



Regional Planning Update

*NPCC Governmental/Regulatory Affairs
Advisory Group*

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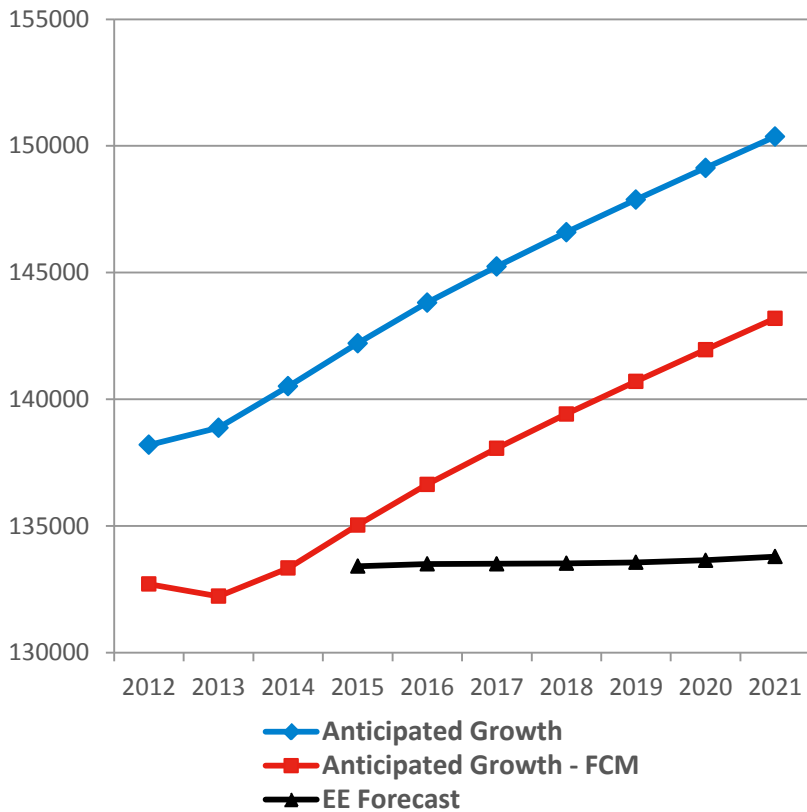
FORECASTING AND ENERGY EFFICIENCY

Incorporating Impact of Energy Efficiency

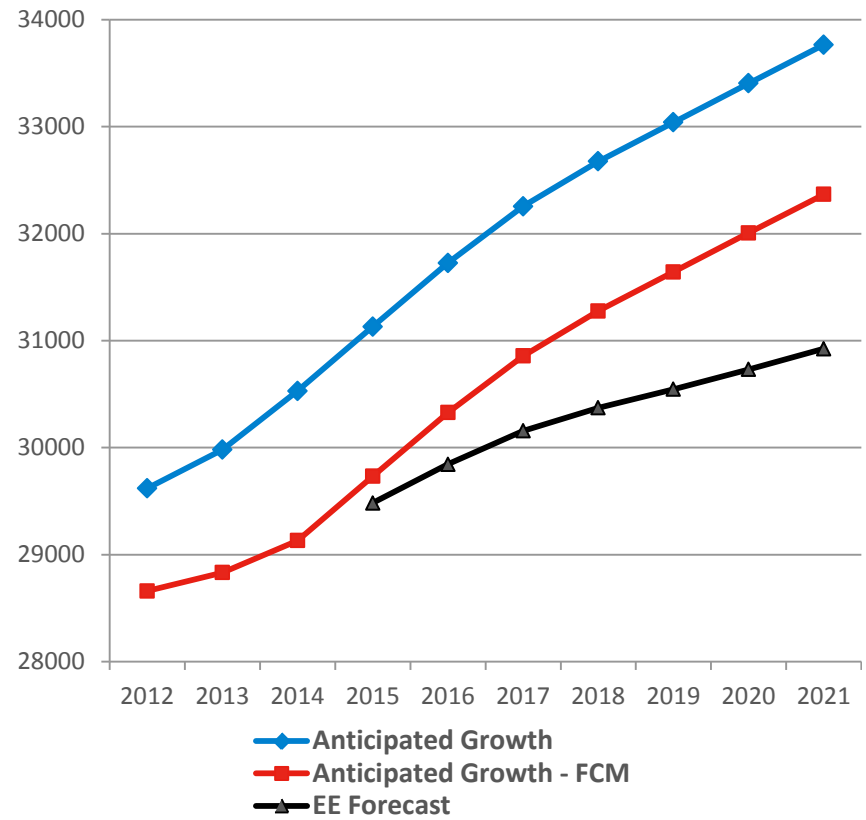
- Given the expectation of large future investment in EE in New England, the ISO worked with the region's stakeholders to identify characteristics of utility-based EE programs in the region that may be useful for forecasting future EE impacts
- The ISO developed a forecast of EE savings across a 10-year planning horizon
 - The forecast projects long-term reductions in peak demand and energy as a function of projected EE spending and historical costs
 - First in the nation multistate energy-efficiency forecast

Forecasted Impacts of Energy Efficiency

Energy Demand (GWh)



Peak Load (MW)



Impact of EE Forecast on Transmission Planning

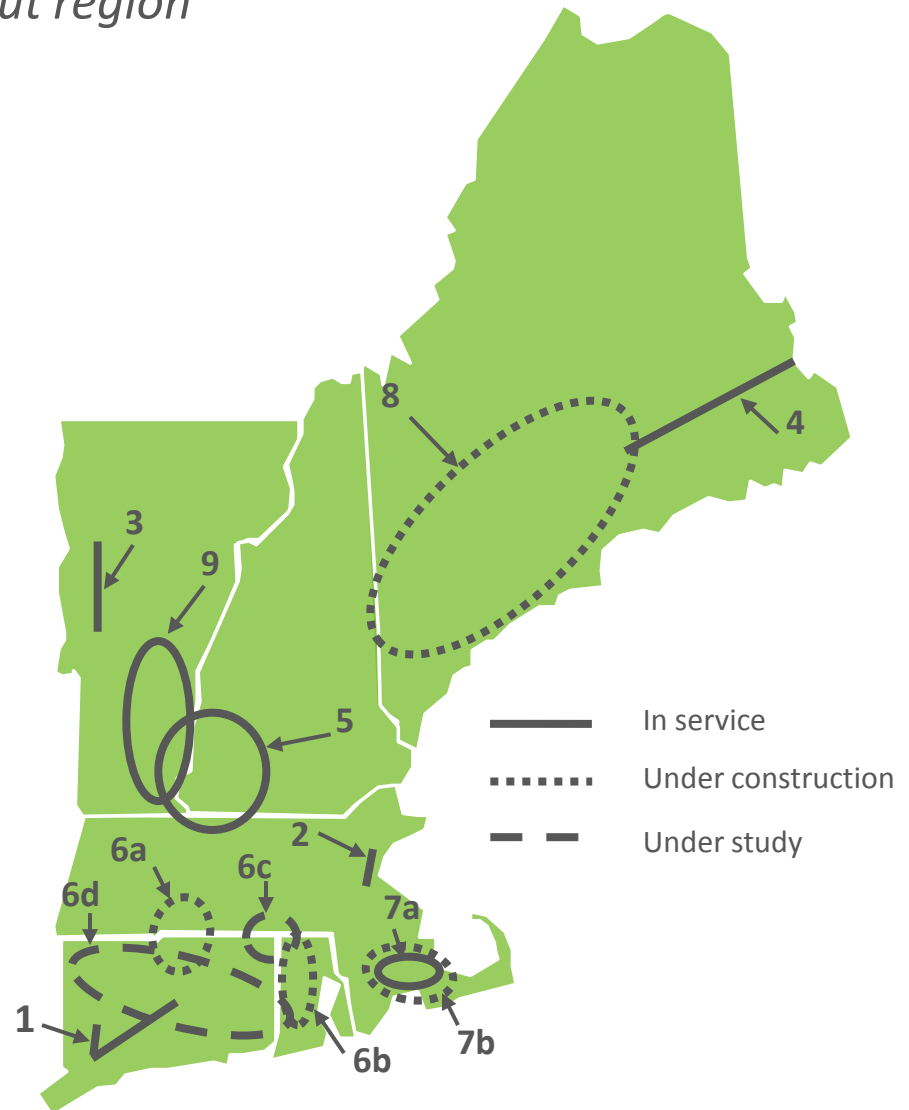
- The first EE forecast, which was recently completed, required dozens of stakeholder meetings and three years to finalize
 - This forecasts revealed that about \$260 million in transmission expenses have already been deferred for New England customers as a result of EE investment and grid improvements
 - Forecast incorporated extraordinary amount of data
- Process updated annually
 - Next forecast to be finalized early 2013

TRANSMISSION AND GENERATION

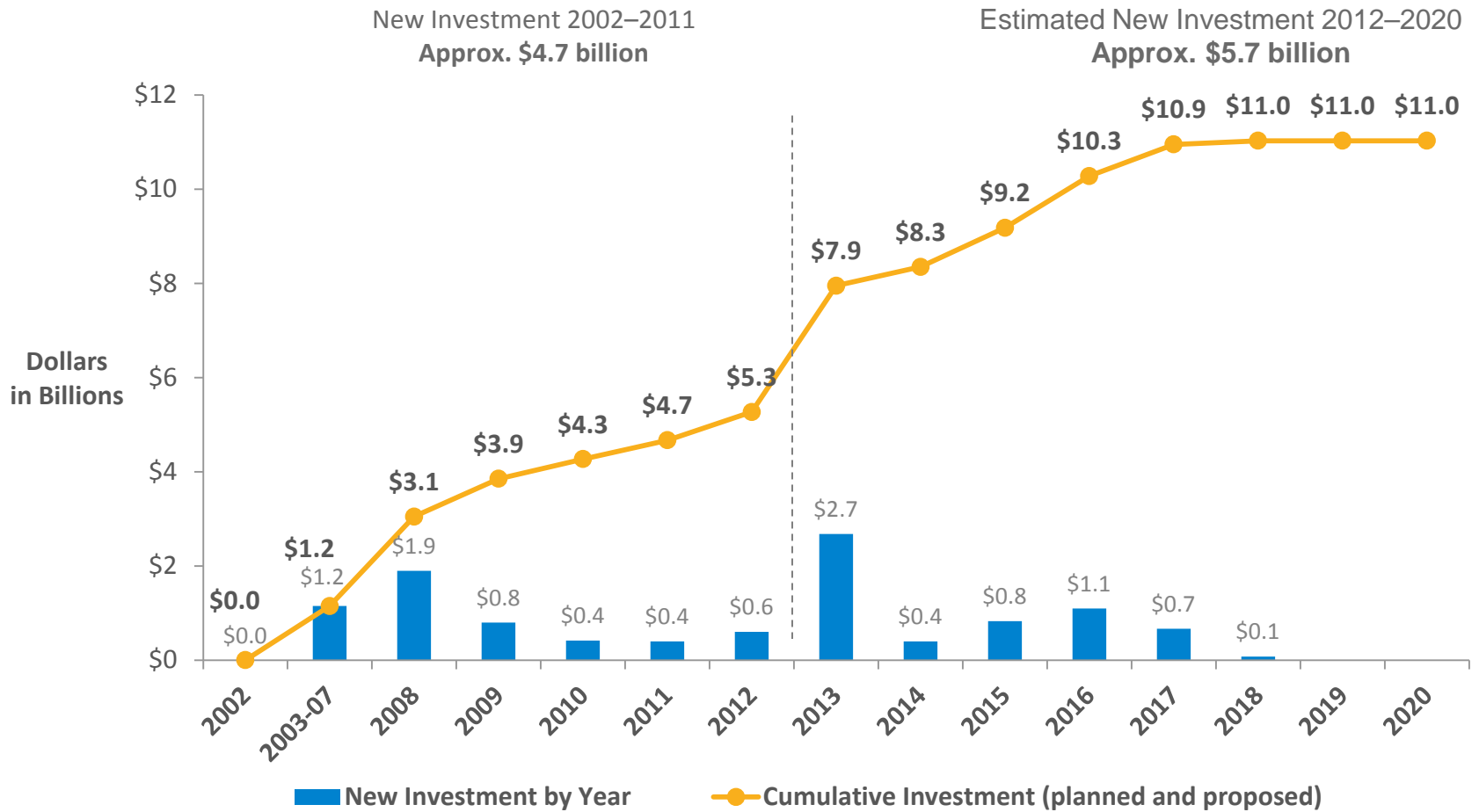
Projects to Maintain Reliability are Progressing

Transmission projects planned throughout region

1. Southwest CT Phases I & II
2. NSTAR 345 kV Project, Phases I & II
3. Northwest Vermont
4. Northeast Reliability Interconnect
5. Monadnock Area
6. New England East-West Solution
 - a. Greater Springfield Reliability Project
 - b. Greater Rhode Island Reliability Project
 - c. Interstate Reliability Project
 - d. Greater Hartford/Central Connecticut
7. Southeast Massachusetts
 - a. Short-term upgrades
 - b. Long-term Lower SEMA Project
8. Maine Power Reliability Program
9. Vermont Southern Loop



Transmission Investment in New England

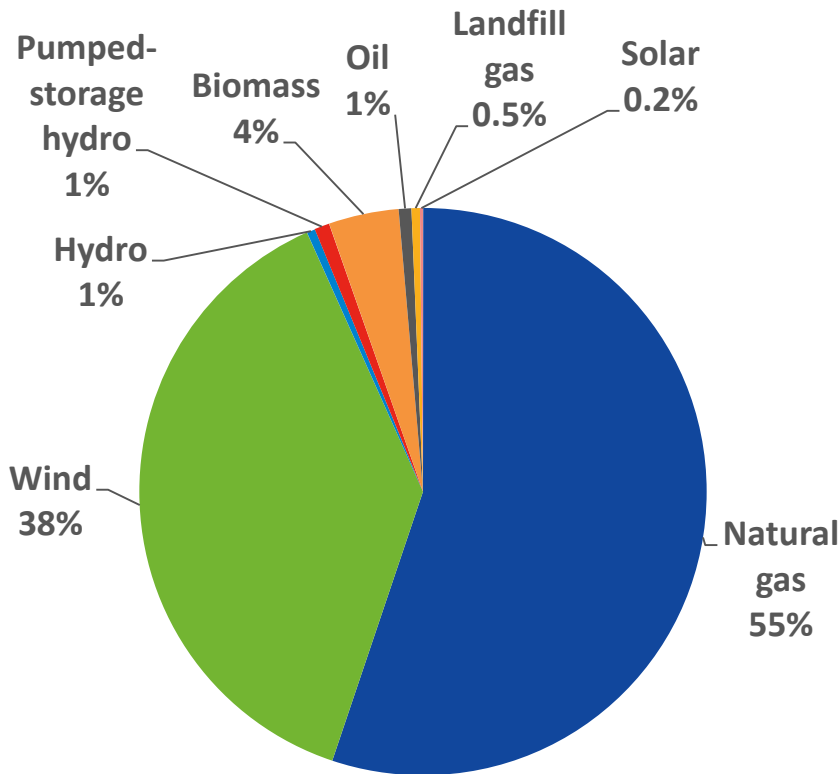


Source: ISO New England Transmission Project List, through October 2012 Update.

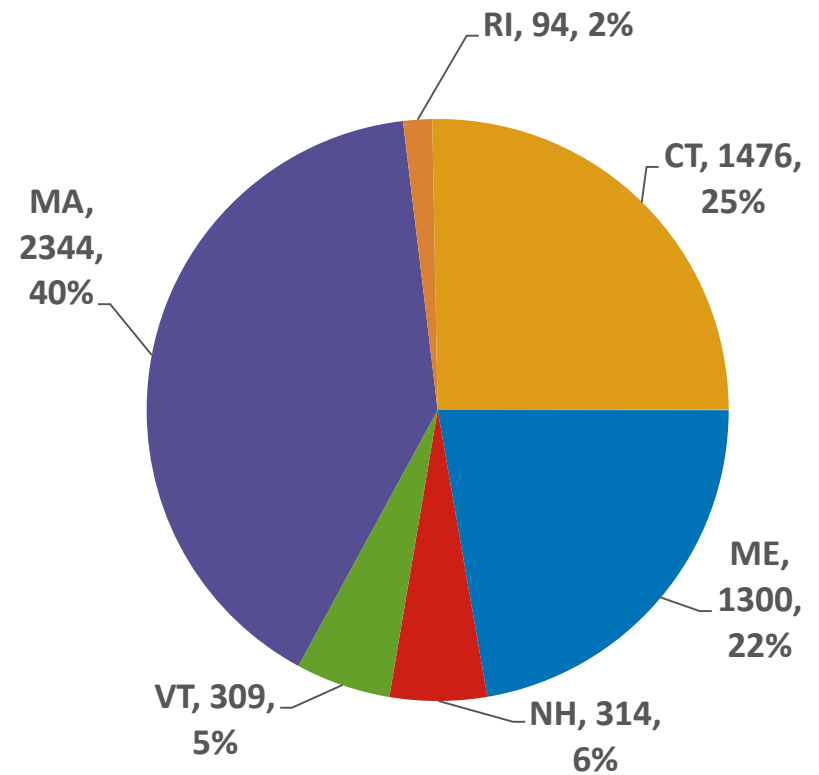
Generator Proposals in the ISO Queue

Approximately 6,000 MW

By Type



By State

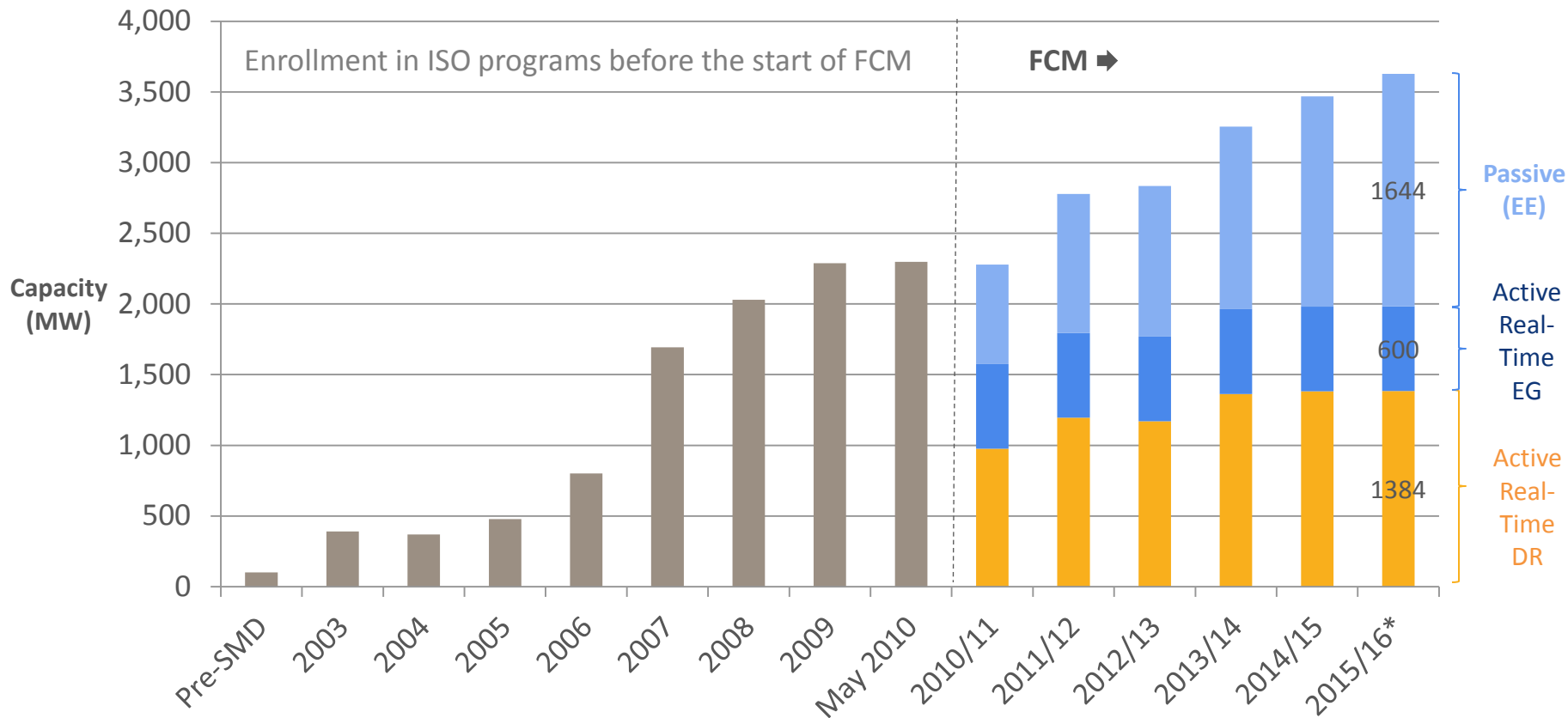


Summer 2012

Demand Resources Growing in New England

Capacity Market has stimulated DR growth

Demand Resource Participation in Region

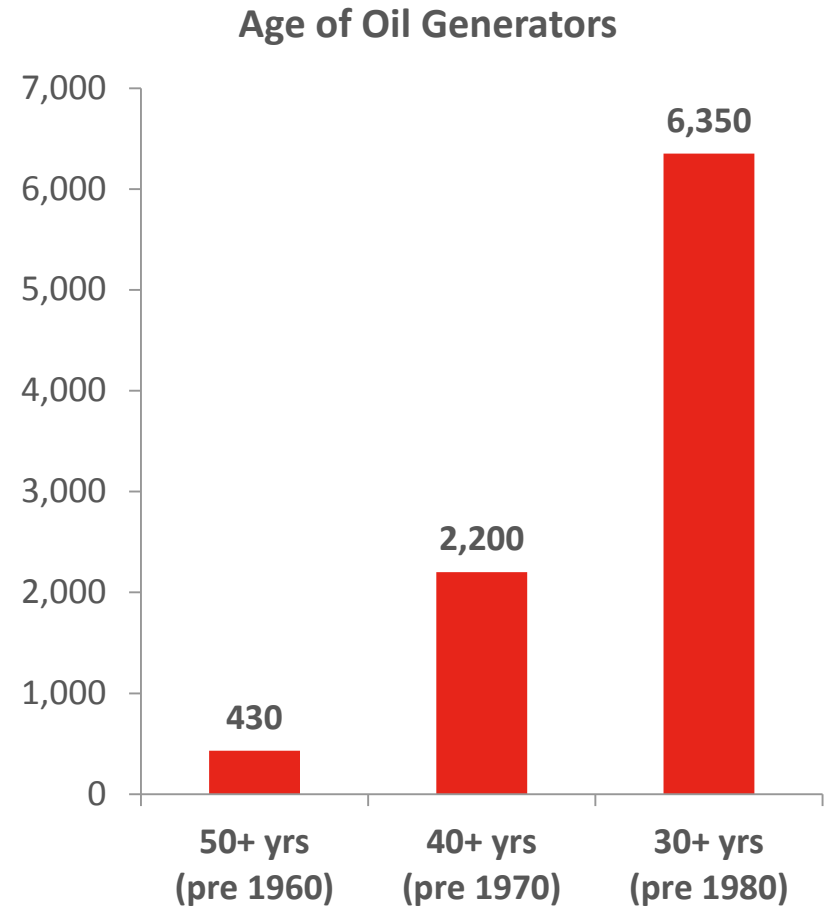


2010/11–2014/16: Total DR cleared in FCAs #1 – #6; real-time emergency generation capped at 600 MW

CHALLENGES FOR REGION

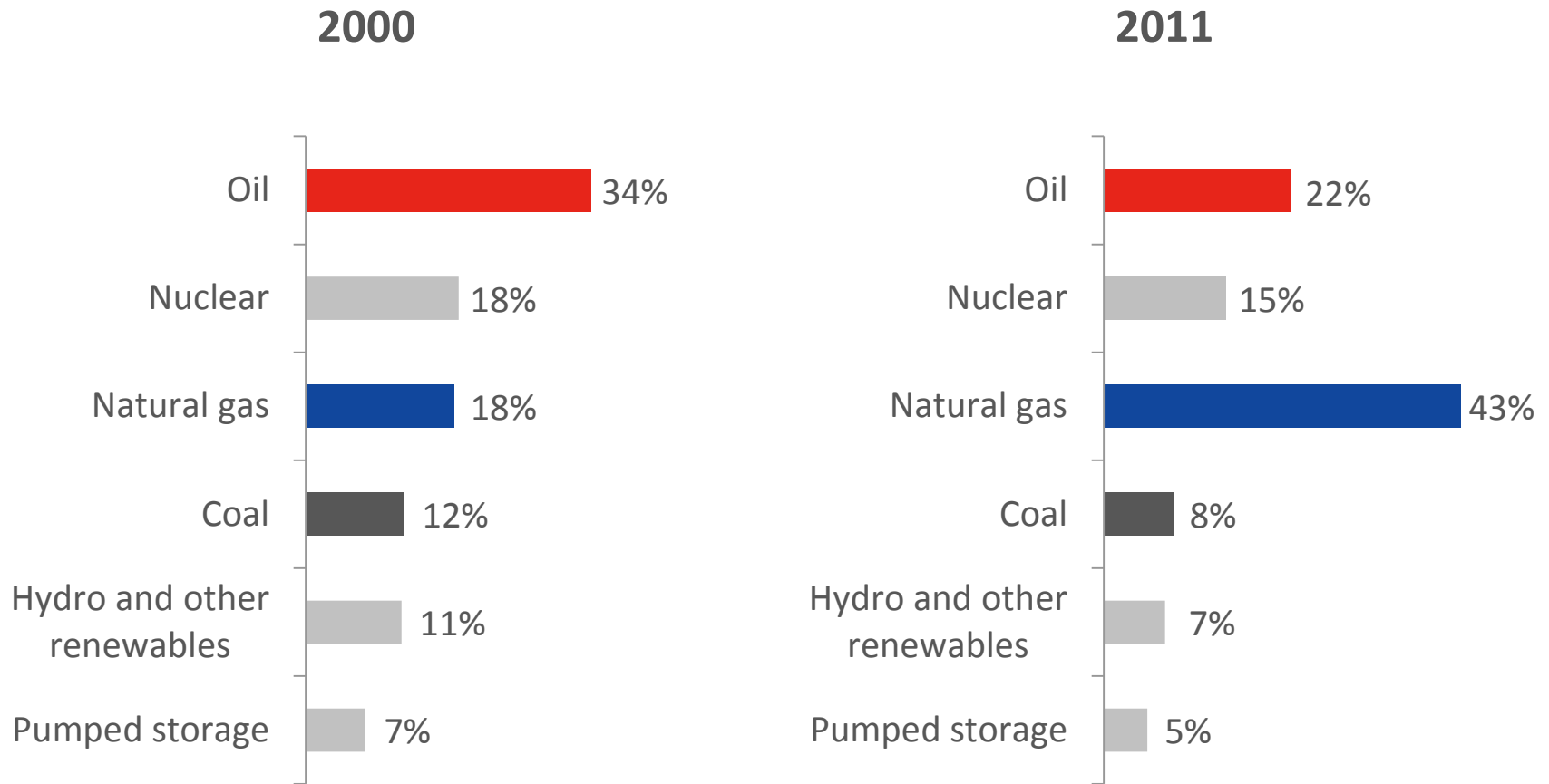
Challenges Facing the Region

- Reliance on natural gas and fuel supply for generators
- Long-term concerns with retaining resources and developing new ones
- Economic factors and environmental regulations will likely result in the retirement of older coal and oil generating units



Regional *Capacity* has Shifted from Oil to Natural Gas

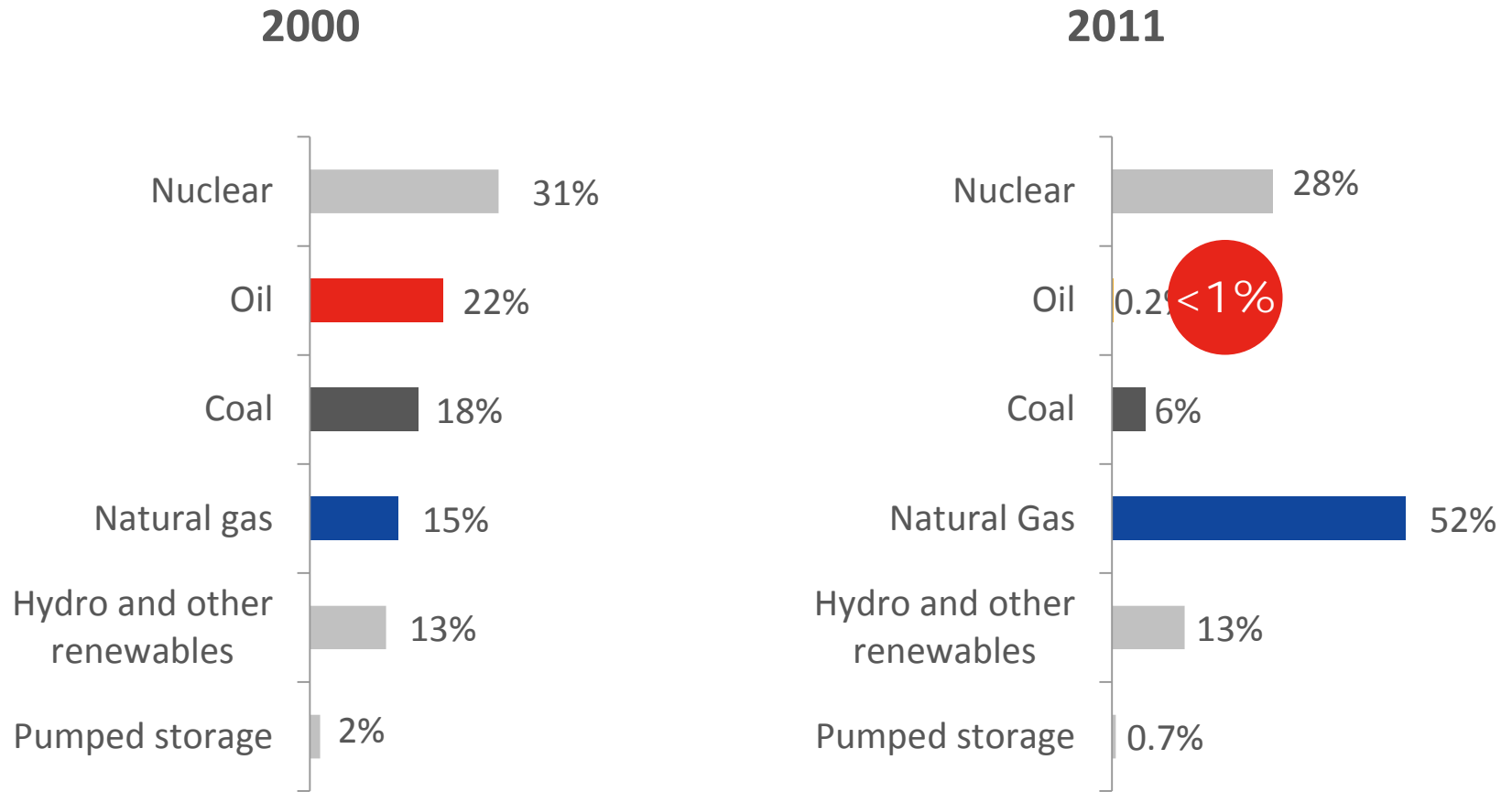
Percent of Total System Capacity



Other renewables include landfill gas, biomass, other biomass gas, wind, solar, municipal solid waste, and misc. fuels.

Regional *Energy* has Shifted from Oil to Natural Gas

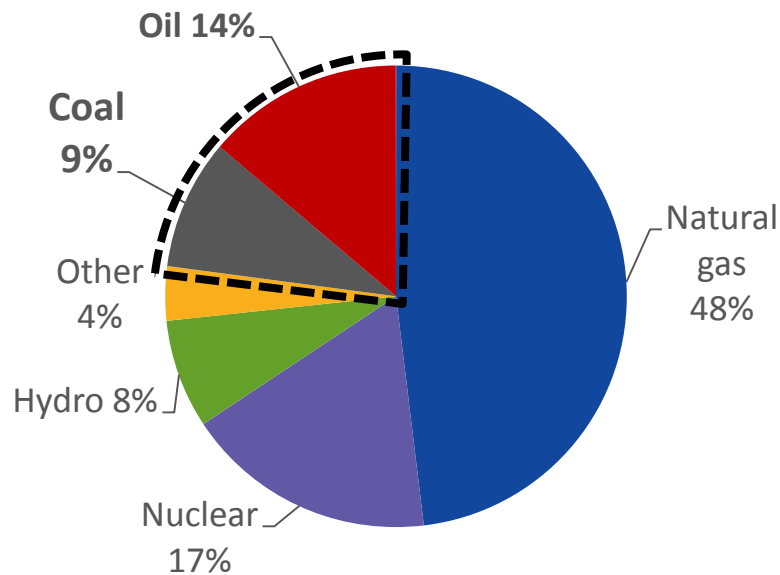
Percent of Total Electric Energy Production



Other renewables include landfill gas, biomass, other biomass gas, wind, solar, municipal solid waste, and misc. fuels.

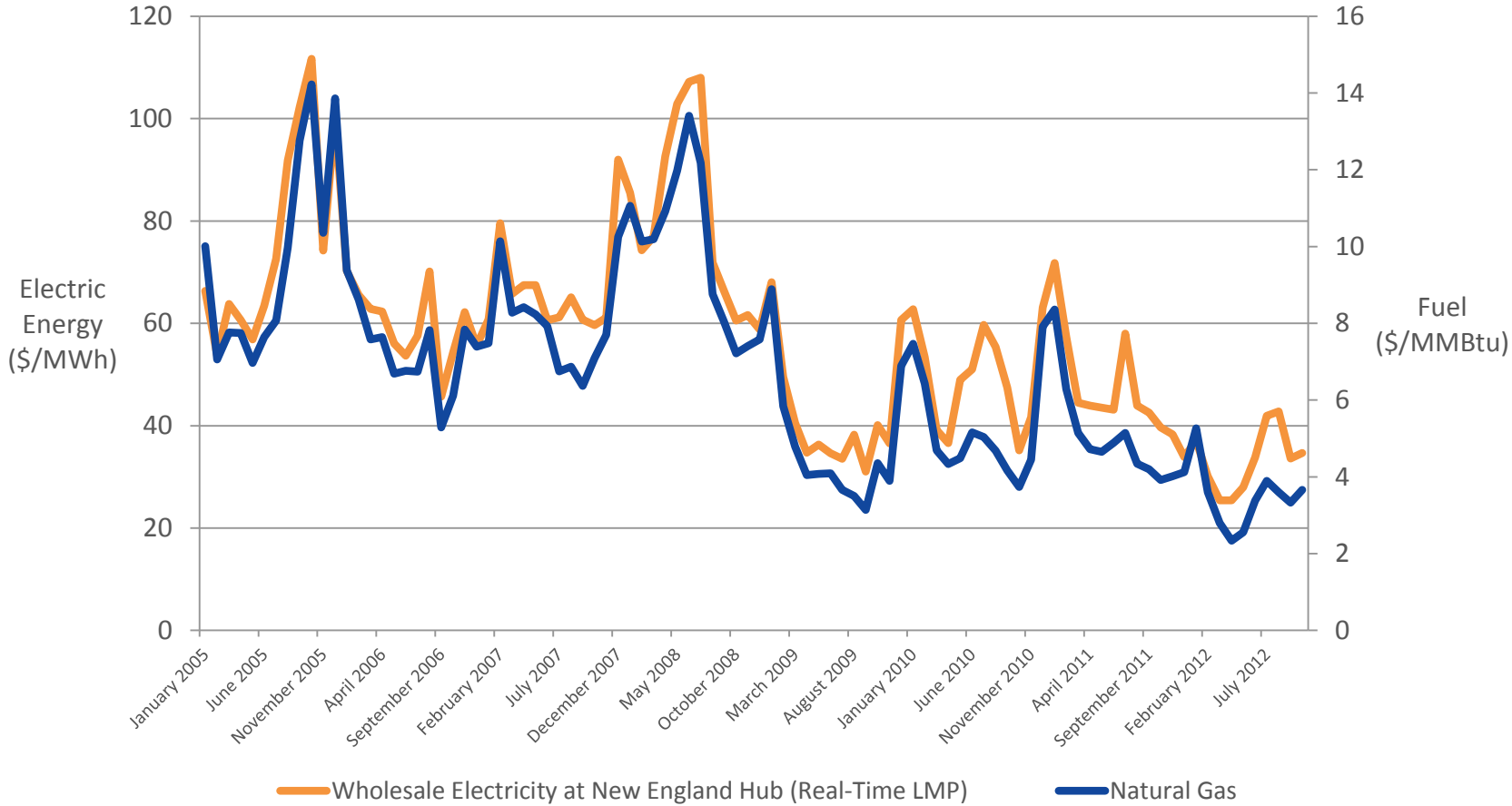
Oil and Coal Resources are Still Needed

Peak Day
July 22, 2011



- Coal- and oil-fired resources supplied nearly **25%** of energy during the 2011 system peak
- But challenges remain for system operators
 - Oil-fired generators are reducing oil inventory due to high fuel costs and infrequent operation
 - Resources have long start-up times and take even longer to come online reliably after extended periods offline

Reliance on Gas Has Resulted in Low Energy Prices



Power Plant Emissions have Declined with Changes in the Fuel Mix

Reduction in Aggregate Emissions (ktons/yr)

Year	NO _x	SO ₂	CO ₂
2001	59.73	200.01	52,991
2009	27.55	76.85	49,380
% Reduction, 2001–2009	↓ 54%	↓ 62%	↓ 7%

Source: Calculated Annual Emissions of NO_x, SO₂, and CO₂ for 2001 to 2009 (ktons/yr), RSP11.

Reduction in Average Emission Rates (lb/MWh)

Year	NO _x	SO ₂	CO ₂
2001	1.36	4.52	1,009
2009	0.46	1.29	828
% Reduction, 2001–2009	↓ 66%	↓ 71%	↓ 18%

Source: Annual Average Calculated NO_x, SO₂, and CO₂ Emissions Rates, 2001 to 2009 (lb/MWh), RSP11.

STRATEGIC PLANNING INITIATIVE

Dependence on Natural Gas is *Highest-Priority* Strategic Risks



Five Strategic Risks Identified:

- Increased Reliance on Natural Gas-Fired Capacity
- Resource Performance and Flexibility
- Retirement of Generators
- Integration of a Greater Level of Variable Resources
- Alignment of Markets with Planning

Strategic Planning Initiative

Continuing analysis underway to inform solutions process

Completed studies/reports

- ✓ **Roadmap for New England**
(March 2012)
- ✓ **Forward Capacity Market Redesign Whitepaper, "FCM 2.0"**
(May 2012)
- ✓ **Aligning Markets and Planning, ISO Discussion Paper**
(June 2012)
- ✓ **Natural Gas Study; phase one**
(June 2012)
- ✓ **Addressing Natural Gas Dependence Whitepaper**
(July 2012)
- ✓ **FCM Paper: Core Capacity Product Definition and Performance Incentives/Consequences**
(October 2012)

Ongoing studies/reports (2012)

- ❑ **Natural Gas Study; phase two**
Scope presented to PAC September 20
- ❑ **Strategic Transmission Analysis: Generator Retirements**
Next presentation to PAC in December 2012
- ❑ **Strategic Transmission Analysis: Wind expansion**
Presentation to PAC in December 2012

Strategic Planning Initiative analysis posted on ISO website:

www.iso-ne.com/spi