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Adapting to a Changing Energy Landscape in New England

International Energy Systems Integration Workshop

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ISO New England's Strategic Planning Initiative

Focused on developing solutions to regional technical and policy challenges

SPI
STRATEGIC PLANNING INITIATIVE

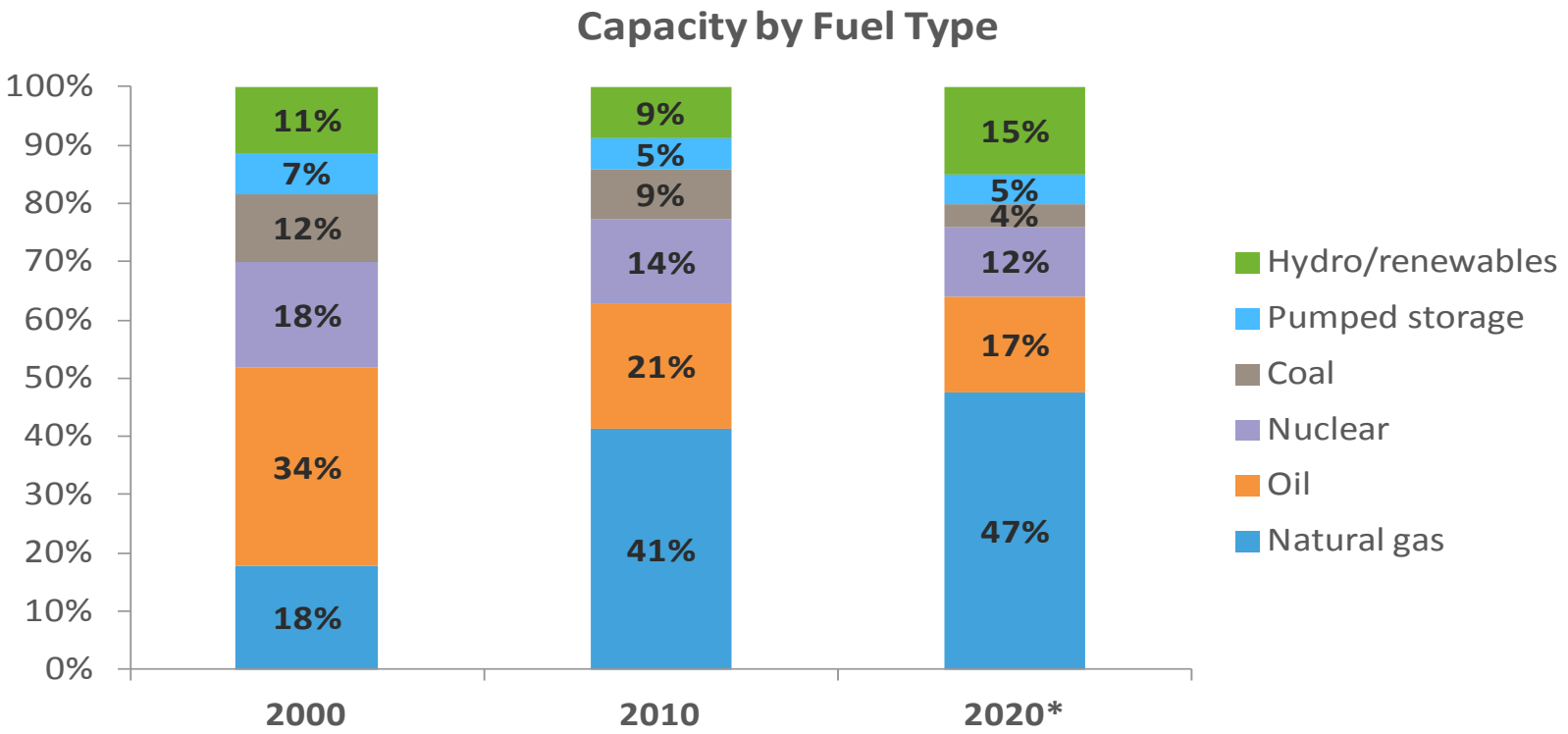
1. Resource Performance and Flexibility
2. Increased Reliance on Natural Gas-Fired Capacity
3. Retirement of Generators
4. Integration of a Greater Level of Variable Resources
5. Alignment of Markets with Planning

Electric Grid is Undergoing Rapid Transformation

- Generation shifting from oil, coal and nuclear to natural gas and renewables

- Public policy driving renewables and "behind the meter" DG/DR and EE investment

Long Term Consequence: Greater operational uncertainty/variability + lowered energy market revenues = need for resource performance/flexibility + greater dependency on the capacity market revenues



* Resources in 2020 assume approx. 5,000 MW of new resources proposed in the ISO Queue as of April 2013 (primarily natural gas and wind); and approx. 3,200 MW of non-price retirement requests for coal, oil and nuclear resources as of October 2013.

Resource Shift Creates Significant Reliability Challenges

- **ISO New England** is increasingly reliant on resources with uncertain performance and availability
  - **Intermittent resource growth** with inherently uncertain output
    - ISO forecasts more than 600 MW of solar PV additions over the next 10 years
    - Over 700 MW of wind currently operational, more than 2000 MW in the queue
    - Multiple transmission proposals to increase access to renewable energy
  - **Natural gas generators** lack firm gas transportation or fuel storage and rely on "just-in-time" fuel supply
  - Winter of 2013/14 highlighted larger than anticipated constraints in both the **oil-supply-chain** and the regional **gas pipeline system**
  - **Coal, oil-steam fleet** is being displaced by more efficient resources
- ISO estimates **up to 8,300 MW of non-gas-fired generation are "at risk" for retirement by 2020** (28 older oil and coal units)
  - If all retire, ISO estimates 6,300 MW of new or repowered capacity will be needed
- The entire fleet, apart from the nuclear units, is becoming '**energy limited**'

Problems with Existing Capacity Market Design

- Capacity payments are poorly linked to resource performance
- Consequences for non-performance are negligible
- Pervasive and worsening performance of existing generation fleet in New England
- Lack of incentive for resource owners to make investments to ensure they can provide energy and reserves when needed
- “Missing money” is paid to all resources, instead of those that invest to be able to perform during scarcity conditions
- Delays exit of poor performers from the market; creates a bias in the FCM to clear less-reliable resources
- Lack of investment poses serious threats to system reliability
- ***ISO’s proposal is a comprehensive solution to these problems***

Region is Taking Action to Improve Electric Market Efficiency and Enhance Gas-Electric Coordination

Recently Implemented (2012–2013)	Near-Term Actions (2013–2014)	Longer-Term Actions (2014–2019)
• Ongoing improvements to information sharing with natural gas pipelines • Moved Day-Ahead Market timeline in 2013 • Increased forward reserve requirements in 2013 • FERC clarification of generator obligations (must purchase fuel unless physically unavailable – economics is not an excuse)	• 2013-2014 Winter Reliability Program (effective Dec. 1-Feb. 28) • Tightened FCM Shortage Event trigger (effective Nov. 2013) • Developed energy market offer-flexibility enhancements (effective Dec. 2014) • Change NCPC cost allocation to drive more load to Day Ahead Market	• Strengthen Forward Capacity Market Performance Incentives "Pay-for-Performance" (will apply to 2018-19 commitment period) • Implement Demand Curve and improve zonal modeling in capacity market • Further improvements to energy market pricing • New England States are driving investments in additional gas pipelines, and transmission to enable additional renewable energy

Top New England Policymakers Seek Solutions

Governors Request ISO's Support to Develop Energy Infrastructure

- New electric transmission infrastructure
  - Enable delivery of 1,200 MW to 3,600 MW of clean energy into New England from no and/or low carbon emissions resources
- Increased natural gas capacity
  - Increase firm pipeline capacity into New England by 1000 mmcf/day above 2013 levels, or 600 mmcf/day beyond announced projects
  - Targeted to be in-service by winter 2017/18
- Cost recovery through ISO tariff
  - States to decide on cost allocation

Senators Request DOE Support in Quadrennial Energy Review

- Highlight concerns that New England's natural gas prices are the highest in the nation
- Urge DOE to evaluate potential solutions to increase natural gas delivery to New England
- DOE Secretary Moniz responds indicating the Quadrennial Energy Review will evaluate potential solutions and focus on the situation in New England

ISO Develops Operational Tools to Forecast Energy Production by Resource Type

- Natural gas forecasting tool
  - Forecast consumption by firm customers
  - Determine remaining capacity available for power generation
- Oil inventory tracking
- Wind forecasting tool
  - Key recommendation of New England Wind Integration Study
  - Implemented in January 2014
  - Provides an aggregate wind power projection for each hour of the next seven days
- Solar forecasting tool
  - Under development with regional partners

Conclusions

- New England has a growing reliability challenges due to:
  - Gas pipeline constraints
  - Poor performance by some resources
  - Growing number of “limited energy resources”
    - Intermittent renewable resources
    - Fossil units (gas and oil) without firm fuel supply
  - New operational tools under development, but further investment needed
- Capacity market improvements will help meet challenges
  - Clarify and strengthen the capacity product definition
  - Improve incentives to achieve results
  - Capacity market incentives are necessary, but may not be sufficient, to fully drive pipeline investments
  - Clear and timely FERC guidance is necessary
- New England Governors propose major investments in energy infrastructure
  - Will it be sufficient and timely?
  - What refinements are needed to the wholesale market design to accommodate the impacts of this initiative?

Questions