

New England Future Grid Reliability Study

Advanced Energy Group



Marianne Perben

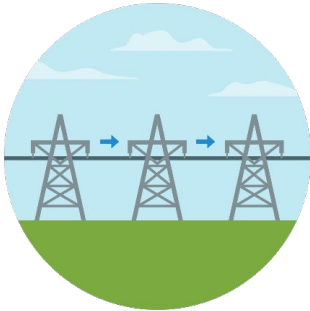
DIRECTOR, PLANNING SERVICES



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

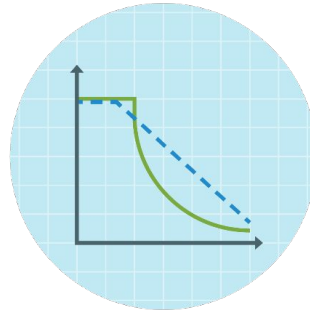
Grid Operation

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



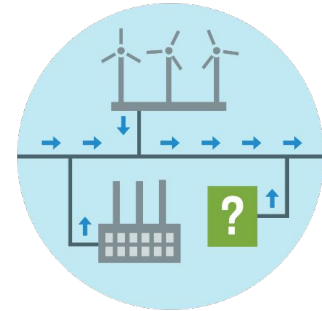
Market Administration

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



Transmission System Planning

Study, analyze, and plan to ensure the transmission system will be reliable over the next 10 years



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

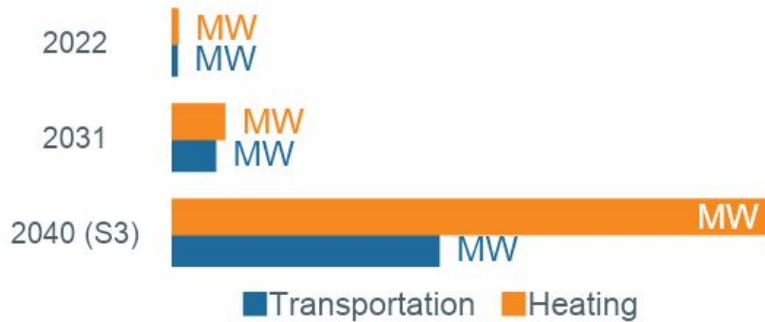
Rapid Electrification of Heating and Transportation Will Drive Unprecedented Demand for Electricity

The ongoing shift to variable resources will further transform the future grid

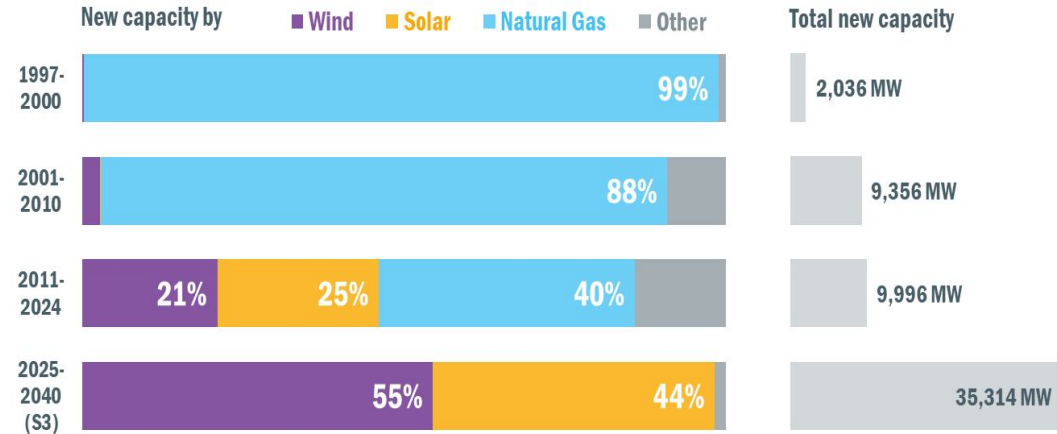
Future Grid Reliability Study Scenario 3

↑86% of New England Heating Electrified

↑1.1 Million Electric Vehicles



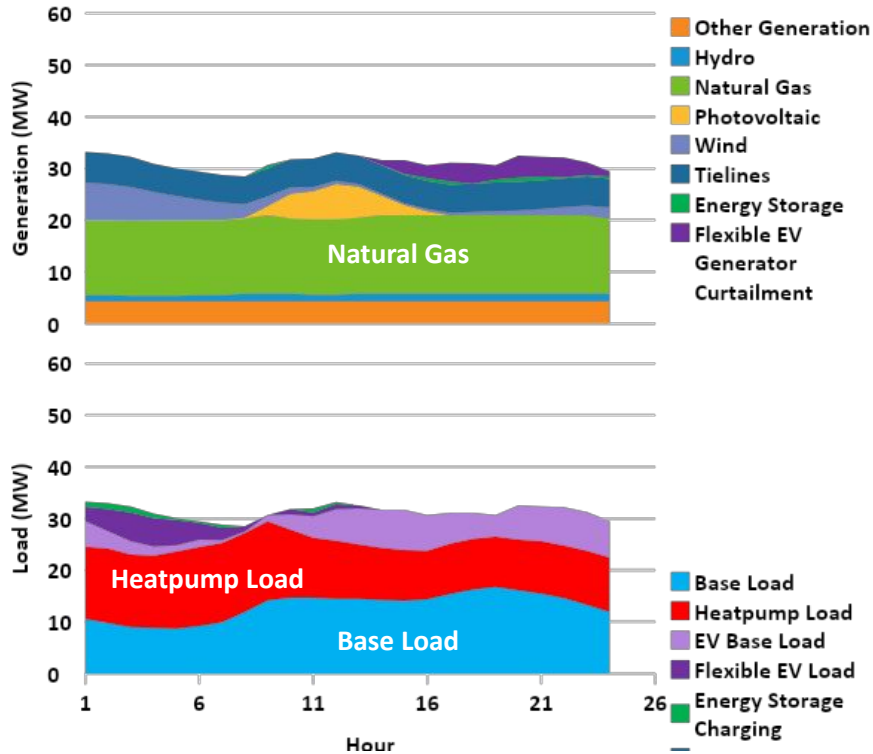
Cumulative New Generating Capacity in New England vs Added Nameplate Capacity in Future Grid Reliability Study (MW)



[New England's Future Grid Initiative Key Project Page](#)
[2021 Economic Study: Future Grid Reliability Study Phase 1](#)

An Outsized Demand for Stored Energy

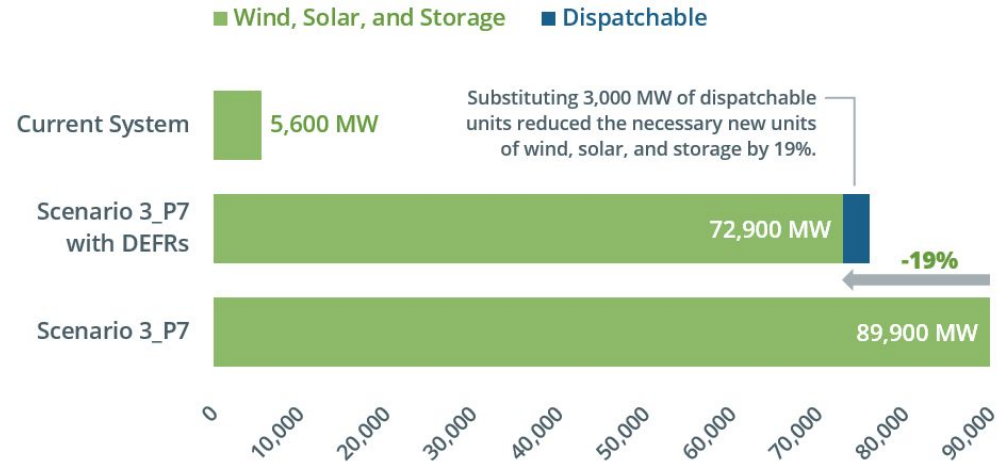
On low wind and solar days, the system relied heavily on natural gas generation



- Future grid scenarios may require a significant amount of gas or stored fuels to support variable resources, which could prove difficult to achieve with current infrastructure
- Some scenarios contain large amounts of battery storage, which may not be able to charge sufficiently under predicted load curves
- The retirement of the region's nuclear generators assumed in some scenarios may pose a challenge to grid reliability and could complicate the states' goals to reduce carbon emissions
- Future dispatchable resources do not necessarily need to be carbon-emitting, but they should have similar attributes to today's dispatchable resources

Dispatchable Generation Can Lessen the Amount of Variable Energy Resources Needed for Reliability

- Substituting relatively small, targeted amounts of dispatchable units significantly reduced the necessary new units of wind, solar, and storage to attain resource adequacy
 - Substituting 3,000 MW of additional units reduced the necessary new units of wind, solar, and storage by 19% (17,000 MW)





A critical obstacle to collectively overcome in 12 months is to maintain and enhance the region's access to stored energy.

Thank you!

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Future Grid Reliability Study PHASE 1

The New England States have set ambitious decarbonization goals to combat climate change over the next several decades. The rapid electrification of heating and transportation will drive unprecedented demand for electricity, and the ongoing shift to variable, renewable resources will further transform the electric grid of the future.

"A reliable future grid depends upon innovative approaches to decarbonization."

ISO New England's Future Grid Reliability Study examines the region's decarbonizing grid. This innovative study analyzed 32 scenarios, each a particular version of the 2040 grid, to identify key gaps and reliability issues. Though specific results for each scenario varied, the exclusive reliance on new wind, solar, and battery resources as a pathway toward a carbon-neutral economy will pose significant reliability challenges.

The specific order of events during this transition will impact reliability. Existing oil, propane, and other high emission heating systems are likely to be electrified before natural gas heating, while simultaneously, the region's fleet of electric vehicles rapidly expands. The resulting growth in demand for electricity will drive natural gas-fired resource use and continue the grid's reliance on gas during peak winter periods in ways that will exceed current supply and pipeline capabilities.

Future Grid Reliability Study Summary Document