

**TESTIMONY OF GORDON VAN WELIE
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BEFORE THE US SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES

***FULL COMMITTEE HEARING TO EXAMINE THE PERFORMANCE
OF THE ELECTRIC POWER SYSTEM UNDER CERTAIN WEATHER CONDITIONS***

TUESDAY, JANUARY 23, 2018

Chairman Murkowski, Ranking Member Cantwell, and members of the committee, thank you for the opportunity to appear before you this morning.

My name is Gordon van Welie, and I am the president and chief executive officer of ISO New England (ISO-NE).

In 2013, I appeared before this committee to highlight a growing reliability concern in New England. In my remarks, I outlined a significant change to the region’s fuel mix – specifically, that New England was becoming more reliant on natural gas for power generation without making a subsequent investment in natural gas supply infrastructure. I noted that “for power-grid reliability to be maintained, we must increase levels of fuel availability within the region, either through more secure gas pipeline arrangements, gas storage or additional dual fuel capability.” Since that time, ISO-NE has continued to express our ongoing concern over the lack of secure fuel arrangements for the region’s generators.¹ ISO-NE has also highlighted the possibility that both wholesale energy prices and emissions will rise when extreme weather results in natural gas pipeline constraints – driving up the price of natural gas (and wholesale energy) and forcing New England to rely on oil- and coal-fired generation for multi-day (or multi-week) periods.

As I will discuss later in my testimony, ISO-NE recently released an extensive study, known as the Operational Fuel Security Analysis (OFSA), which underscores that fuel-security risk—the possibility that power plants won’t have or be able to get the fuel they need to run, particularly in winter—is the foremost challenge to a reliable power grid in New England.

The study reviews possible operational scenarios in New England for the winter 2024/2025 and quantifies the amount of time the region will be short of operating reserves as well as when load-shedding will be needed to keep the bulk power system in balance. I will expand on the purpose and structure of the study later in my testimony, but the headline is that New England’s limited fuel infrastructure will eventually cause severe reliability issues if fuel security is not addressed. Suffice to say the severity of many of the results underscores the tremendous importance of improving fuel security arrangements in New England and the potential consequences for failing to act.

¹ I reiterated these concerns in my most recent Congressional testimony before the House Energy Subcommittee on July 26, 2017.

Recent Cold Weather Operations

In late December and early January we experienced the impacts of the current fuel supply constraints. Bitter cold temperatures drove an increase in demand for natural gas. However, we've known for several years that when it gets cold New England does not have sufficient natural gas supply infrastructure to meet demand for both home heating and power generation. Constrained pipelines resulted in substantially higher natural gas prices² which led to much older and less efficient oil- and coal-fired power plants running "in merit." This means it is less expensive to run those plants than to dispatch natural gas generators (an extremely unusual occurrence most weeks of the year). We also witnessed dual-fuel power plants switch over to burn oil during periods when the price of natural gas exceeded the price of oil.

These circumstances raise reliability challenges. First, a high burn rate for oil-fired generators diminishes oil inventory which inevitably needs to be replaced. However, during a snow or ice event, replenishment can be difficult (or impossible). Second, emissions regulations limit the run-time of oil-fired generators. While we weathered a stretch of extremely cold weather and a blizzard, we remain concerned about resupply of these resources during the remainder of the winter season and are in close coordination with state and federal officials about the challenges of ensuring adequate oil supplies to the region. Finally, given the fuel constraints, the rapid depletion of the oil inventory, and the reality that resupply was several days away during the peak of the cold weather period, our biggest operating concern was that we would experience a large, multi-day system contingency during this period or that oil-fired generators would run out of fuel before they could be resupplied.

This caused us to reduce the operation of a number of the oil-fired resources and commit additional resources in the market in the last few days of the cold weather period in order to manage the remaining oil inventories.

Overall, the bulk power system in New England has operated reliably thus far this winter and we were fortunate to not experience any major contingencies that we could not manage. So far, ISO-NE has not made voluntary appeals for conservation, nor have we entered into operating procedures consequent to a depletion of reserves. Efficient wholesale energy markets have sent critical price signals to encourage generators to be available during critical periods and have reflected the relative value of fuels within the region. That said, we know well that winter is far from over and we will continue to carefully monitor regional fuel availability.

Short- and Long-term Planning is Essential

Prior to the winter 2013/2014, ISO-NE initiated a short-term program to address fuel adequacy concerns during the winter season. That winter, we enacted the first of the region's Winter Reliability Programs (WRP) as an interim measure to mitigate seasonal reliability risk and enhance reliable grid operations.³ Although the Winter Reliability Program has evolved slightly since its initial structure, the

² In several instances over the last few years, pipeline constraints have led to New England having the most expensive spot natural gas prices in the world (as we experienced during this recent cold snap).

³ These programs were developed through New England's stakeholder process and were approved by our regulator, the Federal Energy Regulatory Commission.

goal has remained the same: To create a financial incentive for the physical procurement of oil within the region prior to December 1, to secure firm contracts for liquefied natural gas (LNG), and the creation of a winter-specific active demand-response program. These programs have proven enormously valuable. For instance, this year's WRP procured roughly three million barrels of oil eligible for compensation under the program – inventory that played a substantial role in reliable grid operations during the recent cold weather period. However, these initiatives were designed on a stop-gap, temporary basis until more permanent, market-based improvements could be implemented.

While we have made several improvements to wholesale markets over the last few years to strengthen reliability, perhaps the most notable long-term modification is a change within our Forward Capacity Market (FCM) known as “Pay for Performance.” This approach more closely aligns the capacity payment a resource receives with its performance during critical periods. If a capacity resource over-performs relative to its obligation, it receives a higher capacity payment; consequently, underperforming will result in lower revenue for a capacity resource.⁴ These changes were designed in 2013, approved by the Federal Energy Regulatory Commission (FERC) in 2014 and first included in capacity obligations awarded through Forward Capacity Auction #9 (FCA) conducted in February 2015. These new performance incentives will take effect in the capacity commitment period beginning on June 1, 2018. While we are hopeful these changes will provide a strong incentive for more secure fuel arrangements, we are always ready to identify and propose additional ways that wholesale markets can be modified to improve grid reliability.⁵

To that end, since the initial design of Pay for Performance was discussed and filed, we have closely observed the permitting and siting of dual-fuel resources in the region, the performance of the generation fleet and fuel supply chain during cold weather periods, and the evolution of state policies to determine whether our initial assumptions in 2013 were correct. Much has changed since 2013, and our observations over the past several years cause us to question whether additional changes to the market design, or further actions by regional policymakers, may be necessary to ensure reliable system operations in the future. One of the objectives of the OFSA is to stimulate discussion with regional stakeholders and policymakers as to the degree of operational risk the region is willing to accept, and whether additional changes to the market design may be necessary to address the fuel security risks identified in the study.

The committee may also be interested in changes we recently proposed to integrate an anticipated influx of renewable energy (backed by public-policy driven long-term contracts) into the FCM. Currently, new renewable energy projects will only be developed if supported by long-term, state-backed contracts that provide above-market revenues. As a result, they will likely have difficulty clearing in a capacity auction due to a rule that protects competitive pricing in the auction. The Competitive Auctions with Sponsored Policy Resources (CASPR) proposal we recently filed with FERC would create an opportunity (and financial incentive) for older resources obtaining a Capacity Supply Obligation to transfer those obligations to new renewable resources and subsequently retire. We believe CASPR provides a market-based signal for less efficient units to leave the system in an orderly manner while allowing states to further their public policy goals.

⁴ ISO New England does not dictate how a resource makes arrangements to be available during these periods.

⁵ Outside of market changes, ISO-NE has also done extensive work improving communication and coordination with natural gas pipeline operators.

While this is a positive step toward accommodating policy-driven resources in the wholesale markets, it may exacerbate the fuel-security challenge if certain non-natural gas fired generation were to retire before the region has addressed the fuel infrastructure constraints highlighted in the Operational Fuel Security Analysis.

New England's Fuel Mix Transition Continues

In 2000, oil- and coal-fired resources combined to produce 40% of New England's electricity while natural gas produced 15%. However, natural gas now produces roughly half of the region's electricity while on an annual basis oil and coal combine for well under 10%. While we continue to rely on these older resources under extreme weather conditions, they are retiring from our market.⁶ In addition, within a four and a half year period we will have seen the retirement of two nuclear plants (the Vermont Yankee and Pilgrim Nuclear Power Stations), leaving New England with two nuclear power stations – the 2,100 MW Millstone Power Station in Connecticut (comprising two generators) and the 1,200 MW Seabrook Station nuclear plant in New Hampshire. It is important to note that the future of the Millstone Power Station is uncertain as the asset owner and the state continue discussions about whether to allow Millstone to participate in state procurements for clean energy.

All six New England states are members of the Regional Greenhouse Gas Initiative and each state is striving to meet individual renewable portfolio standards along with (statutory or aspirational) economy-wide carbon reduction goals. These goals will lead to further constraints on burning fossil fuels in the region during the same time as the region adds more renewable energy to the system. And, although the timing is uncertain, we expect to see a higher demand for clean wholesale energy as a number of the states seek to electrify their transportation and heating sectors. We have seen – and will continue to see – tremendous change in our fuel mix driven both by market economics and regional and state public policy needs.

Fuel-Security Analysis Indicates Need for Further Action

As I mentioned earlier, for some time ISO-NE has been publicly discussing the need for additional fuel supply infrastructure or measures that will significantly reduce the need for wholesale electricity production or natural gas supply during peak periods.⁷ Despite several attempts on a regional and individual state basis to find innovative ways to finance new natural gas pipeline investment, ISO-NE does not see that investment materializing in the near future. While measures to reduce wholesale demand have steadily increased, and prior investments in energy efficiency continue to yield tremendous benefits, they are not growing swiftly enough to relieve the constraints. In addition, the region has made significant investments in solar/photovoltaic (PV) resources, particularly at the distribution level. However, while these PV resources can reduce the strain on the electric grid and

⁶ ISO-NE has already approved a retirement bid for the 383 MW coal-fired unit at Bridgeport Harbor Station for the upcoming Forward Capacity Auction #12 (February 5, 2018). The unit was one of three coal-fired facilities that took on a capacity obligation in FCA #11.

⁷ This could take many forms, including new natural gas pipelines, the creation of a “virtual” pipeline including firm LNG contracts, investing in natural gas storage, interregional transmission lines with firm delivery agreements for renewable energy, or measures that will reduce the demand for natural gas and/or electricity produced by natural gas.

offset the need for fossil fuels, their contribution is limited during the winter – particularly during and after winter snow storms.

In late 2016 we embarked on an Operational Fuel Security Analysis,⁸ which we released on January 17, to improve the region’s understanding of reliability risks and inform the subsequent stakeholder discussions. The study does not assume the build-out of any new natural gas supply infrastructure.⁹ It looks at 23 scenarios to analyze whether enough fuel would be available to meet demand and to understand the operational risks without additional gas import capabilities. The scenarios we chose are not intended to predict the future system, but rather seek to illustrate the range of potential risks that could confront the power system if fuel and energy are constrained during winter.

The OFSA found that energy shortfalls *due to inadequate fuel* would occur with almost every fuel-mix scenario in winter 2024/2025, requiring frequent use of emergency actions to protect the grid. The study results suggest that New England could be headed for significant levels of emergency actions, particularly during major fuel or resource outages.

Emergency actions that would be visible to the public range from requests for voluntary energy conservation to involuntary load-shedding (rolling blackouts directed by ISO-NE, but carried out by local utilities, affecting blocks of customers). This outcome is forecasted in 19 of the 23 scenarios. Of course, while ISO-NE tried to model a representative range of scenarios in order to distil risk trends, we readily acknowledge that we cannot predict the future and therefore we are prepared to produce additional scenarios, based on feedback from our stakeholders, which will further refine the study. The study’s findings suggest six major conclusions:

- **Outages:** The region is vulnerable to the season-long outage of any of several major energy facilities.
 - These include a compressor station on a major natural gas pipeline (cutting off fuel to generators with a combined capacity of 7,000 MW); the Millstone Nuclear Power Station; the Canaport LNG facility in New Brunswick, Canada; and the Distrigas LNG facility in Massachusetts.
- **Stored fuels:** Power system reliability is heavily dependent on LNG and electricity imports; more dual-fuel capability is also a key reliability factor, but permitting for construction and emissions is difficult.
- **Logistics:** The timely availability of fuel is critical, highlighting the importance of fuel-delivery logistics.
- **Risk trends:** All but four scenarios result in fuel shortages requiring load-shedding, indicating the trends affecting New England’s power system may intensify the region’s fuel-security risk.
- **Renewables:** More renewable resources can help lessen the region’s fuel-security risk but are likely to drive oil- and coal-fired generation retirements, requiring high LNG imports to counteract the loss of stored fuels.

⁸ The OFSA is not an economic study and thus does not consider fuel costs or prices.

⁹ It is important to note that ISO New England has no mechanism or authority to invest in, or direct investment in, natural gas supply infrastructure or any fuel infrastructure. The process that leads to reliability-based investments in New England’s electric transmission system is fundamentally different than investments in natural gas pipelines which rely on firm, long-term contracts with natural gas customers to get built.

- Positive outcomes: Higher levels of LNG, imports, and renewables can minimize system stress and maintain reliability; *to attain these higher levels, delivery assurances for LNG and electricity imports, as well as transmission expansion, will be needed.*

It will be costly to remedy these fuel-security challenges – whether the region chooses to invest in renewable energy (and related transmission), fuel infrastructure with long-term contracts, or further measures to reduce demand for wholesale electricity and natural gas.

The alternative is negative impacts on system reliability, chronic price spikes during cold weather, higher emissions when it's more economic to burn oil than natural gas, and the possibility of further interventions by ISO-NE in the wholesale electricity market to try to delay critical resources from retiring. It is important to note that while ISO-NE has the authority (subject to final approval from FERC) to enter into reliability agreements to delay the retirement of generators to avoid overloading the transmission system, we currently do not have the authority to delay retirements due to fuel security risks. In order to do this, we would have to seek approval for appropriate tariff changes from FERC. Furthermore, as experience has shown, generation owners may choose to retire their assets regardless of the offer of a reliability agreement.

We are also mindful that new state-level emissions regulations will be even more restrictive by the winter of 2024/25 – impacting ISO-NE's ability to operate certain generators. Due to the lack of historical data and the inability to predict when selected generators will be affected, this constraint was not modeled in the OFSA. Looking forward, we think that it is important to holistically understand the future of reliable operations in a fuel- and emission-constrained power system environment. The tool we created to produce the OFSA will provide us with a starting point to understand future power system dynamics and we used it for the first time in operations during the cold weather period in early January 2018. We intend to update the tool as power system constraints change and use it as a means to dynamically quantify the regional fuel security risks.

ISO-NE will discuss the results of this operational fuel-security analysis with stakeholders, regulators, and policymakers throughout 2018. A key question to be addressed will be the level of fuel-security risk that New England is willing to accept. As the system operator mandated to maintain a reliable power system, ISO-NE must conduct its own assessment of the level of risk to reliable operations. A primary consideration will be ISO-NE's responsibility, as a regional reliability coordinator, to operate the region's power system in a way that maintains the reliability of the region while meeting our responsibilities to the entire Eastern Interconnection.

US Department of Energy's Proposed Resiliency Rule and FERC's Docket on Resiliency

Prior to the implementation of long-term solutions for the region's fuel-security challenges, ISO-NE will respond to FERC's recent action requiring reports on factors impacting resiliency in New England.

As many of you know, this directive from FERC comes after the Commission declined to adopt the 2017 US Department of Energy Notice of Proposed Rulemaking directing cost-of-service payments to certain generation assets. ISO-NE opposed adoption of the NOPR as harmful to the competitive markets that have yielded reliability, economic, and environmental benefits to New England and that it *would*

*not have addressed the fuel-security issues specific to our region.*¹⁰ The recent release of the OFSA should provide valuable guideposts for ISO-NE's eventual response to FERC's resilience proceeding.

Conclusion

The transformation of New England's bulk power system over the last decade has resulted in tremendous benefits for the region in the form of generally lower wholesale electricity prices, a cleaner-burning fleet of resources, and increases in overall electric grid reliability.

However, we now face challenges that do not lend themselves to easy solutions. As we have seen recently, the fuel-security difficulties are real and they are significant. Until they are addressed, cold weather will continue to drive substantial increases in the price of natural gas (as well as wholesale energy) and emissions and create regional reliability challenges. Aided with the findings of the Operational Fuel Security Analysis, we anticipate the fuel-security challenges will require further action by ISO-NE and New England stakeholders. Despite these challenges, I am eager to engage in regional stakeholder discussions on the findings of the study and to work together to find appropriate solutions. If we are able to meet these challenges, it will result in a more reliable, efficient, and clean power grid benefitting the entire region.

I appreciate the committee's focus on this important issue and I hope you will be in touch with any further questions.

Thank you.

¹⁰ ISO New England joined the ISO/RTO Council in its opposition as well.