for 1,844 GWh, or 2% of NEL**
 - Wind power was relatively steady from year to year at **3% of NEL**
 - Coal's contribution to NEL continues to decrease, down to 0.3% of NEL

Data is preliminary and subject to adjustment

ISO-NE PUBLIC

Lower-Emitting Sources of Energy Supply Most of New England's Electricity

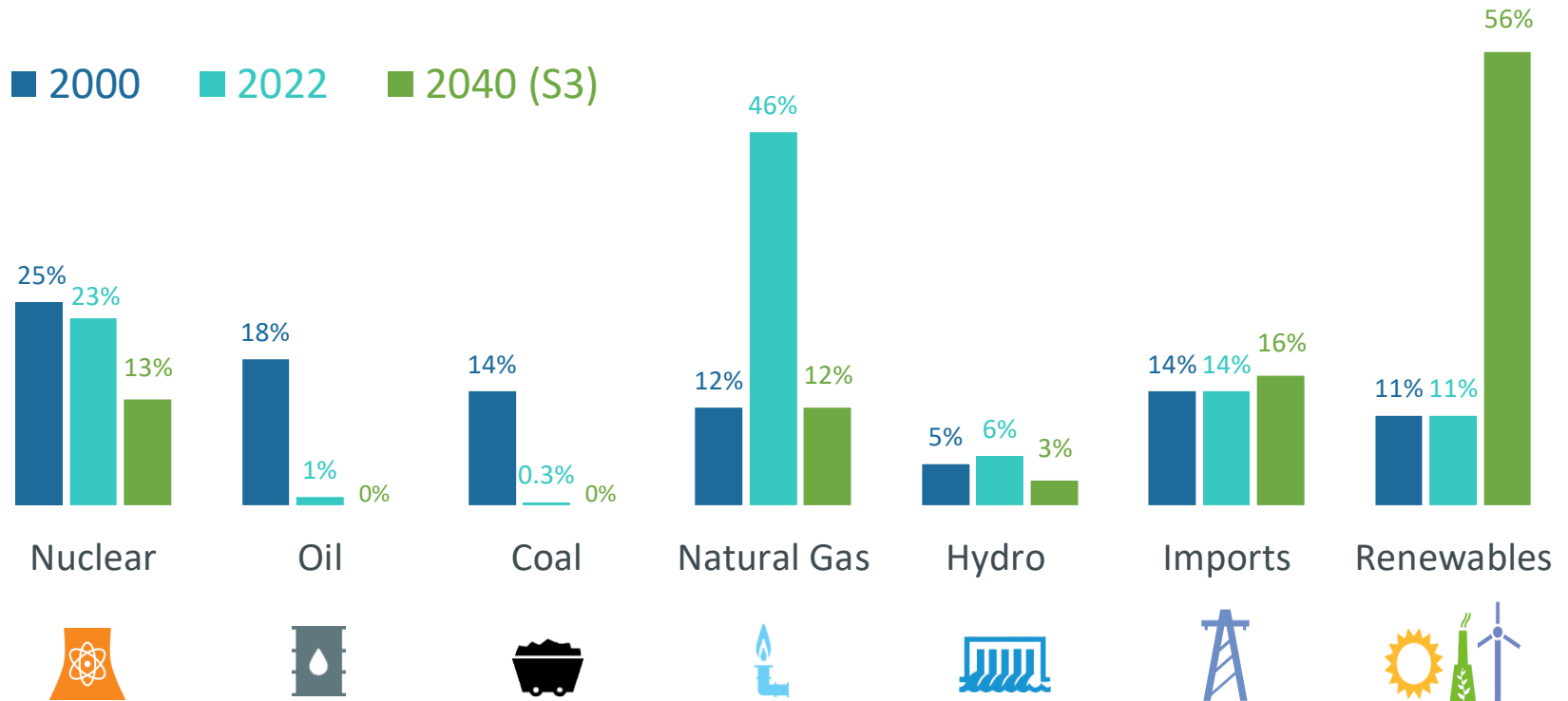
- In 2022, most of the region's energy needs were met by natural gas, nuclear, imported electricity (mostly hydropower from Eastern Canada), renewables, and other low- or non-carbon-emitting resources



*Data is subject to adjustment. Source: 2022 Net Energy and Peak Load by Source
<https://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/net-ener-peak-load>

Dramatic Changes in the Energy Mix

Percent of Total **Electric Energy** Production by Source
(Past, Present, Future)

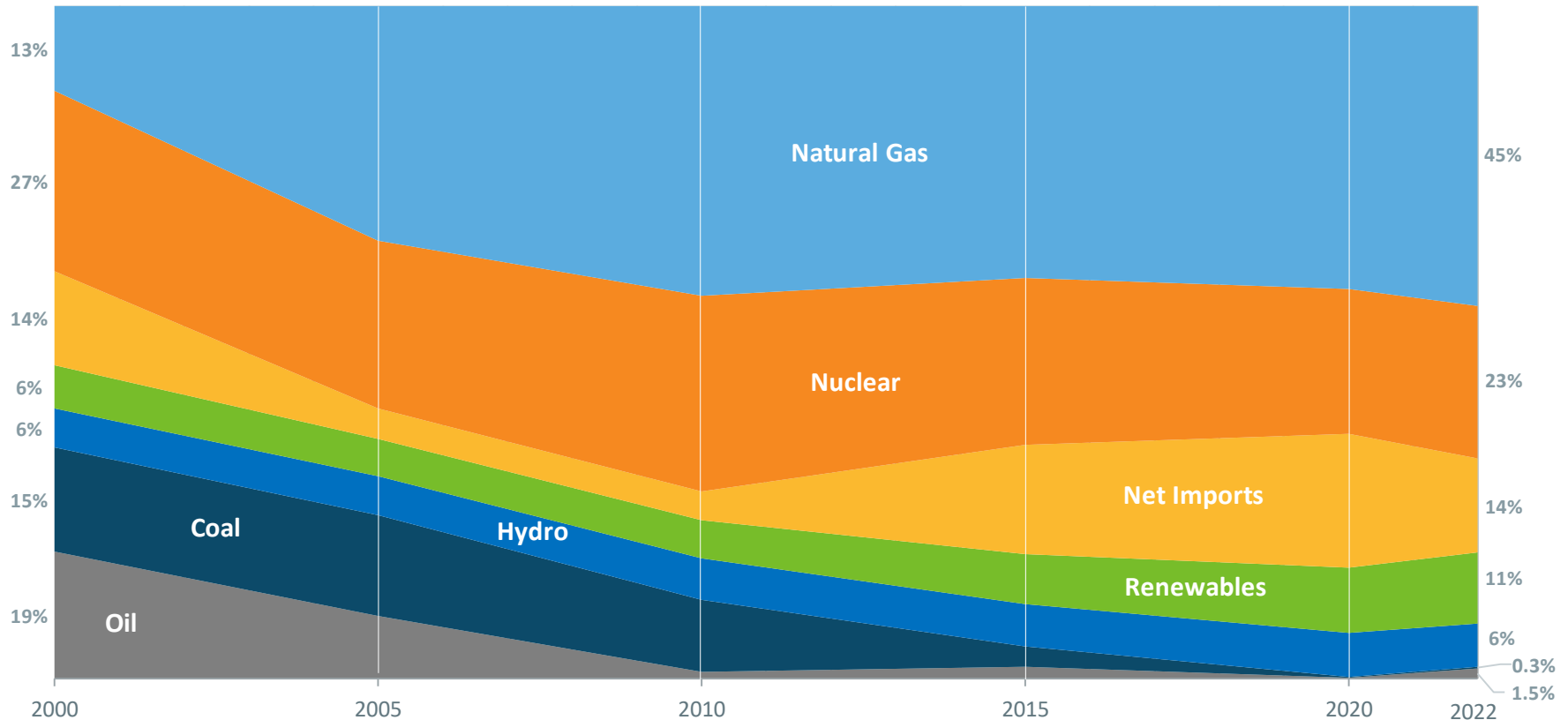


Source: ISO New England [Net Energy and Peak Load by Source](#); data for 2022 is preliminary and subject to resettlement; data for 2040 is based on Scenario 3 of the ISO New England [2021 Economic Study: Future Grid Reliability Study Phase 1](#).

Renewables include landfill gas, biomass, other biomass gas, wind, grid-scale solar, behind-the-meter solar, municipal solid waste, and miscellaneous fuels.

Dramatic Changes in the Energy Mix

Sources of Grid Electricity in New England (Annual Net Energy for Load)



Source: ISO New England, generation data, and *Net Energy and Peak Load by Source Report*



2022 WHOLESALE MARKET COSTS

Preliminary Cost Information



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).

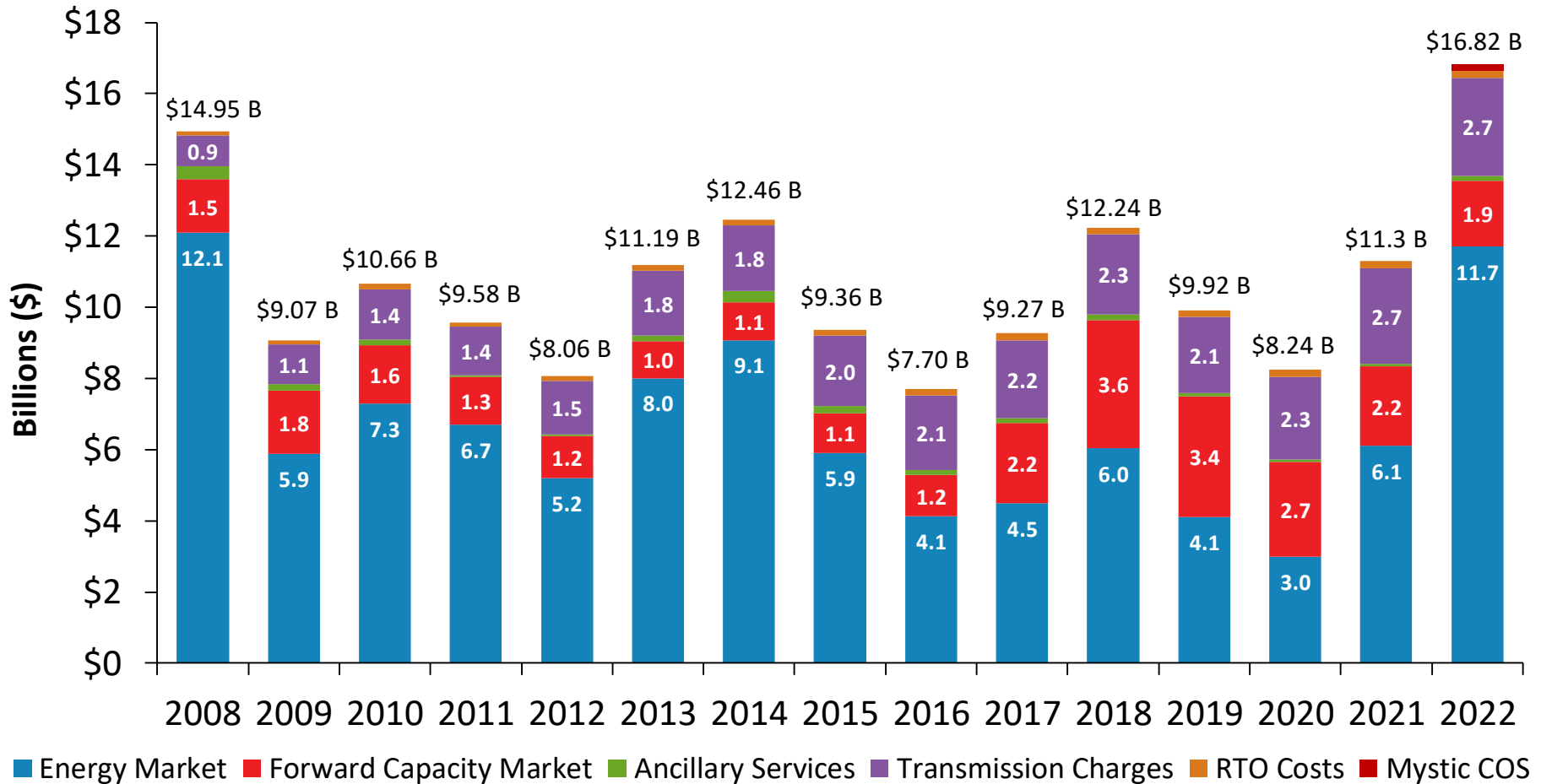
(e) Transmission charges reflect the collection of transmission owners' revenue requirements and tariff-based reliability services, including black-start capability, voltage support, and FCM reliability.

(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

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.

Mystic Cost of Service Agreement

- In 2018, after the owner of the Mystic Generation Station signaled their intention to retire the remaining generating units (Mystic 8 and 9), the ISO filed for, and FERC approved the retention of the units for regional fuel security for the Capacity Commitment Period (CCP) 2022/23 and CCP 2023/2024
 - Mystic 8 and 9 are fueled exclusively by the Everett Liquefied Natural Gas (LNG) facility
 - The Mystic units, the Everett LNG facility, and the cost of LNG delivered to fuel the generating units are included in the Cost-of-Service Agreement
- **The preliminary cost of the Mystic Cost of Service Agreement in 2022 was \$166 Million***
- Additional information about the Mystic COS Agreement is available on the [ISO website](#)



*2022 data is preliminary and subject to resettlement

NOTABLE ISO PLANNING AND IMPROVEMENT EFFORTS



Forecasting the Future Grid

An Ongoing, Important Effort

- ISO New England undertakes a number of forecasting efforts each year in order to develop a 10-year plan for the region to ensure the power grid will continue to meet New England's evolving needs.

Forecasting Effort	Description
Transportation Electrification Adoption Forecast	Forecast the energy and demand impacts associated with the uptake of electric vehicles (EVs)
Heating Electrification Forecast	Forecast the energy and demand impacts associated with the electrification of the heating sector
Energy Efficiency Forecast	Forecast the reductions in energy and demand from state-sponsored EE programs in the New England control area by state
Solar PV Forecast	Forecasts the long-term adoption of PV in the region.
Energy and Seasonal Peak Forecasts	Develops a 10-year forecast of energy and demand (gross and net), factoring in electrification, energy efficiency measures, distributed generation, and price responsive demand



Other Market, Planning, and Study Improvements Underway

- [FERC Order No. 2222](#)
 - On March 1, FERC issued an order accepting in part and rejecting in part the ISO's Order 2222 proposal to further integrate DERs and DER Aggregations into the regional markets. **The ISO will be making a series of filings to comply with the order.**
- [Storage as a Transmission Only Asset](#)
 - The ISO recently submitted proposed tariff changes to FERC **to create a new, separate class of storage resources that would be purpose-built as transmission equipment.**
- [Economic Studies Improvements](#)
 - The ISO recently submitted proposed tariff changes to FERC to **improve the economic study process by making its studies more consistent and repeatable.** These changes will provide greater insight into power system trends and help better facilitate the comparison of findings.

CONSUMER LIAISON GROUP RESOURCES AND ISO-NE UPDATES

Updated ISO-TEN Registration Page

Reports, Regional Profiles, Annual Work Plan, and Other Publications

Upcoming Opportunities for Engagement

Board Announcements

ISO-NE Budget

The ISO Has Streamlined the Process to Sign-up for an ISO-TEN Account to Register for Meetings

- Signing up for ISO-TEN now only requires your **name**, an **email** address and **phone** number (and company and organization are optional)
- ISO will continue to use [ISO-TEN](#) for registration going forward as it allows the ISO to provide updates on events, helps maintain training records, and provides accurate attendance information

ISO New England's Training and Events Network (ISO-TEN)

Have questions or need support? Email ISONE_Registration@iso-ne.com.

* First Name:

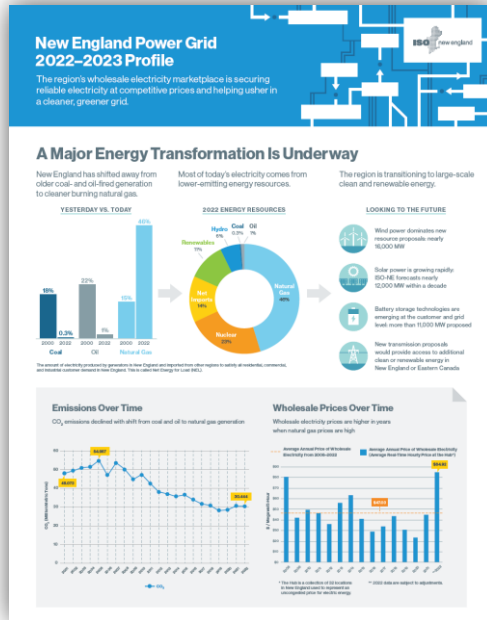
* Last Name:

* Email Address:

Company/Org (N/A if not applicable):

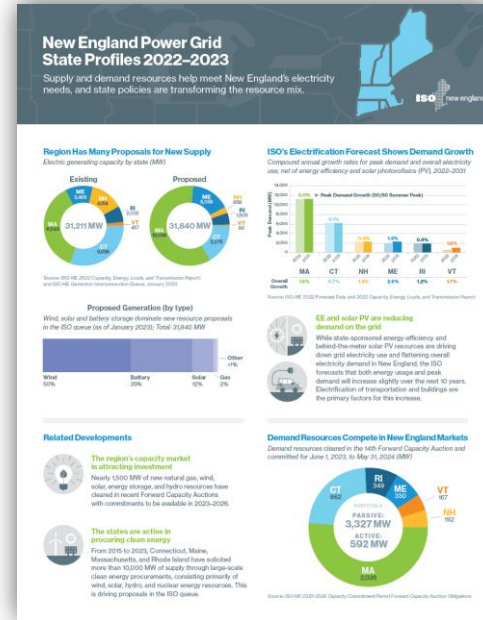
* Phone:

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



ISO New England's 2023 Annual Work Plan

- The ISO's [2023 Annual Work Plan](#) (AWP) outlines anchor projects and other notable initiatives for the coming year
- Anchor projects include:
 - Immediate and longer-term steps to ensure energy adequacy for the region
 - New market products to procure and transparently price day-ahead ancillary services essential to system reliability
 - Updates to the ISO's resource capacity accreditation methods to better reflect individual reliability contributions from the region's evolving mix of electricity generators
- The Annual Work Plan is published each fall and updated each spring
 - **The ISO solicits input on the AWP from NEPOOL and the New England State through NECPUC and NESCOE**

2023 AWP	Q1	Q2	Q3	Q4
Markets Related	Resource Capacity Accreditation			
	Day-Ahead Ancillary Services			
	Preferred Pathway to the Future Grid Assessment			
	FCM Assessments and Enhancements			
	Energy Shortage Pricing Assessment			
	IEP Updates			
Planning & Operations	Extended/Longer-Term Transmission Planning Phase 2			
	2050 Transmission Study			
	Future Grid Reliability Study Phase 2			
	FCM Three-Year Capacity Time Out			
	Extreme Weather/EPRI			
	Energy Adequacy			
	Expanded Weather Analytics			
Capital Priorities	Continuing Business			
	nGEM Market Clearing Engine			
	Models & Simulators to Support Future Grid			
	Cloud Computing			
	Cyber Security			

Upcoming Opportunities for Engagement in the Region

- **June 8** – Second Quarterly CLG Meeting
- **June 20** – FERC to convene its [second New England Winter Gas-Electric Forum](#) in Portland, Maine
- **September 21** – Third Quarterly CLG Meeting
- **November 1** – [2023 Regional System Plan Public Meeting/Open Meeting of the ISO New England Board of Directors](#)
- **Fall 2023** – ISO 101 for Public Officials
- **December 6** – Fourth Quarterly CLG Meeting



ISO New England Board Adopts Mission Statement on Board Diversity, Equity, and Inclusion



- In January, the ISO New England Board of Directors adopted a [Mission Statement on Diversity, Equity, and Inclusion](#)
- “The Board's Nominating and Governance Committee, which oversees the ISO’s role in electing members to the Board, has committed to work with stakeholders through the Joint Nominating Committee process to ensure that each pool of candidates includes candidates who will add to the Board’s diversity of experience and background”

FERC Approves ISO-NE 2023 Budget

- On October 14, 2022, the ISO filed its proposed 2023 operating and capital budgets with FERC, following a vote to approve by the NEPOOL Participants Committee on October 6
 - **FERC approved the ISO's 2023 Budget on [December 20](#)**
- Under the formal budget review process, the New England states have the opportunity to submit questions and comments on the proposed budget following the August presentation
- The 2023 operating budget (before depreciation and true up) is projected to be \$209.2 million (\$20.1 million or 10.7% higher than 2022)
- The 2023 capital budget is projected to be \$33.5 million (4.7% higher than 2022)
- After depreciation and true up, the revenue requirement for 2023 is projected to be \$225.6 million (\$9.5 million or 4.4% higher than 2022)
 - **If the revenue requirement for 2023 were fully passed through to end-use customers, their cost would average \$1.18 per month (up from \$1.12 per month for 2022)**



For more information, visit the ISO New England website: <https://www.iso-ne.com/about/corporate-governance/budget/>

ISO-NE 2023 Training Schedule Announced

- ISO New England has [announced](#) its training schedule for 2023, including classes and webinars
- 2023 Training Classes Include:
 - Introduction to Wholesale Electricity Market (WEM)101
 - May 22-25
 - Forward Capacity Market (FCM 101)
 - October 24-26
 - Intermediate Whole Electricity Markets (WEM 201)
 - November 14-16
- Interested Parties can also sign up for the [ISO training mailing list](#)
- Other, self-paced, training courses are available through [ISO-TEN](#), and [training materials](#) and [e-learning materials](#) posted on the ISO website

FOR MORE INFORMATION...



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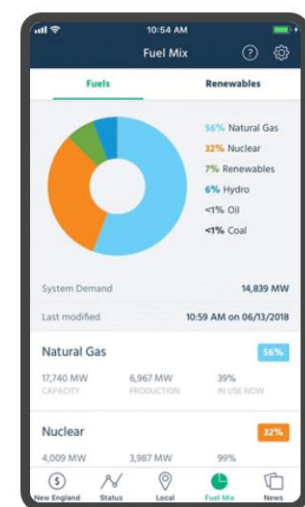
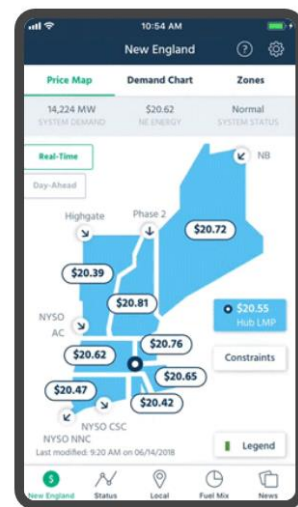


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An Ongoing Dialogue: ISO's External Affairs Team



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Questions



APPENDIX



FORWARD CAPACITY AUCTION RESULTS

Past Results



Recent Forward Capacity Auction Results

Auction Commitment Period	Total Capacity Acquired (MW)	Capacity Target (MW)	Surplus/Deficit (MW)	New Demand Resources ¹ (MW)	New Generation (MW)	Auction Zones ²	Clearing Price (\$/kW-month) ³
FCA 11 2020/2021	35,835	34,075	1,760	640	264	SENE, NNE, ROP, and NY and Quebec imports	\$5.30
						New Brunswick imports	\$3.38
FCA 12 2021/2022	34,828	33,725	1,103	514	174	SENE, NNE, ROP and NY imports	\$4.63
						Quebec imports	\$4.63 for 54 MW \$3.70 for 442 MW
						New Brunswick imports	\$3.16
FCA 13 2022/2023	34,839	33,750	1,089	654	837	SENE, NNE, ROP, and NY and Quebec imports	\$3.80
						New Brunswick imports	\$2.68
FCA 14 2023/2024	33,956	32,490	1,466	323	335	SENE, NNE, Maine, ROP, and NY, New Brunswick, and Quebec imports	\$2.00
FCA 15 2024/2025	34,621	33,270	1,351	170	950	SENE	\$3.98
						NNE	\$2.48
						Maine	\$2.48
						ROP	\$2.61
FCA 16 2025/2026	32,810	31,645	1,165	230	311	SENE	\$2.64
						NNE	\$2.53
						Maine	\$2.53
						ROP	\$2.59
FCA 17 2026/2027	31,370	30,305	1,065	130	619	New Brunswick imports	\$2.55
						SENE, NNE, Maine, ROP, and NY and Quebec imports	\$2.59

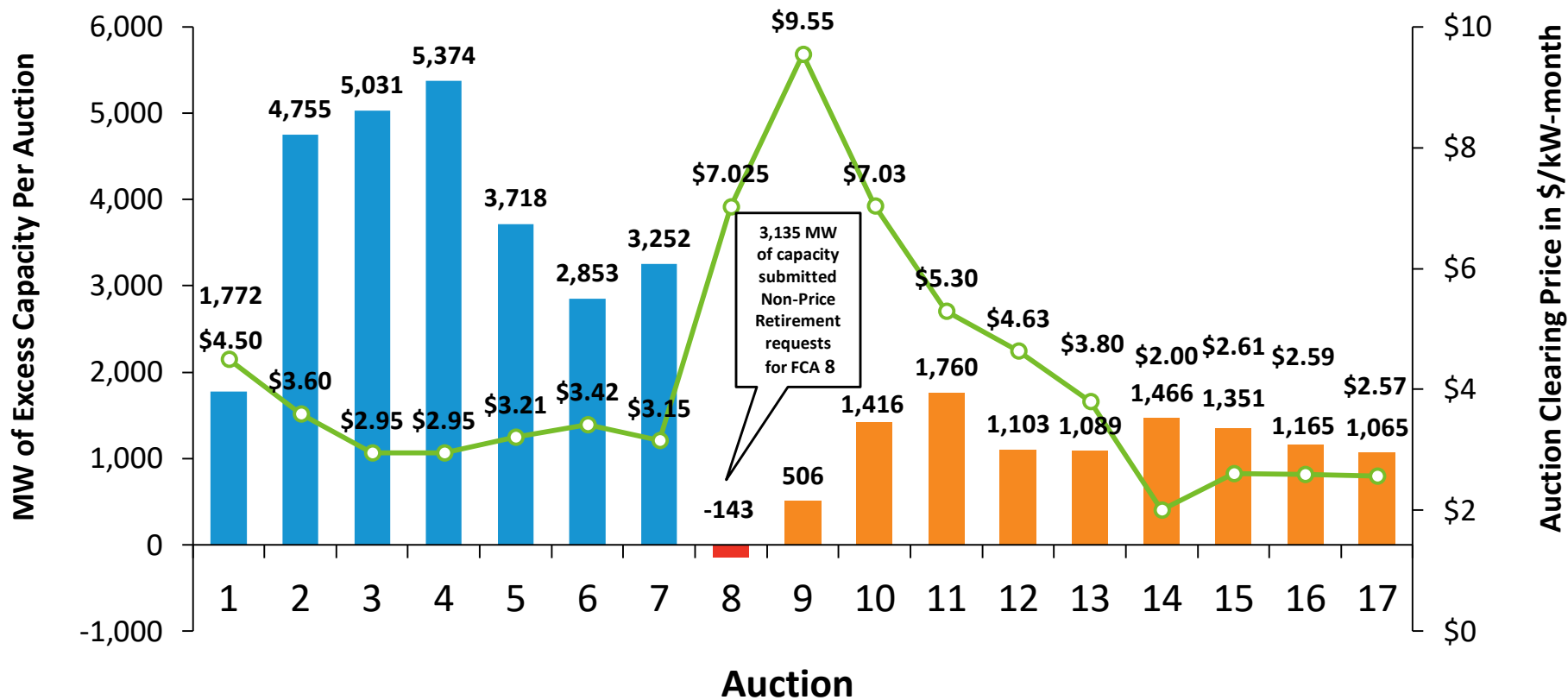
¹ Demand resources include energy efficiency, demand-response resources, and real-time emergency generation (RTEG). ² Capacity pricing zones: In **FCA 10**, Rest-of-Pool (ROP) included Western/Central MA, CT, ME, NH, and VT; the new Southeast New England (SENE) zone combined Northeastern MA/Boston and Southeastern MA/RI. In **FCA 11**, Northern New England (NNE) comprised of ME, NH, VT; Southeast New England (SENE) including NEMA/Boston, SEMA, and RI; and ROP including CT and WCMA. In **FCA 12** Southeast New England (SENE) included Southeastern MA, RI and Northeastern MA/Boston, Northern New England (NNE) included ME, NH and VT; Rest-of-Pool (ROP) included CT, Western/Central MA. In **FCA 13**, the same zones were modeled as FCA 12. In **FCAs 14-17**, Southeast New England (SENE) included Southeastern MA, RI and Northeastern MA/Boston load zones; the Northern New England (NNE) include NH, VT and ME; Maine is a separate nested zone; Rest-of-Pool (ROP) included CT and Western/Central MA. ³ From **FCA 9 on**, a sloped demand curve has been used, allowing more or less than the capacity requirement to be procured, depending on price and reliability needs.

Changes in Supply Dynamics in FCAs 1–17

Capacity Surplus or Deficit (MW) Against Auction Clearing Prices (\$/kWh-month)

Negotiated Ceiling and Floor Prices (per settlement)

Sloped Demand Curve, Price-Lock Extension*, Removal of Administrative Pricing Rules



*Price-Lock extension terminated after FCA #15

DECEMBER 2022

Wholesale Market Prices, Cost Drivers, Demand, and Resource Mix



December 2022 Prices, Demand, and Usage

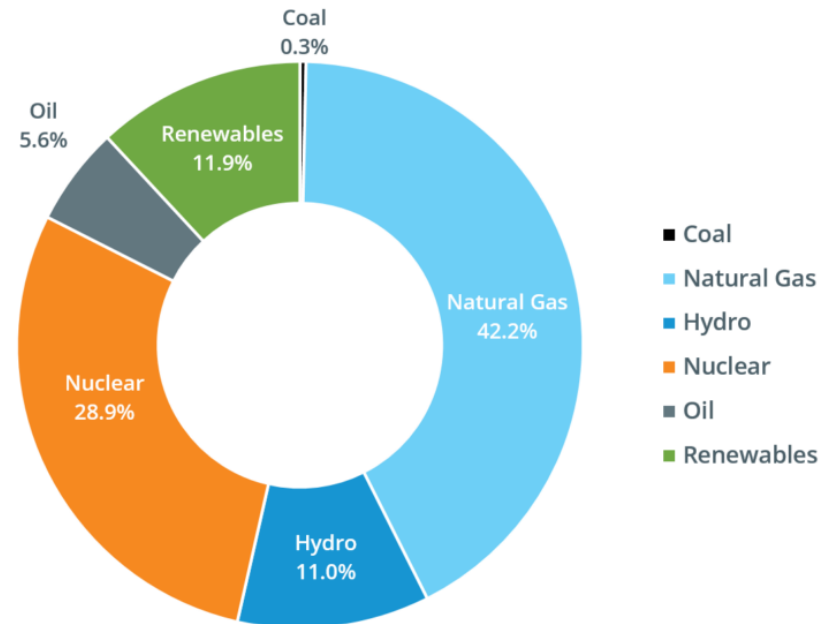
Dec. 22 and Percent Change from Dec. 21 and Nov. 2022	December 2022	December 2021	November 2022
Average Real-Time Electricity Price (\$/megawatt-hour)	\$121.47	104.4%	80.4%
Average Natural Gas Price (\$/MMBtu)	\$13.86	65.4%	140.6%
Peak Demand	17,949 MW	-0.1%	6.2%
Total Electricity Use	10,403 GWh	0.9%	16.4%
Weather-Normalized Use ²	10,517 GWh	0.2%	16.1%

Source: <https://isonewswire.com/2023/02/03/monthly-wholesale-electricity-prices-and-demand-in-new-england-december-2022/>



December 2022 Resource Mix in New England

- Elevated natural gas prices throughout the month led to a pronounced increase in wholesale electricity costs in December 2022
- Oil-fired resources produced 5.6% of the electricity generated within New England in December
- Oil resource are dispatched more often when natural gas prices are high.
- Oil-fired plants generated significant amounts of electricity between December 23 and 28, coinciding with the highest natural gas prices of the month



Source: <https://isonewswire.com/2023/02/03/monthly-wholesale-electricity-prices-and-demand-in-new-england-december-2022/>

JANUARY 2023

Wholesale Market Prices, Cost Drivers, Demand, and Resource Mix



January 2023 Prices, Demand, and Usage

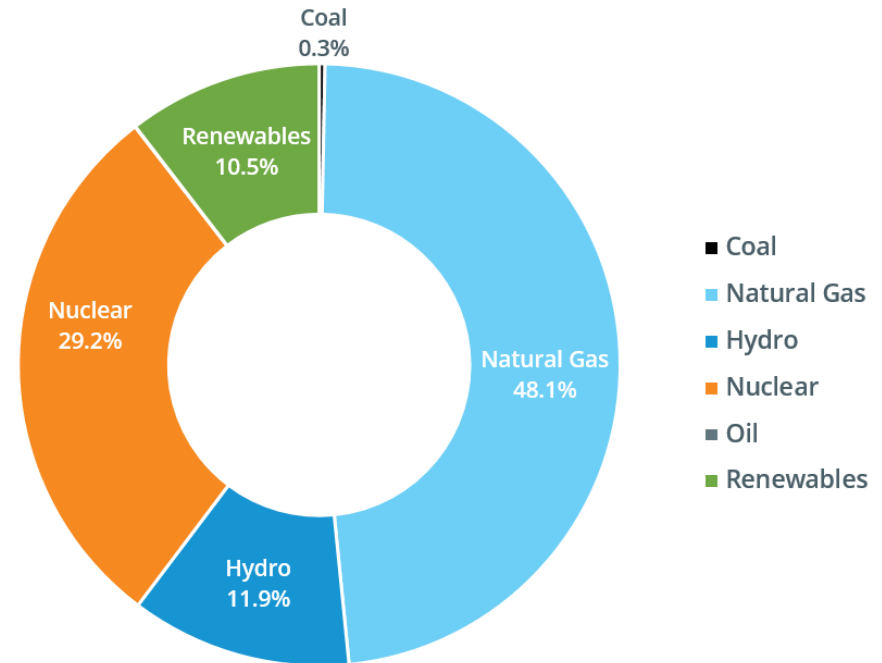
Jan. 23 and Percent Change from Jan. 22 and Dec. 2022	January 2023	January 2022	December 2022
Average Real-Time Electricity Price (\$/megawatt-hour)	\$50.51	-66.0%	-58.4%
Average Natural Gas Price (\$/MMBtu)	\$4.73	-76.5%	-65.9%
Peak Demand	17,294 MW	-12.5%	-3.6%
Total Electricity Use	10,232 GWh	-9.6%	-1.6%
Weather-Normalized Use ²	10,949 GWh	-1.4%	4.1%

Source: <https://isonewswire.com/2023/03/02/monthly-wholesale-electricity-prices-and-demand-in-new-england-january-2023/>



January 2023 Resource Mix in New England

- Mild weather, lower natural gas prices, and a drop in demand led to year-over-year decreases in wholesale electricity prices in January 2023
- The average temperature during January was 36° Fahrenheit (F) in New England, up 11° from the previous January
- The average dew point, a measure of humidity, was 28°F in January, up 15° from the previous January
- There were 904 heating degree days (HDD) during January, while the normal number of HDD in January is 1172 in New England



Source: <https://isonewswire.com/2023/03/02/monthly-wholesale-electricity-prices-and-demand-in-new-england-january-2023/>

FEBRUARY 2023

Wholesale Market Prices, Cost Drivers, Demand, and Resource Mix



February 2023 Prices, Demand, and Usage

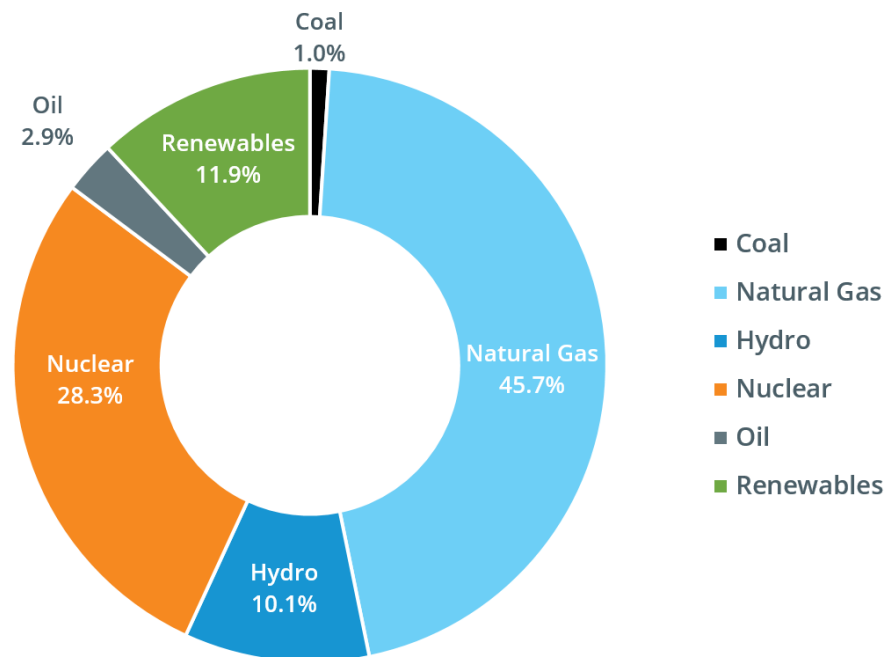
Feb. 23 and Percent Change from Feb. 22 and Jan. 2023	February 2023	February 2022	January 2023
Average Real-Time Electricity Price (\$/megawatt-hour)	\$65.21	-40.0%	29.1%
Average Natural Gas Price (\$/MMBtu)	\$8.13	-44.3%	72.2%
Peak Demand	19,645 MW	6.2%	13.6%
Total Electricity Use	9,323 GWh	-3.4%	-8.9%
Weather-Normalized Use ²	9,692 GWh	-1.6%	-11.5%

Source: <https://isonewswire.com/2023/03/23/monthly-wholesale-electricity-prices-and-demand-in-new-england-february-2023/>



February 2023 Resource Mix in New England

- Despite a cold spell in the beginning of the month, mild weather, lower natural gas prices and lower demand led to year-over-year decreases in wholesale electricity prices in February 2023
- The average temperature during February was 33° Fahrenheit (F) in New England, up 2° from the previous February.
- The average dew point, a measure of humidity, was 20°F in February, the same as the previous February.
- There were 892 heating degree days (HDD) during February, while the normal number of HDD in February is 1010 in New England



Source: <https://isonewswire.com/2023/03/23/monthly-wholesale-electricity-prices-and-demand-in-new-england-february-2023/>

ANNUAL WHOLESAL MARKET COSTS

Past Costs and Drivers



New England Wholesale Electricity Costs, 2011 to 2022

	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022 ^(b)	
	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh	\$ Mil.	c/kWh
Wholesale market costs																						
Energy (LMPs)^(c)	\$5,193	3.9	\$8,009	6.0	\$9,079	6.9	\$5,910	4.5	\$4,130	3.2	\$4,498	3.5	\$6,041	4.7	\$4,105	3.3	\$2,996	2.4	\$6,099	4.8	\$11,698	9.0
Ancillaries^(d)	\$56	0.0	\$152	0.1	\$331	0.3	\$210	0.2	\$146	0.1	\$132	0.1	\$147	0.1	\$81	0.1	\$61	0.0	\$59	0.0	\$134	0.1
Capacity^(e)	\$1,182	0.9	\$1,039	0.8	\$1,056	0.8	\$1,110	0.8	\$1,160	0.9	\$2,245	1.8	\$3,606	2.8	\$3,401	2.7	\$2,662	2.2	\$2,245	1.8	\$1,864	1.4
Subtotal	\$6,431	4.8	\$9,200	6.9	\$10,466	8.0	\$7,229	5.5	\$5,437	4.2	\$6,875	5.4	\$9,794	7.6	\$7,586	6.0	\$5,719	4.7	\$8,404	6.6	\$13,697	10.6
Transmission charges^(f)	\$1,493	1.1	\$1,822	1.4	\$1,828	1.4	\$1,964	1.5	\$2,081	1.6	\$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^(g)	\$139	0.1	\$167	0.1	\$165	0.1	\$165	0.1	\$180	0.1	\$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	\$8,063	6.0	\$11,189	8.4	\$12,459	9.5	\$9,358	7.1	\$7,698	5.9	\$9,267	7.3	\$12,240	9.4	\$9,915	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.

(b) **The wholesale values for 2022 are preliminary and subject to reconciliation.**

(c) 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.

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

(e) Capacity charges are those associated with the Forward Capacity Market from June 2012 forward.

(f) Transmission charges reflect the collection of transmission owners' revenue requirements and tariff-based reliability services, including blackstart capability, voltage support, and FCM reliability. In 2019, the cost of payments made to these generators for reliability services under the ISO's [Open-Access Transmission Tariff \(OATT\)](#) was \$57.4 million. Transmission charge totals for 2010 forward reflect the refund of OATT, Schedule 1 through-or-out (TOUT) service charges to regional network load.

(g) 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](#).



Natural Gas and Wholesale Electricity Prices Are Linked

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

