



State of the Grid: 2020

This document contains the remarks and full slides presented by Gordon van Welie, president and CEO of ISO New England, during the State of the Grid 2020 media briefing.

A recording of the presentation, including the question-and-answer session, is available at: www.iso-ne.com/about/news-media/press-releases/state-of-the-grid-2020



State of the Grid: 2020

2020 Regional Electricity Outlook

Gordon van Welie

PRESIDENT & CEO, ISO NEW ENGLAND INC.



Agenda

- 10:30 to 10:35 a.m. **Welcome**
Ellen Foley, director, Corporate, Media, and Web Communications
- 10:35 to 10:45 a.m. **State of the Grid: 2020**
Gordon van Welie, president and CEO
- 10:45 to 11:30 a.m. **Question-and-Answer Session**
Gordon van Welie, president and CEO
Anne George, vice president, external affairs and corporate communications

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Good morning, everyone. My name is Ellen Foley and I am the Director of Corporate, Media & Web Communications at ISO New England. Gordon van Welie, president and CEO of ISO New England, and Anne George, vice president of external affairs and corporate communications are here with me today.

Welcome to our annual State of the Grid media briefing.

ISO New England offers these media briefings to provide a closer look at the trends affecting New England's electricity industry. The content is **on the record**, and may be quoted and attributed to the speaker.

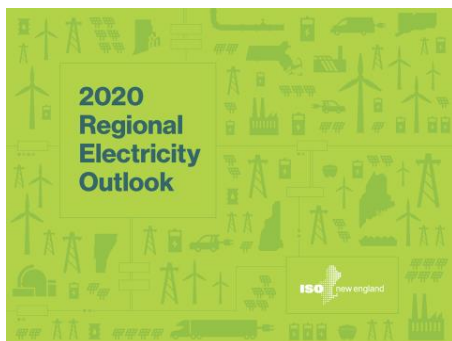
This year's briefing will focus on the 2020 Regional Electricity Outlook, which we released last week. We invite you all to read the report at www.iso-ne.com/reo.

In just a few moments, Gordon van Welie will go over the highlights of the report, after which he and Anne will take questions from the media. We will go over how to submit questions following the presentation.

If you are experiencing any technical difficulties with the WebEx software, please contact Gae Warman-Gold at 413-535-4138 or gwarmangold@iso-ne.com.

After the briefing concludes, the presentation and prepared remarks will be posted in the press release section on the ISO New England website. We will post a recording of the complete session as soon as possible.

Now, I will turn the briefing over to Gordon.



Thank you, Ellen and thanks to everyone for dialing in today. As always, I appreciate the opportunity to speak with you all about these important issues.

As Ellen mentioned, last week, we released the 2020 Regional Electricity Outlook and today I will walk you through some of the highlights of the report.

There is no doubt that New England is moving towards a clean-energy future. The region's resource mix has changed and will continue to

change over the coming years and decades, driven by innovation within the electric industry and state policy goals.

The best way to achieve these goals and unlock this innovation is by harnessing the same competitive market forces that have kept the power system reliable for more than 20 years.

In our role as the system operator, ISO New England has worked for the past two decades to ensure the region's power system is there to serve New England and its consumers every day—today, tomorrow, and for decades to come. As we move forward, New England's wholesale markets will continue to evolve and adapt to the region's changing resource mix and the changing needs of its power system.

The New England states, stakeholders, and the ISO will also need to continue to collaborate to understand the needs of the future power system while keeping in mind the needs of the consumer.

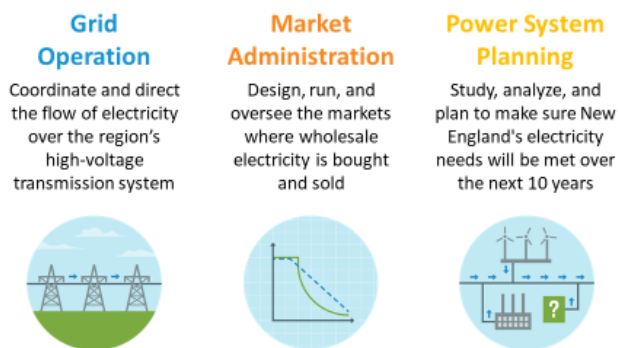
But before we look towards the future, it's helpful to take a look at what the competitive markets have delivered to the region.

FOCUSING ON STATE GOALS



In the late 1990s, New England restructured its wholesale electricity industry, propelled by state and federal policies and initiatives that were guided by the principle that a reliable supply of competitively priced electricity is fundamental to a thriving society and economy. Specifically, the overarching policy goals of introducing wholesale competitive markets were to lower costs, encourage innovation, and shield consumers from unwise investments.

ISO New England's Three Critical Roles



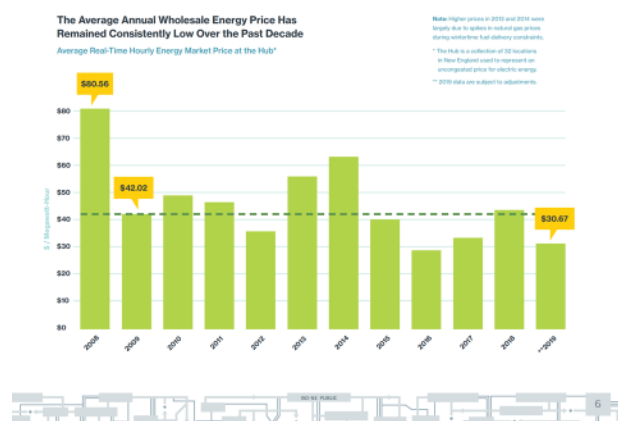
ISO New England was created in 1997 to manage these efforts as the independent operator of the region's power system and administrator of the region's wholesale markets.

By all measures, these goals have been achieved.

Over two decades, the market and policy approach has driven around \$16 billion in private investment in some of the most efficient, lowest-emitting power resources in the country, and shifted investment costs and risks away from consumers.

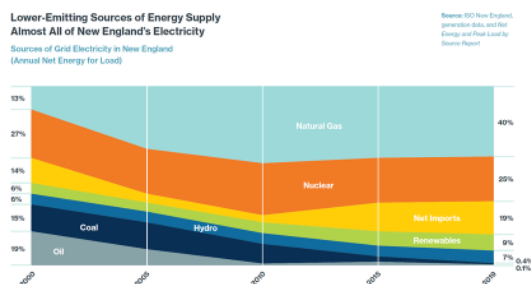
Competitive markets have driven innovation in New England's power system, with developers constantly looking for new ways to provide grid services in a more efficient, cost-effective way.

The result has been lower wholesale electricity prices, reduced carbon emissions, and a grid and marketplace ready to transition to an even lower-carbon system.

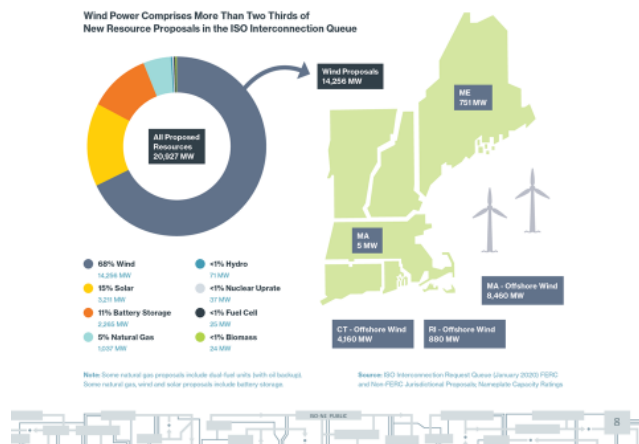


In 2019, New England experienced a mild winter that moderated natural gas prices, a cool summer that tempered air conditioning use, and surging amounts of solar power and energy efficiency that lessened electricity demand from the grid.

The markets responded in-kind, producing the second-lowest average prices and the lowest energy market value since the introduction of the current market structure in 2003.



2019 also saw lower-emitting resources produce 99.5% of New England's electricity, with only 0.5% coming from coal and oil plants.



While natural gas is currently the predominant fuel for our region, the path towards a clean energy future is evident in the ISO interconnection queue. This queue represents the latest inventory of proposed new resources. About 95% of resources currently proposed for the region are grid-scale wind, solar, and battery projects. It is clear that developers of clean-energy resources are looking to take advantage of state incentives, declining technology costs, and revenues from the wholesale markets.

FOCUSING ON THE ISO'S ROLE



Most of these projects are some years away, but ISO New England is already hard at work preparing for a power system that is much more reliant on renewable energy.

For over a decade, ISO experts have been working steadily and intensively to integrate high levels of energy efficiency, demand-response resources, energy storage, wind, and solar into our system operations, wholesale electricity market design, and power system planning.

Forecasting the region's needs – now and in the future

- Hourly forecasts
 - Wind and solar
- 10-year forecasts
 - Energy efficiency
 - Behind-the-meter solar
 - Air-source heat pumps
 - Light-duty electric vehicles



We will continue to innovate and work with all stakeholders to ensure a coordinated effort to meet the goals of our region while still ensuring that electricity is available to every customer, every minute of the day.

Much of the work to integrate all new power sources and increased energy efficiency centers on forecasting, both short- and long-term.

In recent years, the ISO has pioneered multi-state 10-year forecasts of energy efficiency and behind-the-meter solar. This year, the ISO will launch our first forecasts on the impact of air-source heat pumps and light-duty electric vehicles on the bulk power grid.

The ISO has developed a highly accurate hourly wind forecast that enables the efficient management of wind power fluctuations. This enables us to utilize the low-cost wind energy when it's available, and maintain reliable operations when it's not. In 2019, the ISO launched a new method of predicting solar output across the region in a way that can be integrated into existing day-ahead and seven-day operational load forecasts.

Other ISO innovations include:

- Introducing **negative market pricing** so wind and solar resources can stay online during low-load conditions
- Fully integrating **demand response** resources into the electric energy and reserve markets, becoming the first grid operator in the nation to do so
- Introducing **enhanced rules for energy storage** to participate in the markets whether these resources are charging or discharging
- Establishing a route for **state-sponsored renewable resources** to enter the capacity market while maintaining the competitiveness of the market



Other examples of ISO innovations include:

- Introducing negative market pricing so wind and solar resources can stay online during low-load conditions

- Fully integrating demand response resources into the electric energy and reserve markets, becoming the first grid operator in the nation to do so
- Introducing enhanced rules for energy storage to participate in the markets whether these resources are charging or discharging, and
- Establishing a route for state-sponsored renewable resources to enter the capacity market while maintaining the competitiveness of the market

These efforts are just a handful of those undertaken by ISO New England to ensure the region's power system remains reliable in the future.

Energy-Security Improvements ensure “on demand” energy

- Market-based incentives for resources to firm-up energy supplies
- Opportunities for resources, regardless of fuel type and technology



In recent years, the region has moved away from power plants with stored fuel, such as coal or oil, and has become increasingly reliant on

“just in time” resources like natural gas-fired generation and renewables.

The ISO must ensure that the grid has sufficient energy “on demand” to power New England if these resources are unavailable simultaneously, whether the timeframe runs from a fraction of a second to several weeks.

To solve this challenge, ISO New England and regional stakeholders have been working on market enhancements, known as Energy-Security Improvements, or ESI, that will go into effect in 2024. ESI introduces strong market-based compensation for new energy and reserve services. Regardless of fuel-type or technology, this market will reward the lowest-cost resources that can firm-up their energy sources and deliver electricity reliably when unforeseen grid operating challenges arise.

For example, a solar facility with battery storage has the same opportunity to provide these reliability services as a natural gas plant with a contract for liquefied natural gas, or an offshore wind farm that operates at a high capacity factor during winter. All may participate and be paid under the ESI design.

ISO New England plans to file the first component of these changes, a trio of new energy market reserve services, with the Federal Energy Regulatory Commission next month.

FOCUSING ON THE FUTURE



The New England power system will look very different in the future, particularly as the heating and transportation sectors are electrified. This “electrification of everything” raises important questions about where the region is heading in the coming decades.

In recent years, several New England states have signed long-term contracts to spur the development of new renewable resources. These resources are compensated largely through contracts and are less dependent on wholesale market revenues. This has created an inherent market design tension because other needed resources rely only on market revenue.

Carbon pricing can achieve state climate goals

- The simplest, easiest, and most efficient way to reduce greenhouse gas emissions
- Could be state or federal policy, including the Regional Greenhouse Gas Initiative structure



Pricing carbon is the simplest, easiest, and most efficient way to ease this tension and reduce greenhouse gas emissions. It could be implemented by state or federal policy, including through the existing Regional Greenhouse Gas Initiative structure.

In general, putting a realistic price on carbon emissions would raise energy market revenues. It will favor the operation of resources that reduce carbon emissions, and drive the clean energy transition desired by the states. At the same time, it would improve the overall efficacy of the existing market structure. Carbon pricing has the potential to be a solution that is relatively seamless in implementation, yet effective in

helping states meet their renewable energy and carbon reduction goals.

To date, there has not been a regional consensus on this approach. Therefore, we will continue to work with the states and industry stakeholders to determine if there are other adjustments to the current markets, or other market design solutions, that will achieve the same policy objectives.

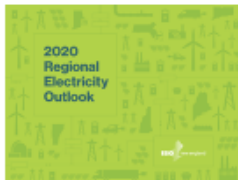
Last year, the New England States Committee on Electricity, the New England Power Generators Association, and other participants asked the ISO to dedicate time and staffing resources to discuss potential future market frameworks in light of state decarbonization goals.

As we understand it, this stakeholder-led discussion seeks to determine how best to harmonize the achievement of three objectives: carbon reduction, reliability, and using markets to select the lowest-priced resources.

ISO New England respects the environmental policy objectives of the New England states. We believe that a strong, competitive wholesale market provides the best structure for achieving those objectives. It is cost-effective, ensures system reliability, and does not expose consumers to the risks of long-term contracts.

New England has a successful history of solving difficult problems. At ISO New England, we are committed to working with the states and industry stakeholders to evaluate how wholesale markets can sustain a power grid that can reliably support decarbonization across New England's economy and society.

FOR MORE INFORMATION...



The 2020 Regional Electricity Outlook is available at www.iso-ne.com/reo

Corporate Communications contacts:

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Matt Kakley mkakley@iso-ne.com or 413-535-3821



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2020 Regional Electricity Outlook



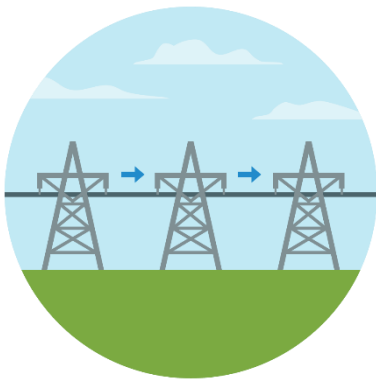
FOCUSING ON STATE GOALS



ISO New England's Three Critical Roles

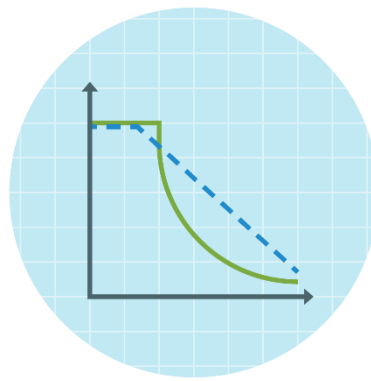
Grid Operation

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



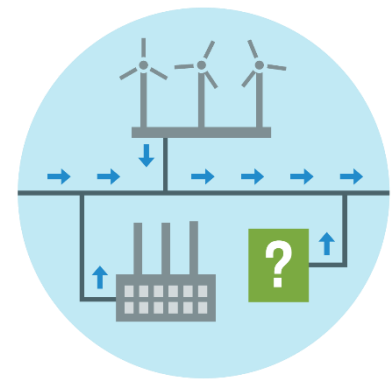
Market Administration

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



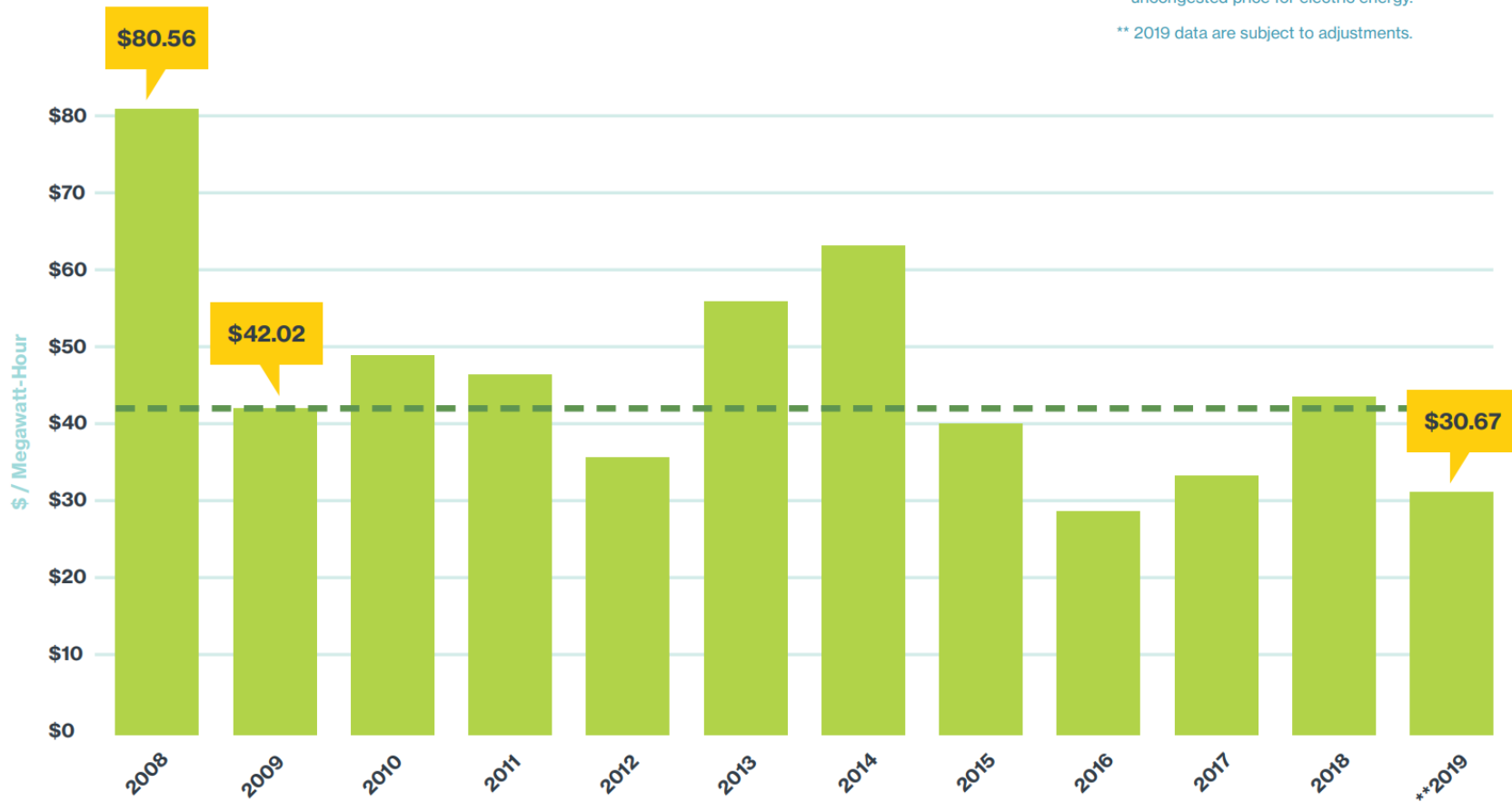
Power System Planning

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



The Average Annual Wholesale Energy Price Has Remained Consistently Low Over the Past Decade

Average Real-Time Hourly Energy Market Price at the Hub*



Note: Higher prices in 2013 and 2014 were largely due to spikes in natural gas prices during wintertime fuel-delivery constraints.

* The Hub is a collection of 32 locations in New England used to represent an uncongested price for electric energy.

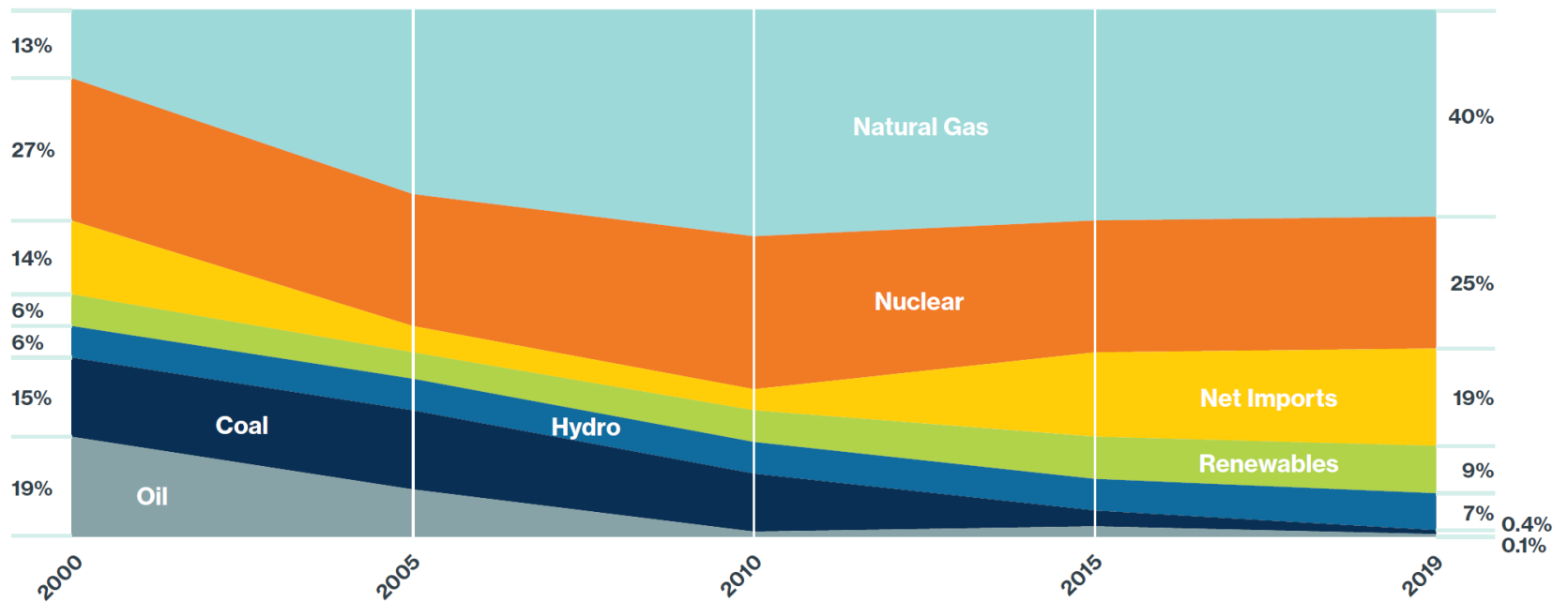
** 2019 data are subject to adjustments.



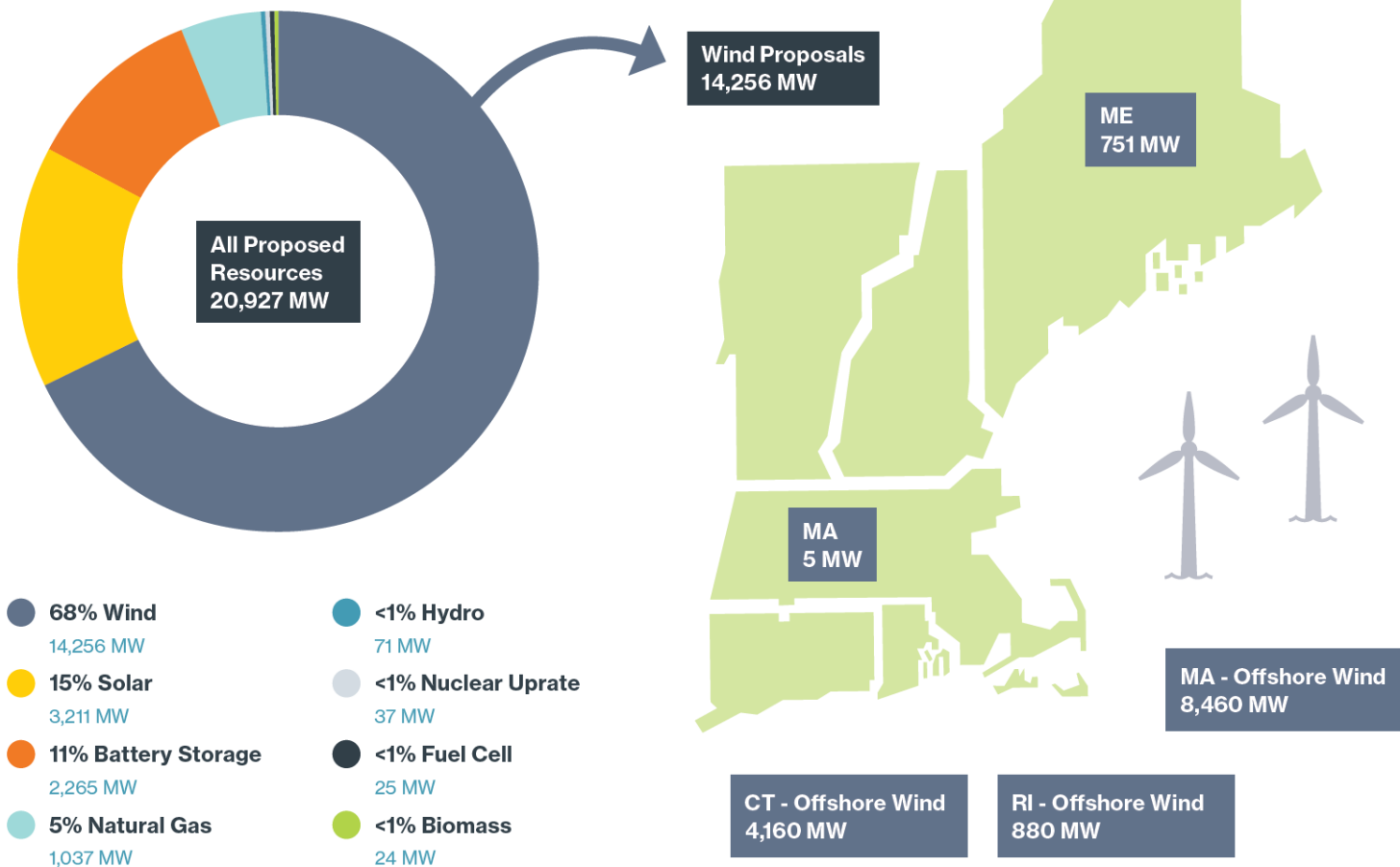
Lower-Emitting Sources of Energy Supply Almost All of New England's Electricity

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*



Wind Power Comprises More Than Two Thirds of New Resource Proposals in the ISO Interconnection Queue



Note: Some natural gas proposals include dual-fuel units (with oil backup).
Some natural gas, wind and solar proposals include battery storage.

Source: ISO Interconnection Request Queue (January 2020) FERC and Non-FERC Jurisdictional Proposals; Nameplate Capacity Ratings

FOCUSING ON THE ISO'S ROLE



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FOCUSING ON THE FUTURE



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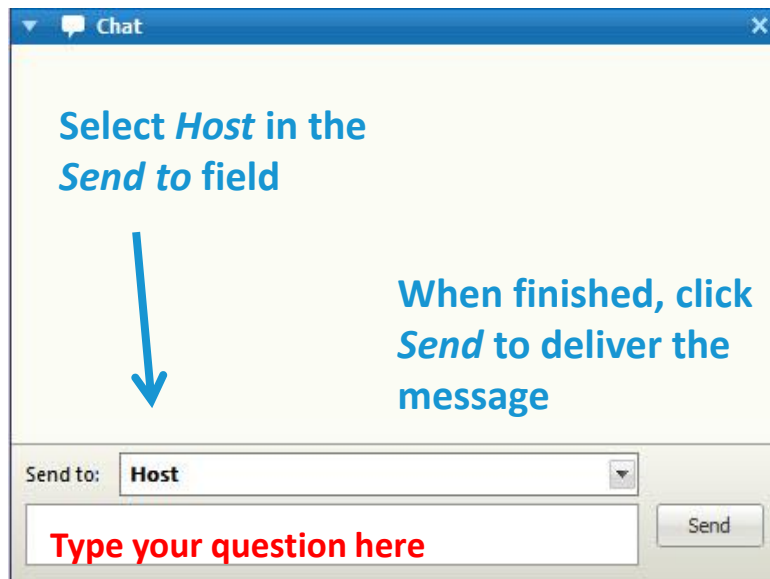
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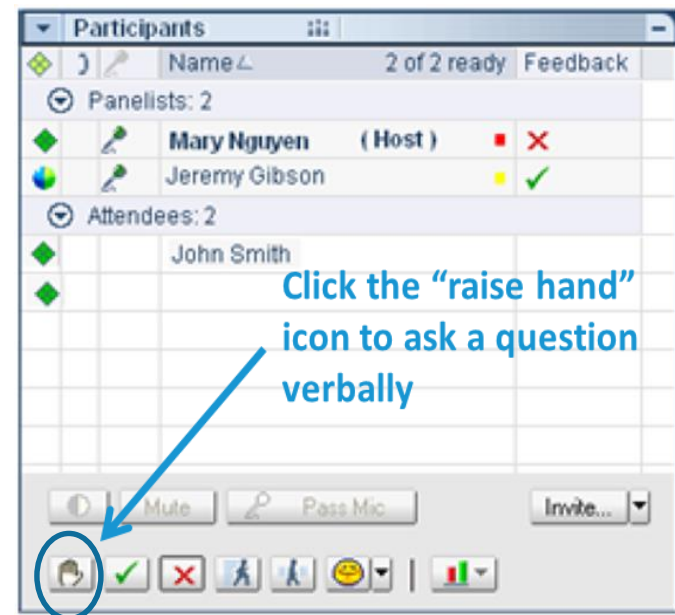
Q&A Session for Media

Please use the **Chat** function to submit a written question.

To ask a question *verbally*, please click the **Raise Hand** button at the bottom of the **Participants** window. When you have no further questions, please click the button again to lower the hand.

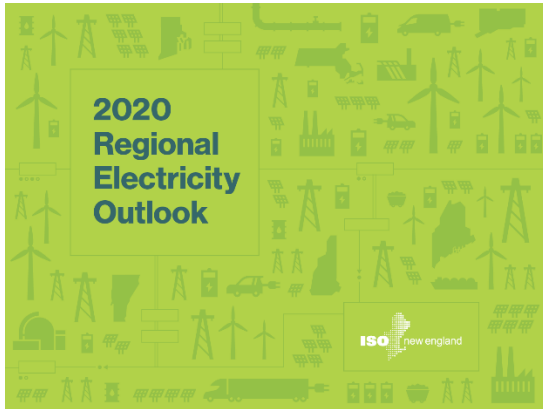


Written question



Verbal question

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