Ensuring Reliability: ISO New England's Role in the Region's Energy Transition

NGA Regional Market Trends Forum 2023

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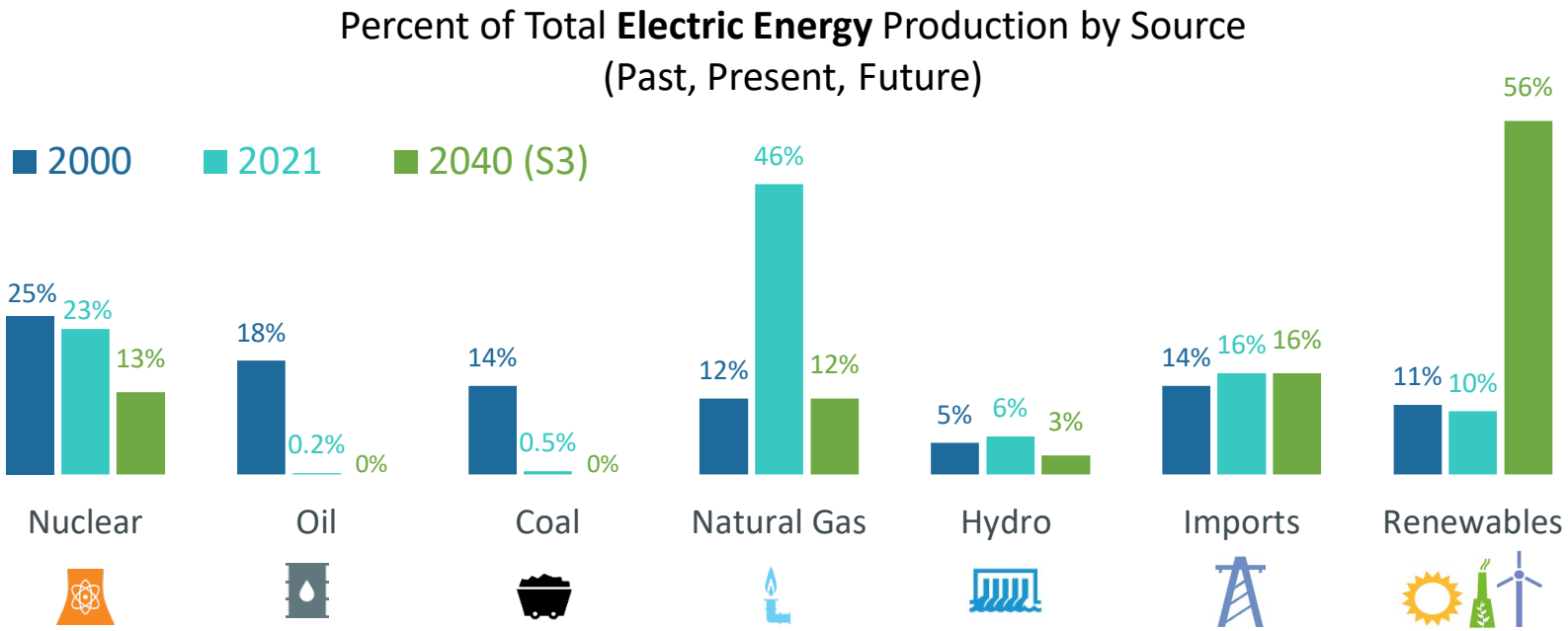
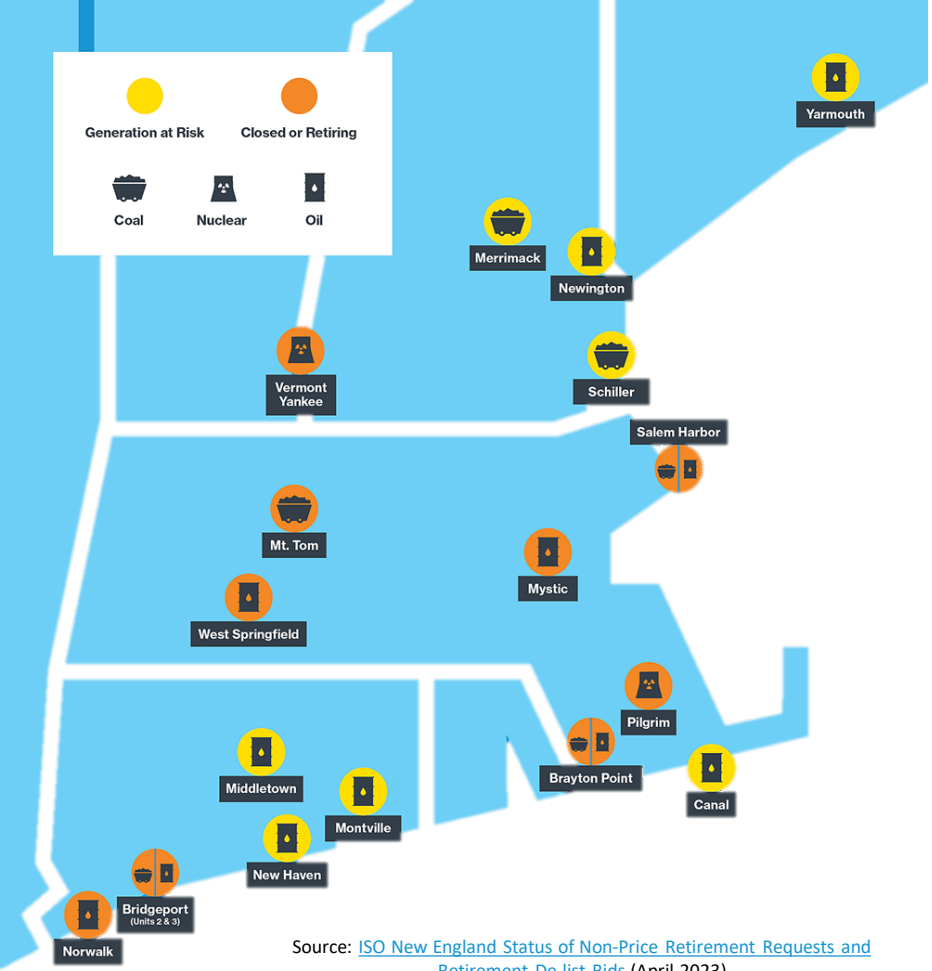
Dramatic Changes in the Energy Mix Are Underway



Source: ISO New England Net Energy and Peak Load by Source; data for 2021 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.



Source: ISO New England Status of Non-Price Retirement Requests and Retirement De-list Bids (April 2023)

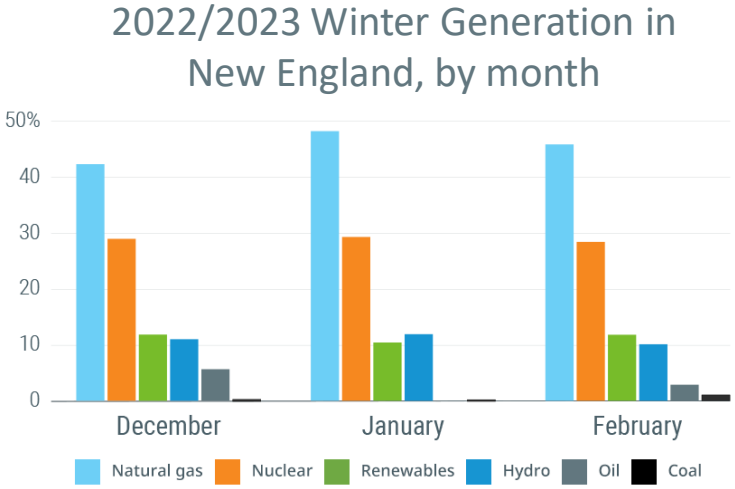
Since 2013, Roughly 7,000 MW of Generation Have Retired or Announced Plans for Retirement in the Coming Years

- Include predominantly coal, oil, and nuclear resources
- Another **5,000 MW** of remaining coal and oil are at risk of retirement
- These resources have played an **important** role in recent winters when natural gas supplies are constrained in New England

Winter 2022/2023 Recap

Wholesale prices drop during warm season marked by cold snaps

- ~5°F warmer than normal with 35 consecutive days, including all of January, when the temperature was above normal
- Electricity demand peak peaked at 19,645 MW (Feb. 3, 4°F avg. temp)
- “A Tale of Two Cold Snaps”: Dec. 24 & Feb. 3-4
- Natural gas predominate energy fuel (45%)
- The winter energy market value decreased from $3.7 billion in the winter of 2021/2022 to $2.6 billion in the winter of 2022/2023



Four Pillars of Supporting a Successful Energy Transition

New England is on a path to achieve a clean-energy future over the next several decades. Calling upon the results of several key studies, as well as 25 years' experience planning the region's power system, the ISO has identified four pillars critical to supporting the region's clean energy transition

1

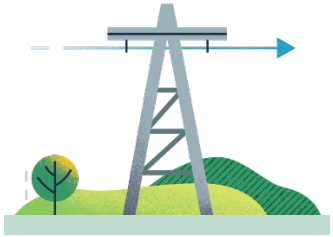
Significant amounts of clean energy to power the economy with a greener grid

2

Balancing resources that keep electricity supply and demand in equilibrium

3

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

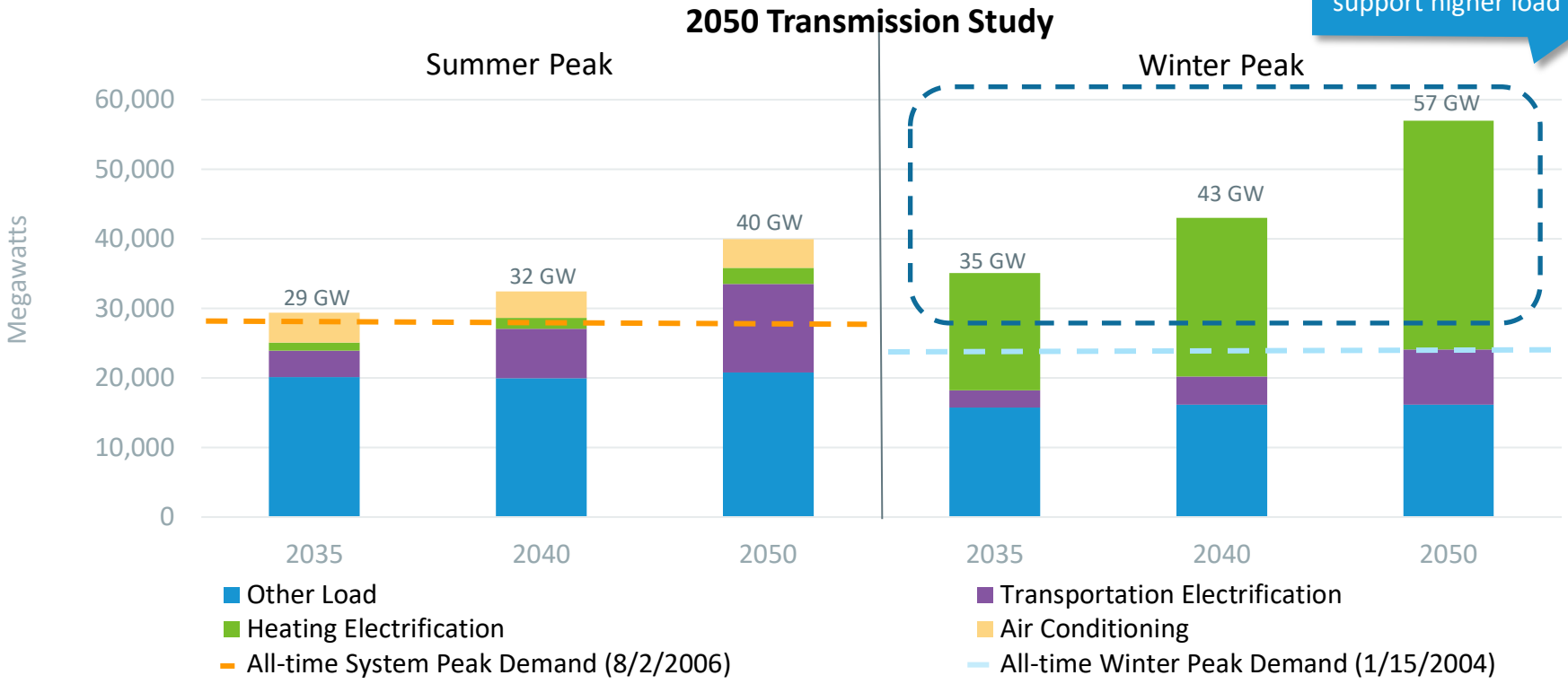


4

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

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

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



New Risks and Difficult Questions on the Horizon

- Energy and ancillary services prices will become increasingly volatile
- Significant, **long-duration** balancing **energy sources** will be needed
- The **coordination of resource (and energy) adequacy** has become more tenuous
- Barriers to entry (**infrastructure siting**) are growing
- How to manage the **interdependent** nature of the wholesale electric and gas **system** when the regulatory models are so different?
- The **pace of change** is challenging for wholesale market designers, and transmission and distribution operators. Market design must strive to adhere to economic principles but accommodate regulatory/policy imperatives and constraints (including **prioritizing reliability)**

APPENDIX: BACKGROUND INFORMATION

Overview of Studies Supporting the Future Grid

- **Weather**: Operational Impacts of Extreme Weather Events
  - The ISO is working with the Electric Power Research Institute (EPRI) to perform various modeling
  - Rigorously model likelihood and impact of extreme weather events
- **Transmission**: 2050 Transmission Study
  - What transmission is needed to support renewable/high load future
  - Initial results presented at the Planning Advisory Committee in March, April, and July 2022.
  - The ISO is moving forward with identifying high-level transmission solutions
- **Operations**: Future Grid Reliability Study (Phase 1)
  - Examine operational effects of renewable-heavy grid
  - The Final Future Grid Reliability Study (FGRS) was released in July 2022
  - Phase 2 kicking off spring 2023
- **Markets**: Pathways to the Future Grid
  - Evaluate different market options to support a renewable-heavy grid
  - Final report available
- **Reliability**: Transmission Planning for the Clean Energy Transition
  - Explores how near-term needs assessments should evolve with renewables
  - Final report available