



# Working to Solve Gas-Electric Challenges in New England

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*Restructuring Roundtable*

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# Resource shift creates reliability challenges

- **ISO New England** is increasingly reliant on resources with uncertain performance and availability
  - **Intermittent resource growth** with inherently uncertain output
  - **Natural gas resources** lack fuel storage and rely on “just-in-time” fuel supply
  - **Coal, oil-steam fleet** is being displaced by more efficiency resources
- ISO estimates **up to 8,300 MW of non-gas-fired generation is “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 in the region
- Almost **3,400 MW of generation plan to retire within the next five years**
  - Source: Status of Non-Price Retirement Requests; October 23, 2013

# Fuel-related challenges affect electric reliability

- **Contingencies** on pipelines or at non-gas-fired generators could have an immediate effect on reliability
  - Sudden loss of gas supply or sudden increase in gas demand
- **Oil-related operating issues** last winter:
  - Oil-fired generators entered the winter with **low fuel inventories**
  - Runtimes diminish quickly without **replenishment of oil tanks**
  - Cold weather creates challenges for **fuel deliveries**
  - As oil generation has diminished, its **supply chain has contracted**
  - Extreme cold and pipeline constraints **increase demand on oil units**
- High natural gas prices made some oil-fired generators economic in the energy market, which **reduced already-low oil inventories**
- If cold weather had persisted, or had been colder than normal, the region may have had **insufficient fuel** to meet energy needs



# Reports highlight gas infrastructure constraints

- Investment in gas pipeline infrastructure that brings low cost, plentiful Marcellus gas to region has not kept up with increasing demand from natural gas fired generators, particularly in peak demand periods
- Overall pipeline capacity is inadequate to meet the anticipated demand of the power generation sector
  - ICF/ISO New England (2012)
- New England will face significant natural gas infrastructure constraints in the absence of infrastructure or other solutions to increase supply or reduce demand
  - Black & Veatch/New England States Committee on Electricity (2013)
- Natural gas prices in New England may spike again this winter as temperatures fall and local pipelines become constrained
  - Winter 2013-14 Energy Market Assessment, Federal Energy Regulatory Commission
- Broad interregional study will evaluate the capability of the natural gas system to meet the needs of the electric system
  - Eastern Interconnection Planning Collaborative (mid-2015)



# Market incentives needed for reliable performance

- **‘Systemic risk’ to reliability** if too many units cannot perform simultaneously
- Many types of investments could reduce current performance-risk concerns, at new and existing facilities:
  - New pipelines and non-interruptible gas transport
  - More liquid fuels and other energy storage
  - Peaking LNG services, dual-fuel generation
  - New, flexible, generation capacity, and
  - More fast-responding DR
- **Concern:** Existing markets provide insufficient incentives to undertake these investments
  - Many of the incremental investments are needed few hours per year
  - Current market revenues have been insufficient to justify them
  - Fixing these incentives requires changes to the primary markets:
    - FCM, energy and reserves

# Region is taking action to improve electric market efficiency and enhance gas-electric coordination

<b>Recently Implemented (2012–2013)</b>	<b>Near-Term Actions (2013–2014)</b>	<b>Longer-Term Actions (2018–2019)</b>
<ul style="list-style-type: none"><li>• Ongoing improvements to information sharing with natural gas pipelines</li><li>• Moved Day-Ahead Market timeline in 2013</li><li>• Increased forward reserve requirements in 2013</li></ul>	<ul style="list-style-type: none"><li>• 2013-2014 Winter Reliability Program (effective Dec. 1-Feb. 28)</li><li>• Tightened FCM Shortage Event trigger (effective Nov. 2013)</li><li>• Developed energy market offer-flexibility enhancements (effective Dec. 2014)</li></ul>	<ul style="list-style-type: none"><li>• Strengthen Forward Capacity Market Performance Incentives “Pay-for-Performance” (proposed for 2015 auction)</li></ul>



# Sound principles for market reforms

- 1. Reward outputs (power delivered), do not specify inputs**
  - Let suppliers identify least-cost solutions, bearing risks and rewards
- 2. Redefine performance measures for capacity resources**
  - Delivery of energy and reserves during (reserve) scarcity conditions
  - Not peak period ‘availability,’ or equivalent forced outage measures
- 3. Better align resources’ financial incentives with the value of reliable service during tight system conditions**
  - Mimic the **performance incentives** of an efficient energy market, with the **reduced volatility** that a forward market provides

# ISO New England proposes to make capacity a proper forward-sold good

## Forward-Sold Goods

- Initial revenue on fwd sale
- Specifies a forward financial commitment ('position')
- 2<sup>nd</sup> Settlement based on *deviations* at delivery ...
- ... at a contract rate, or at replacement (floating) price

## ISO's Capacity Reforms

- ✓ Auction-based fwd sale (FCA)
- ✓ *Pro-rata share* of system requirements (load + reserves) during RT reserve shortages
- ✓ 2<sup>nd</sup> settlement for delivery (energy + reserves) deviation from system share
- ✓ At (high) tariff-specified rate (analogous to scarcity pricing)



# Long-term actions to strengthen resource performance

## *FCM Pay-For-Performance*

- ISO is proposing a pay-for-performance (PFP) incentive approach in the FCM
  - Over-performing resources will be paid a premium through revenue transfers from under-performing resources
- Incentive will drive resources to perform when and where needed, including creating a strong incentive for investment in more secure fuel arrangements
- ISO anticipates filing market rule changes in late 2013 to be effective ahead of FCA 9 for the 2018–19 Capacity Commitment Period (June 1, 2018 through May 31, 2019)
- **Expected benefits:** Improved system reliability; cost-effective solutions to region's investment needs; and a simpler, resource-neutral capacity market design

# Improved flexibility for resources to offer in ISO market

## *Offer Flexibility Enhancements*

- ISO and NEPOOL developed enhancements to the energy market to provide greater **flexibility** for market participants to structure and modify their supply offers in the day-ahead and real-time markets, including the ability to:
  - Change offers in **real-time** (not just during the limited, re-offer period the day before the operating day)
  - Submit **hourly** offers (not just daily offers)
  - Submit **negative** offers, as low as  $-\$150/\text{MWh}$
- Allows generators to better reflect the real-time price of fuel in their offers and improves financial incentives to follow ISO dispatch
- FERC approved enhancements in October 2013 to be effective in December 2014



# Strengthening ability to maintain reserves

## *Real Time and Forward Reserve Market Enhancements*

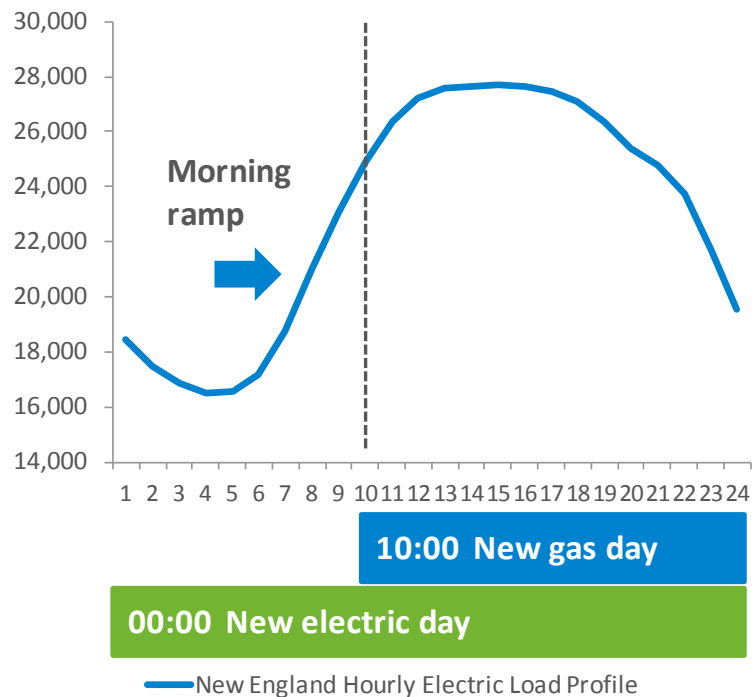
- ISO and NEPOOL have developed solutions to address historic underperformance of resources that provide operating reserves during stressed system conditions
- Increased the quantity of operating reserves
  - Procurement of 10-minute reserves in “real time” (RT) and in the “forward” reserve market (FRM) is now adjusted to reflect the historical underperformance of resources
  - Increased DA, RT and FRM requirements for 30-minute reserves to reflect “replacement reserves,” in place of supplemental commitment
- Improved the performance incentives for resources providing reserves
  - Increased forward reserve penalty rate and added new trigger for assessing non-performance
- Enhanced auditing of resources providing reserves
  - Ensures that offers are consistent with a resource’s physical capability
- Changes phased in between summer 2012 and fall 2013

# Electric-market shift better aligns with gas market

## *Day-Ahead Market Timing Changes*

Different operating days are a challenge for gas-fired resources scheduling in both markets

ISO moved up day-ahead electric market timing to better align with gas market nomination deadlines



- Beginning in May 2013, ISO moved the Day-Ahead Market timing earlier in the day
  - Bidding deadline moved up to 10 a.m.
    - Immediately after gas trading period
  - Market clears between noon. & 1:30 p.m.
    - Gas Timely nominations 12:30 p.m.
  - Initial Resource Adequacy Assessment process completed by 5 p.m.
    - Gas Intra-day 2 at 6 p.m.
    - Gas Evening Nom. At 7 p.m.
- Insufficient time between gas trading and Timely nomination deadline to submit bids and produce DA market Schedules
  - ISO seeking shorter time to clear market
  - Moving Timely nomination would help

# Conclusions

- Growing dependence on natural gas for power generation is the highest-priority strategic risk for New England
- Region would benefit from long-term investment in energy infrastructure to fully support natural gas demands of power generation
- Expanding pipeline capacity into New England would allow the region to more-fully realize the benefits of low-priced shale gas
- Changes to ISO's electricity markets will strengthen resource performance and seek the most economic market solutions, but these changes alone won't spur long-term investment in infrastructure
- Solving these challenges will require action by all stakeholders

# Questions

