Overview of Market-Based Solutions and Reliability Programs to Address Identified Risks with Winter Operations

Winter Operations Related Improvements

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BACKGROUND
ISO New England’s Strategic Planning Initiative

Focused on developing solutions to the region’s top reliability risks

Reliability requires a flexible, high-performance fleet to address strategic risks:

• Natural gas dependency
• Power plant retirements
• Renewable resource integration
Dramatic Changes in New England’s Energy Mix

Percent of Total Electric Energy Production by Fuel Type (2000 vs. 2013)

- Nuclear: 31% (2000) vs. 33% (2013)
- Oil: 22% (2000) vs. <1% (2013)
- Coal: 18% (2000) vs. 6% (2013)
- Natural Gas: 46% (2000) vs. 15% (2013)
- Hydro and Other Renewables: 13% (2000) vs. 14% (2013)
- Pumped Storage: 1.7% (2000) vs. 1% (2013)
Gas Price Volatility Drove Wholesale Electricity Prices to Record Levels over the Past Two Winters

Winter 2012-13 and 2013-14
Gas Units Produced Significantly Less Than Capacity

- While oil provided more energy than in recent years, and other non-gas generators neared their capacity limits, gas produced far less than capacity.
- As shown below, on one cold day, the system had total gas-fired capability ("Capacity Supply Obligation" or "CSO") of more than 11,000 MW – but gas generators produced only about 3,000 MW during the peak hour.
Availability of Fuel for Gas-Fired Units Can Create Reliability Risks

- Gas-fired generators operate with limited flexibility in fuel-supply arrangements, which affect their ability to meet real-time ISO dispatch needs.
- Lack of liquidity in natural gas markets during evening and weekend hours have frustrated generators’ ability to obtain gas supplies in real time in response to ISO dispatch needs.
- Gas-fired generators that are run at higher-than-expected levels may burn through their fuel supply, reducing or eliminating availability later in the day for operation.
Oil Resources’ On-Site Fuel Inventory May Be Insufficient to Operate for Extended Periods

- Infrequently used oil-fired generation fleet held only a portion (about a third) of potential oil storage capacity
  - Even with the minimum commitment of oil-fired generation, a number of units experienced fuel availability issues

- Oil-fired generators reported difficulty in replenishing fuel inventory. Issues included:
  - Unavailability of oil
    - Increased demand from both heating and power sectors
    - No. 6 is not readily available on short notice
  - Supply chain contraction
    - Following diminishment of oil generation in recent years
  - Transportation
    - Great difficulty securing barge transportation throughout the Northeast, due to weather and inability to transport through shallow areas
    - Trucks were limited, as were hours for truck drivers
      - Massachusetts Governor extended trucking hours at ISO-NE’s request
PROPOSED SOLUTIONS
A Number of Market-Based Modifications Have Been Proposed and Implemented to Mitigate Risks

• Implemented market-based solutions
  – Modifications to the timing of the Day-Ahead Market and RAA process
  – Shifting reliability commitments for local second contingency protection requirements into the DAM
  – Increases to real-time reserve requirements and the addition of a replacement reserve constraint penalty factor (RCPF)
  – Modifications to the Forward Reserve Market (FRM) requirements to reflect how reserves are carried in real-time and stronger penalties for unavailability and non-performance
  – Expansion of when an FCM shortage event can be triggered

• Pending market-based solutions
  – Energy Market Offer Flexibility for Dec-2014 (pending implementation)
  – Forward Capacity Market (FCM) pay-for-performance design for the 2018/2019 commitment period (pending with FERC)
The ISO also Proposed a Reliability Program to Help Transition to These Market-Based Solutions

- **2013/2014 Winter Reliability Program (implemented)**
  - Oil Program
  - Dual-Fuel Resource Program
  - Demand-Response Program

- **2014/2015 Winter Reliability Program (in discussion with stakeholders)**
  - Dual-Fuel Commissioning Program
  - Unused Oil Inventory Program
  - Unused Contracted LNG Program
  - Demand-Response Program

- ISO is also proposing additional permanent changes for 2014 and beyond for dual-fuel resources for:
  - Auditing their capability, and
  - Modifying requirements around how these resources offer into the market and expectations around what fuel is used in their operation
WINTER RELIABILITY PROGRAM 2013/2014

1. Oil Program
2. Dual-Fuel Program
3. Demand-Response Program
Program Procurement Approach

• Eligible oil, dual-fuel and demand-response resources were able to bid (MWh) into the program
• ISO reviewed offers to provide service and cleared MWh to meet the requirements balancing cost and reliability
• Structure was set up to be a pay-as-bid approach for each offer that was cleared
Oil Inventory Program

• Oil required to be in on-site storage by December 1, 2013
• Oil burned after November 15, 2013 was credited
• Penalties for unit unavailability, sale/transfer of oil, and shortfalls to awarded inventory
• 2013-14 Winter Program Inventory
  – Awarded (Initial Inventory): 3,057,554 Barrels
  – Awarded (Replenishment): 484,477 Barrels
  – Initial Inventory Shortfall as of Dec 1: 53,742 Barrels
  – Program Oil Burned Through Feb 28: 2,700,468 Barrels
    • Equivalent Oil MWh burned\(^1\) 1,620,279 MWh

\(^1\) Based on an average heat content of 6,000,000 Btu/Barrel and proxy heat rate of 10,000,000 Btu/MWh.
Dual-Fuel Program

• Dual-fuel units agree to switch to/operate on a secondary fuel should the unit’s primary fuel not be available

• Dual fuel for this proposal is the capability of operating on natural gas and a secondary liquid fuel (distillate)

• Subject to the same obligations as the Oil Program

• Demonstrate prior to December 1\textsuperscript{st} switching from the primary fuel to secondary fuel within five hours and operation on secondary fuel
  – Duration of testing based on manufacture specifications
  – Must include a minimum of 60 minutes at EcoMax
  – Test plan must be submitted and approved by the ISO
Demand-Response Program

• Market Participants with an asset located within the New England Control Area with a positive Demand Response Baseline (showing energy consumption at the Retail Delivery Point)
  – No more than 200 assets shall be accepted by the ISO, nor Real-Time Emergency Generators
  – Assets must be available for dispatch in real time between hours ending 0600 and 2300 on all days

• Assets will be dispatched by the ISO at its discretion prior to, or concurrent with, ISO New England Operating Procedure No. 4, Action 2
  – Each asset shall be required to respond to dispatch instructions no more than ten times

• Participants providing the demand response services also received a monthly energy payment
  – Payment is based upon the higher of the hourly Real-Time LMP or $250/MWh, multiplied by the asset’s MWh performance adjusted for avoided distribution losses as appropriate
  – Assets that do not perform are subject to penalties
PROPOSED WINTER RELIABILITY PROGRAM
2014/2015

1. Dual-Fuel Commissioning Program
2. Unused Oil Inventory Program
3. Unused Contracted LNG Program
4. Demand-Response Program
Dual-Fuel Commissioning Program

• Program design is intended to offset testing costs associated with restoring or commissioning dual-fuel capability by December 1, 2015

• Resources that are eligible and elect to participate in the program will be compensated through real-time NCPC ("uplift charges") for any testing related costs
  – Resources that elect to participate will have a resource specific cap set on the amount of real-time NCPC for which they would be eligible
  – Resources that do not maintain their dual-fuel capability per the obligations of the program will be charged back a portion of the compensation
Unused Fuel Oil Inventory Program

- Program design is intended to offset risk of having unused fuel oil inventory at the end of the winter period
- Resources (including dual-fuel) that are eligible and elect to participate in the program will be compensated for any unused fuel oil up to the lesser of the maximum compensation level, the initial inventory level and the ending inventory level based upon a fixed rate
  - Resources that are fully unavailable for any hours during the winter period will have their payments reduced
Unused Contracted LNG Program

• Program design is intended to offset risk of having unused contracted LNG volumes at the end of the winter period providing compensation for resources that acquired firmer fuel
  – This program’s focus is on providing a peaking service that would augment the availability of pipeline gas

• Resources that are eligible and elect to participate in the program will be compensated for any unused contracted LNG volumes up to the maximum program level based upon a fixed rate
  – Resources that are fully unavailable for any hours during the winter period will have their payments reduced
Demand-Response Program

• This program resembles what was proposed for 2013/2014

• A fixed rate is used for the monthly payment
  – No payment made if performance is below 75% of commitment

• Assets that do not perform are no longer subject to penalties through the energy compensation
Questions