Integrating Policy, Planning, and Electricity Markets In New England

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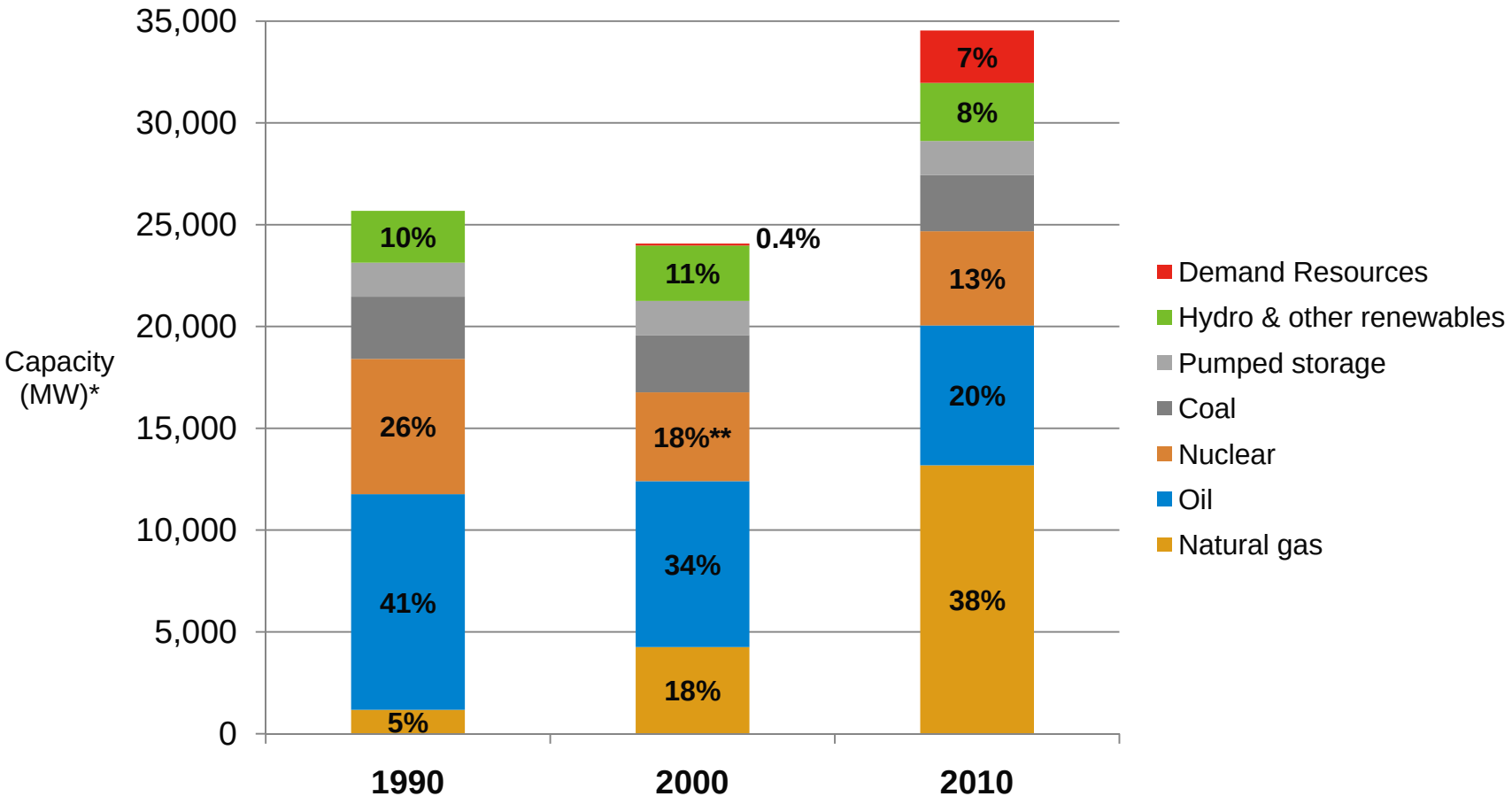
Boston, Massachusetts

Overview

- Policy objectives (environmental requirements and the introduction of competitive wholesale markets) started the transition of the New England resource base over a decade ago
- The transition has:
  - begun to accelerate because of prevailing economic conditions and increasing environmental standards;
  - created operational challenges, which are becoming exacerbated as the resource mix changes; and,
  - driven the need to make further improvements to the regional wholesale market design, the transmission planning process and system operations
- The region has a successful and productive history of collaborating to solve complex problems – we will need to build on that success to address the upcoming challenges

Transition of the Capacity Base

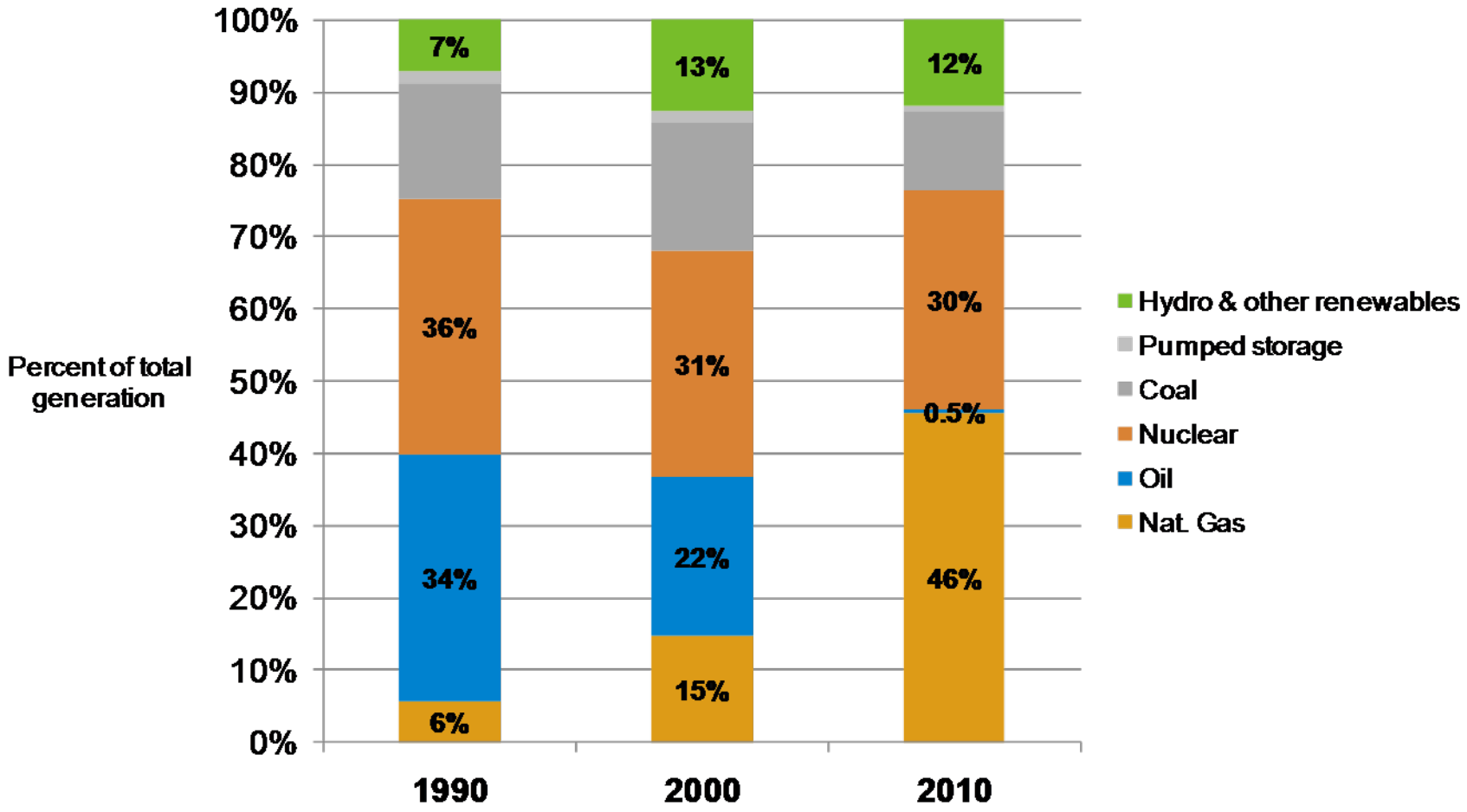
Historically Dominated by Oil and Nuclear, has Shifted to Natural Gas and Demand Resources, and may Trend towards Renewables



* Percentage values are based on a percent of total capacity, including generating resources and demand resources.

** The reduction in capacity between 1990 and 2000 is largely due to the shutdown of more than 2,300 MW of nuclear capacity in the 1990s.

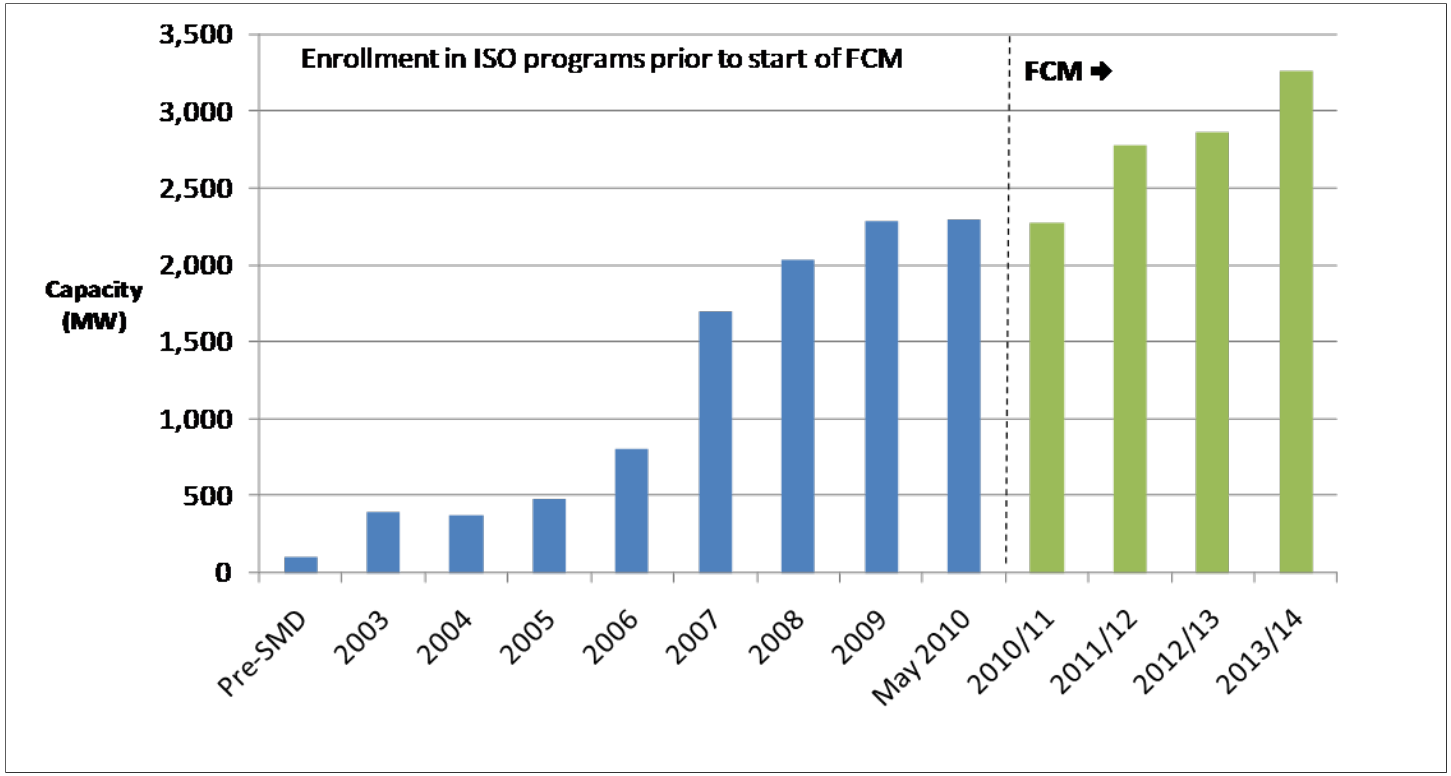
Dramatic Shift in Energy Production



Source: 2011 System Overview, Planning Advisory Committee, May 23, 2011.

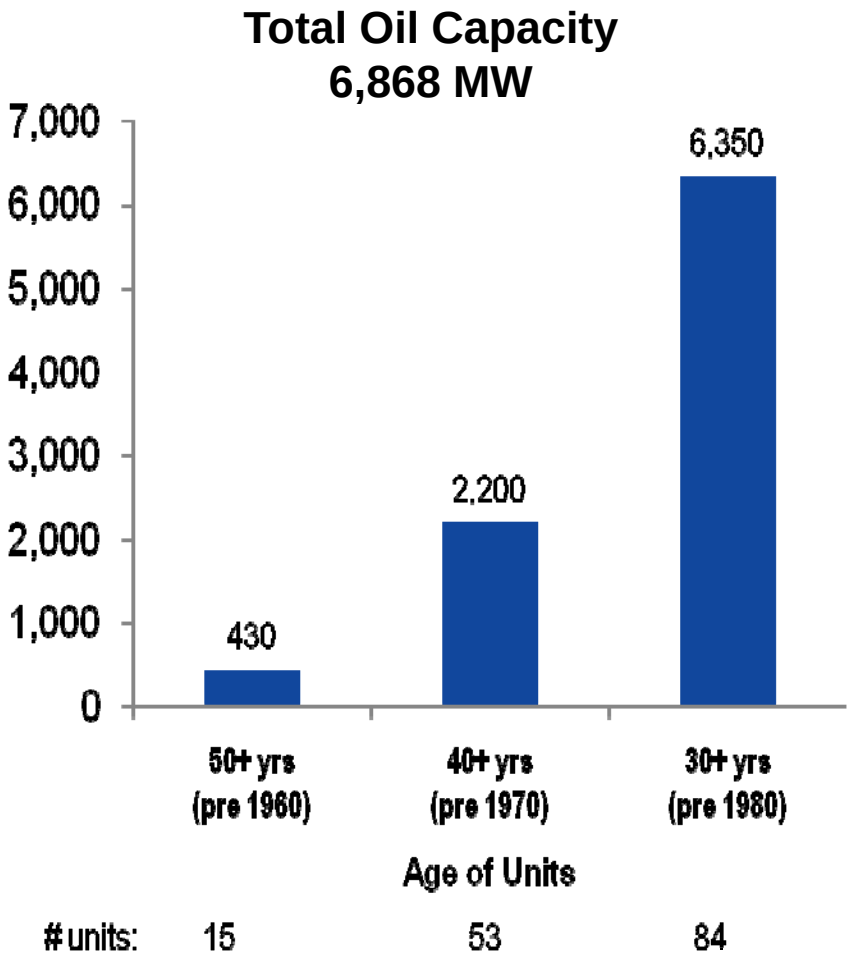
Demand Resources Replace Generation as Capacity

- **7% (2300 MW) of the region's capacity comes from demand resources today – growing to 10% (3200 MW) in 2013/14**



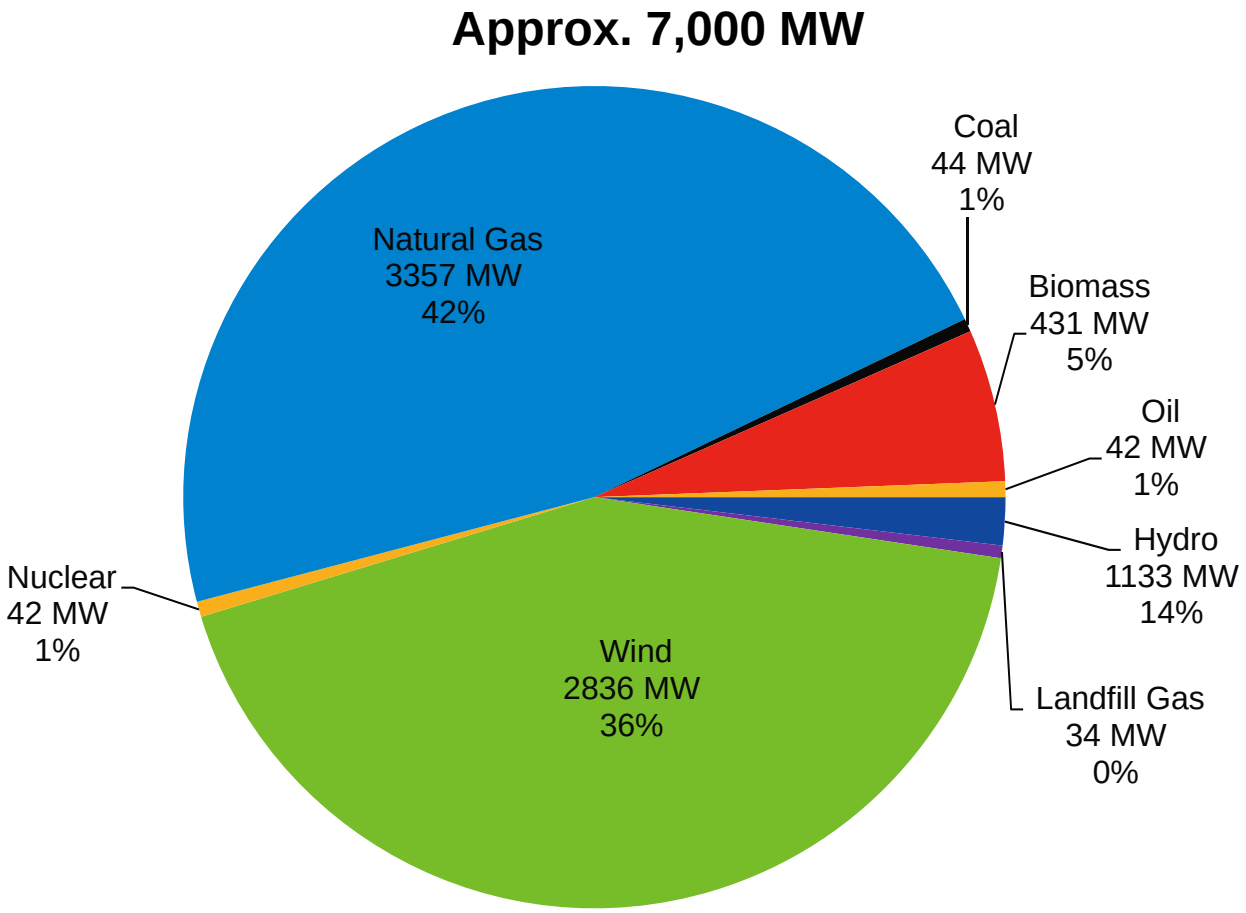
Market And Regulatory Conditions Accelerate Transition

- 20% of the region's capacity comprised of older oil-fired generation that produces only .5% of the region's energy
  - Continued fuel/capacity market pricing pressure
  - New EPA regulations
  - Salem station to retire in 2014
- The future of nuclear plants uncertain
  - Vermont Yankee



Looking Ahead, Continued Shift to Natural Gas, Integration of Wind

Nearly 80% of New Generator Proposals are for Wind and Natural Gas



May 2011 Queue, by fuel type; values shown in MW and percent.

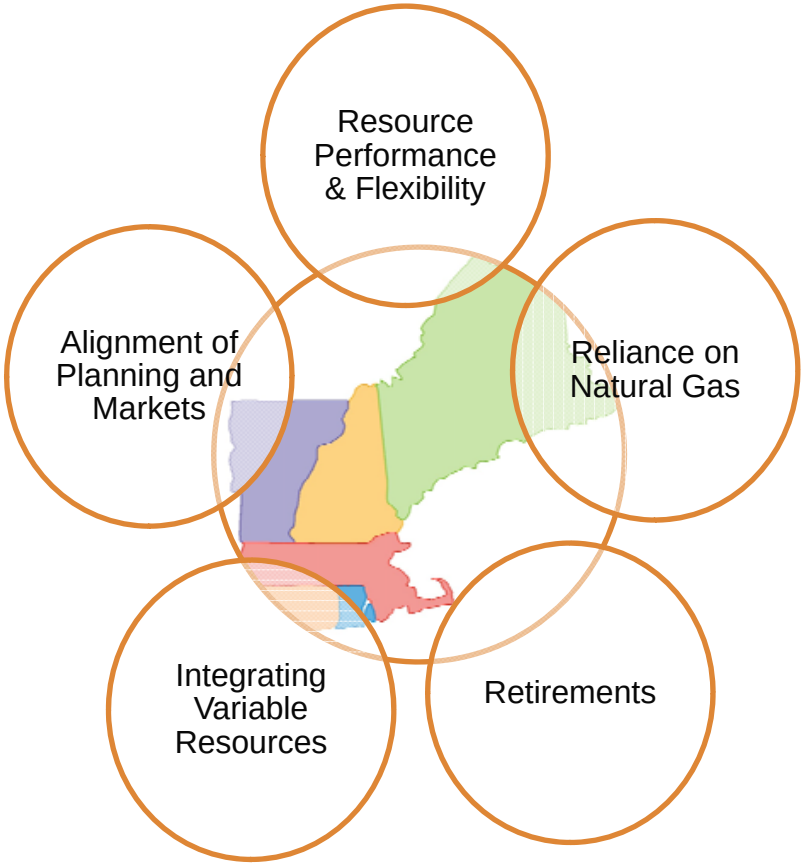
Transition Creates Operational Issues Today

- **Several operational events in the last 12 months have revealed…….**
  - Uncertain performance of aging supply resources and new demand resources
  - Uncertain availability of natural gas generation during peak winter demand conditions
  - Lack of system flexibility to recover from large source contingency

- **Reliable and efficient operations today – and successful transition to the future power system -- requires solutions**

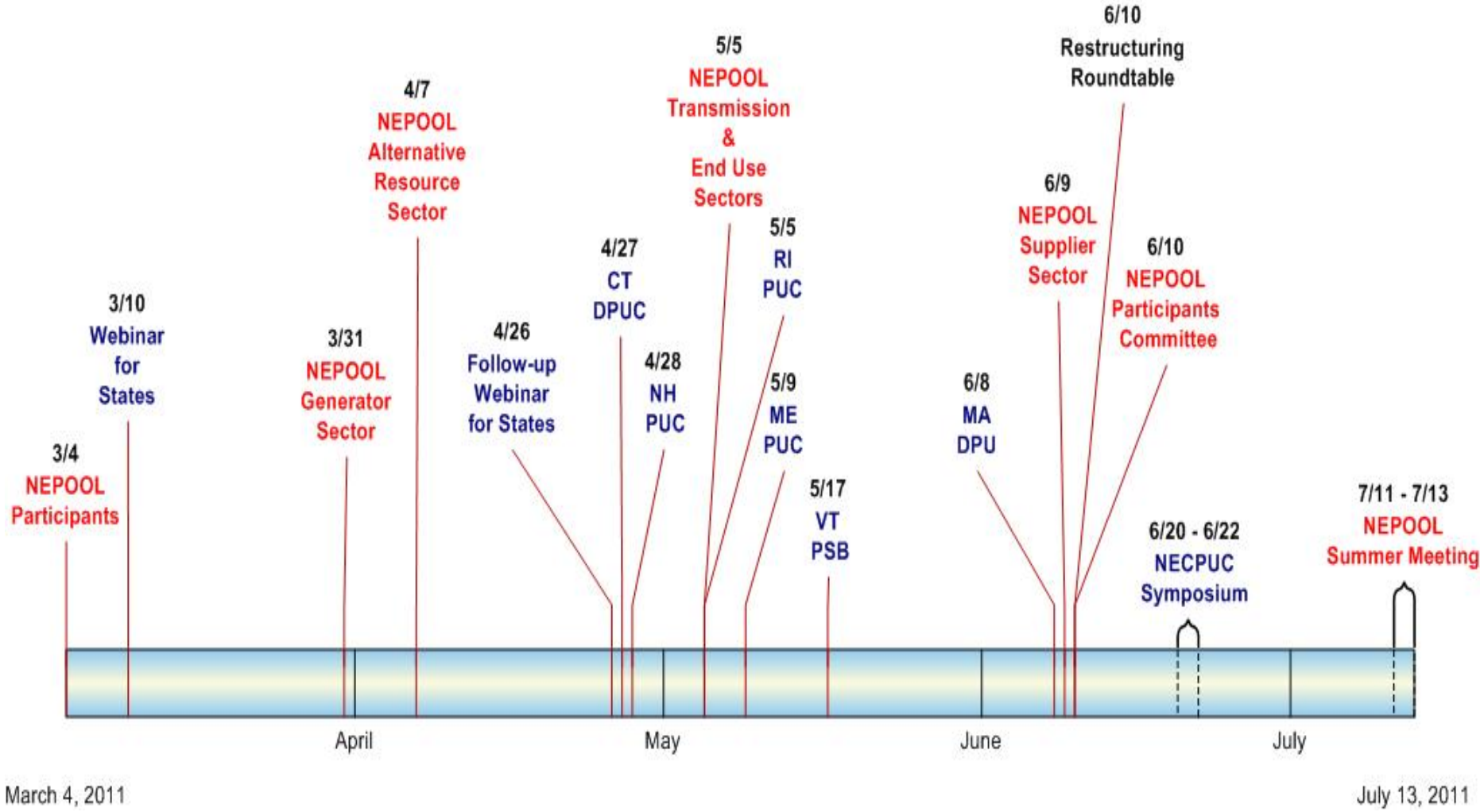
Strategic Planning Initiative Launched

Five interrelated risks identified, near and long-term components

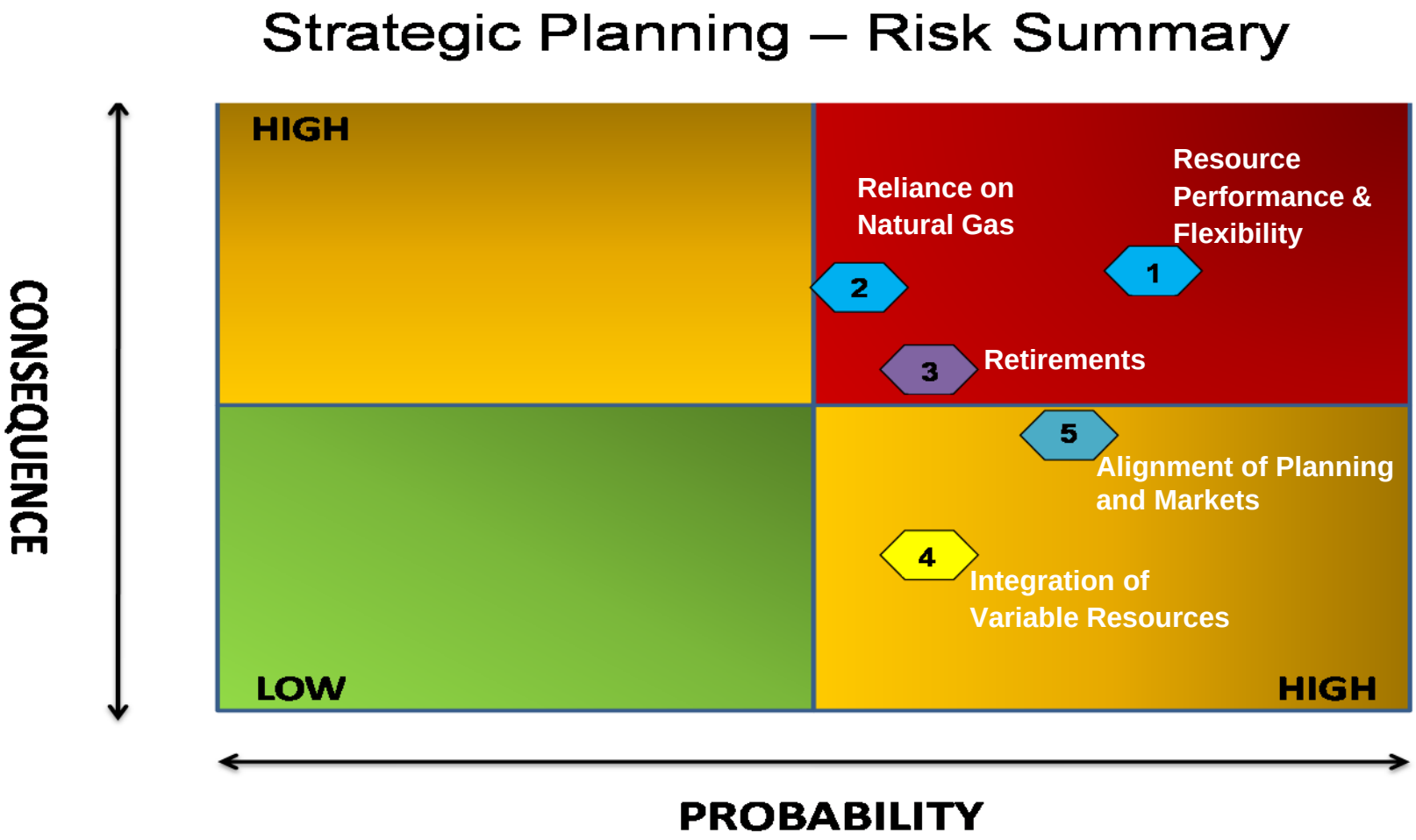


Comprehensive review of markets, planning and operations necessary

Discussions With States and NEPOOL Sectors Refines Risks and Issues



Impact, Likelihood and Timing of Risks Identified



NOTES

1. Assessment regarding impact and likelihood reflects the collective assessment of ISO-NE senior staff, and are described in the pages that follow.
2. Color coding on category markers: BLUE: Risk is already evident or likely to materialize over the near-term (0-3 years); PURPLE Risk is likely to materialize over the mid-term (3-6 years); YELLOW Risk is likely to materialize over the long term (6-7 years)

Significant Analysis in Support of Strategic Planning Effort

- Natural Gas Pipeline Capacity to Satisfy Short and Longer-Term Power Generation Needs
- Gas System Contingencies
- Fleet performance and audit procedures
- Operating reserve requirements
- System impacts of units expected to need infrastructure upgrades
- Interconnection / economic studies of wind integration
- Pilot Market Resource Analysis for VT/NH Needs Assessment
- Approaches for reflecting reliability needs in market design

Initial ISO Observations

- Solution design and implementation will need to be done in stages to address the most pressing issues first – and lay the groundwork for the longer-term, more complex market and planning issues

- Solutions range from minimal to significant market redesign and reorganization concepts

- In developing solutions, the region should utilize competitive markets and avoid the temptation of having ISO New England do integrated resource planning

Initial ISO Observations (cont)

- Measures adopted in response to the 2004 Cold Snap mitigated, but did not solve, the problem of gas availability during peak winter periods

- As gas-fired generation increases and the oil fleet retires, it's clear that investment in dual-fuel capacity, duplicative resources, or firm access to gas will be required to ensure reliable operations during extreme winter periods -- and in the event of a gas system contingency

- Incorporating these types of long term reliability needs on a proactive basis into market design has not been addressed in any other wholesale electricity market -- and is likely to require several years of effort to achieve a fully integrated solution

Initial Solution Concepts

- Near-term:
  - Incentive/penalty structures for availability and performance
  - Elimination of barriers to economic repowering
  - Increase in non-spinning reserves and ramping capability

- Longer-term:
  - Consistent evaluation of transmission, generation and demand solutions to meet reliability needs
  - Market design improvements to procure resources with more geographic granularity and desired performance characteristics
  - Evaluation of regional diversity and deliverability needs

Next Steps

- Draft documents refining the problem statement -- and detailing the possible range and sequence of solutions to be posted next week
- Additional discussions
  - NECPUC Symposium
  - NEPOOL Summer Meeting
- Focused solution development phase this fall
- New and revised strategic planning documents on ISO New England's website