



ISO New England Overview

Presenting to the Connecticut Equity & Environmental Justice Advisory Council (CEEJAC) Energy Subcommittee

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An Ongoing Dialogue: ISO's External Affairs Team



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ISO New England Keeps Power Flowing Across the Region Every Minute of Every Day

Congress, States Restructure Electric Industry

Policymakers seek to promote competition, with a focus on costs to consumers

- **1992:** Congress promotes competition in the wholesale energy markets by creating “**open access**” to transmission facilities (*Energy Policy Act*)
- **1996:** Federal Energy Regulatory Commission (FERC) issues orders to implement the 1992 Act and introduces the concept of an independent system operator, or **ISO** (*Orders 888 & 889**)
- **Late 1990s:** Most New England states pass restructuring legislation to:
 - **Lower prices** to consumers through competition for electricity supply (this included opening retail markets to competition and requiring monopoly utilities to divest generation assets), and
 - **Shift risk of bad investment** decisions to shareholders (away from ratepayers)

“The Commission's goal is to remove impediments to competition in the wholesale bulk power marketplace and to bring more efficient, lower cost power to the Nation's electricity consumers.”

- FERC Order 888

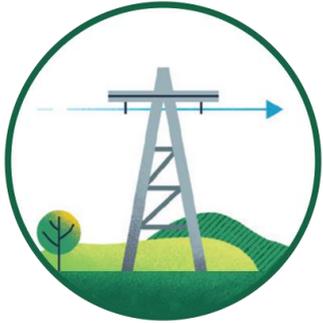
*FERC **Order 888** Promoting Wholesale Competition Through Open Access, Non-Discriminatory Transmission Services by Public Utilities, and **Order 889** Open Access Same-Time Information System and Standards of Conduct

Creation and Evolution of ISO New England

- **1997:** ISO New England formed in response to federal policy implemented by FERC, and proposal from NEPOOL that was supported by the six public utilities commissions
- Key elements of the proposal to restructure NEPOOL and the New England wholesale electric power market:
 - Open access transmission tariff established terms for regionwide transmission service
 - Creation of an ISO, and
 - Restated NEPOOL Agreement
- **1999:** FERC issued an order encouraging voluntary formation of **regional transmission organizations** (RTOs), that would encompass broader geographic areas than ISOs (Order 2000)
- **2005:** ISO-NE obtained FERC approval to become an RTO but retained the name “ISO”

Why an Independent System Operator?

ISOs are independent, not-for-profit organizations that coordinate generation and transmission to provide reliable and cost-effective electricity



Non-discriminatory,
open access to the
transmission system



Full control of the
transmission system



Consumers benefit
from competition for
electricity supply



Independence from
market participants

ISO New England Has Nearly Three 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's *Mission and Vision*

Mission: *What we do*

Through collaboration and innovation, ISO New England plans the transmission system, administers the region's wholesale markets, and operates the power system to ensure reliable and competitively priced wholesale electricity

Vision: *Where we're going*

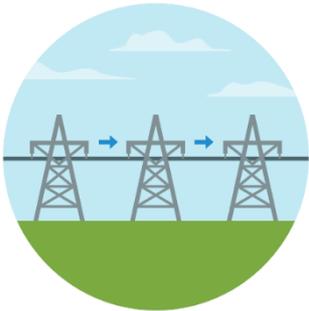
To harness the power of competition and advanced technologies to reliably plan and operate the grid as the region transitions to clean energy



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

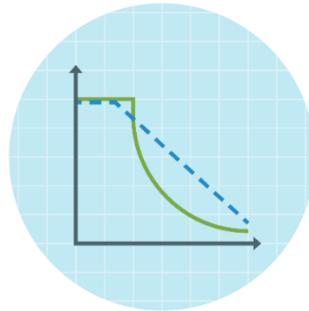
Grid Operation

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



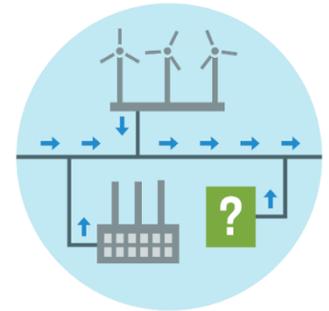
Market Administration

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

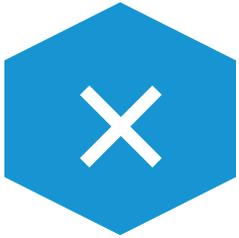


Power System Planning

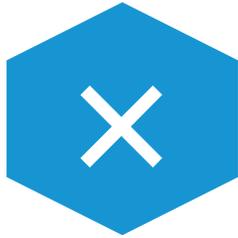
Study, analyze, and plan to make sure New England's electricity needs will be met over the next 10 years



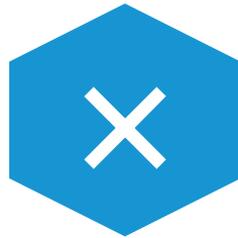
Things We Don't Do



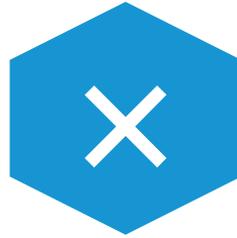
Handle retail electricity



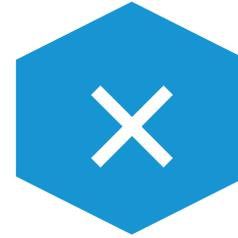
Own power grid infrastructure



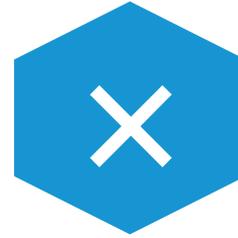
Have a stake in companies that own grid infrastructure



Have jurisdiction over fuel infrastructure



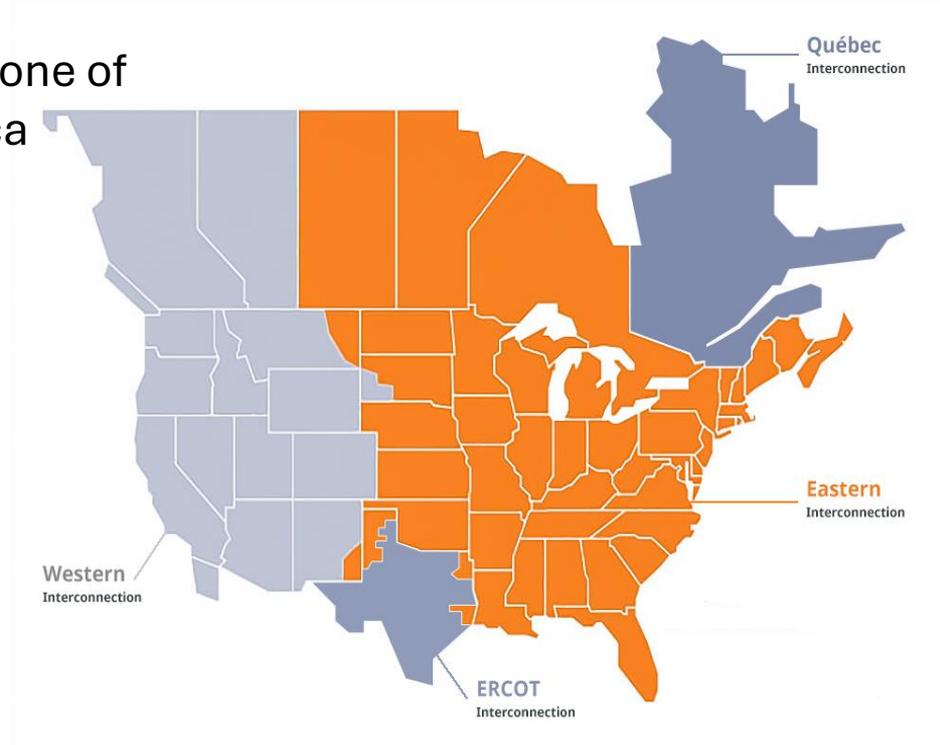
Have control over siting decisions



Plan the resource mix

New England's Power Grid Is Part of a Larger Electric Power System

- Part of the **Eastern Interconnection**, one of four large power grids in North America
 - Interconnected through primarily alternating current (AC) transmission
- Tied to **Québec** only through direct current (DC) transmission
- 2003 blackout ushered in wide-area monitoring and **mandatory** reliability standards
- Subject to reliability standards set by **NERC** and **NPCC***



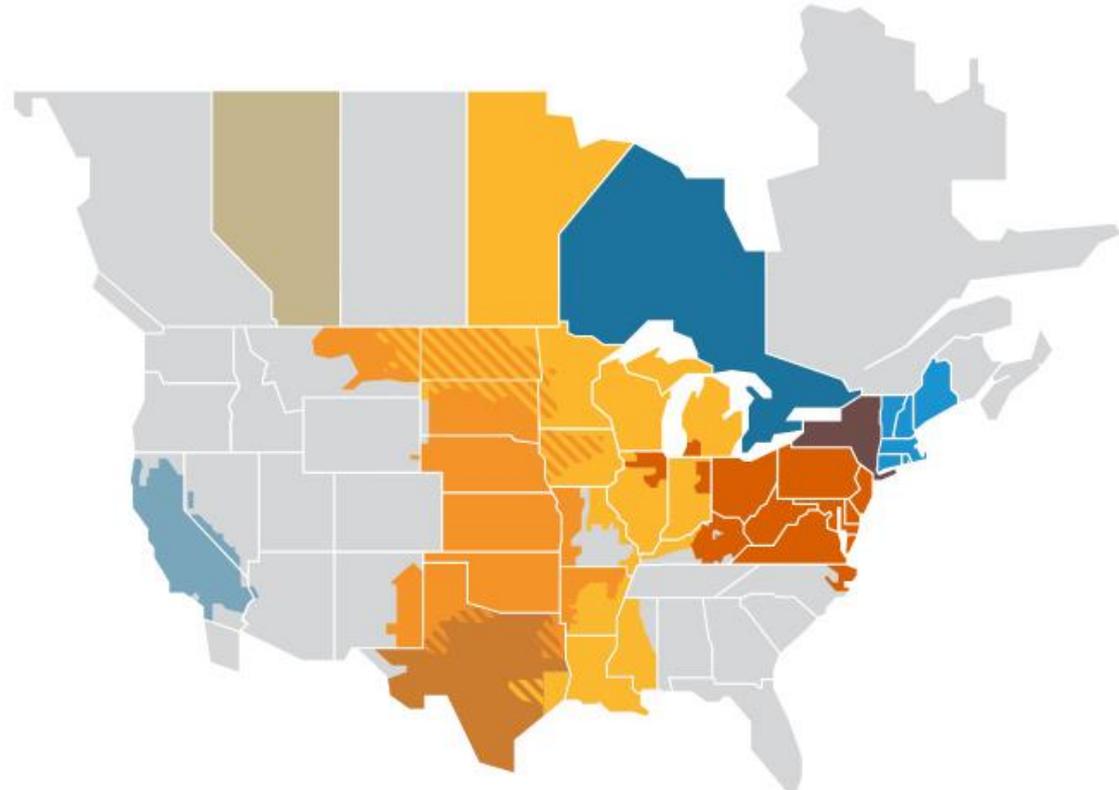
* North American Electric Reliability Corporation (NERC) and Northeast Power Coordinating Council (NPCC)

ISO New England Is Part of the ISO/RTO Council

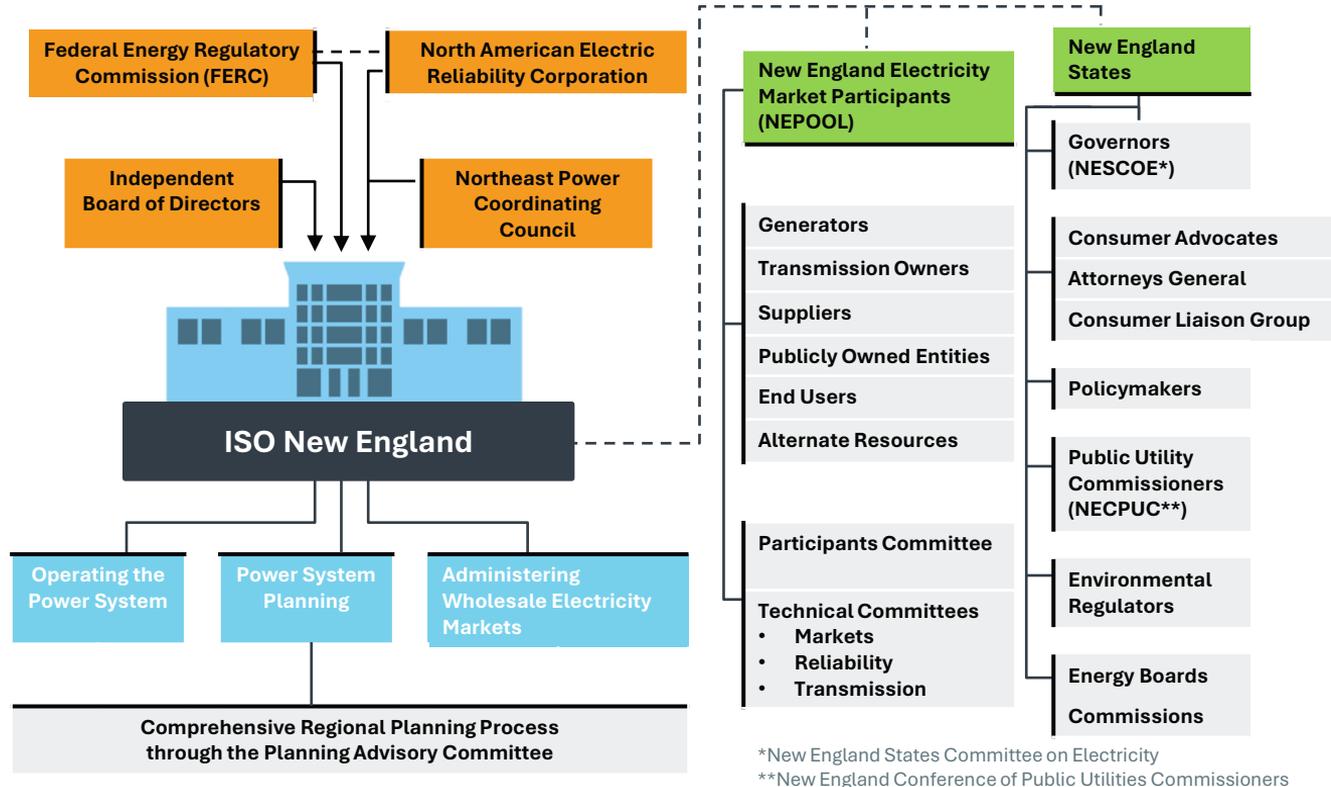
There Are Nine ISOs and RTOs in North America

ISO New England covers the six states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

- California ISO
- Alberta Electric System Operator
- Electricity Reliability Council of Texas
- Southwest Power Pool
- Midcontinent ISO
- Ontario Independent Electricity System Operator
- PJM Interconnection
- New York ISO
- ISO New England

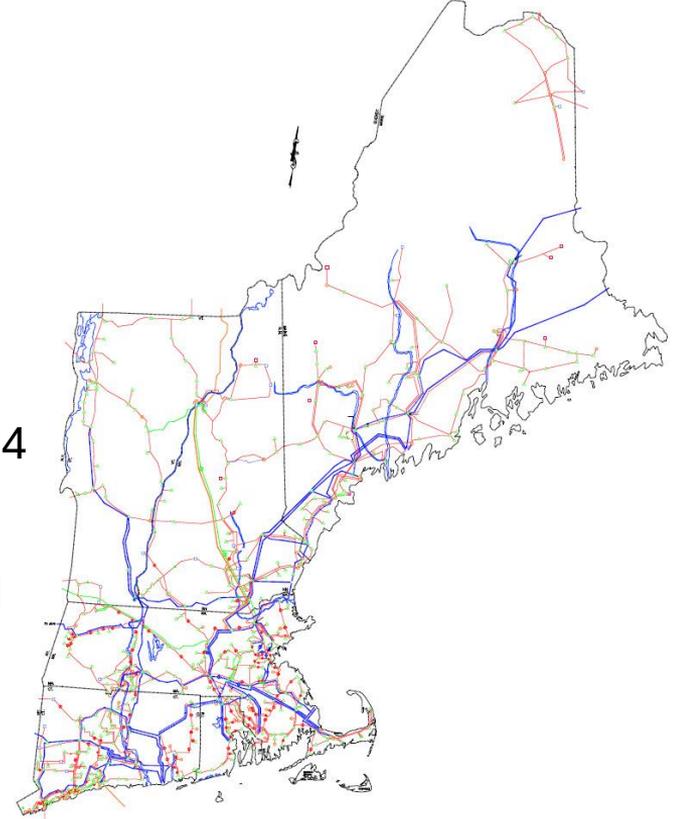


Numerous Entities Including an Independent Board Provide Oversight of and Input on ISO's Responsibilities



New England's Transmission Grid Is the Interstate Highway System for Electricity

- **9,000 miles** of high-voltage transmission lines (primarily 115 kV and 345 kV)
- **13 transmission interconnections** to power systems in New York and Eastern Canada
- **9%** of region's energy needs met by imports in 2024
- **\$12.7 billion** invested to strengthen transmission system reliability since 2002; **\$1.4 billion** planned
- Developers have proposed multiple transmission projects to access **non-carbon-emitting resources** inside and outside the region



There Are **Four Pillars** Necessary to Support a Successful Clean Energy Transition



PILLAR ONE

Clean Energy

Significant amounts of clean energy to power the economy with a greener grid



PILLAR TWO

Balancing Resources

Resources that can supply electricity, reduce demand, or provide other services to maintain power system equilibrium



PILLAR THREE

Energy Adequacy

A dependable energy supply chain and/or a robust energy reserve to manage through extended periods of severe weather or energy supply constraints



PILLAR FOUR

Robust Transmission

To integrate renewable resources and move clean energy to consumers across New England

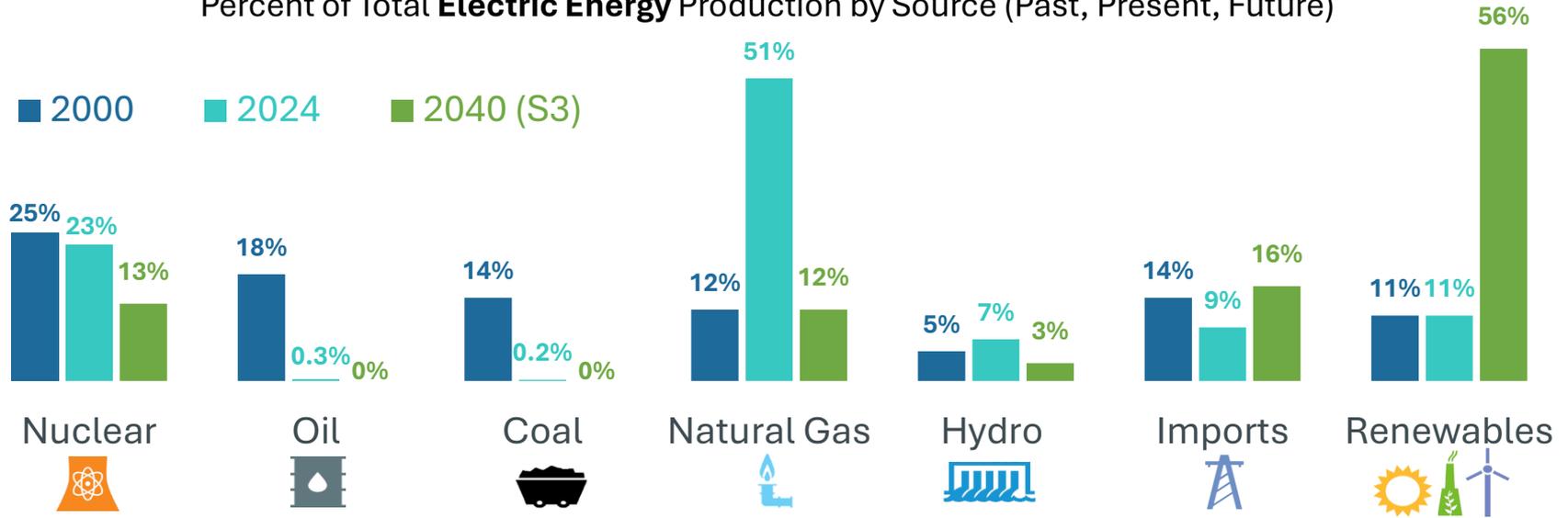
State Laws Target Deep Reductions in CO₂ Emissions and Increases in Renewable and Clean Energy

≥80% by 2050	Five states mandate greenhouse gas reductions economy wide: MA, CT, ME, RI, and VT (mostly below 1990 levels)
Net-Zero by 2050 80% by 2050	MA emissions requirement MA clean energy standard
100% by 2035	VT renewable energy requirement
100% by 2050 Carbon-Neutral by 2045	ME renewable energy goal ME emissions requirement
100% by 2040	CT zero-carbon electricity requirement
100% by 2033	RI renewable energy requirement

Dramatic Changes in the Energy Mix

New England made a major shift from coal and oil to natural gas over the past two decades, and is shifting to renewable energy in the coming decades

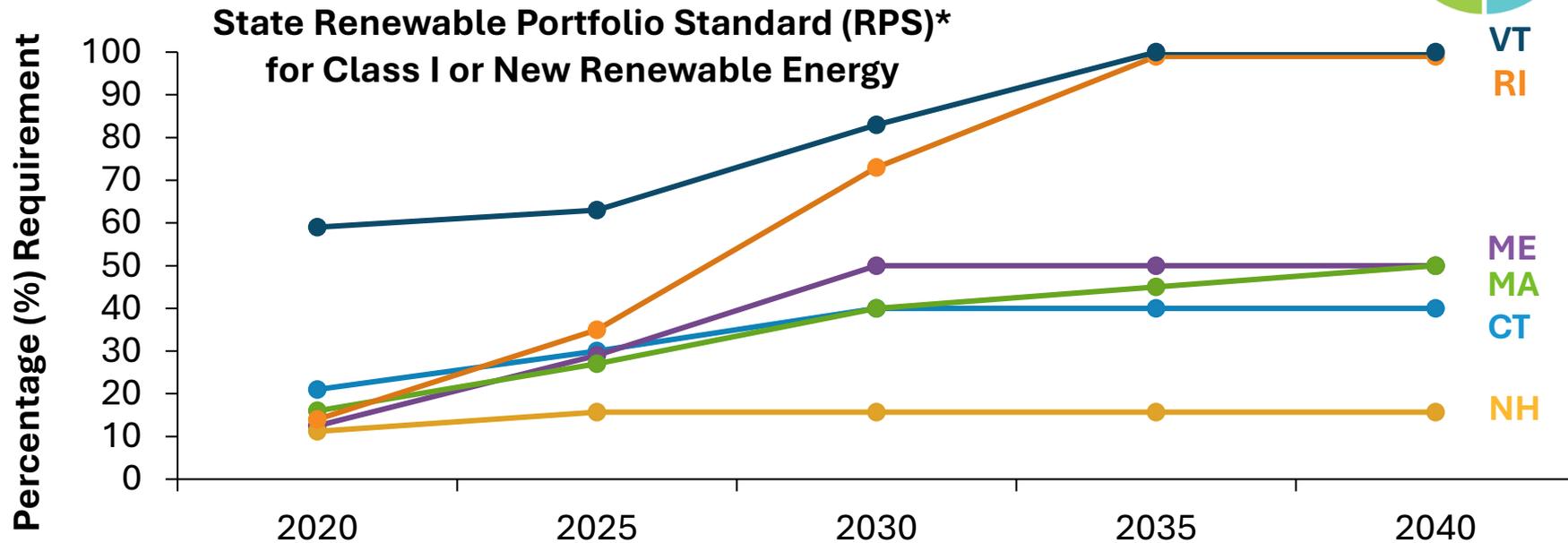
Percent of Total **Electric Energy** Production by Source (Past, Present, Future)



Source: ISO New England [Net Energy and Peak Load by Source](#); data for 2024 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.

Renewable Energy Is on the Rise

State policy requirements are a major driver

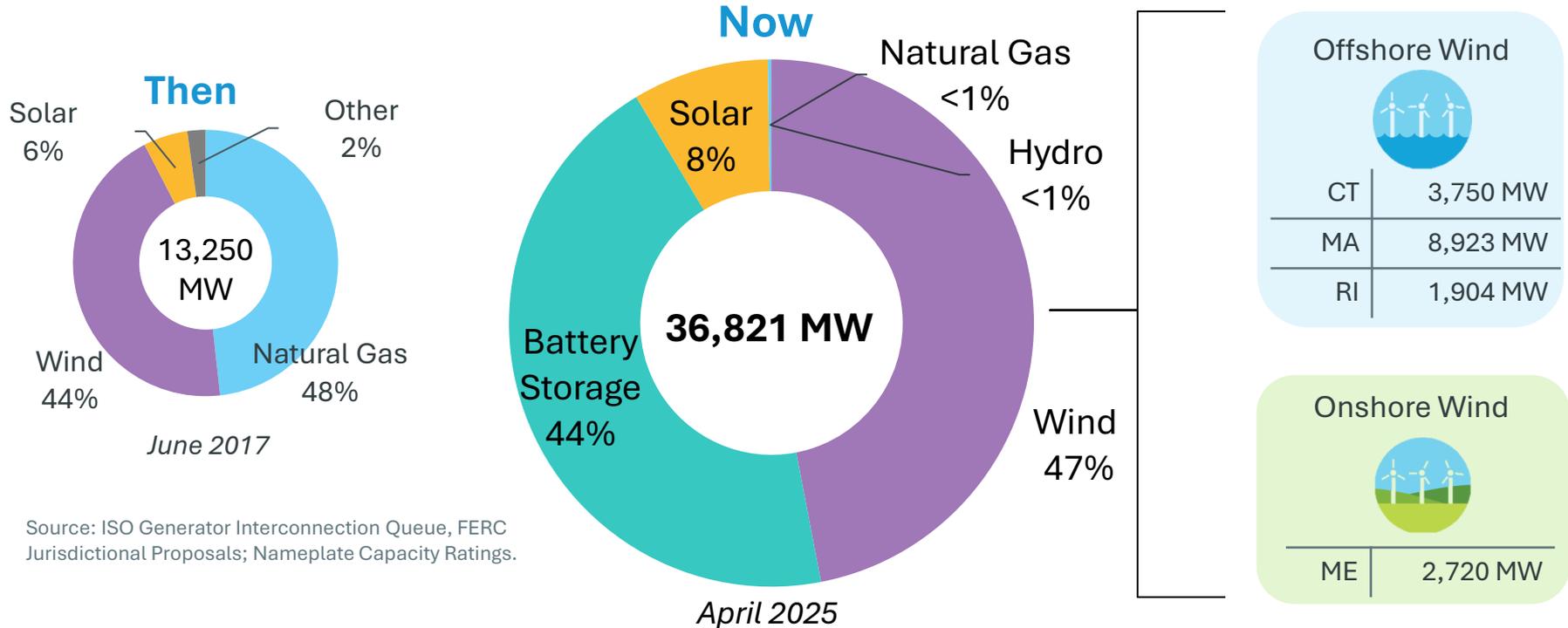


Notes: State RPS requirements promote the development of renewable energy resources by requiring electricity providers (electric distribution companies and competitive suppliers) to serve a minimum percentage of their retail load using renewable energy. Connecticut's Class I RPS requirement plateaus at 40% in 2030. Maine's Class I/IA RPS requirement increases to 50% in 2030 and remains at that level each year thereafter. Massachusetts' Class I RPS requirement increases by 2% each year between 2020 and 2024, 3% each year between 2025 and 2029, reverting back to 1% each year thereafter, with no stated expiration date. New Hampshire's percentages include the requirements for both Class I and Class II resources (Class II resources are new solar technologies beginning operation after January 1, 2006). New Hampshire's Class I and Class II RPS requirements plateau at 15.7% in 2025. Rhode Island's requirement for 'new' renewable energy reaches 100% in 2033. Vermont's 'total renewable energy' requirement reaches 100% for all utilities in 2035; it recognizes several tiers comprised of new and existing renewable energy, located in Vermont or New England, and is unique in classifying large-scale hydropower as renewable.

June 2024

The ISO Generator Interconnection Queue Provides a Snapshot of Resource Proposals

Dramatic shift in proposed resources from natural gas to battery storage and renewables



Energy Storage Is a Key Part of the New England Power Grid's *Past, Present, and Future*

- Storage has a long history of providing services to the regional electric grid
- Batteries can participate in all of ISO New England's markets **today**
- Two pumped-storage hydro facilities have operated in New England since the 1970s
 - These resources can supply up to **1,800 MW** of power within **10 minutes** for up to **7 hours**
- Currently, about **100 MW** of batteries are dispatchable by the ISO, with many more proposed

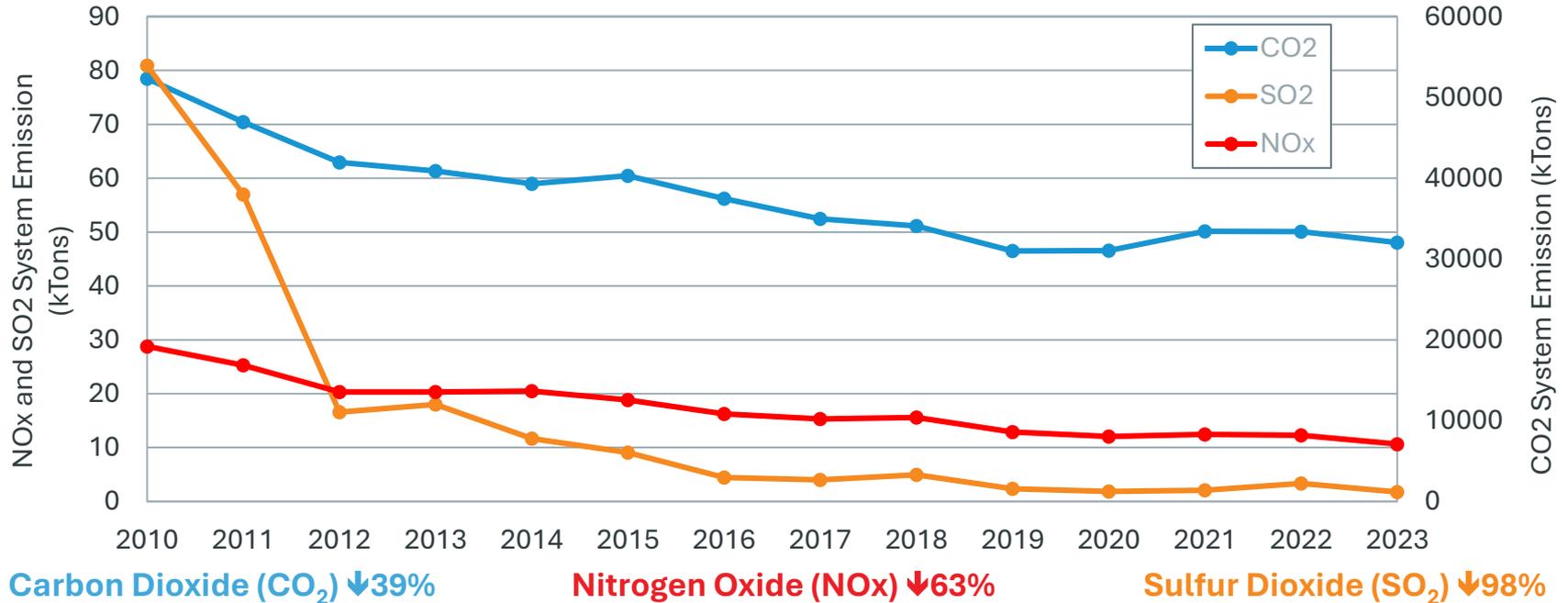


Source: Seasonal Claimed Capability Monthly Report April 2024

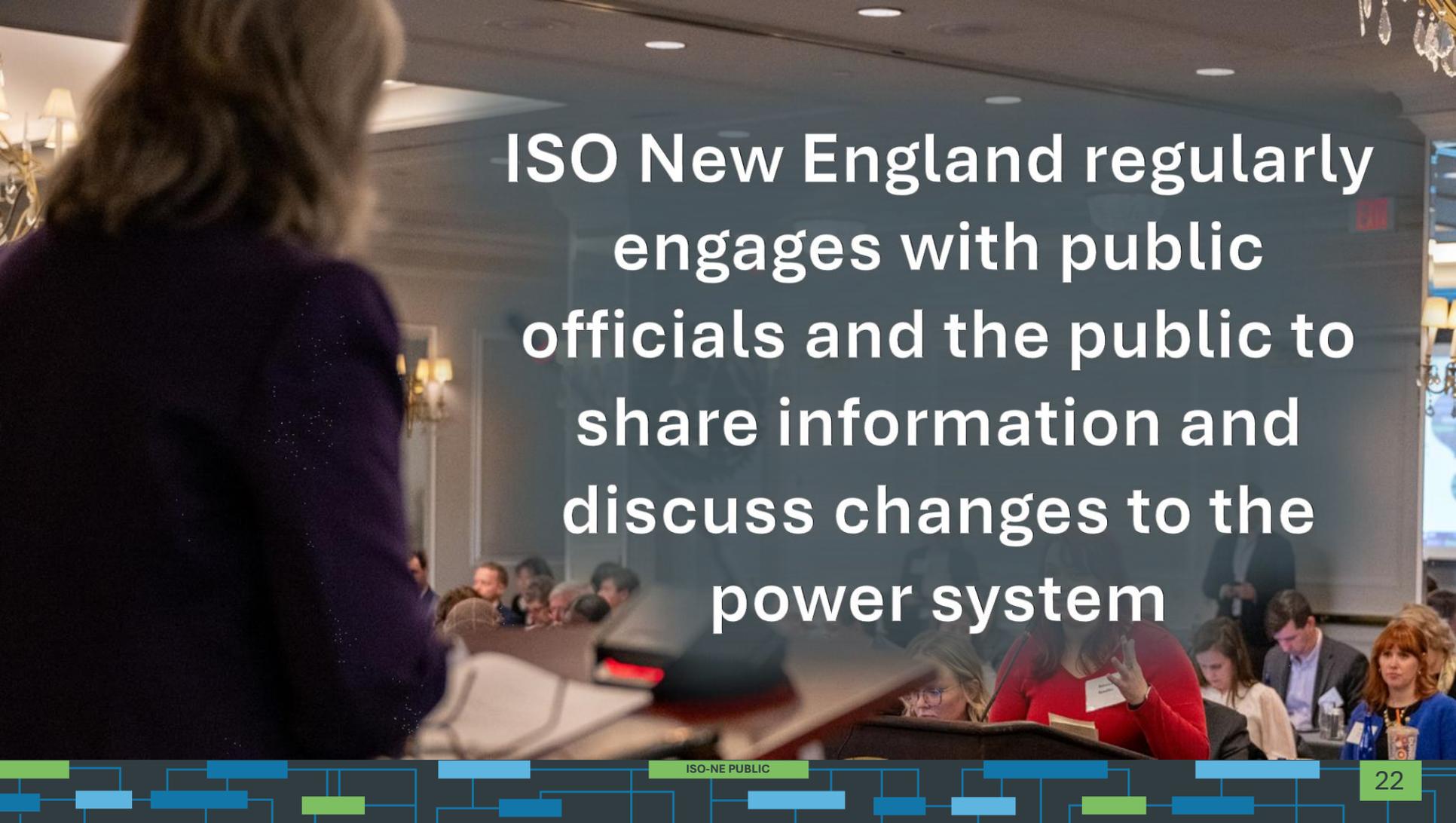
Major Emissions Reductions

Emissions from regional generators have fallen significantly since 2001

Annual New England System Generator Emissions, 2010-2023 (Thousand Short Tons)



Source: ISO New England, *New England Electric Generators Air Emissions Report*

A woman with long brown hair, wearing a purple top, is seen from behind, speaking at a podium. The podium has a microphone and a small red light. In the background, a group of people are seated at tables, listening. The room has a chandelier and recessed ceiling lights. The text is overlaid in white on a semi-transparent dark blue background.

ISO New England regularly engages with public officials and the public to share information and discuss changes to the power system

Opportunities to Engage and Learn More

Public Webinars

- ISO External Affairs periodically hosts informational **webinars** that are free and open to the public on topics such as recent ISO studies, including:
 - [Pathways Study](#)
 - [Future Grid Reliability Study](#)
 - [Overview of System Planning](#)
 - [FERC Order 2023](#)
 - [2050 Transmission Study](#)
 - [Economic Planning for the Clean Energy Transition](#)
 - [Annual Electric Generator Air Emissions Report](#)



Opportunities to Engage and Learn More

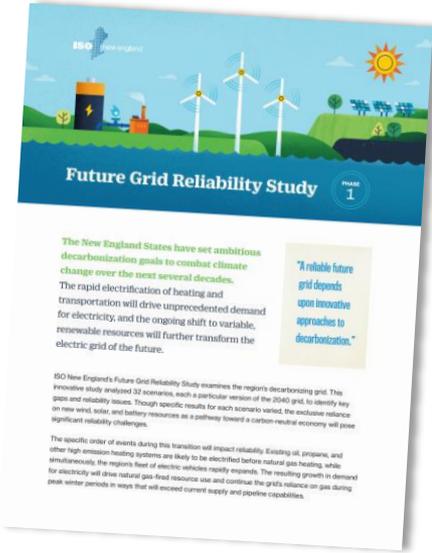
ISO Board of Directors Engagement

- The ISO **Board of Directors** host an **open meeting** annually to provide an opportunity for the public to observe its discussions firsthand
 - 2024 meeting materials, including slides and a recording of the meeting, are posted on the [event webpage](#)
 - The meeting includes a listening session during which the public can address the Board directly
 - [Public comments](#) to the Board and the [Board's responses](#) to public comments are published to the ISO website
- The ISO Board and management continue to encourage **ongoing communications and feedback** from members of the public and stakeholders to make further collective improvements to ISO initiatives and public engagement



Opportunities to Engage and Learn More

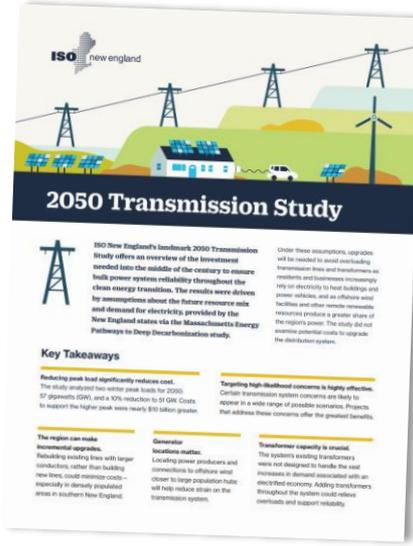
ISO creates accessible and informative fact sheets on many key initiatives



Future Grid Reliability Study Summary



2023 Regional System Plan Summary



2050 Transmission Study Factsheet



2024 EPCET Report Factsheet

Public Forums

Stakeholder committees and working groups assist in fulfilling our three roles in New England. The following committees and groups host meetings that are free and open to the public:

Consumer Liaison Group

- Forum for sharing information between the ISO and electricity consumers in New England
- In-person and virtual options to participate

Environmental Advisory Group

- Open stakeholder forum that provides stakeholders an opportunity to learn about, and provide input on, environmental matters related to the region's power system

Planning Advisory Committee

- Open stakeholder forum that provides input to ISO on the regional system planning process

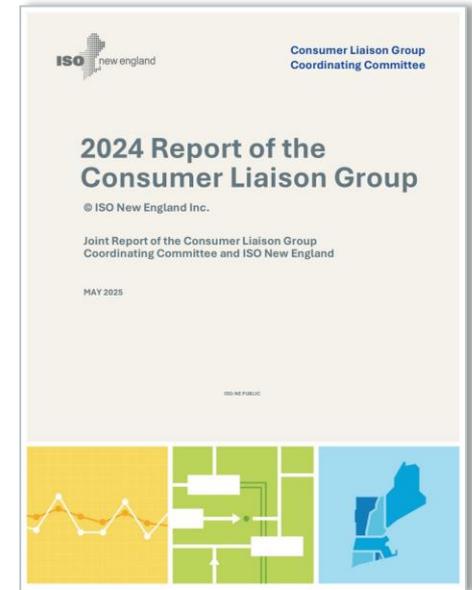


Consumer Liaison Group Provides a Forum for Consumers to Learn about Regional Electricity Issues

- A forum for sharing information between the ISO and electricity consumers in New England
- The CLG Coordinating Committee consists of 14 members who are elected every two years
- Quarterly meetings are free and open to the public, with in-person and virtual options to participate

2025 CLG Meeting Dates and Locations:

- [Thursday, March 27](#) – Providence, Rhode Island
- [Wednesday, June 4](#) – Springfield, Massachusetts
- [Thursday, September 11](#) – New Hampshire
- [Wednesday, December 3](#) – Boston, MA



2024 CLG Annual Report

More information on the CLG is available at: <https://www.iso-ne.com/committees/industry-collaborations/consumer-liaison/>

ISO New England Publications

2024 Regional Electricity Outlook The Four Pillars

Introduction

The clean energy transition is accelerating, but there are challenges. The four pillars provide a framework for talking about what we need to get to a reliable clean energy future.

PILLAR ONE Clean Energy
PILLAR TWO Reliability
PILLAR THREE Energy Adequacy
PILLAR FOUR Robust Transmission

PILLAR ONE Clean Energy
Support more clean energy to power the economy with a greener grid

PILLAR TWO Balancing Resources
Ensure the clean energy system can reliably meet demand, or provide clean and flexible backup power system flexibility

PILLAR THREE Energy Adequacy
Adequately meet clean energy demand to ensure enough available capacity to meet customer needs in any ready conditions

PILLAR FOUR Robust Transmission
Expand resources, resources and make clean energy transmission more resilient

New England's electric power grid is undergoing a tremendous transformation. Public policy aimed at fighting climate change by

2024 Regional Electricity Outlook

Provides an in-depth look at New England's biggest challenges to power system reliability, the solutions the region is pursuing, and other ISO New England efforts to improve services and performance

About US - Government and industry affairs
2025 New England Power Grid State Profiles

Supply and demand resources help meet New England's electricity needs, and state policies are transforming the resource mix

Region Has Many Proposals for New Supply

Electric generating capacity by state (MW)

State	Existing (MW)	Proposed (MW)
Connecticut	15,000	1,000
Massachusetts	10,000	5,000
New Hampshire	5,000	2,000
Rhode Island	2,000	1,000
Vermont	1,000	500
New York	10,000	10,000
Pennsylvania	10,000	10,000
Delaware	1,000	1,000
Maryland	1,000	1,000
District of Columbia	1,000	1,000
Virginia	1,000	1,000
North Carolina	1,000	1,000
South Carolina	1,000	1,000
Georgia	1,000	1,000
Florida	1,000	1,000
Alabama	1,000	1,000
Mississippi	1,000	1,000
Louisiana	1,000	1,000
Texas	1,000	1,000
Oklahoma	1,000	1,000
Kansas	1,000	1,000
Nebraska	1,000	1,000
South Dakota	1,000	1,000
North Dakota	1,000	1,000
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Bilingual (English/Spanish) Community Engagement

Over 10% of New England's population are Spanish speakers
(CT: 18%; MA: 13%; ME: 6%; NH: 6%; RI: 18%; VT: 2%)



ISO Minute

Short videos where ISO-NE experts share what they do for our communities



States Profiles

2-page layout with key energy information for each New England state



Regional Profile

2-page layout with regional-scale important energy facts and figures



Public Events

Face-to-face dialogue with local, state and regional stakeholders

For More Information



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[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



Questions



APPENDIX



Who is ISO New England?

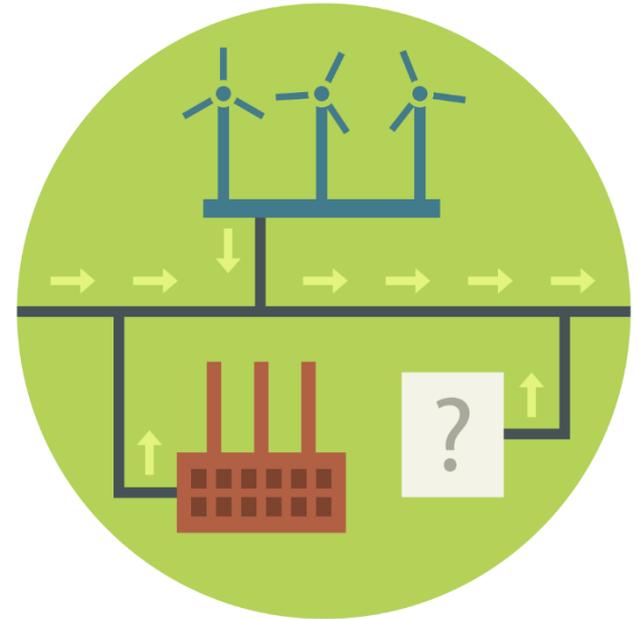
FERC's Eleven Principles of an ISO

1. The ISO's **governance** should be structured in a fair and non-discriminatory manner
2. An ISO and its employees should have **no financial interest** in the economic performance of any power market participants. An ISO should adopt and enforce strict conflict of interest standards.
3. An ISO should provide **open access** to the transmission system and all services under its control at non-pancaked rates pursuant to a single, unbundled, grid-wide tariff that applies to all eligible users in a non-discriminatory manner.
4. An ISO should have the primary responsibility in ensuring short-term **reliability** of grid operations. Its role in this responsibility should be well-defined and comply with applicable standards set by NERC and the regional reliability council.
5. An ISO should have **control** over the operation of interconnected transmission facilities within its region.
6. An ISO should identify **constraints** on the system and be able to take operational actions to relieve those constraints within the trading rules established by the governing body. These rules should promote efficient trading.
7. The ISO should have appropriate incentives for efficient **management and administration** and should procure the services needed for such management and administration in an open competitive market.
8. An ISO's transmission and ancillary services pricing policies should promote the **efficient** use of and investment in generation, transmission, and consumption. An ISO or an RTG of which the ISO is a member should conduct such studies as may be necessary to identify operational problems or appropriate expansions.
9. An ISO should make **transmission system information** publicly available on a timely basis via an electronic information network consistent with the Commission's requirements.
10. An ISO should develop mechanisms to **coordinate** with neighboring control areas
11. An ISO should establish an [alternative dispute resolution] **ADR process** to resolve disputes in the first instance.

Source: FERC [Order 888](#) Promoting Wholesale Competition Through Open Access, Non-Discriminatory Transmission Services by Public Utilities

ISO New England Manages Regional Power System Planning to Meet Future Electricity Needs

- Manage regional power system planning in accordance with mandatory reliability standards
- Administer requests for interconnection of generation and regional transmission system access
- Conduct transmission system needs assessments
- Plan regional transmission system to provide regional network service
- Develop Regional System Plan (RSP) with a ten-year planning horizon

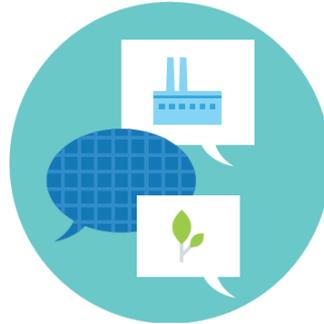


Why Competitive Markets?

New England restructured its power industry and launched competitive wholesale electricity markets in the late 1990s based on several key principles



Competition among wholesale electricity buyers and sellers yield prices that accurately reflect a resource's true operating costs



Efficiency and transparency spur innovation and investment in new technologies and power resources to ensure power system reliability



Investment risk associated with developing new power resources shifts from consumers to private investors

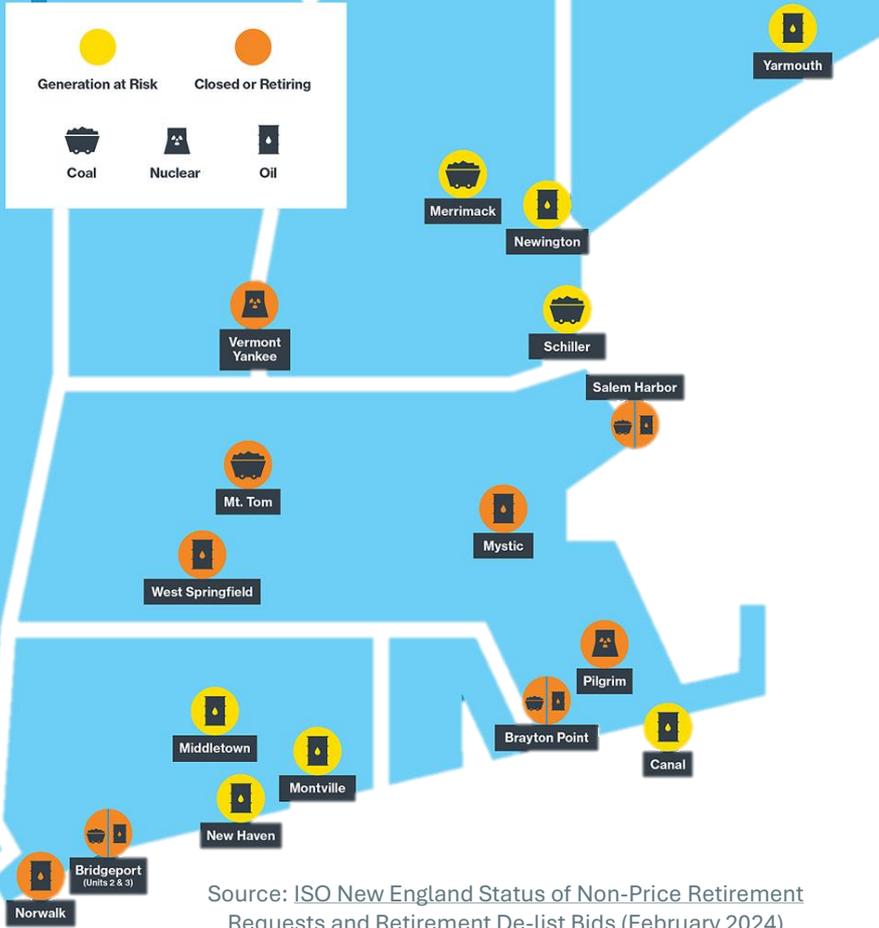
Generation and Demand Resources Are Used to Meet New England's Energy Needs

- Nearly **400** dispatchable generators in the region
- **Nearly 30,000 MW** of generating capacity
- Approximately **37,000 MW** of proposed generation in the ISO Queue
 - Mostly wind, storage, and solar proposals
- Roughly **7,000 MW** of generation have retired or will retire in the next few years
- Nearly **3,600 MW** of demand resources with obligations in the Forward Capacity Market*, including energy efficiency, load management, and distributed generation resources
 - Demand resources have had further opportunities in the wholesale markets since 2018



* In the Forward Capacity Market, demand-reduction resources are treated as capacity resources.

From 2013 to 2024, More than 7,000 MW of Generation Have Retired



- Includes predominantly coal, oil, and nuclear resources
- Another **750 MW** of generation have announced plans for retirement
- These resources have played an **important** role in recent winters when natural gas supplies are constrained in New England

Source: [ISO New England Status of Non-Price Retirement Requests and Retirement De-list Bids \(February 2024\)](#)

Transmission Projects to Maintain Reliability Have Progressed throughout New England



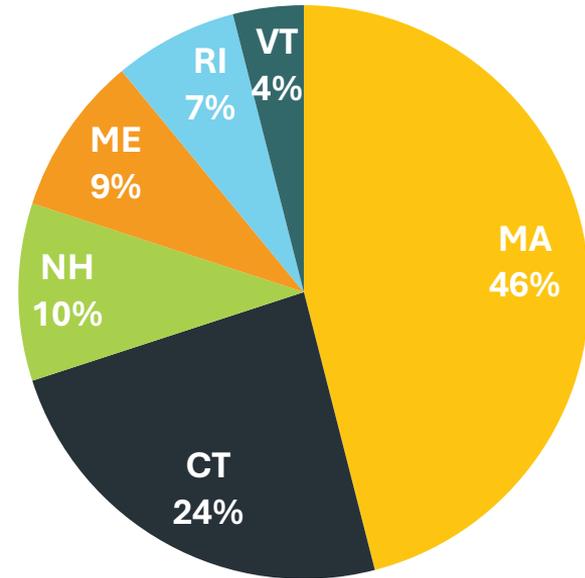
- Before industry restructuring began in the 1990s, New England saw little investment in transmission infrastructure
- Since 2002, hundreds of projects have been placed in service across the region to fortify the transmission system; additional projects are planned, proposed or under construction through 2028
- These projects:
 - reinforce key load centers (e.g., Boston metro area, Southwest CT)
 - reinforce transmission-serving areas that have experienced significant load growth (e.g., northwestern VT)
 - Enable better power transfer within New England (e.g., between eastern and western New England)
- Projects completed and planned represent **~\$14.1 billion** in investment

Source: ISO New England RSP Transmission Project Listing, October 2024

How Are Transmission Costs Allocated?



- The New England electric grid is a **tightly interconnected** system; each state shares in the benefits of reliability and market efficiency upgrades
- The amount of electricity demand in an area determines its **share** of the cost of new or upgraded transmission facilities needed for reliability or market efficiency



2024 Network Load by State