

For Immediate Release:

June 15, 2015

NYISO Issues *Power Trends 2015*

Rightsizing the grid with balance of centralized and distributed resources

Rensselaer, N.Y.— Transformative technology, shifting economics, and aging infrastructure all are converging to create an array of challenges for today’s electric grid, according to the [*Power Trends 2015: Rightsizing the Grid*](#) report released today by the New York Independent System Operator (NYISO).

The report reviews how consumer demand for electricity is flattening and the ways in which the emergence of distributed energy resources “behind the meter” are changing historical patterns of consumption. A sizeable portion of the existing generation and transmission resources is several decades old, and increasingly stringent environmental regulations are accelerating the retirement of older generating units as compliance costs grow. A shift in the century-old model of centralized grid operation is coming, but its pace and scope remain to be seen.

“We can’t take a ‘one-size-fits-all’ approach to shaping the grid of the future. We need to bolster the strength and stability of the centralized grid while we foster the flexibility and resilience offered by distributed energy resources,” NYISO President and CEO Stephen G. Whitley said.

“Rightsizing the grid will include modernizing and upgrading the essential foundation provided by high-voltage transmission as well as facilitating customer-sited solar power, community-based microgrids, and combined heat and power systems. The key to that challenge is effective integration of distributed resources with the centralized grid,” he added.

The annual *Power Trends* report is intended to promote awareness and understanding of the key forces and factors facing New York’s energy future. Among its findings this year, the report highlights:

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 over the next decade. In contrast, the peak demand is expected to grow. 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 by more than 2,700 megawatts (MW) from projected levels by 2025. They are also expected to lower annual energy usage served by the bulk power system by more than 14,000 gigawatt-hours (GWh) in 2025.

Markets Delivering Resources and Efficiencies

- New generation added from 2000 through 2014 totals more than 11,600 MW, providing enough power to meet more than one-quarter of New York’s electricity needs.
- Power supply resources in excess of New York’s reliability requirements grew to 2,300 MW in 2015, up from 1,900 MW last year, enhancing system reliability.
- Competitive wholesale electricity markets have improved the fuel efficiency of New York’s power resources by more than 27 percent, reducing fuel costs by a cumulative total of \$6.4 billion from 2000 through 2013.
- Market-driven improvements in generation efficiency have enabled reductions in reserve requirements, saving an estimated \$540 million from 2000-2014 while sustaining reliability.

The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state’s bulk electricity grid, administering New York’s competitive wholesale electricity markets, conducting comprehensive long-term planning for the state’s electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.

- Approximately 1,000 MW of power resources are returning at critical locations in southeastern New York. The new capacity zone in the Lower Hudson Valley played an instrumental role in encouraging development of generation in the region, addressing pressing reliability needs.
- Demand response programs continue to provide more than 1,100 MW of resources to address peak demand, but legal challenges have made their future uncertain.

The Role of Transmission

- Two-thirds of New York's electricity is used in the southeastern part of the state (Long Island, New York City, and the Lower Hudson Valley). Yet, only half of the state's generating capacity is located in this region. Sustained and enhanced transmission capability is vital to efficiently moving power to address regional power needs.
- Over 80 percent of New York's high-voltage transmission lines went into service before 1980 and will need to be upgraded or replaced in coming years.
- New and upgraded transmission capacity can play a valuable role in addressing concerns about aging infrastructure, providing greater flexibility in grid operations, advancing integration of renewable energy resources, and enhancing environmental quality by helping to meet needs that may develop when environmental regulations limit the production of fossil-fueled generation.

Growing Reliance on Natural Gas

- Power projects using natural gas and dual-fuel power plants that can run on gas and/or oil account for 56 percent of New York's generating capacity.
- More than 70 percent of all proposed generating capacity in New York would use natural gas (gas-only and dual-fueled gas/oil units).
- The NYISO and its stakeholders are exploring the creation of additional market-based incentives for fuel supply assurance during periods of summer and winter peak demand that can stress both the electric and the natural gas delivery systems.

Cultivating Green Power & Addressing Environmental Goals

- In 2014, 35,756 gigawatt-hours of New York's electricity were produced by renewable resources, representing approximately 25 percent of New York's electric generation.
- 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 currently are proposed for interconnection with the New York grid.
- From 2000 through 2014, New York power plant emission rates dropped significantly. SO₂ emissions rates declined 94 percent. NO_x emission rates declined 78 percent. CO₂ emission rates declined 39 percent.
- The Clean Power Plan proposed by the U.S. Environmental Protection Agency (EPA) presents potentially serious reliability implications for New York and does not adequately credit New York's progress in cutting emissions reductions. A "reliability safety valve" is needed to provide sufficient flexibility to address unforeseen circumstances when reliability may be at risk, such as the need to switch generators to oil when gas becomes unavailable during peak gas consumption periods in summer and winter.

Integrating Distributed Energy Resources

- New York State's Reforming the Energy Vision (REV) initiative 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).

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- 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.

For more information, please see the *Power Trends 2015: Rightsizing the Grid* report, which is available on the NYISO website, www.nyiso.com.

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