Federal Energy Regulatory Commission (FERC) Panel Discussion

Winter 2016-2017 Operations and Market Performance in Regional Transmission Organizations and Independent System Operators (Docket No. AD16-24-000)

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Introduction

My name is Peter Brandien. I am Vice President of Operations for ISO New England. I am pleased to be here to provide information on ISO New England's preparations for the upcoming winter season. ISO New England is the not-for-profit Regional Transmission Organization responsible for overseeing the day-to-day operation of New England's bulk power system, administering the region's competitive wholesale electricity markets, and planning to ensure the future reliability of the system.

The New England system consists of approximately 9,000 miles of high-voltage transmission lines and roughly 350 generators with a total generating capacity of around 31,000 megawatts (MW). In 2015, New England produced 49% of its electricity using natural gas, up from 15% in 2000. Because so much of the region's electricity is sourced by natural gas, the price of this fuel sets the price for wholesale electricity about 70% of the time. Consequently, availability of natural gas for power generation has a profound impact on grid reliability and production costs in New England.

New England has limited natural gas pipeline infrastructure serving the region, and these pipes have reached their maximum capacity, especially during the winter months when demand for natural gas to heat homes is at its highest.

January 2004 "Cold Snap"

ISO New England's attention to and concerns surrounding winter preparedness predate the 2014 Polar Vortex. A decade earlier, during the January 2004 "Cold Snap," New England experienced extremely low temperatures and particularly high demand for electricity, prompting concern about market and system performance during severe cold weather conditions. The 2004 "Cold Snap" revealed vulnerabilities of the New England bulk power system, especially with regard to capacity limitations on the natural gas pipeline system and the availability of gas transportation for non-firm customers like gas-fired generators within New England.

After the 2004 "Cold Snap," ISO New England developed new operating procedures designed to improve information on generator availability during cold weather conditions, requiring generators to report their anticipated availability to ISO New England, including details on their ability to procure fuel and any physical limitations of their generating units. The ISO also enhanced communications with the regional gas industry to improve the ISO's ability to detect conditions on the gas system that could affect the availability of gas-fired generators. These procedures are still in effect today.

Recent Winter Reliability Programs

Winter operational concerns regarding fuel adequacy returned during the 2012/2013 winter. Extreme cold weather led to constraints on the natural gas pipeline system, the inability of gas-fired generators to procure fuel, and an increased reliance on oil-fired generation. Because of their infrequent dispatch, oil-fired generators entered the winter with low fuel inventories. Complicating matters were the challenges associated with replenishing oil inventories once the winter season began. Had cold weather persisted, the region may not have had enough fuel to meet the demand for electricity.

These operational challenges prompted the ISO to take out-of-market action to mitigate the reliability risks associated with inadequate fuel supplies during the 2013/2014 winter. The ISO developed a temporary winter reliability program to provide incentives to oil-fired generators to firm up their fuel supplies before the start of the winter. The program also included a demand response component and incentives for gas-fired generators to invest in dual-fuel capability. The generators that participated in the program procured roughly 4 million barrels of oil (the equivalent of nearly two million megawatt-hours (MWh) of energy), almost all of which was needed that winter. The program proved invaluable to power system operations during extreme cold weather conditions, particularly during the Polar Vortex, because generators had the fuel they needed to run when called on by the ISO.

To improve fuel neutrality, the winter program was expanded to include a liquefied natural gas (LNG) component during the 2014/2015 winter. Compensation under the program was also modified. Rather than paying for inventory upfront, payments were made to offset some of the costs associated with unused oil inventories and unused LNG contract volumes at the end of the season. Demand response and incentives for gas-fired generators to invest in dual-fuel capability remained components of the program. Indeed, more than 1,000 MW of dual-fuel capability have been commissioned through the winter programs.

In September 2015, the Federal Energy Regulatory Commission (FERC) approved a winter reliability program to be used during the next three winters (the 2015/2016 winter, the 2016/2017 winter, and the 2017/2018 winter). These programs, in addition to the two that preceded them, serve as a stop-gap measure until longer-term capacity market design changes, called “Pay for Performance,” go into effect on June 1, 2018.

2016/2017 Winter Reliability Program

Consistent with prior years’ programs, the 2016/2017 winter program is intended to mitigate the reliability risks associated with inadequate fuel supplies during severe cold weather conditions. The program will run from December 1, 2016 to February 28, 2017 and include an oil inventory component, an LNG component, and a demand response component. Requests to participate in these three components of the program were due to ISO New England by October 1, 2016. The ISO reserves the right to reject any notice of proposed participation on any grounds, including the ISO’s concerns about the deliverability of the fuel or the past performance of the asset.

Generators participating in the oil inventory component must notify the ISO of their expected level of oil inventory by December 1, 2016. The ISO will evaluate the generator's inventory on December 1 and deem eligible for compensation the amount of usable oil inventory that meets or exceeds the lesser of: (i) 85% of the usable fuel storage capability and (ii) supply sufficient to operate the generator for 10 days at full load based on the generator's winter Seasonal Claimed Capability.

Generators participating in the LNG component must present their executed LNG contracts to the ISO by December 1, 2016, along with a certificate demonstrating that the contracts include a "take-or-pay" construct, a term that spans December 1 through the end of February, the pipeline delivery point name and gas meter number of the participating generator, and pipeline transportation to the meter of the generator. Contracts that do not include one or more of these terms will be rejected.

Assets participating in the demand response component must have additional capacity beyond their obligations in the Forward Capacity Market, be registered with the ISO, have meters installed and operational, and otherwise be fully ready to respond by December 1, 2016.

Generators participating in the program may not sell the fuel or fuel rights, or take any other action that is inconsistent with ensuring the availability of the fuel for energy production and use in New England. The program will go a long way toward ensuring New England has adequate fuel supplies to meet the demand for electricity this winter.

Market Enhancements to Increase Market Efficiency and Improve Gas-Electric Coordination

In addition to three winter reliability programs, the ISO has taken major steps to increase market efficiency and improve gas-electric coordination to address the challenges posed by the region's constrained natural gas pipeline system.

The ISO has increased information sharing and operational interfaces with the natural gas pipelines to improve communications with the natural gas industry and develop decision-support tools for our system operators.

One such tool, called the Gas Usage Tool (or "GUT") by our system operators, allows the ISO to estimate the amount of natural gas available for electric generation. This is accomplished by estimating the demand for gas by industrial and local gas distribution companies' customers, as well as gas-fired generators, compared to the capability of the natural gas pipeline system, including LNG injections into the regional gas pipelines.

In addition, the ISO has shifted the day-ahead energy market timeline to better align the electricity and natural gas markets to give generators more time to procure the gas they need to run. The ISO now closes the day-ahead market offer and bid period at 10 am (as compared to 12 pm under the former rules), and publishes the results by 1:30 pm (as compared to 4 pm under the former rules), giving generators more time to nominate the gas they need to run the following operating day.

The ISO has implemented energy market offer-flexibility enhancements to allow participants to update their offers to supply electricity in real-time to reflect changing fuel costs, improving market pricing and incentives to perform.

The ISO has tightened the shortage event trigger in the Forward Capacity Market and increased payments to resources providing reserves during scarcity conditions to give resources better incentives to perform when they are needed the most.

The ISO has improved scheduling of wholesale electricity sales between New York and New England through a project called Coordinated Transaction Scheduling (CTS). CTS makes more efficient use of the transmission lines connecting New York and New England by allowing bidding and scheduling in 15-minute intervals. These changes enable the scheduling of the most economic transactions between New York and New England, enhancing the efficient flow of electricity over the ties.

Finally, longer-term market enhancements, called "Pay for Performance," effective June 1, 2018, will provide strong incentives for resources to invest in operational improvements and secure fuel arrangements to ensure resource performance.

Further Preparations for Winter Coordination and Communications

In terms of further preparations for winter coordination and communications, ISO New England conducts regular conference calls with the Reliability Coordinators within the Northeast Power Coordinating Council (NPCC), including the New York ISO, the Ontario Independent Electricity System Operator, the New Brunswick Power Corporation, and Hydro Québec. These calls provide an opportunity for system operators to share timely information about the outlook for operating conditions in nearby regions. As an example, if one or more regions anticipate reliability concerns, the calls provide advanced warning that other areas may need support from, or may be unable to provide support to, interconnected power systems.

ISO New England is in regular communication with the gas pipeline companies to exchange information relating to weather conditions, posted notices, equipment-related restrictions on the delivery of gas, and overall capacity requirements to serve electricity demand in New England. These communications are daily if not hourly on high gas demand days.

ISO New England is also in regular contact with the region's coal-, oil-, and gas-fired generators to monitor and confirm their fuel arrangements throughout the winter. Monthly fuel surveys are sent to coal- and oil-fired generators to monitor their inventories. These surveys can be sent weekly and daily, if necessary. For gas-fired generators, the ISO confirms each day that generators have nominated sufficient volumes of gas to meet their day-ahead obligations.

Operating Procedures to Maintain Reliability

In planning for the winter season, ISO New England takes into account a number of outage scenarios, including the potential for some natural gas-fired generators to be temporarily unavailable during extreme cold weather conditions. However, should unexpected generator or transmission line outages

occur, the ISO has procedures in place to maintain reliability during a capacity deficiency (known as Operating Procedure No. 4, *Action During a Capacity Deficiency*). These procedures allow the ISO to take a number of actions, including calling on demand-response resources to reduce their energy use, importing emergency power from neighboring regions, and asking businesses and residents to voluntarily conserve electricity. In total, the ISO can obtain approximately 3,000 MW of relief through 11 action steps of Operating Procedure No. 4.

Practical Implications and Challenges for this Winter

With the winter reliability program in place, ISO New England expects to have adequate electricity supplies to meet consumer demand this winter. While natural gas pipeline constraints continue to be a concern, increased pipeline capacity resulting from Spectra Energy's Algonquin Incremental Market (AIM) project, scheduled to be in service by November 2016, will provide temporary relief this winter. The project expands the pipeline capacity of the existing Algonquin Gas Transmission system by roughly 340,000 dekatherms of natural gas per day. This relief will be short-lived as non-gas resources retire and gas-fired generation takes their place. In fact, more than 1,500 MW of non-gas units, namely Brayton Point Power Station in Southeast Massachusetts, will retire by June 1, 2017.

New England has benefited from the availability of LNG resources in prior winters, but there is no guarantee that those same shipments will arrive this winter. New England is served by three primary LNG facilities – Distrigas in Everett, Massachusetts, Canaport in Saint John, New Brunswick, and the Northeast Gateway facility off the coast of Boston, Massachusetts. LNG is supplied to these facilities by tankers that sell on the world market. These ships may elect to go elsewhere depending on prices.

Non-gas resources will continue to play a vital role in maintaining reliability when there are constraints on the natural gas pipeline system. But, as I noted, these resources are retiring. More than 4,200 MW of generating capacity has retired or announced plans for retirement over the next few years. This includes coal, oil, and nuclear power plants. Another 6,000 MW of older coal- and oil-fired resources are at risk of retirement in the coming years. The region's pipeline infrastructure will face continued constraints as heating demand grows and gas-fired generation replaces retiring units.

Notwithstanding our winter preparedness efforts to date, the biggest challenge we see going into this winter—what keeps me up at night—is an extended cold snap when non-gas fuel inventories are depleted, or an operating day in which New England is primarily utilizing nuclear, coal, and oil resources and we suddenly lose a large non-gas resource. The region has adequate electric generating capacity to serve the load under these conditions, but our ability to meet electric energy needs is at risk if the natural gas infrastructure serving the region is unable to supply fuel to gas-fired generators. New England has ties to neighboring power systems, but those systems may not have excess supply to send into our region if they are experiencing similar cold weather conditions. Under these conditions, our system operators may need to rely on emergency actions to maintain operating reserves and meet the region's demand for electricity reliably.

Thank you for the invitation to share information on ISO New England's winter preparedness efforts.