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Harsh Weather Conditions Could Pose Challenges to New England's Power System This Winter

Fuel supply issues may threaten ability to meet consumer demand if the region sees extended periods of extreme cold weather

Holyoke, MA—December 6, 2021 —Well-documented natural gas pipeline constraints, coupled with global supply chain issues related to deliveries of oil and liquefied natural gas (LNG), are placing New England's power system at heightened risk heading into the winter season, according to ISO New England Inc., operator of the region's power grid. The ISO expects to have the resources needed to meet consumer demand if the winter is mild, but a severe prolonged cold snap could necessitate emergency actions if power-producing resources lack access to the fuel they need to operate.

"As we continue our work with the New England states and industry stakeholders to transition to a cleaner grid, the ISO also has to maintain real-time power system reliability," said Gordon van Welie, ISO New England's president and CEO. "In recent years, oil and LNG have filled the gaps when extended periods of very cold weather have constrained natural gas pipeline supplies. Higher prices globally for these fuels, as well as pandemic-related supply chain challenges, could limit their availability in New England if needed to produce electricity this winter. The region would be in a precarious position if an extended cold snap were to develop and these fuels were not available."

Projected winter electricity needs

ISO New England anticipates demand for electricity will peak at 19,710 megawatts (MW) during average winter weather conditions of 10°F, and 20,349 MW if temperatures reach below average conditions of 5°F. These projections are both about 2 percent lower than last year's forecasts. New England's all-time winter peak record was set during a January 2004 cold snap when electricity usage reached 22,818 MW.

Uncertainty leads to heightened risk

Going into this winter period, there are a number of uncertainties that could affect how ISO New England will operate the region's power system. Three of these variables include weather severity, the global price of oil and LNG that could affect storage and deliveries into New England, and natural gas pipeline constraints that occur when there is simultaneous demand for natural gas from both heating customers and electricity generators. If these risks materialize and threaten power system reliability, the ISO will turn to several operating procedures to manage the grid, up to and including controlled power outages. While employing controlled power outages is a last resort, the ISO wants to educate the public that if this step were required, it would be used to protect the region's power grid from an overall collapse.

"Highlighting these concerns is not meant to cause undue alarm at this early stage," said van Welie. "Rather, by identifying and sharing the conditions under which the power system would be most challenged, we hope to prepare the region that if these conditions arise, the ISO, utilities, and government officials may ask for conservation of electricity and gas usage as an early step in avoiding or minimizing the need for emergency actions."

Weather and scenario analysis

Weather is the largest driver of energy use in New England. The [National Oceanic and Atmospheric Administration](#) (NOAA) is projecting a warmer than average winter in New England, though a warmer than average season does not eliminate the threat of prolonged stretches of cold weather. Climate change is making weather more volatile and harder to predict, while stimulating more severe weather. As demonstrated in Texas in February, extreme weather can exacerbate reliability risks on the power grid.

To enhance situational awareness entering this winter, the ISO compared expected consumer demand levels and other system conditions for this winter with three historical weather scenarios:

- [Last winter \(2020/2021\)](#), when the region experienced no extreme temperatures;
- The [winter of 2017/2018](#), when, despite a forecasted mild season, all major cities in New England had average temperatures below normal for at least 13 consecutive days; and
- The [winter of 2013/2014](#), when the region experienced several cold weather stretches of four or more consecutive days, including a stretch of ten consecutive days at or below freezing.

The analysis assumed that there were no significant generation or transmission outages, and that fuel replenishment was limited.

Under this analysis, the ISO would anticipate reliable system operations without the need for emergency procedures with mild conditions similar to last year. Weather similar to 2017/2018 may require limited emergency procedures, while weather similar to 2013/2014 may require the implementation of all available emergency procedures. The ISO would not expect these actions to be necessary if generators are able to adequately replenish their fuel supplies and if the system does not experience any unexpected generator or transmission outages.

Emergency procedures

ISO New England's system operators have many tools at their disposal in the event emergency conditions develop. These procedures include importing emergency power from neighboring regions, calling on power system reserves, and asking businesses and residents to voluntarily conserve energy.

In severe events, system operators may be forced to call for controlled power outages to protect the overall grid. Though a drastic step, these controlled outages would be necessary if there is not enough energy supply to meet demand. Controlled outages prevent a collapse of the power system that would take many days or weeks to repair. In the event controlled outages are needed, the ISO directs local distribution utilities, who know their systems best, to lower electricity demand in their areas.

Long-standing fuel supply issues

For the past two decades, ISO New England has raised concerns about fuel supply issues and their impact on electricity supply during periods of extreme cold weather. Constraints on the natural gas pipeline system limit the availability of fuel for natural gas-fired power plants, as heating customers are served first through firm service contracts. When natural gas is not available or is higher priced than alternate fuels, the wholesale markets will clear a mix of other resources, including resources fueled by LNG, coal, or oil. Since 2013, roughly 7,000 MW of these resources have retired or announced plans for retirement in the coming years, with nearly 2,000 MW having retired since winter 2017/2018.

Over the years, the region has tried to address the need to ensure regional energy adequacy through actions by the states, the Federal Energy Regulatory Commission (FERC), or the ISO, but most of these major steps to solve this risk have been unsuccessful. The ISO does not have the authority to require generators to procure fuel in advance, though resources paid through the Forward Capacity Market to be available during periods of system stress face significant financial penalties if they do not meet their commitments.

Fuel supplies this winter

New England generators rely on the delivery of both global and domestic fuel supplies to produce electricity. As the world recovers from the pandemic, global fuel supply chains are being stretched, leading to high prices for oil and LNG across the globe. These issues may limit the ability for resources in New England to replenish their tanks if they run low during the winter months. These limitations are in addition to typical logistical challenges, such as inclement weather, that can affect fuel deliveries into the region. A national shortage of truck drivers may also affect the speed at which some generators can replenish their fuel supplies, as the trucking system is shared by multiple industries, including commercial and residential heating and electric generation.

Winter wholesale prices in New England

As the administrator of the region's wholesale electricity markets, ISO New England cannot speculate on future energy prices, but higher and volatile fuel costs typically leads to higher and volatile wholesale electricity prices. The extent of any increase is hard to predict, and will depend on a number of factors including consumer demand, weather, and the responsiveness of the fuel supply chain. The impact of these expected higher wholesale prices on residential electricity rates will vary based on different state regulations and utility and competitive supplier practices for procuring energy.

Impact of COVID-19

ISO New England continues to track the estimated impact of the COVID-19 pandemic on consumer demand for electricity. While the pandemic is having a minimal effect on peak demand, the ISO is noticing increased energy use during the day, as many former office workers continue to work remotely. This increased energy use could exacerbate fuel supply issues during a prolonged cold snap.

Pre-winter preparations

As a part of its winter operations, ISO New England routinely monitors weather forecasts and fuel supplies, including the availability of pipeline gas and expected production from wind and behind-the-meter solar resources. The ISO also surveys generators at a minimum weekly to determine their inventories of stored fuels. These surveys are combined with forecasted consumer demand and published to the ISO website on a rolling 21-day look-ahead aimed at identifying potential energy shortfalls early enough to be addressed.

ISO New England prepares short-term forecasts for the winter season, taking into account estimated contributions from all resources, including those with and without an obligation through the capacity market, to supply electricity; resource outages due to a lack of fuel or other unanticipated issues; imports from neighboring regions; and resource additions and retirements. These estimates help inform ISO New England's planning on how to operate the grid during the upcoming winter. These forecasts also estimate consumer demand under a variety of weather conditions.

Ahead of each winter, ISO New England hosts a readiness seminar for generators to detail expectations for the coming season. The ISO also meets with industry and governmental officials to discuss the upcoming season, going over capacity and demand forecasts, as well as how the ISO will communicate throughout the season if challenging conditions materialize.

2021-2022 winter outlook by the numbers

- Winter peak forecast: 19,710 MW under normal weather conditions; 20,349 MW under below average conditions
- Last winter's demand peaked at 18,756 MW on December 17, 2020
- The all-time winter peak demand is 22,818 MW, set on January 15, 2004, during a cold snap
- Resources with a Forward Capacity Market (FCM) capacity supply obligation to be available: 31,397 MW
- Total resources, including both FCM obligations and capability without FCM obligations: 34,422 MW (a generator's maximum possible output may be greater than its FCM obligation)
- Natural-gas-fired generating capacity at risk of not being able to get fuel when needed: more than 3,700 MW
- All-time peak demand: 28,130 MW, on August 2, 2006

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.