



ISO New England's Role in the Clean Energy Transition

The ISO's Efforts to Support the Region's Energy Transition and Policy Goals

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

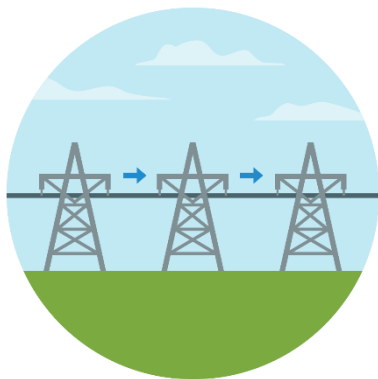
- **Regulated** by the Federal Energy Regulatory Commission
- **Reliability Coordinator** for New England under the North American Electric Reliability Corporation
- **Independent** of companies in the marketplace and **neutral** on technology



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

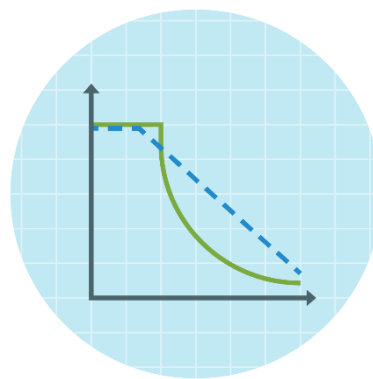
Grid Operation

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



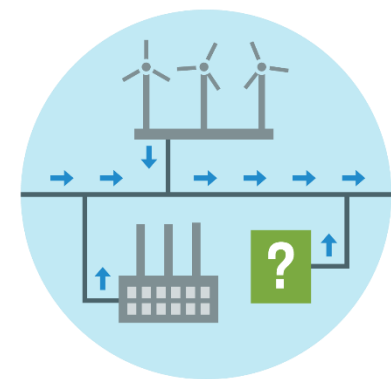
Market Administration

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

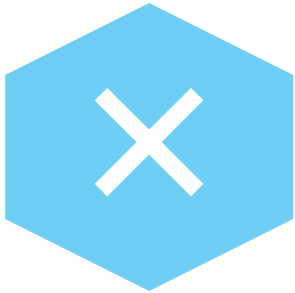


Power System Planning

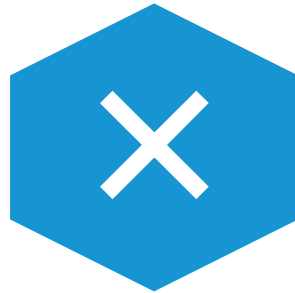
Study, analyze, and plan to make sure New England's electricity needs will be met over the next 10 years



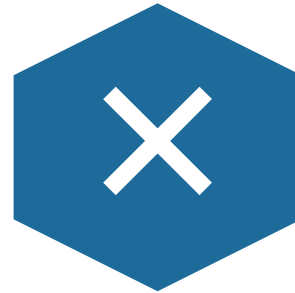
Things We Don't Do



Handle retail electricity —the power you buy from your local utility or electric supplier



Own, maintain, or repair the power grid's infrastructure, such as power plants, power lines, and substations



Have a stake in companies that own the infrastructure



Have jurisdiction over fuel infrastructure



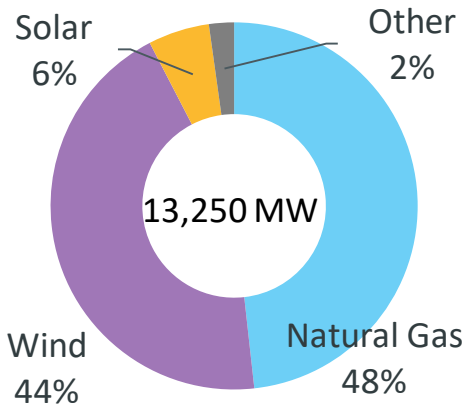
State Laws Target Deep Reductions in CO₂ Emissions and Increases in Renewable and Clean Energy

≥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
90% by 2050	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 2030	RI renewable energy requirement

The ISO Generator Interconnection Queue Provides Snapshots of the Future Resource Mix

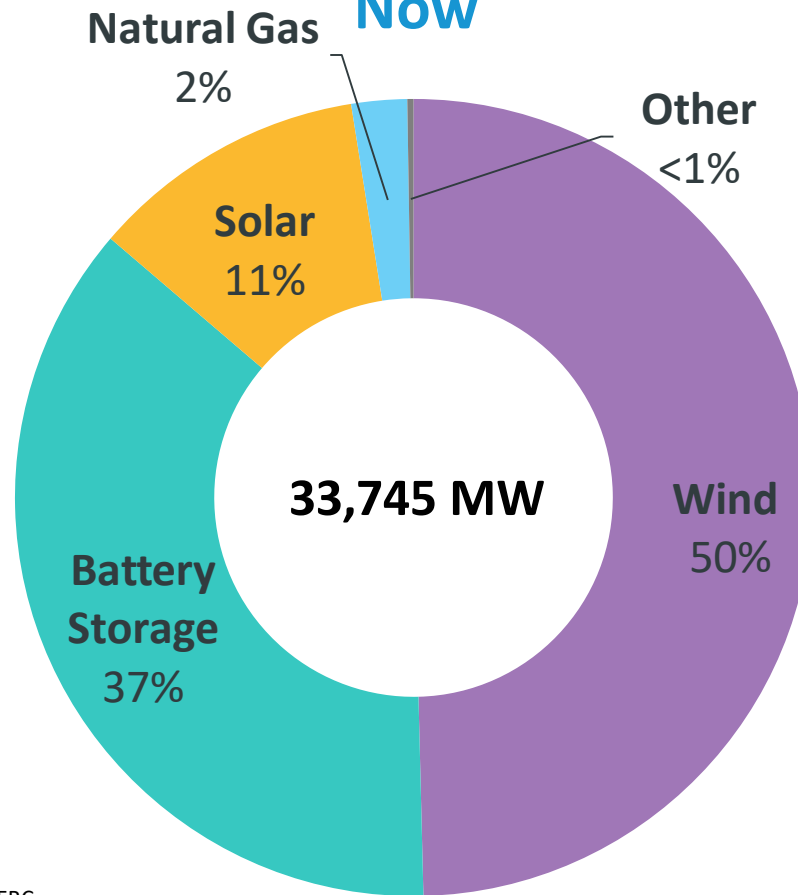
Dramatic shift in proposed resources from natural gas to battery storage and renewables

Then



June 2017

Now



March 2023

Offshore Wind



CT	2,400 MW
MA	11,514 MW
ME	12 MW
RI	704 MW

Onshore Wind

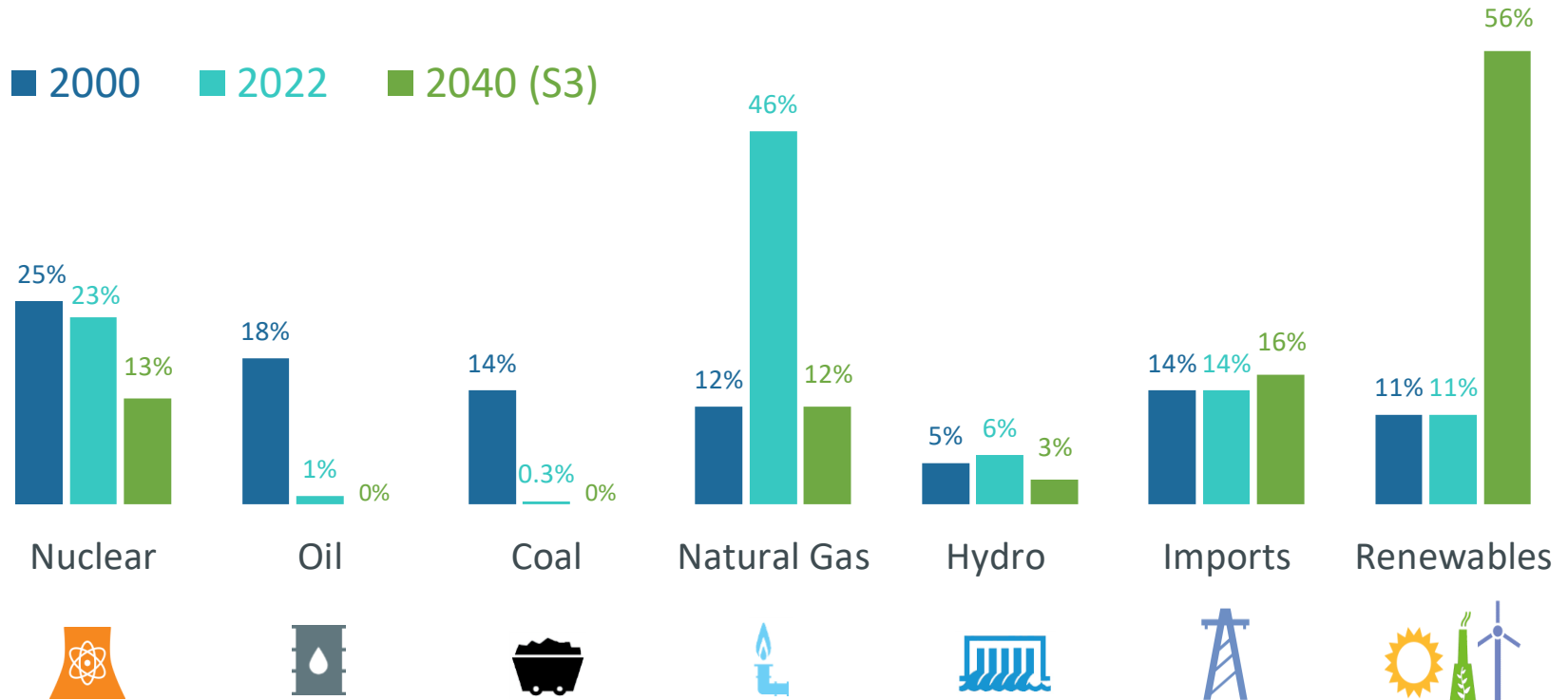


ME	2,110 MW
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Source: ISO Generator Interconnection Queue, FERC Jurisdictional Proposals; Nameplate Capacity Ratings.

Dramatic Changes in the Energy Mix

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



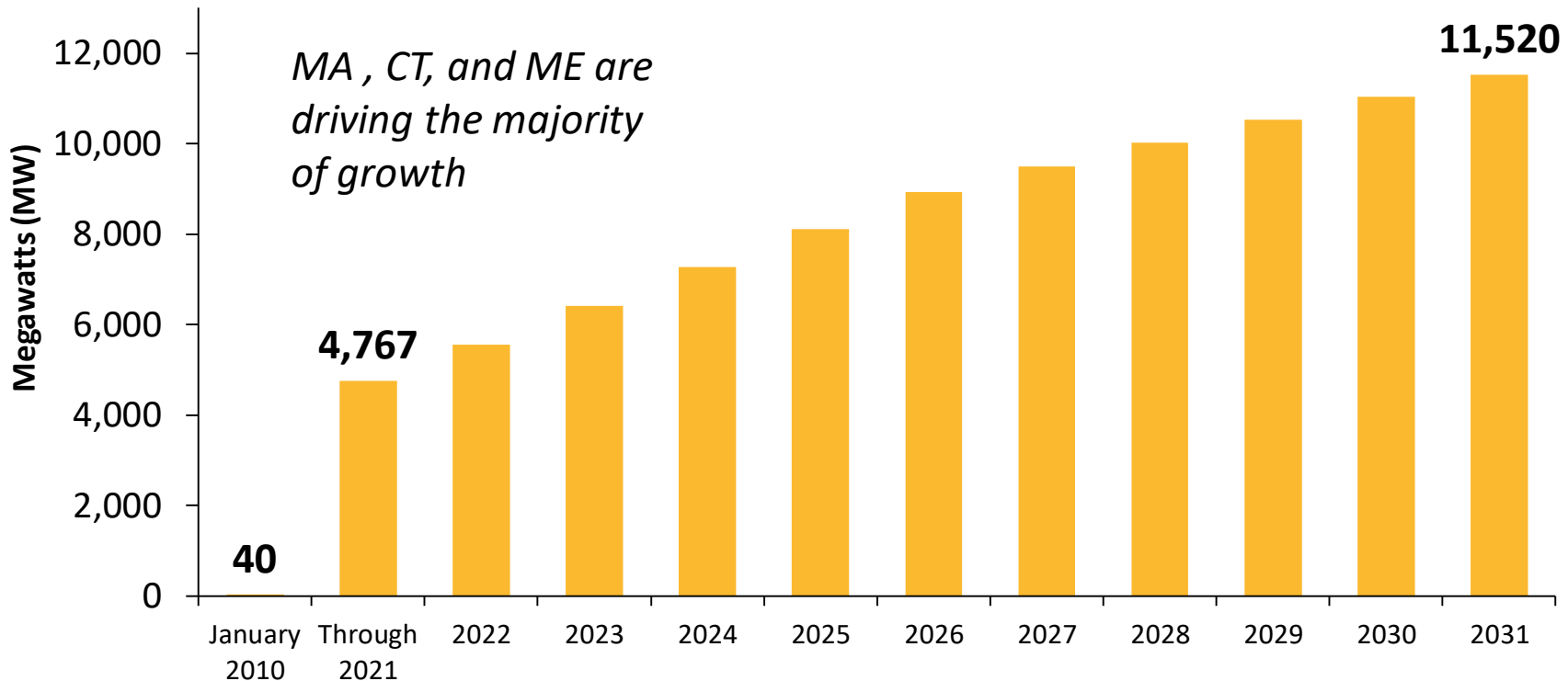
Source: ISO New England [Net Energy and Peak Load by Source](#); data for 2022 is preliminary and subject to resettlement; data for 2040 is based on Scenario 3 of the ISO New England [2021 Economic Study: Future Grid Reliability Study Phase 1](#).

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

ISO New England Forecasts Strong Growth in Photovoltaic (PV) Resources



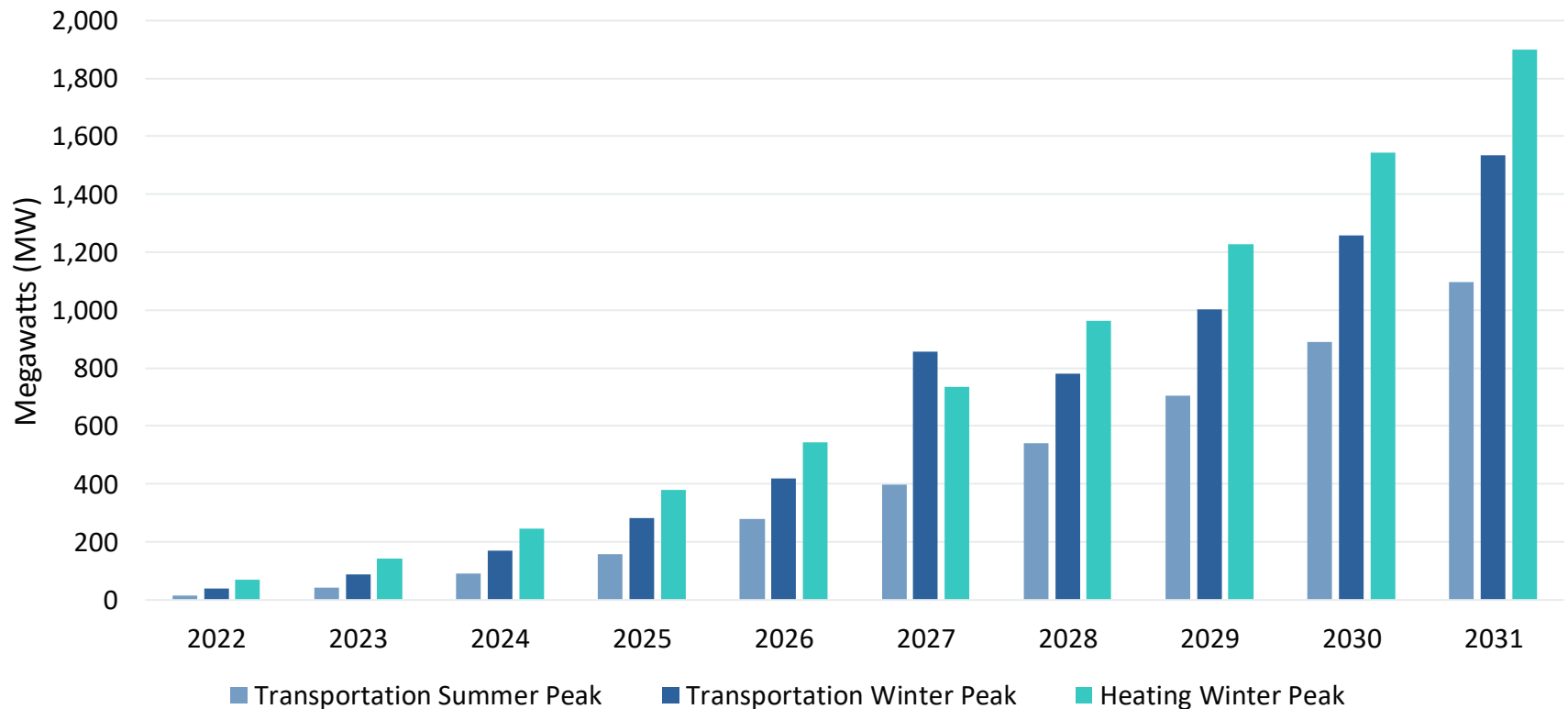
Cumulative Growth in Solar PV through 2031 (MW)



Note: The bar chart reflects the ISO's projections for nameplate capacity from PV resources participating in the region's wholesale electricity markets, as well as those connected "behind the meter." The forecast does not include forward-looking PV projects > 5 MW in nameplate capacity. Source: [ISO New England 2022-2031 Forecast Report of Capacity, Energy, Loads, and Transmission](#) (2022 CELT Report) (May 2022); MW values are AC nameplate. State specific details are available in the final report.

Electricity Demand from Electric Vehicles and Heating Sectors to Grow Over the Next Decade

Transportation and Heating Forecasts: Impact on Peak Electricity Demand, 2022–2031



* Percentage of Net System Peak in 2030: Transportation – summer: 4%; Transportation – winter: 7%; Heating – winter: 8%

Sources: [ISO New England 2022-2031 Forecast Report of Capacity, Energy, Loads, and Transmission](#) (2022 CELT Report) (May 2022), [2022 Forecast Data](#).

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



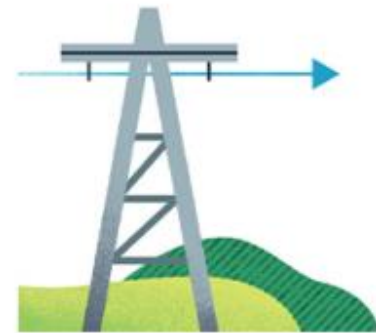
Significant amounts of **clean energy** to power the economy with a greener grid



Balancing resources that keep electricity supply and demand in equilibrium



Energy adequacy—a dependable energy supply chain and/or a robust energy reserve



Robust transmission to integrate renewable resources and move clean electricity to consumers across New England

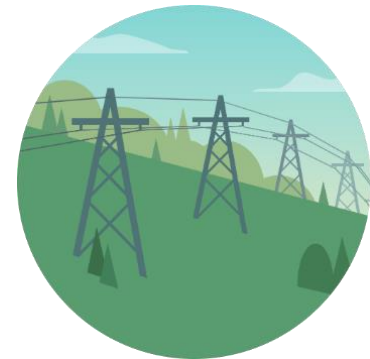
Overview of Studies and Projects Supporting Future Grid

- **Weather:** [Operational Impacts of Extreme Weather Events](#)
 - Rigorously model likelihood and impact of extreme weather events
- **Transmission:** [2050 Transmission Study](#)
 - Determine transmission needs to support renewable/high load future
- **Operations:** [Future Grid Reliability Study \(Phase 1\)](#)
 - Examine operational effects of renewable-heavy grid
- **Markets:** [Pathways to the Future Grid](#)
 - Evaluate different market options to support a renewable-heavy grid
- **Reliability:** [Resource Capacity Accreditation in the Forward Capacity Market](#)
 - Identify and implement methodologies that will more accurately reflect resource contributions to resource adequacy in the FCM as the resources on the grid continue to evolve



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

- 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 **well beyond** the ISO's typical 10-year horizon for transmission planning
- It is ***not*** a plan to build specific projects

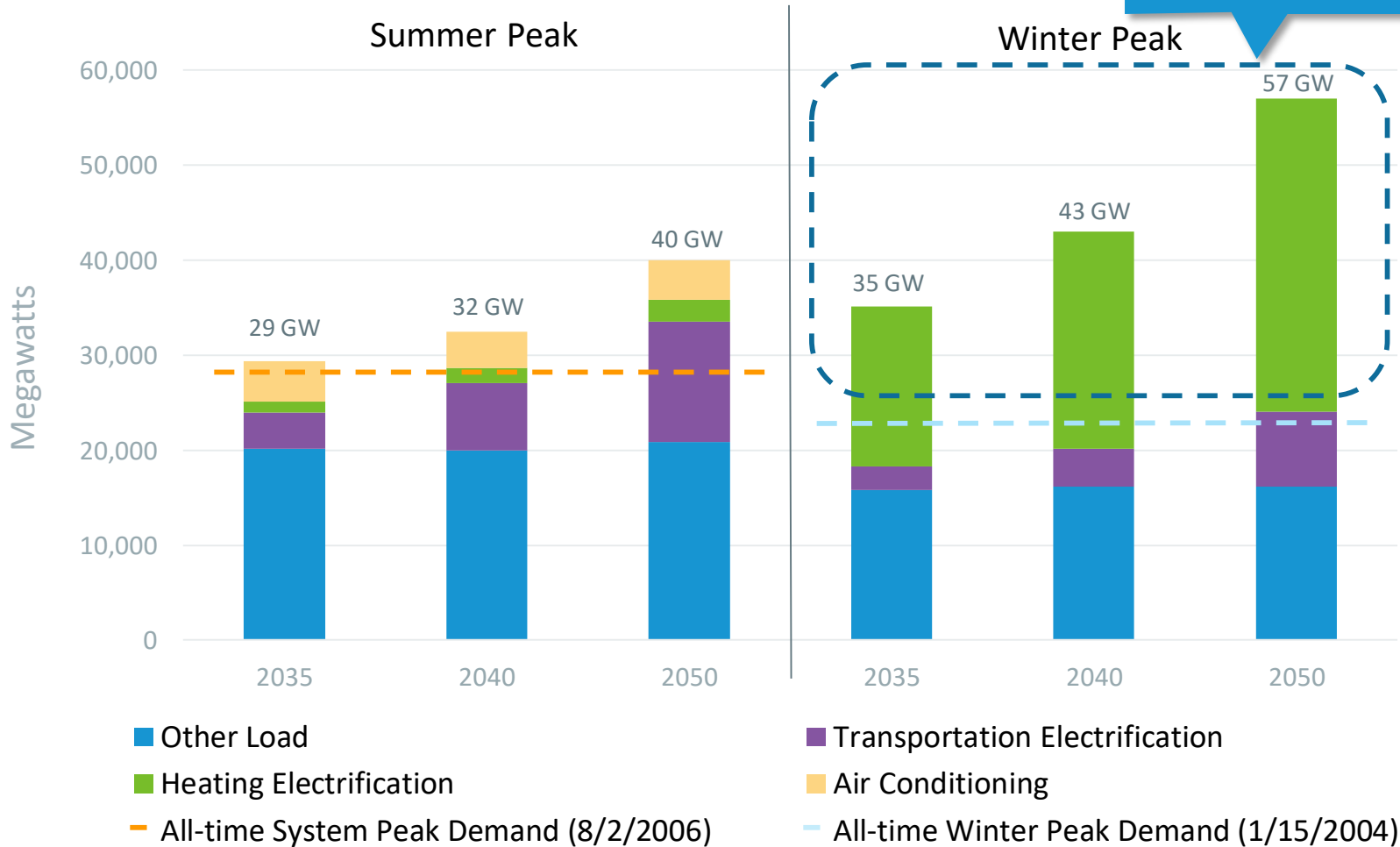


The most up-to-date information on the 2050 study is available at the [Planning Advisory Committee](#) and [Longer-Term Transmission Studies](#) webpages.

New England System Peak Grows Substantially and Shifts to Winter-Peaking

2050 Transmission Study

Region needs to address energy adequacy risk to support higher load levels



2021 Economic Study: Future Grid Reliability

Study Phase 1

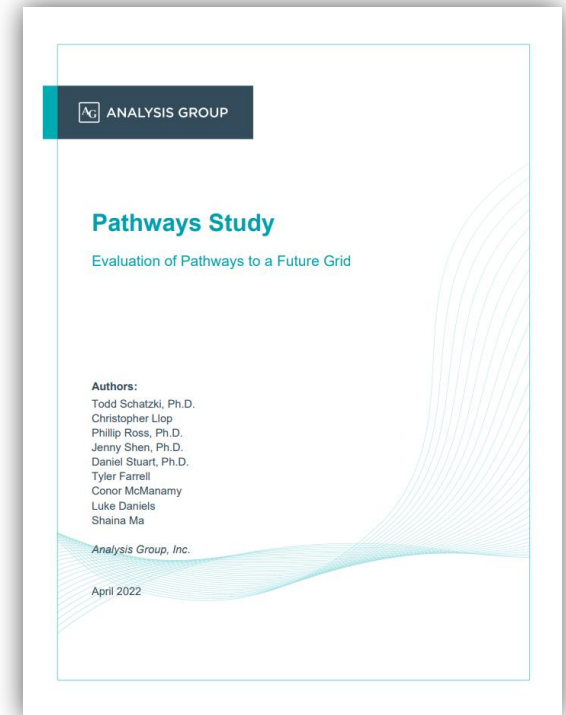
- [The 2021 Economic Study: Future Grid Reliability Study Phase 1](#) was released on July 29, 2022
- The study, requested by NEPOOL stakeholders, evaluates how a 2040 grid could perform when the system has significantly more renewables and a greater amount of electrification of the transportation and heating sectors
- The ISO hosted a webinar on October 21, 2022 to discuss the findings of the study
 - A recording of the webinar is available on the [ISO website](#)



Pathways Study

Evaluation of Pathways to a Future Grid

- In early 2021, the ISO New England Board directed management to pursue an analysis to guide the region's discussion on the next generation of market design, aimed at meeting the states' decarbonization goals
- On [June 1, 2022](#) the ISO held a public, virtual meeting to discuss the findings of the Study
- The [report](#) focused on four potential "paths":
 - New England states continue **status quo** arrangements and sign long-term power purchase agreements with renewable energy developers
 - A centralized **forward clean energy market** (FCEM) with a forward procurement that awards certificates for clean energy production
 - A **net carbon price** is imposed on carbon emissions for each unit of carbon emitted and revenues are returned to consumers
 - A **hybrid approach** that combines net carbon pricing applied to existing resources, and an FCEM for clean energy that only awards clean energy certificates to new resources



Stakeholder Discussions Underway To Address Resource Capacity Accreditation in New England Market

- Discussion of the [Resource Capacity Accreditation \(RCA\)](#) in the Forward Capacity Market (FCM) Key Project began at the June 7 Markets Committee (MC) meeting
- The RCA project proposes improvements to ISO-NE's accreditation processes in the FCM to further support a reliable, clean-energy transition by implementing methodologies that will more appropriately accredit resource contributions to resource adequacy as the resource mix transforms
- The ISO has made a commitment to FERC to file proposed improvements in time for FCA 19, which coincides with the 2028/29 capacity commitment period



Ongoing and Emerging Efforts to Support State Decarbonization Efforts

- Providing technical expertise to the states in their competitive solicitations for clean energy resources
- Developing new mechanisms to enable development of transmission that supports state policy goals
- Enhancements to ISO system planning studies (e.g. economic studies, needs assessments)
- Working to develop a more holistic approach to replacement of existing transmission infrastructure (asset condition and replacement projects)
- Supporting interconnection of Distributed Energy Resources to achieve the state's energy objectives.

Completed Efforts to Integrate New Technologies

- **The ISO published the nation's first long-term, multistate forecasts of [energy-efficiency measures](#) in 2012 and [solar photovoltaic \(PV\) capacity](#) in 2014. The forecasts project the anticipated growth and impact of these resources and are used in the ISO's system planning process**
- In 2013, the ISO began offering a [wind power forecast](#), integrating it into scheduling and dispatch services in 2014
- **Storage Efforts**
 - In 2015, the ISO's redesigned regulation market went into effect, allowing storage to compete in providing regulation service
 - In 2018, the ISO implements market changes to enable storage resources to participate in the Day-Ahead and Real-Time wholesale electricity markets while continuing their participation in the Regulation Market.
- **In June 2018, ISO-NE became the first grid operator to integrate demand response into energy dispatch and reserve designation process in a manner comparable to that of generating resources**
- The ISO developed the Qualified Capacity Estimator—a tool for the review and determination of wind and solar project capacity qualifying for Forward Capacity Market Auctions.
- Developed and implemented the **interconnection “clustering” process**
- **The ISO has completed system impact studies for over 8,700 MW of non-emitting resources**

Questions

