Department of Energy

Quadrennial Energy Review

Second Installment

Electricity: Generation to End-Use

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Statement of Richard Dewey, Executive Vice President

New York Independent System Operator (NYISO)

Good morning. I am Richard Dewey, Executive Vice President of the NYISO. I am pleased to be here, and I want to thank Secretary Moniz and Department of Energy staff for this opportunity to participate in today's meeting.

The scope of today's meeting addresses the challenges and the opportunities the electric industry faces as we move further into the 21st century. Change is not new to the NYISO. New York's 19 million consumers today enjoy benefits of competitive wholesale electricity markets made possible by pioneering public policy decisions in Washington and Albany in the 1990s, when federal and state policymakers took action to transform the approach to buying and selling electricity by developing efficient and competitive wholesale markets for electricity. The transformation necessitated the formation of the New York Independent System Operator as an independent, not-for-profit organization that manages the flow of electricity across New York. To provide the lowest-cost power available to reliably meet consumer needs, the NYISO conducts and monitors competitive auctions of wholesale electricity every five minutes, every day of the year.

This transition to competitive markets administered by the NYISO has produced significant benefits to consumers, the economy, and the environment, including:

- **$6.4 billion** in fuel savings due to increases in fuel efficiency in electricity generation from 2000 through 2013.
- **$540 million in consumer savings** due to reduced reserve requirements compared to reserves carried prior to the formation of the NYISO.
- Nearly **25 million tons of avoided carbon emissions** in 2013 compared to 1999 due to improved power plant efficiency and a cleaner supply mix —a 41 percent reduction equivalent to taking 4.8 million passenger vehicles off the road. **Market incentives to control** electricity commodity costs, resulting in cost increases of **only 2 percent** in 2013 compared t**o** 2000, while the national rate of inflation grew by over 35 percent.
- Seamless integration of electricity generated by **wind power** in New York, increasing from 103 GWHs in 2003 to 3,541 GWHs in 2013, or enough electricity to power 490,000 New York homes (greater than the number of households in Buffalo, Rochester, Syracuse, Binghamton, Albany, Poughkeepsie, and Yonkers combined).

NYISO operates under the nation's strictest reliability standards, including approximately 1,000 individual requirements designed to preserve bulk system reliability. These requirements are established, maintained, and enforced by North American, Northeast and New York State reliability organizations, and overseen by the Federal Energy Regulatory Commission (FERC) and the New York State Public Service Commission (PSC). The NYISO, supported by a $37.8 million Department of Energy grant, has invested in technology that gives it access to real-time regional data on the condition of the grid to help avoid similar outages in the future.

General Trends Relating to New York's Electric System

Moderate Energy Usage & Growing Peak Demand

Year-to-year growth in the overall usage of electric energy from the bulk electric system is forecasted to be flat – or decrease -- over the next decade. In contrast, the peak demand continues to grow, though not at as rapid a pace as it has previously. Peak demand is a relatively small portion of a year's overall power consumption, but it is a significant factor because reliability reserve requirements are based on projected peaks and those requirements determine the amount of capacity resources that must be purchased to meet the system's resource adequacy needs. Energy efficiency programs and distributed energy resources (solar photovoltaics and other "behind-the-meter" systems) in New York are expected to reduce the growth of peak demand on the bulk power system and affect energy usage.

Markets Delivering Resources and Efficiencies

Markets have consistently responded to identified reliability needs in New York. Since 2005, when the NYISO launched its comprehensive reliability planning process, we have conducted seven reliability assessments, five of which identified emerging reliability needs. In each case, the markets responded to address those needs. Demand response programs continue to provide more than 1,100 MW of resources to address peak demand.

Cultivating Green Power & Addressing Environmental Goals

New York's wholesale electricity markets have continued to evolve in an effort to cultivate the growth of green power. From 2000 through 2014, New York power plant emission rates dropped significantly. SO_2 emissions rates declined 94 percent. NO_x emission rates declined 78 percent. CO_2 emission rates declined 39 percent, showing that markets are responding to more stringent environmental and fuel efficiency goals.

The NYISO was the first grid operator in the nation to integrate wind power in its economic dispatch system, fully balancing the reliability requirements of the power system with the use of the least costly power. The nameplate generating capacity of wind-powered projects in New York grew from 48 MW in 2005 to 1,746 MW in 2015. Another 2,300 MW of wind power is currently proposed for interconnection with the New York grid.

The NYISO is undertaking a study of the impact of the growth of solar resources. There is currently 455 MWs of installed nameplate solar capacity behind-the-meter in New York, with 15 MWs of new behind-the-meter solar capacity added each month. Further, 173 MWs (from 5 large solar farms in NYISO interconnection queue) could be completed by end of 2016.

The Role of Transmission

New York's proposed Clean Energy Standard will mandate that 50 percent of all electricity consumed in New York by 2030 come from clean and renewable energy sources. According to the New York State Department of Public Service, the "50x30" goal requires 75,000 GWh of total renewable energy by 2030, which means increasing energy from renewables by 33,700 GWh from current levels.[1] Regions rich in renewables tend to be remote from the population centers with high demand for electricity. For example, all of New York's existing wind power resources *(1,746 MW)* and all of its currently proposed wind projects *(2,000+ MW)* are located in rural Northern and Western New York – hundreds of miles from metropolitan New York City and its suburbs on Long Island and in the Lower Hudson Valley. Robust and resilient transmission is needed to deliver carbon-free and renewable resources. In New York State, the Public Service Commission has issued orders that identified "Public Policy Transmission Needs" in Western New York[2] and the Central East/UPNY-SENY corridors[3]. The NYISO has estimated that increasing the capability of the West-to-East and North-to-South transmission in New York by a total of 2,000 MW (1,000 MW each) would enable an increase of 17.5 Million megawatt-hours of renewable power from wind and hydro resources – which represents an almost 50% increase from the current level of renewable energy production in the state. The emission reductions that accompany an increase in clean imports and additional renewable energy production would total 8 Million tons of CO_2 – the equivalent of taking 1.5 million vehicles off the road annually. In addition, New York's transmission infrastructure is aging and needs modernization. Over 80 percent of New York's high-voltage transmission lines went into service before 1980.[4] Of the state's more than 11,000 circuit-miles of transmission lines, nearly 4,700 circuit-miles will require replacement within the next 30 years, at an estimated cost of $25 billion, as determined by New York's Transmission Owners themselves.[5]

Energy Storage

In 2009, the NYISO became the first grid operator in the nation to establish federally approved energy storage market rules and deploy associated software and control systems. Storage resources can provide flexible tools for operators to balance the output from variable resources like wind and solar. The New York Public Service Commission – through the REV proceeding – has directed utilities to move forward with energy storage. Efforts are underway include the Con Edison Brooklyn/Queens project, which seeks to defer $1 billion in traditional distribution system upgrades with a $200 million investment in storage installed by Con Edison and its

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[1] *Staff White Paper On Clean Energy Standard, New York State Department of Public Service,* Case 15-E-0302 January 25, 2016.

[2] In July 2015, the NYS PSC issued an order that identified relieving congestion in Western New York as a Public Policy Transmission Need. The Commission determined that reducing transmission congestion in the region could achieve significant environmental, economic and reliability benefits throughout the state. These include maintaining output from the Niagara Power Project (a New York Power Authority hydroelectric facility at Niagara Falls), greater imports of renewable energy from Ontario, and increased operational flexibility and efficiency.

[3] In December 2015, the New York State PSC advanced its AC transmission proceeding to a competitive process managed by the NYISO by identifying a Public Policy Transmission Need to relieve congestion on the UPNY-SENY and Central East interfaces. The Commission action limited the new transmission lines to replacing and upgrading existing lines within existing rights-of-way, and adding new substation facilities at several locations, which is intended to reduce or eliminate adverse environmental, landowner, and economic impacts.

[4] *Power Trends 2015*, New York Independent System Operator, June 2015.

[5] *New York State Transmission Assessment and Reliability Study* , STARS Technical Working Group, April 30, 2012.

customers.[6] New York's REV initiative envisions significant contributions from storage resources at the distribution level.[7]

Integrating Distributed Energy Resources

New York's Reforming the Energy Vision (REV) is identifying and implementing regulatory changes necessary to expand the role of distributed energy resources. New York's current mix of distributed energy resources is led by combined heat and power (57 percent), followed by solar PV (41 percent), and energy storage (2 percent). Demand forecasting techniques will need data currently "behind-the-meter" to effectively integrate distributed resources into power system operations and planning. Advances in metering and communications infrastructure will be essential. Wholesale market potential of distributed resources may include price responsive demand, which reduces consumption when prices rise or increases use when prices fall. Such resources could also supply capacity and ancillary systems needed to maintain reliable services (such as power reserves and regulation) through aggregators.

Interregional Collaboration

Removing barriers to the efficient flow of power between electric systems is a vital component of improved flexibility in grid operations and enhanced wholesale market efficiency. The NYISO's Broader Regional Markets initiatives with neighboring regions in New England, the Mid-Atlantic and Canada are reducing the need to use more expensive local power when less costly power is available from a neighboring grid operator. The new market structures have shortened the time needed for moving power across control area borders, allowing faster responses to changing conditions.

Conclusion

The NYISO would like to thank Secretary Moniz and Department of Energy staff for the opportunity to participate in today's meeting. Wholesale energy markets have been effective in meeting the reliability needs of consumers while enabling cost efficiencies and environmental emissions reductions to enhance the performance of the grid. Wholesale markets are poised to continue to support reliable and efficient grid operations as we move further into the 21st century. I look forward to a robust discussion with my fellow panelists, and look forward to all of today's discussions on these important topics.

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[6] *Con Edison Energy Storage Activities*, EIA Conference, June 15, 2015.

[7] The 2014 DPS staff report, *Reforming the Energy Vision*, stated: *"Storage is expected to play an essential role in DSPP [Distributed System Platform Provider] planning."*