

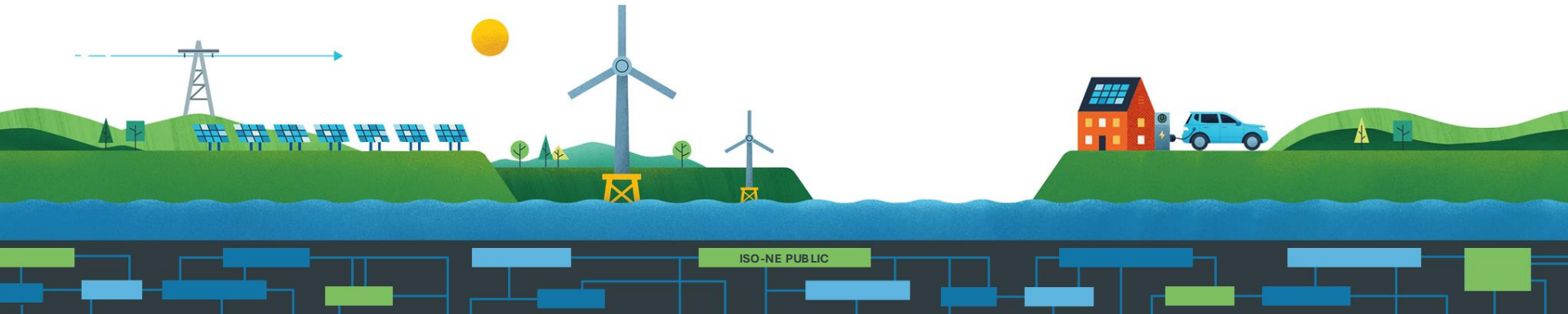


New England's Evolving Grid

AEE New England Energy Outlook Forum

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Today's Presentation

1. Introduction
2. Building Upon Past Knowledge
3. Key Findings
4. Conclusion



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

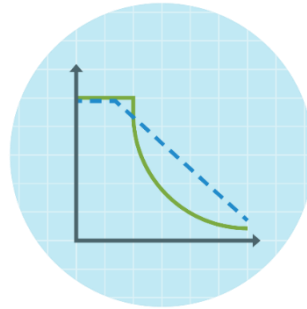
Grid Operation

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



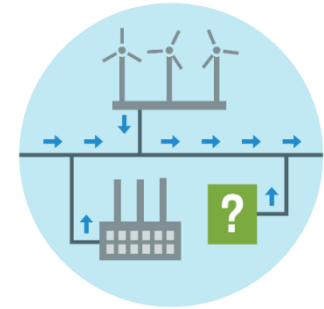
Market Administration

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

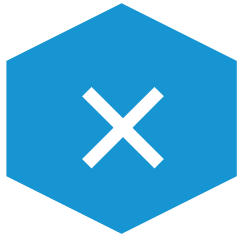


Power System Planning

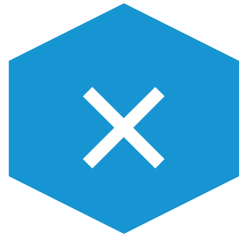
Study, analyze, and plan to make sure New England's electricity needs will be met over the next 10 years



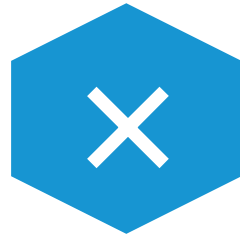
Things We Don't Do



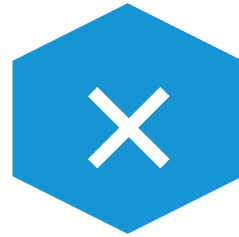
Handle
retail electricity



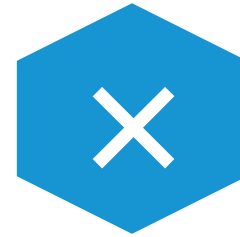
Own power grid
infrastructure



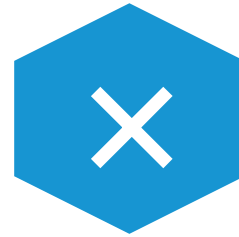
Have a stake in
companies
that own grid
infrastructure



Have
jurisdiction
over fuel
infrastructure



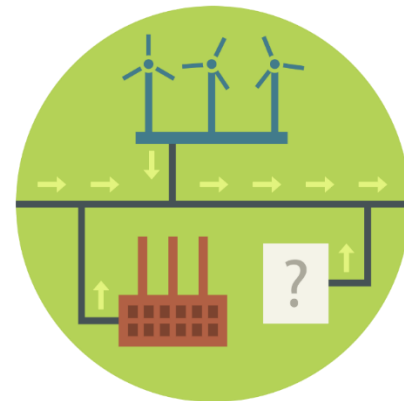
Have control
over siting
decisions



Plan the
resource mix

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
- Perform longer-term transmission planning



ISO-NE Is a Summer-Peaking System

New England shifted from a winter-peaking system to a **summer-peaking** system in the early 1990s, largely because of the growth of air conditioning and a decline in electric heating

- Peak demand on a normal summer day has typically ranged from 17,500 MW to 22,000 MW
- Summer demand usually peaks on the **hottest and most humid** days, with peaks on such days averaging roughly 25,600 MW since 2000
- Region's all-time summer peak demand was **28,130 MW** on **Aug. 2, 2006**

The region is expected to shift back to a **winter-peaking system** with the electrification of heating demand

- Region's all-time **winter** peak demand was **22,818 MW** on **Jan. 15, 2004**

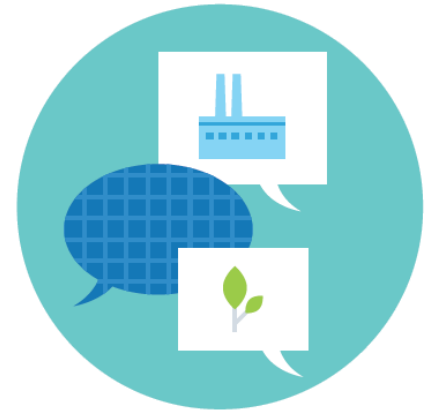


BUILDING UPON PRIOR KNOWLEDGE



Economic Studies Background

- Previously, ISO New England performed stakeholder requested Economic Studies to analyze future potential power systems
- Following recent changes to the Economic Study process' Tariff provisions, the ISO now performs three repeated scenarios along with a potential Stakeholder-Requested Scenario*
- The [Economic Planning for a Clean Energy Transition Study \(EPCET\)](#) was a dry run of the new Economic Study process
 - The 2024 Economic Study was the first Economic Study conducted under this new structure
- Previous Economic Studies can be found on the [ISO-NE Economic Studies webpage](#)



* A self-funded stakeholder request option is also available

Objective of the Economic Study Process

- Provide information to stakeholders to help them evaluate the economic and environmental impacts of New England state policies, federal policies, and various resource technologies on satisfying future resource needs
- Identify potential system efficiency issues on the New England transmission system (specifically the Pool Transmission Facilities portion) and, where appropriate, explore competitive solutions to address any identified congestion above the set dollar threshold
- Economic Studies are not plans to build certain resources
- More details on the Economic Study process can be found in [the Economic Studies Technical Guide](#)



Economic Studies Modeling

Production Cost Modeling

- Replicates the hourly economic dispatch of the New England power system
- Provides data on emissions, prices, production cost to generators, cost to load, fuel consumption, generation and curtailment, system congestion, and generator revenues

Capacity Expansion Modeling

- Longer-term view of the evolution of the New England power system over time
- Usually paired with production cost models to provide more detailed data on individual years

Economic Study Reference Scenarios

**Prior
Year**

Benchmark Scenario

Model the previous calendar year and compare it to historical performance to assess model fidelity and improve future scenario accuracy

**10 Years
Out**

System Efficiency Needs Scenario*

Model a future year (10-year planning horizon) based on the ISO's existing planning criteria to identify system efficiency issues that could meet the threshold of a System Efficiency Needs Assessment and move on to the competitive solution process for System Efficiency Transmission Upgrades needs

**Beyond 10
Years**

Policy Scenario

Model future years (10+ year planning horizon) based on satisfying New England region and other energy policies and goals

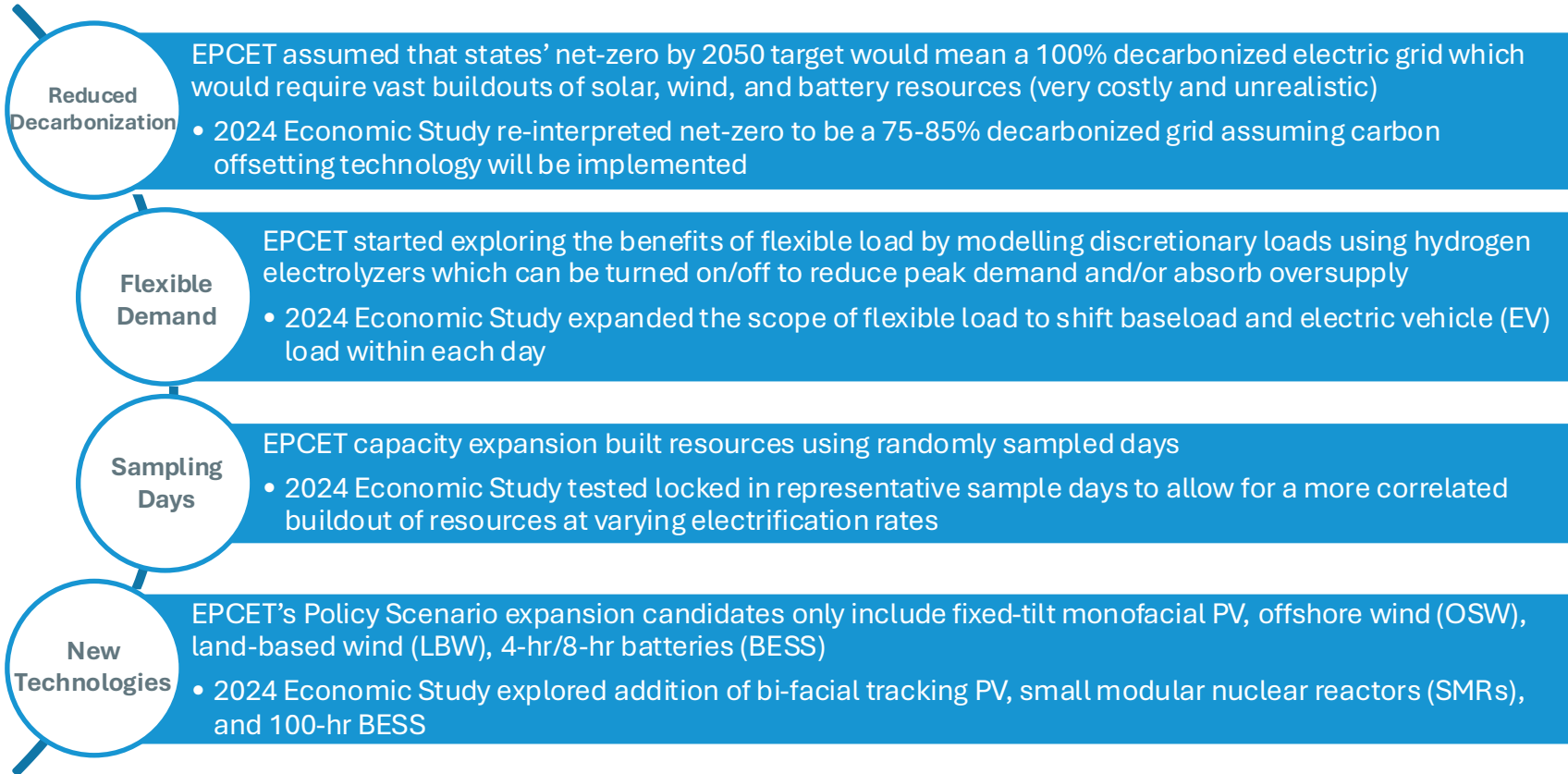
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Stakeholder-Requested Scenario

Stakeholders may request analysis with a region-wide scope that is not covered by the other three scenarios; or they may request additional “sensitivity” analysis on these three scenarios

* System Efficiency Needs Scenario results are not included as part of the 2024 Economic Study Report and can be found on the [Economic Study page of the ISO website](#)

Building Upon EPCET



KEY FINDINGS



Overview of Key Findings

1

Including more dispatchable technologies reduces needed capacity by over 15%

2

Shifting the hours of peak demand in winter reduces costs

3

Emissions reductions beyond 85% of policy goals drive escalating costs

4

Demand growth also increases costs beyond the 2040s

5

Deep decarbonization in 2040s drives increased curtailment of renewables and reduces the economic viability of certain technologies

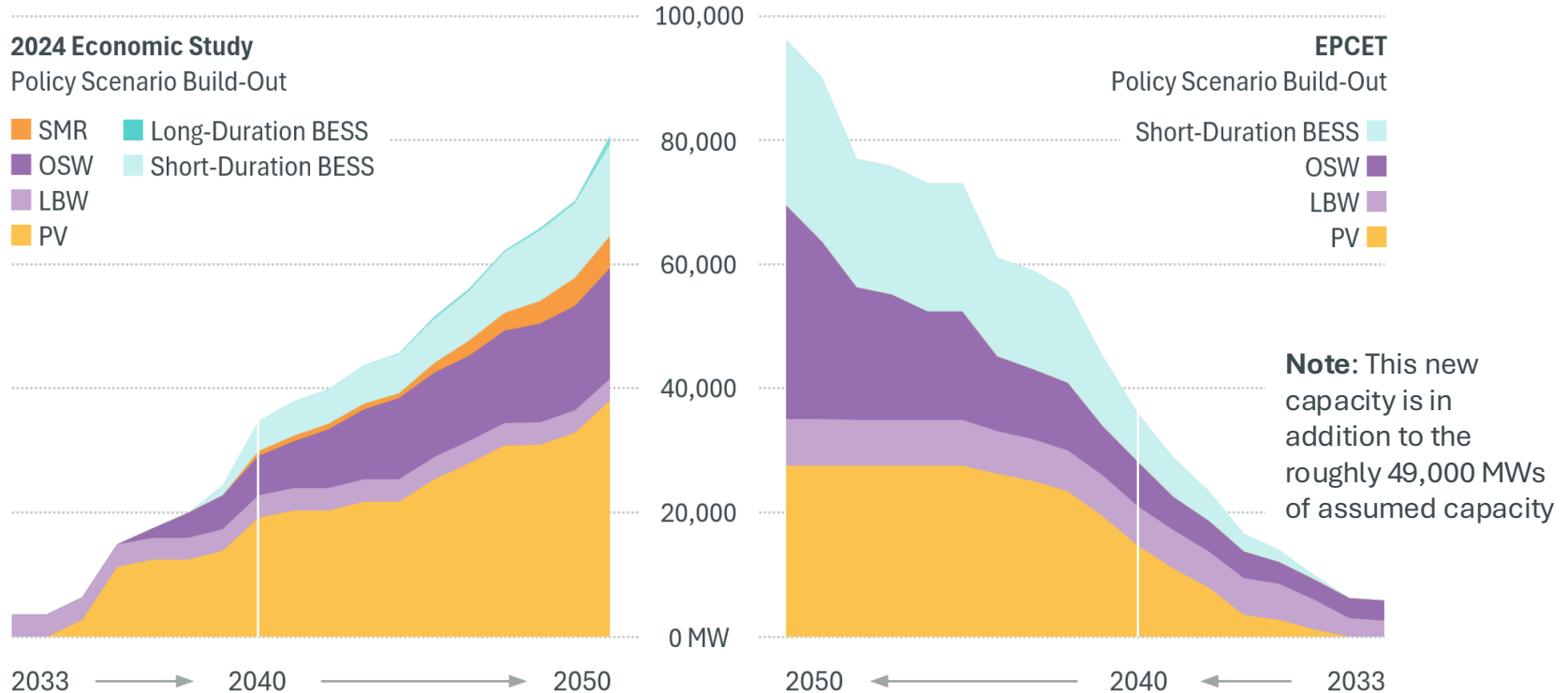
6

Land-based wind is consistently economical from 2033 to 2050, while PV supports early decarbonization

[See report for full description of findings and results](#)

Including More Dispatchable Technologies Reduces Needed Capacity by More Than 15%

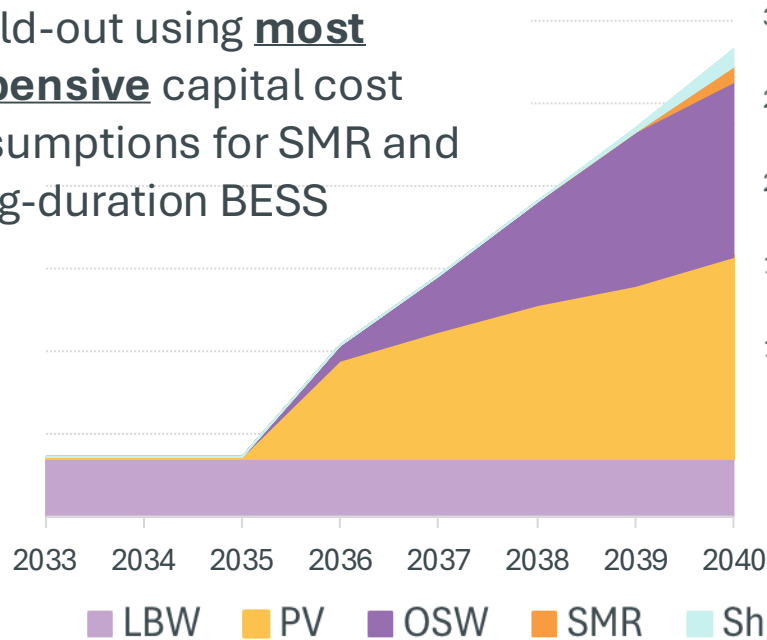
Key Finding 1



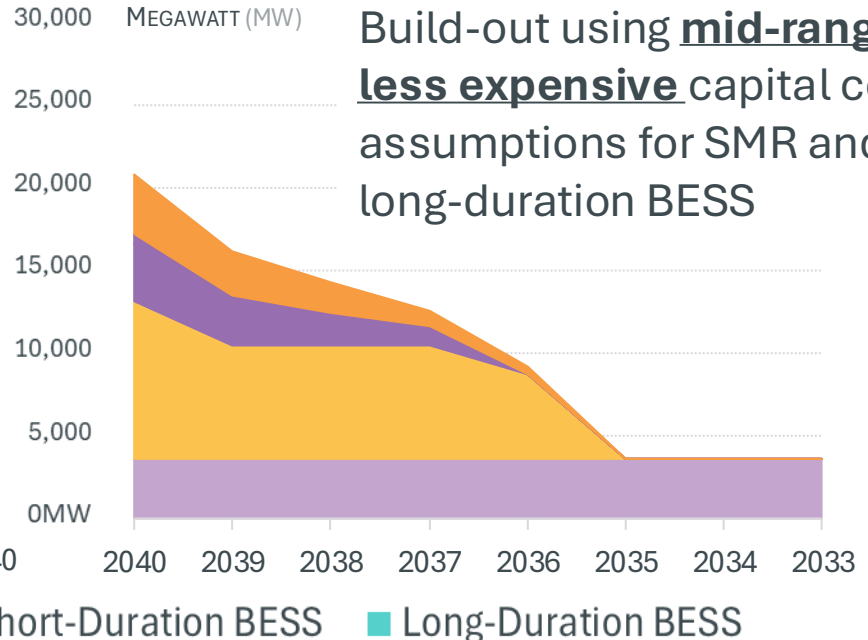
Including More Dispatchable Technologies Reduces Needed Capacity by More Than 15%, cont.

Key Finding 1

Build-out using **most expensive** capital cost assumptions for SMR and long-duration BESS



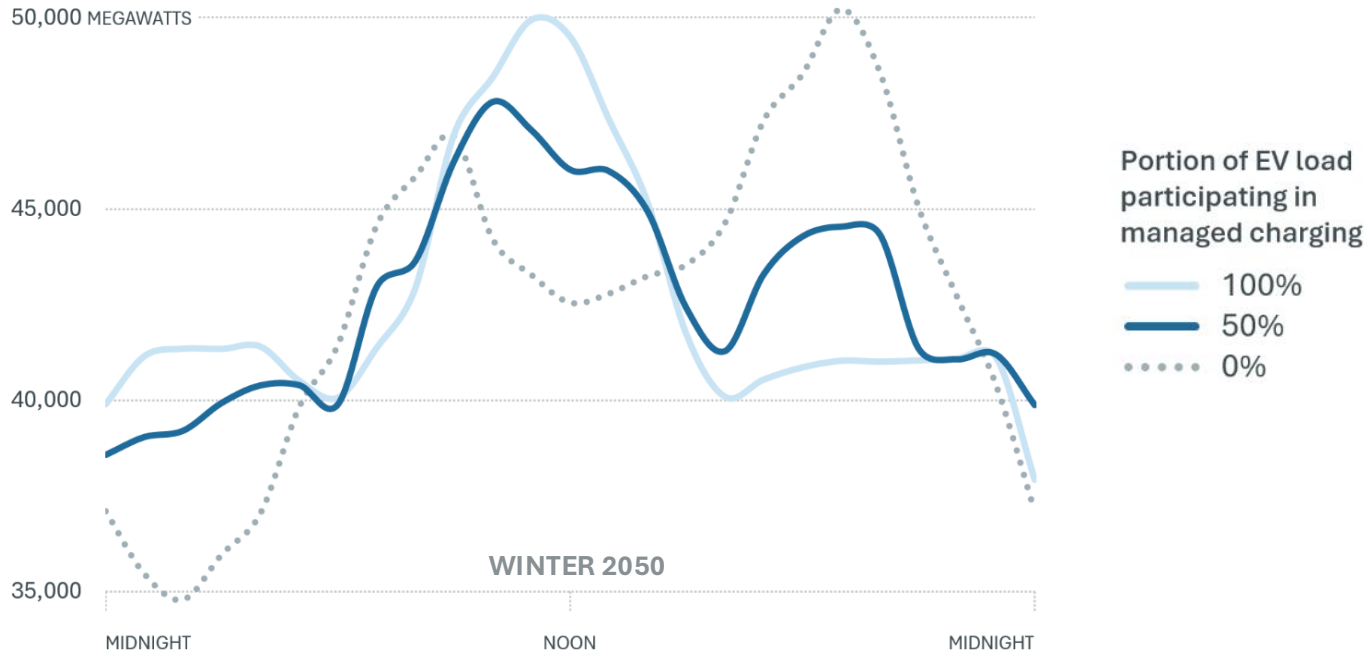
Build-out using **mid-range less expensive** capital cost assumptions for SMR and long-duration BESS



Shifting Peaks in Winter Demand Reduces Costs

Key Finding 2

Flexible charging of EVs reduces even peak demand in winter 2050



Note: Chart includes behind the meter (BTM) solar, but does not account for utility scale solar

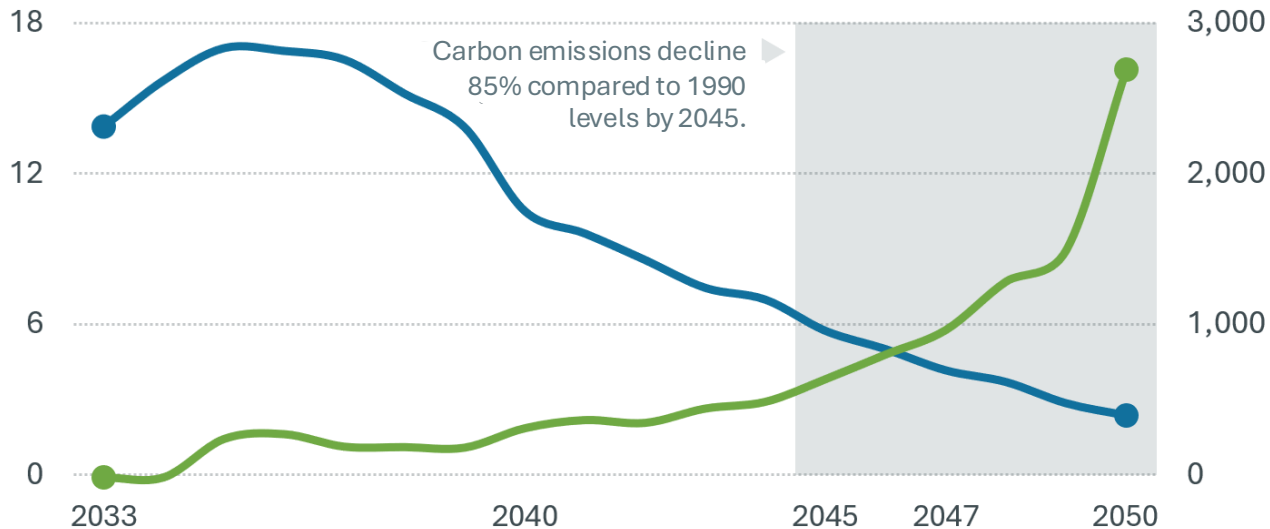
Emissions Reductions Beyond 85% of Policy Goals Drive Escalating Costs

Key Finding 3

The lower emissions get, the costlier it is to reduce them further

Electric Sector CO₂ Production
(million tons/year)

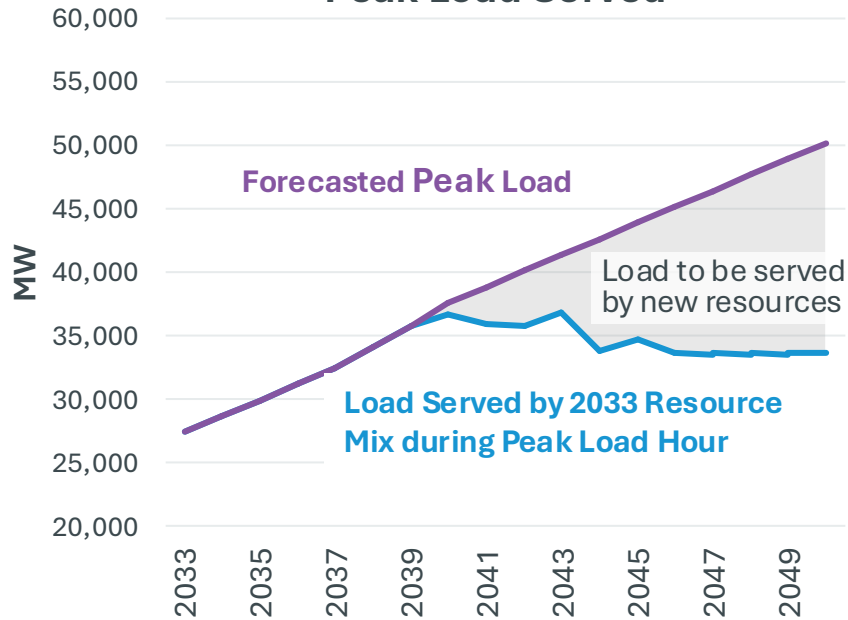
Cost of Mitigating Carbon
(\$/ton)



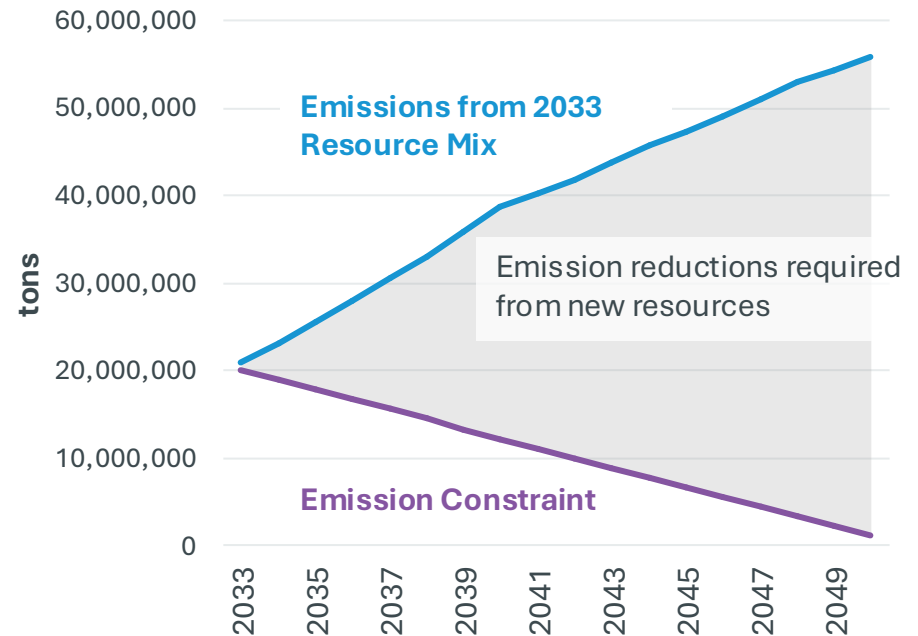
Demand Growth Also Increases Costs in the 2040s

Key Finding 4

2033 Resource Mix Performance: Peak Load Served

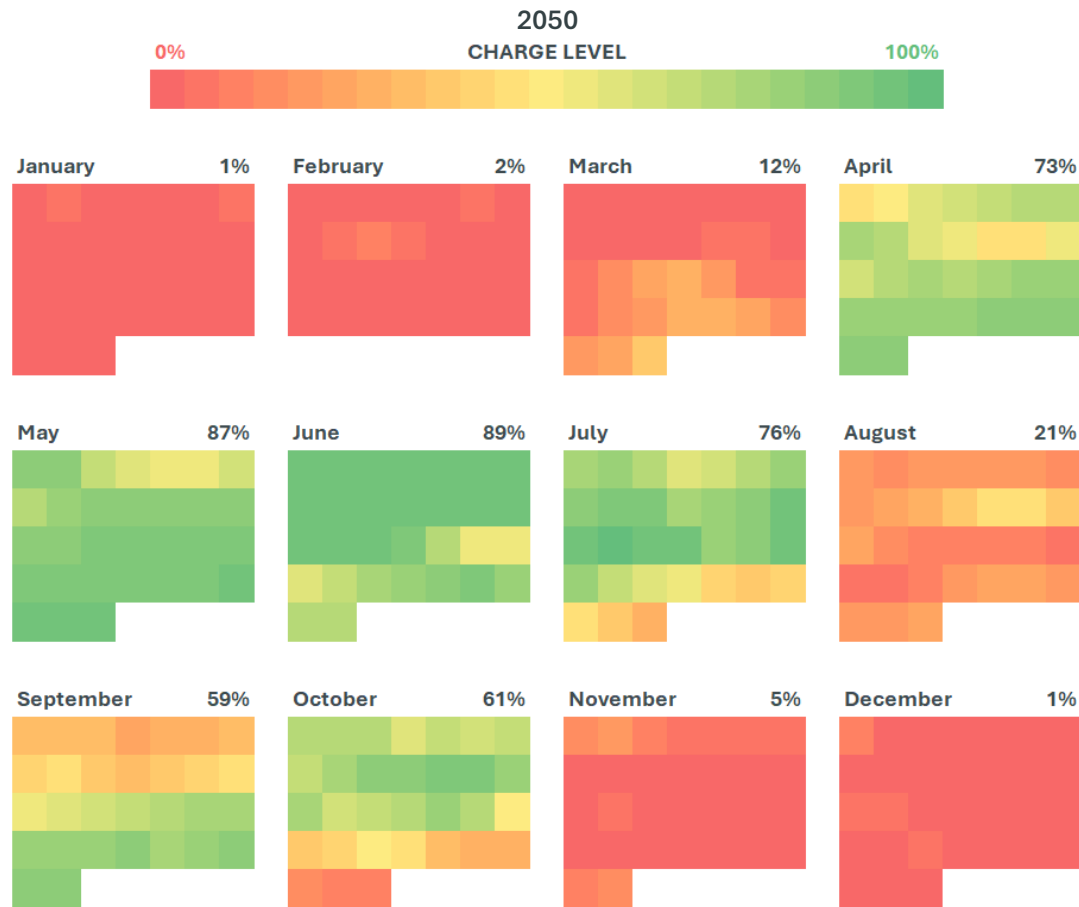


2033 Resource Mix Performance: Emissions



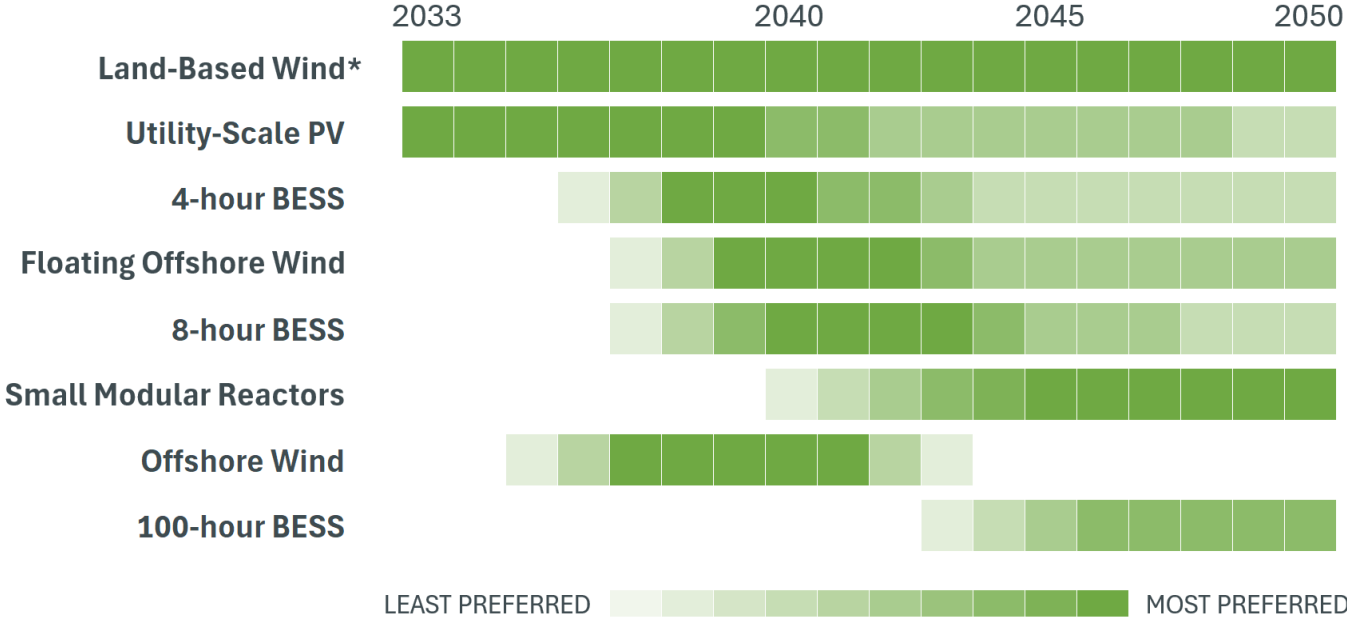
Deep Decarbonization in 2040s Drives Increased Curtailment of Renewables and Reduced Economics of Certain Technologies

Key Finding 5



Land-based Wind is Consistently Economical from 2033 to 2050, While PV Supports Early Decarbonization

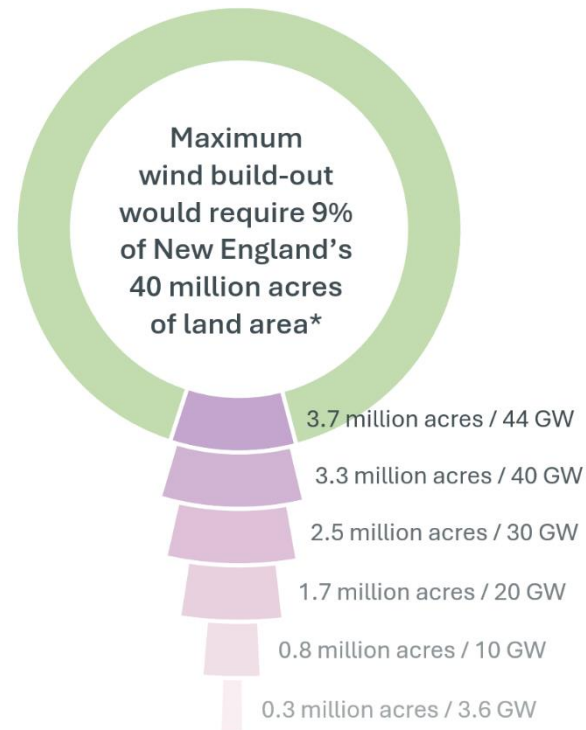
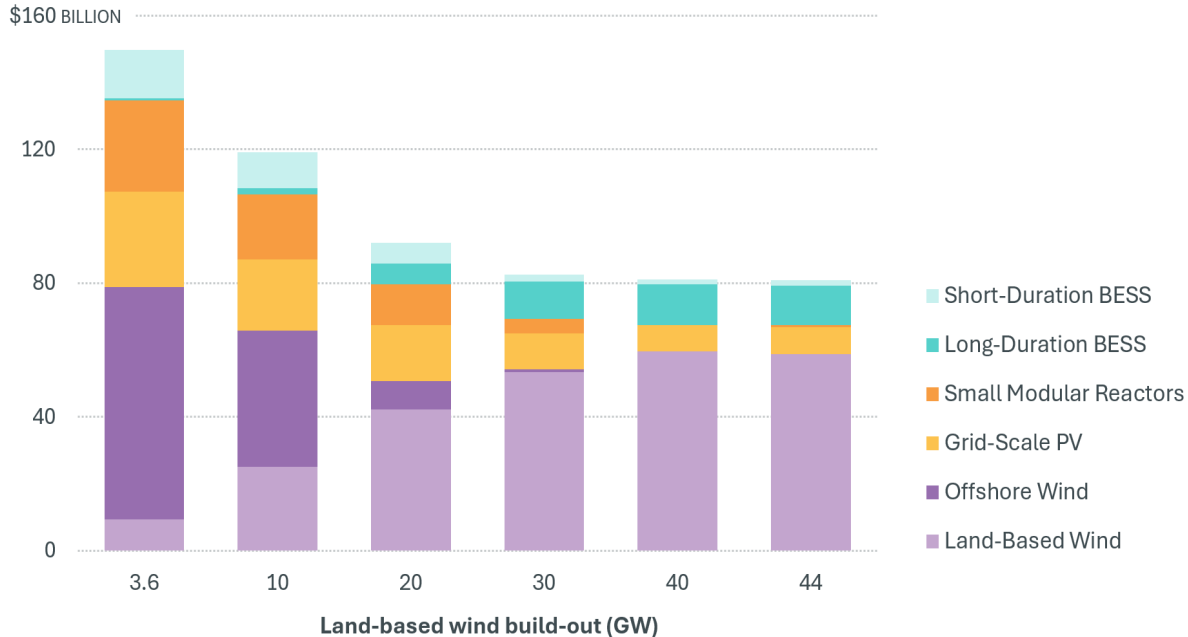
Key Finding 6



*Land-based wind is the only technology subject to land availability constraints. This category reflects what the model would build without these constraints.

Land-Based Wind is Consistently Economical from 2033 to 2050, While PV Supports Early Decarbonization, cont.

Key Finding 6



* Assuming 6 MW turbines requiring 500 acres each.

Shifting part of the decarbonization effort away from the electric sector can significantly reduce costs

Additional Findings

% electric sector decarbonization

%

% electrification of transportation and heating sectors

cost reduction versus Reference*

*Reference case assumes 100% electric sector decarbonization and 100% electrification of transportation and heating sectors

100% electric sector decarbonization

18%

cost reduction versus Reference

85% electrification of transportation and heating sectors

85% electric sector decarbonization

29%

cost reduction versus Reference

100% electrification of transportation and heating sectors

85% electric sector decarbonization

43%

cost reduction versus Reference

85% electrification of transportation and heating sectors

100% electric sector decarbonization

30%

cost reduction versus Reference

75% electrification of transportation and heating sectors

75% electric sector decarbonization

43%

cost reduction versus Reference

100% electrification of transportation and heating sectors

75% electric sector decarbonization

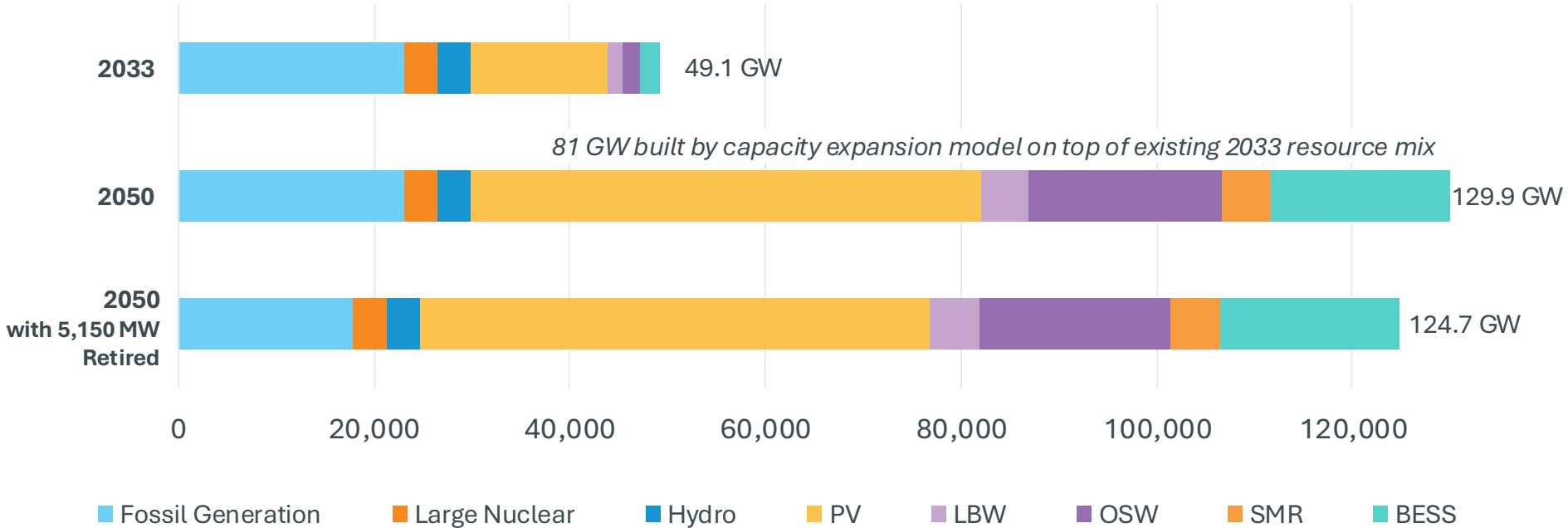
66%

cost reduction versus Reference

75% electrification of transportation and heating sectors

System Will Continue to Rely on Existing Fleet for Reliability

Additional Findings



LOOKING FORWARD



Conclusion and Next Steps

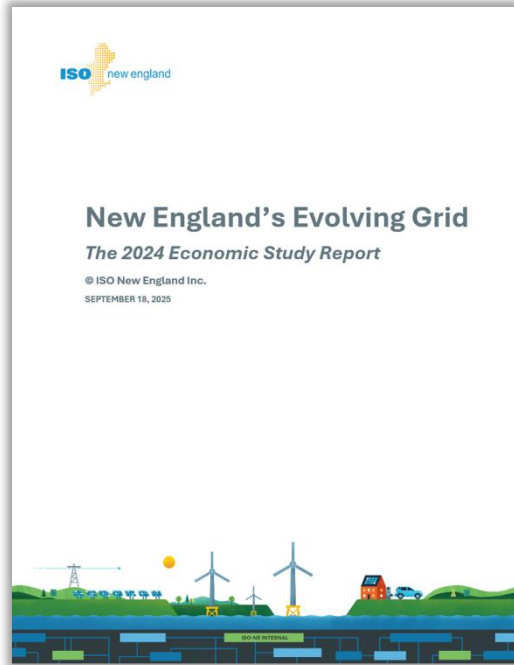
- The 2024 Economic Study is **one of the broadest power system analyses the ISO has conducted to date**, with over 2,500 simulations across nearly 40 scenarios
 - The results show that **early, least-cost emissions reductions and a diverse set of technologies** can maintain reliability at scale
 - **Insights on flexible demand, renewable integration, and system planning** are relevant well beyond New England
- The work **builds on EPCET results**, creating continuity in the analysis and helping to track trends in the region's decarbonization pathways
- Findings will **guide policymakers, planners, and stakeholders** in evaluating tradeoffs and practical strategies, while also informing the 2026 Economic Study as it explores new trajectories for the regional grid

Questions

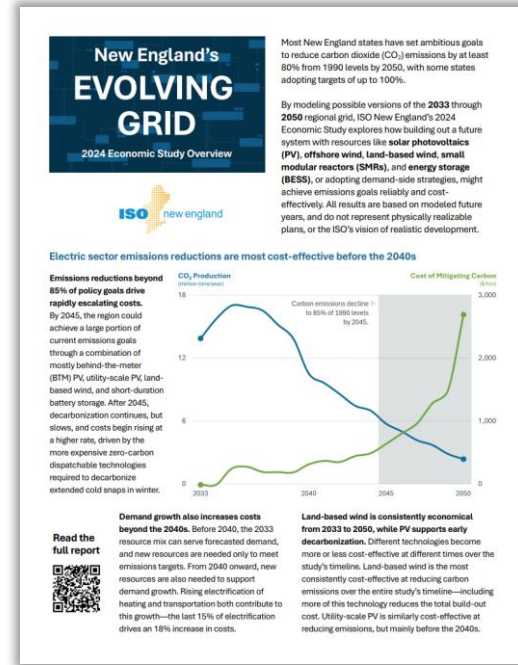


Dig Deeper

2024 Economic Study materials can be found on [the ISO Economic Studies webpage](#)



[New England's Evolving Grid: The 2024 Economic Study Report](#)



[New England's Evolving Grid Fact Sheet](#)

Acronyms

BESS	Battery Energy Storage Systems
BTM PV	Behind the Meter Photovoltaic
CELT	Capacity, Energy, Load, and Transmission Report
EPCET	Economic Planning for the Clean Energy Transition
EV	Electric Vehicle
LBW	Land-based Wind
OSW	Offshore Wind
PV	Photovoltaic
RSP	Regional System Plan
SMR	Small Modular Reactor

For More Information



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