

Energy Insights -- Feb/March Update

Briefing on New England Energy Issues and Trends

Trends & Challenges Facing New England's Electricity System

ISO New England, the organization responsible for the reliable operation of the region's bulk electricity system and the administration of wholesale markets, has issued its 2017 *Regional Electricity Outlook* - an annual report on the challenges and trends impacting the region's electricity system. Key highlights include:

- *Natural gas supply constraints are causing grid reliability issues and price volatility* - The region's natural gas pipelines are running at or near maximum capacity in the winter which severely limits the delivery of fuel to the region's generating plants in cold spells. This threatens the supply of electricity and drives up wholesale electricity prices and air emissions (due to switching to oil-fired generation). Under extreme circumstances, in coming winters, ISO predicts it could be forced to use stronger measures such as controlled outages to maintain system reliability as nearly half of the region's current electricity generating capability and roughly half the proposed new generation relies on natural gas. Without investment to expand natural gas supplies, ISO notes the region can expect price volatility, potential reliability issues and higher emissions when gas pipelines are constrained in the winter. This is in contrast to recent studies claiming that the region does not require additional natural gas infrastructure.
- *New transmission has improved reliability and reduced costs* - Transmission investments of \$8 billion since 2003 (consisting of 690 projects) have fixed weak spots and bottlenecks on the system, eliminating reliability issues and costly congestion that prevented the least-cost electricity from reaching certain locations. The region's transmission system now consists of about 9,000 miles of high-voltage power lines and related facilities spanning six states as well as 13 interconnections with neighboring power systems. The system enables the import of competitive and emergency supplies from New York and eastern Canada. An additional 153 projects are anticipated to be completed over the next decade to ensure electricity continues to move reliability and efficiently across the region. Finally, new transmission projects will also be needed to deliver renewable electricity generated in remote areas to population

In This Issue:

Trends & Challenges Facing New England's Electricity System

NESCOE Issues Renewable and Clean Energy Scenario Analysis

New England Carbon Emissions Increase after Nuclear Plant Closure

Auction Secures Sufficient Resources to Meet Region's Electricity Needs for 2010-2021

Renewables Account for Nearly One-Fifth of Total New U.S. Generating Capacity

Once Again, FERC Commissioner Cheryl LaFleur Named Acting Chairman

Did You Know:

According to the latest data on household energy characteristics, the number of televisions per U.S. home declined from 2.6 per household in 2009, to 2.3 in 2015. Other findings include:

70 million homes (59%) now have double or triple pane windows

Only 11% of U.S. households have all incandescent bulbs

The number of homes heating with fuel oil has declined 23% from 2005

77 million households now

centers.

- *State clean energy initiatives are interfering with competitive markets* - State renewable portfolio standards (which are applicable to all six New England states) require electricity suppliers to provide customers with increasing percentages of renewable energy. However, even with no fuel costs, most renewable resources are still relatively expensive. As a result, incentives, tax credits and long-term contracts are being offered by states to attract clean energy projects which can undermine the region's competitive marketplace and interfere with accurate energy market pricing. This enables subsidized resources to sell energy for artificially low prices, putting traditional generation needed for reliability at a price disadvantage. ISO notes that maintaining traditional generation resources needed for reliability and accommodating state-subsidized renewables is a "conundrum with no simple solution".
- *The transition towards a hybrid grid of renewables and natural gas requires balancing reliability, economic and environmental goals* - Because a number of New England states are moving to significantly increase the amount of renewable energy on the grid as noted above, ISO has been refining systems and market rules to integrate renewables, which are intermittent, with natural gas-fired and baseload nuclear generation which operate 24/7 to ensure grid stability. New market mechanisms are being sought to create a bridge between reliability needs and state environmental goals.

Source: 2017 Regional Electricity Outlook, ISO New England, Inc., February 2017.

NESCOE Issues Renewable and Clean Energy Scenario Analysis

The New England States Committee on Electricity (NESCOE) issued the first phase of a two-phase study on the impacts of increasing renewable and clean energy resources on New England's wholesale electricity markets. Conducted by London Economics International (LEI), the modeling analysis assessed New England's wholesale electric energy and capacity market dynamics in two future years - 2025 and 2030 - under various hypothetical market conditions.

The results, combined with other studies, data and information produced by ISO New England and other entities, will be used as future planning tools. The two-phase effort is being conducted to address NESCOE's observation that New England's competitive wholesale markets may need to be revised to better accommodate state energy and environmental laws if they are to remain sustainable over time.

Source: Renewable and Clean Energy Scenario Analysis

have central air-conditioning -- up 17% since 2005

Source: Residential Energy Consumption Survey by the U.S. Energy Information Administration, February 27, 2017.

New England Carbon Emissions Increase after Nuclear Plant Closure

The retirement of the Vermont Yankee Nuclear Power Station - as well as increased oil and natural gas-fired electricity generation - increased carbon dioxide emissions from electricity generation in 2015 compared to 2014. According to ISO New England, carbon dioxide rates in 2015 were 747 pounds per MWh up from 726 in 2014 - causing a 2.5 percent increase in total emissions from electricity generation.

Between 2014 and 2015, New England experienced a 15% decrease in production from non-carbon emitting generators, largely from the loss of more than 600 MW from Vermont Yankee. Natural gas-fired generation also increased by about 12%. Oil-fired generation also saw an increase of 10% due to winter time natural gas supply constraints. Coal-fired generation, on the other hand, decreased by 23% from generation that retired in 2014. Additional coal-fired retirements are expected in the coming years.

These findings highlight the importance of nuclear plants in lowering carbon emissions from electricity generation. The Millstone Nuclear Power Station in Connecticut, for example, generates 98% of that state's low carbon electricity. According to the Connecticut Department of Energy and Environmental Protection, if Millstone were to shut down, New England's carbon emissions from electricity generation would increase 27 percent - or by 8 million tons per year.

Sources: 2015 ISO New England Electric Generator Air Emissions Report, January 2017; "Connecticut lawmakers again asked to consider nuclear energy, New Haven Register, February 13, 2017.

Auction Secures Sufficient Resources to Meet Region's Electricity Needs for 2020-2021

New England's annual capacity auction administered by ISO New England secured enough electricity to meet the region's electricity needs three years from now. The 11th annual Forward Capacity Auction procured commitments from power plants and demand resources to be available in 2020 and 2021 - totaling 35,505 MW.

Preliminary results indicate the clearing price for the auction was the lowest since 2013 - at \$5.30 per kilowatt-month compared to \$7.03 in the previous auction - dropping by 25%. The total cost to the region is about \$2.4 billion, down from last year's \$3 billion and 2015's \$4 billion. In the previous auctions, a supply shortfall pushed up prices. The higher prices attracted new competition which helped lower the prices.

The annual auction is held three years before each capacity commitment period to provide time for new resources to be

developed. Resources include traditional power plants, renewable generation and demand resources such as load management and energy efficiency measures. Resources that clear in the auction receive a monthly payment during the capacity period in exchange for making a commitment to provide power or curtail demand when called on by the ISO. The capacity market is separate from the energy market where resources compete on a daily basis to provide power and are paid for the electricity they produce.

Source: "Auction Acquires Power System Resources Needed for 2020-2021 at Lower Price," ISO New England media release, February 9, 2017.

Renewables Account for Nearly One-Fifth of Total New U.S. Generating Capacity

According to the Energy Infrastructure Update released by the Federal Energy Regulatory Commission (FERC), renewables accounted for 62% of newly added electricity capacity in the U.S. in 2016. Renewable sources dominated capacity additions in the country with 16,124 MW of new capacity. In comparison, other capacity additions included: coal (45 MW), oil (58 MW), nuclear power (1,270 MW) and natural gas (8,689 MW). Renewable sources include wind, solar, biomass, hydropower and geothermal.

In New England, over 40 percent (totaling 5,800 MW) of all proposed new generation is wind powered - mostly from proposed projects located in northern Maine or offshore Massachusetts.

Source: "Renewables now account for nearly one-fifth of total US generating capacity," *Renewable Energy News*, 2017.

Once Again, FERC Commissioner Cheryl LaFleur Named Acting Chairman

President Trump named FERC Commissioner Cheryl LaFleur as Acting Chairman of the Commission. She was first nominated by President Obama to FERC in 2010 and was confirmed for a second term by the Senate in 2014. She was previously appointed by President Obama to serve as Acting Chairman of the Commission from November 2013 to July 2014 and as Chairman from July 2014 until April 2015. Since joining the Commission, her priorities have included reliability and grid security, promoting regional transmission planning, and supporting a clean and diverse power supply.

Prior to joining the Commission in 2010, Acting Chairman LaFleur had more than 20 years' experience as a leader in the electric and natural gas industry. She served as executive vice president and acting CEO of National Grid USA, responsible for the delivery of electricity to 3.4 million customers in the Northeast.

About the New England Energy Alliance, Inc.

The New England Energy Alliance is a coalition of energy companies advocating to ensure the availability, reliability and affordability of future energy supplies which are vital to the region's economic growth and prosperity. Formed in 2005, the Alliance works to balance public debate about solutions to New England's energy infrastructure by providing information on the region's energy needs and the resources, technologies and policies needed to meet those needs.

Please visit www.newenglandenergyalliance.org for more information on the Alliance.