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ISO New England Issues Annual Power System Plan for New England

Energy-efficiency measures expected to flatten electricity demand over time, but retirements increase need for new resources

Holyoke, MA— November 6, 2014—ISO New England Inc., the operator of the New England power system and wholesale electricity markets, today issued its [2014 Regional System Plan](#) (RSP14), the annual report that guides long-term power-system planning efforts in New England. RSP14 was approved by the ISO New England board of directors today.

In addition to providing forecasts of energy and peak demand over a 10-year horizon, the plan identifies areas of the grid where transmission upgrades and market responses, such as generators or demand-side resources, are needed to address reliability requirements. RSP14 also provides a thorough overview of power system infrastructure development, current issues facing the region, and discussion of major ISO New England and regional initiatives underway. The comprehensive document is the result of a robust and transparent process that involves ISO New England, market participants, public officials, state agencies, consumer advocates, and other interested stakeholders.

“The Regional System Plan serves the region as a blueprint for power system needs and illustrates the benefits of collaborative and strategic long-term planning,” said Gordon van Welie, president and CEO of ISO New England Inc. “Significant upgrades to the high-voltage transmission system have eased bottlenecks that 10 years ago impeded the efficient flow of power. Over the same period, the competitive marketplace has brought new investments in generation and demand-side assets, ensuring a adequate resources and improving the overall efficiency of electricity production in the region.

“Despite this progress, the New England power system is undergoing a rapid transformation,” continued van Welie. “This transformation is driven by retirements of generation and demand-response resources, causing the region to fall short of its resource target for 2017; deteriorating resource performance, creating reliability issues; and a lack of fuel adequacy, primarily due to natural gas pipeline constraints. In addition, because New England is a leader in the development of demand resources, energy efficiency, and renewable energy, we expect that state policymakers will continue to focus on expanding these resources. Planning for the future power system is more important than ever, and the RSP will continue to serve as a valuable guide.

“The lack of pipeline infrastructure has raised fuel adequacy for natural gas generators to the top of the list of pressing concerns for New England’s power system. ISO New England has made changes to the wholesale power markets and to operating procedures to help address this concern, but to keep the region’s power grid reliable and flexible, a commitment to investing in fuel adequacy is needed from all New England stakeholders,” added van Welie. As outlined in the RSP, fuel infrastructure investments could include oil storage at gas generators to enable fuel switching, forward arrangements for liquefied natural gas supply or storage, and added gas pipeline transportation capacity.

Progress Report

Transmission—From 2002 through June 2014, 559 transmission projects to address reliability needs were put into service in the six New England states. These projects represent a \$6.6 billion investment in new infrastructure.

System resources—From November 1997 through April 2014, nearly 15,000 megawatts (MW) of new generation have been constructed in New England, while more than 4,100 MW of generating resources have retired. Approximately 2,100 MW of demand resources (both demand response and energy-efficiency [EE] measures) are a part of New England’s resource mix.

Long-Term Outlook

Long-term load forecast—Energy consumption, unadjusted for energy-efficiency measures, is projected to grow an average of 1% annually through 2023, while summer peak demand is expected to grow by 1.3% per year. Since 2012, ISO New England has used a multistate EE forecast to capture the longer-term effects of EE in its system planning processes. When the energy-saving effects of EE are included, the forecast shows essentially no growth in total electricity usage and 0.7% annual growth in summer peak demand over the 10-year planning horizon.

Transmission and power system planning—Substantial upgrades to the high-voltage transmission system to meet federal reliability requirements are under construction, have been approved, or are under development. Major projects underway include the Interstate Reliability Project component of the New England East–West Solution, which comprises transmission upgrades in Massachusetts, Connecticut, and Rhode Island and is expected to be in service by the end of 2015 and the Maine Power Reliability Program, most of which is expected to be in service in early 2015, with additional upgrades scheduled for completion in early 2017. Transmission system upgrades in the Greater Boston area are currently being evaluated to determine the most cost-effective solution to meet the reliability needs in this area. Approximately \$4.5 billion in transmission investment for reliability purposes is planned. Additionally, several elective transmission projects that would be funded by private developers have been proposed.

The Federal Energy Regulatory Commission’s (FERC) Order 1000 requires changes to grid operators’ interregional and regional transmission planning processes. ISO New England is awaiting final FERC orders on its compliance filings and has requested rehearing on aspects of Order 1000 that would require changes to the regional planning process.

Capacity—More than 4,600 MW of capacity is expected to retire over the next three years. Despite the slow load growth forecasted for New England, the pending retirements of large generators and the likelihood of additional retirements mean the region will need new capacity resources to reliably serve demand in the future. The eighth Forward Capacity Market auction (FCA #8), held in February 2014 to secure capacity obligations from resources for the 2017/2018 commitment period, procured slightly less than the capacity requirement, which resulted in higher capacity prices than the seven previous auctions.

The new resources proposed for New England are predominantly natural gas or wind plants. RSP14 reports that, as of April 2014, 6,915 MW of new generation had been proposed. More recent data from November 2014 show that about 8,300 MW of new generation has been proposed: more than 4,500 MW of natural gas resources and nearly 3,700 MW (nameplate) of wind. Not all proposed projects will be built; historically, the proposal queue has had a megawatt attrition rate of 70%.

Additional Highlights

New England’s fuel mix—In 2013, 45.1% of the electricity generated in the region was produced by natural-gas-fired power plants, while oil units produced less than 1% and coal plants generated 5.6%. Nuclear produced 33.2%; hydro, pumped storage, and renewable energy resources together produced 15.3% of the electricity generated in the region.

Wind power forecast—In January, ISO New England incorporated a new wind power forecast into its processes and control room dispatch services. The forecast provides ISO system operators with information about where, when, and approximately how much electricity may be produced by each of the large wind facilities in New England. Wind resource owners can download the forecast for their individual units, which in turn may help them more effectively plan how much energy to offer into the Day-Ahead Energy Market. The ISO is continuing its work to fully integrate wind resources into system dispatch.

Distributed generation forecast—In 2014, ISO New England, with help from stakeholders, developed the nation’s first multistate forecast of distributed generation (DG) resources to quantify and better understand the impact of increased amounts of DG on both grid operations and future grid planning. Because solar photovoltaic (PV) resources constitute the largest segment of DG in New England, the first forecast focused on the amount of PV expected in the region through 2023. The forecast considers the amounts and locations of existing PV resources, state policy objectives for PV development, and uncertainties in future policy and market and price conditions necessary to support the continued development of PV. By the end of 2013, the installed nameplate of PV in New England was approximately 500 MW. Results of the first forecast show that this resource will continue to grow in the region, with 1,800 MW (nameplate) forecasted by 2023. The ISO will continue to work closely with stakeholders to further improve uses of the PV forecast in the regional planning process and to address many of the technical challenges posed by this variable distributed resource.

Natural gas and oil fuel-adequacy concerns

ISO New England continues to have concerns about the availability and performance of power plants, particularly natural gas and oil-fired power plants. The vulnerabilities and limitations of the system were highlighted during the past two winters when fuel constraints reduced the availability of generation and pushed up wholesale electricity prices. To mitigate potential grid reliability issues, ISO New England will implement a second Winter Reliability Program for the upcoming winter. The program includes incentives for oil and dual-fuel generators to increase their oil inventories; for gas-fired generators to contract for liquefied natural gas to augment pipeline gas; for power plants to become dual-fuel resources; and for new demand-response resources to participate. A similar program in place in winter 2013/2014 was critical in maintaining system reliability. ISO New England is working with stakeholders on wholesale power market changes to address these challenges over the long term.

Planning for the Future Grid

Strategic Planning Initiative—ISO New England launched this initiative in 2010 to identify risks to long-term power grid reliability. The risks include the region’s growing dependence on natural gas to produce electricity, declining resource performance, resource retirements, and increasing amounts of renewable resources. To address these risks and help bolster reliability, the ISO has implemented operational and market enhancements, and more market changes are underway. Market enhancements taking effect in the coming months include the following:

- **Energy market offer flexibility:** On December 3, new market rules will go into effect that will enable generators to submit power supply offers that vary by hour in the Day-Ahead Energy Market, instead of offering one price for the entire operating day. They also will be able to update their offers in the Real-Time Energy Market to reflect changes in the real-time price of fuel. This major initiative, under design and development for two years, will result in more accurate prices and improve resources’ incentives to follow the ISO’s dispatch instructions.
- **Pay for Performance:** In May 2014, FERC accepted most of the ISO’s proposed changes to core elements of the Forward Capacity Market (FCM). Under current FCM rules, capacity payments to resources are weakly linked to actual performance—a shortcoming that has resulted in poor resource performance at times when it’s needed most. The new rules make each resource’s capacity payment contingent, in part, on its actual performance during stressed system conditions. With greater financial risks and rewards, resource owners are expected to undertake investments to boost their facilities’ ability to perform when dispatched. These changes will apply to resources clearing in the February 2015 Forward Capacity Auction (FCA #9) and will take effect in 2018.
- **Downward-sloping demand curve and seven-year lock in:** Also beginning with FCA #9, the ISO will implement a sloped demand curve in the FCM. Previous auctions have procured a fixed quantity of megawatts, regardless of the clearing price; establishing a sloped-demand curve for capacity means that the total amount procured will depend on the clearing price. This new mechanism is designed to reduce price volatility over time and yield smaller swings in capacity prices when the market moves from conditions of excess supply to periods when new capacity resources are needed, which may occur as resources retire. In addition, new resources will

have the option of receiving a seven-year lock in at the clearing price. This change was made in order to reduce the financial risk facing resource developers.

The Role of Planning in New England

The annual Regional System Plan is developed to meet requirements established by FERC, the North American Electric Reliability Corporation, and the Northeast Power Coordinating Council, and is produced in accordance with the requirements in Attachment K of the ISO's [Open Access Transmission Tariff](#). Each RSP is a snapshot of the power system and relevant studies and forecasts at a point in time, and the results are updated as needed. The regional planning process is open and transparent and reflects input from a diverse group of regional stakeholders through the [Planning Advisory Committee](#) (PAC). In 2014, the ISO hosted 15 PAC meetings, bringing together nearly 200 stakeholder representatives.

The [2014 Regional System Plan](#) is available on ISO New England's website.

ABOUT ISO NEW ENGLAND

Created in 1997, ISO New England is the independent, not-for-profit corporation responsible for the reliable operation of New England's electric power generation and transmission system, overseeing and ensuring the fair administration of the region's wholesale electricity markets, and managing comprehensive regional electric power planning.

