Energy Initiative Symposium

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About ISO New England

• Not-for-profit corporation created in 1997 to oversee New England’s restructured electric power system
  – Regulated by the Federal Energy Regulatory Commission

• Regional Transmission Organization
  – Independent of companies doing business in the market
  – No financial interest in companies participating in the market
Identification of Risks to New England

Five Strategic Risks:

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

Strategic Planning Initiative - materials: [http://www.iso-ne.com/spi](http://www.iso-ne.com/spi)
Natural Gas Dominant Fuel for Power Generation in New England

Existing Generation

Natural gas has largely displaced oil- and coal-fired generation

Energy by Fuel Type, 2012 (GWh)

Proposed Capacity

Natural gas is the fuel of choice for new capacity and gas-fired generators will be needed to balance variable energy resources

ISO Generator Interconnection Queue January 2013, nameplate capacity (MW)
Wholesale Electricity Prices Track Natural Gas Prices

![Graph showing the correlation between Wholesale Electricity at New England Hub (Real-Time LMP) and Natural Gas prices over time. The graph indicates that there is a strong correlation between the two, with peaks and troughs occurring simultaneously.](image-url)
Reliability Concerns for the Electric System

• Year-round natural gas-related operating conditions cause reliability concerns for the electric system
  – Availability of gas-fired generators without secure fuel arrangements
  – Natural gas-supply disruptions
  – Availability of gas-fired generators during pipeline maintenance
  – Generation dispatch following power-system equipment outages, limited by the ability of pipelines to support deviations from nomination schedules
  – Pipeline constraints due to shift in natural-gas flows

Recent winter operations illustrate this concern
Temperatures During Region Cold-Weather Periods

Average temperature at time of system peak

Feb 10-14, 1979: 4°F
Jan 12-16, 2004: -1°F
Jan 19-23, 2009: 24°F, 20°F
Jan 21-25, 2013: 17°F, 10°F
February 8-9, 2013: 25°F, 30°F
Limited Fuel and Slow-Start Ups

Oil resources diminish quickly without replenishment

Time before older resources can be online from cold start

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**Graph 1:**
- **Y-axis:** MW
- **X-axis:** Hours
- Data points: 0, 24, 48, 72, 96, 120, 144, 168, 192, 216, 240, 264, 288
- Trend shows a decrease in MW over time.

**Graph 2:**
- **Y-axis:** Capacity (MW)
- **X-axis:** Start-Up + Notification Time (Hours)
- Data points: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
- Trend shows an increase in capacity over time with key points at:
  - 10 Hours: 1,000 MW
  - 16 Hours: 5,000 MW
  - 24 Hours: 6,000 MW

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DOE Spotlight on Energy Prices in New England

January 18

- U.S. Department of Energy (DOE) issued a Short-Term Energy Outlook Supplement indicating that constraints in New England are likely to affect regional energy prices this winter
  - DOE reported that since November, New England has had the highest natural gas prices in the U.S.

January 25

- DOE issued a Northeastern Winter Natural Gas and Electricity Alert, reporting that natural gas prices had reached $35/MMBtu in New England while prices remained below $4 in the rest of the country
  - DOE indicated that natural gas prices had become high enough in New England that some oil units would be economic to be dispatched in the region’s wholesale electricity market
Winter 2013 Operating Issues

January 21-25 (Cold Stretch)

- Economics drove some generators to switch from natural gas to oil,
  - Reduced already-low oil inventories
- Oil inventories depleted rapidly during sustained cold weather when gas supplies are constrained
- ISO committed additional generation to manage the inflexibility of fuel delivery to gas-fired generators

February 8-9 (Blizzard)

- The loss of non-gas-fired generation (e.g., oil, nuclear and coal plants) increased reliance on gas-fired plants and exacerbated concerns
- Early morning February 9, numerous generators informed ISO that they could not get gas
- More than 6,000 MW of gas- and oil-fired generating capacity became unavailable on February 9, either because of storm-related outages or because of the uncertainty of their fuel supply
During Blizzard Generator Outages and Reductions Jumped Quickly
Efforts to Improve Performance and Reliability

• Recent efforts intended to improve resource reliability and performance
  – Move up Day-Ahead Market
    • Facilitate supplemental commitment of oil and coal generators if necessary and provide gas-fired generators more time to line up fuel for the operating day
  – Increase Ten-Minute Non-Spinning Reserves in Forward Reserve Market
    • Will help availability of reserves to meet the increased real-time reserve requirements
  – Information sharing
    • Allow ISO to share information concerning the scheduled output of natural gas-fired generation resource with interstate natural gas pipeline companies service the region
Proposed Reliability Enhancements

Due to the urgency of the need and tight time frames for implementation, ISO is seeking a limited out-of-market solution for next winter and will then move to a market solution for winter of 2014-15 and beyond

For Next Winter

• ISO New England has three proposed enhancements that are currently being discussed with stakeholders and should be voted over the next few months
  1. Maintain fuel oil inventory
  2. LNG Storage
  3. Test dual-fuel units to ensure reliable switching

Over Next Couple of Years

• Energy market enhancements
  – Hourly offers and intra-day re-offers in the energy market to reflect changing fuel costs and provides greater flexibility

• Forward Capacity Market enhancements
  – Pay-for-performance incentive
Questions