UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

ISO New England's Petition for Waiver of ISO-NE Transmission, Markets and Services Tariff Provisions to Retain Mystic 8 and 9 Units for Fuel Security	)))))	**Docket No. ER18-1509-000**

MOTION TO INTERVENE OUT OF TIME AND COMMENT OF THE ISO-NEW ENGLAND EXTERNAL MARKET MONITOR

Pursuant to Rules 212 and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("FERC" or "Commission"), 18 C.F.R. §§ 385.212 and 214 (2007), Potomac Economics respectfully moves to intervene in the above-captioned proceedings concerning the filing by ISO-New England ("ISO-NE") in which it proposes to revise its Transmission, Markets and Services Tariff ("Tariff") to retain Mystic 8 and 9 Units for fuel security reasons.

Potomac Economics is the External Market Monitor ("EMM") for ISO-NE. In that capacity, we seek to ensure the efficiency and integrity of the ISO-NE markets. Our comments involve supporting the ISO's petition for waiver of its tariff. We believe that there is a legitimate concern with the effects of fuel supply disruption on bulk power system reliability. We also discuss key issues the ISO should address in designing a market solution to satisfy New England's fuel security needs.

I. NOTICE AND COMMUNICATIONS

All correspondence and communications in this matter should be addressed to:

Dr. David B. Patton
Potomac Economics, Ltd.
9990 Fairfax, Boulevard, Suite 560
Fairfax, VA 22030
(703) 383-0720

Dr. Pallas LeeVanSchaick
Potomac Economics, Ltd.
9990 Fairfax, Boulevard, Suite 560
Fairfax, VA 22030
(703) 383-0719

II. MOTION TO INTERVENE

As the EMM for ISO-NE, Potomac Economics is responsible for monitoring and evaluating the performance of the ISO-NE markets, recommending market design changes to improve the performance of the markets, and evaluating design changes proposed by ISO-NE or market participants. As the EMM, Potomac Economics has a unique responsibility to ensure the efficiency and integrity of the ISO-NE wholesale power markets. Potomac Economics' interests, therefore, cannot be adequately represented by any other party. Accordingly, Potomac Economics respectfully requests that it be permitted to intervene in this proceeding with full rights as a party.[1]

III. BACKGROUND AND INTRODUCTION

New England has become increasingly reliant on natural gas and vulnerable to disruptions in fuel supplies in recent years. Over the decade from 2010 to 2020, 4 GW of oil and coal-fired capacity has retired or will retire, while the remaining oil and coal-fired capacity in New England will be economically challenged by falling capacity prices, the phase-in of Pay for Performance ("PFP") capacity market rules, and the entry of state-subsidized resources. ISO-NE has been concerned about its increasing reliance gas-fired generation for some time and published a study

---

[1] We are making this filing two days out of time. Good cause also exists to permit Potomac Economics' motion to intervene out of time as it has a significant interest in this proceeding. Permitting Potomac Economics to intervene at this time will not prejudice any party in the proceeding as the Commission has not yet acted on the Filings.

that of its exposure to fuel security issues. These concerns were recently exacerbated after Exelon announced plans to retire the Mystic generating station and the Distrigas LNG import facility.

These trends raise concerns about whether the current planning processes and market requirements are adequate to ensure reliability under conditions when fuel supply contingencies or fuel demands limit natural gas availability to New England. As a result, ISO New England filed a tariff waiver request in this Docket that would enable it to retain Mystic 8 and 9 units for the CCPs 2022/23 and 2023/24 through cost-of-service reliability must-run ("RMR") contracts.

We support the ISO New England's finding that fuel security issues present a substantial threat to reliability in New England and, therefore, the need to take action. These comments include an analysis of fuel security that we have conducted as the EMM for ISO New England that supports the ISO's reliability concerns. To address these concerns, we believe it is essential to clearly define the reliability requirements related to fuel security, and to design market-based solutions to procure the necessary resources to satisfy the requirement. Because this will take some time, we recognize the need for these contracts and support the ISO acquiring the authority to enter into such contracts as needed. Therefore, we recommend the Commission accept ISO's request for proposed waiver of its Tariff.

The Mystic units provide a small but substantial share of the total available firm fuel resources in the region. While providing an RMR contract for Mystic 8 and 9 may be necessary in the short-term, it would not be just and reasonable over the long-term because many other resources contribute to satisfying the same reliability needs. Accordingly, the ISO intends to work with stakeholders to develop a market design that would allow the market to procure the resources needed to satisfy its fuel security requirements over the long term. We believe that this is essential and comment on the elements and timing of the long-term solution that should be addressed by the Commission in approving this short-term solution.

However, there is no guarantee that stakeholders will agree to a market solution that will reconcile the disparity between the payments that the Mystic units will receive under an RMR agreement and that compensation that other units that provide a comparable service (i.e., firm fuel supplies) will receive through the ISO markets. Thus, we recommend the Commission require the ISO to file by a date certain market design changes to procure and value firm fuel characteristics that contribute to satisfying New England's fuel security needs..

IV. COMMENTS AND EVALUATION OF THE ISO-NE FILING

Our comments focus on the key issues related to the fuel security concerns confronting the ISO New England markets and the ISO's proposed response to these concerns. Subsection A summarizes our reasons for finding that fuel security is a serious concern in New England and that an RMR agreement is necessary in the short-term to maintain reliability. Subsection B discusses the need to develop a clear reliability criteria and the difficulty of designing a market solution without it. Subsection C discusses some of the key market design elements that ISO New England should address as it develops market design changes to satisfy the winter fuel-security concerns.

A. EMM Evaluation of Fuel Security Issues in New England

The New England region has seen entry of over 4 GW of new fuel-efficient conventional generation, while a comparable amount of nuclear, coal-fired, and older steam turbine capacity retired between the 2010/11 and 2020/21 Capacity Commitment Periods. While the region has seen net increases in capacity, its resource mix has become substantially more reliant on natural gas. The share of installed capacity resources relying on natural gas (gas-fired or dual-fuel) has risen from 47 percent to 63 percent over this timeframe.

The shift towards gas-fired generation is a result of investment incentives that have favored investment in gas-fired resources together with the retirement of older coal and oil-

capable steam turbines. This raises concerns about the increasing reliance of the ISO-NE's system on natural gas. Furthermore, it is unclear whether gas-fired generation will be motivated to install and maintain the capability to operate on a back-up fuel.[2]

Hence, in both the 2016 and 2017 Annual Assessments of the ISO-NE Markets, we have evaluated fuel security issues in New England, which we summarize in this section. ISO-NE has also been concerned about its increasing reliance gas-fired generation for some time and published a study of its exposure to fuel security issues. This study was timely given the changes happening in the New England market.

In this section, we evaluate how the available resource margins are expected to change during a winter cold spell in the coming years, accounting for expected changes in the resource mix. Although the reliability councils have become more concerned with the effects of fuel supply disruptions on the bulk power system reliability, the criteria for ensuring reliability during fuel supply disruptions are still evolving. Lacking an established set of methods for evaluating fuel security during winter conditions, we analyze the potential for a fuel supply shortage over a two-week period of severe winter weather. Specifically, the following analysis compares electric generators' demand for oil and gas to the available supply in the region for two winter seasons: 2014/15 and 2023/24.

- The winter 2014/15 scenario shows actual conditions observed in the second half of February 2015, which is representative of prolonged severe weather conditions that can produce unique reliability needs the ISO may need to plan to satisfy.[3]

---

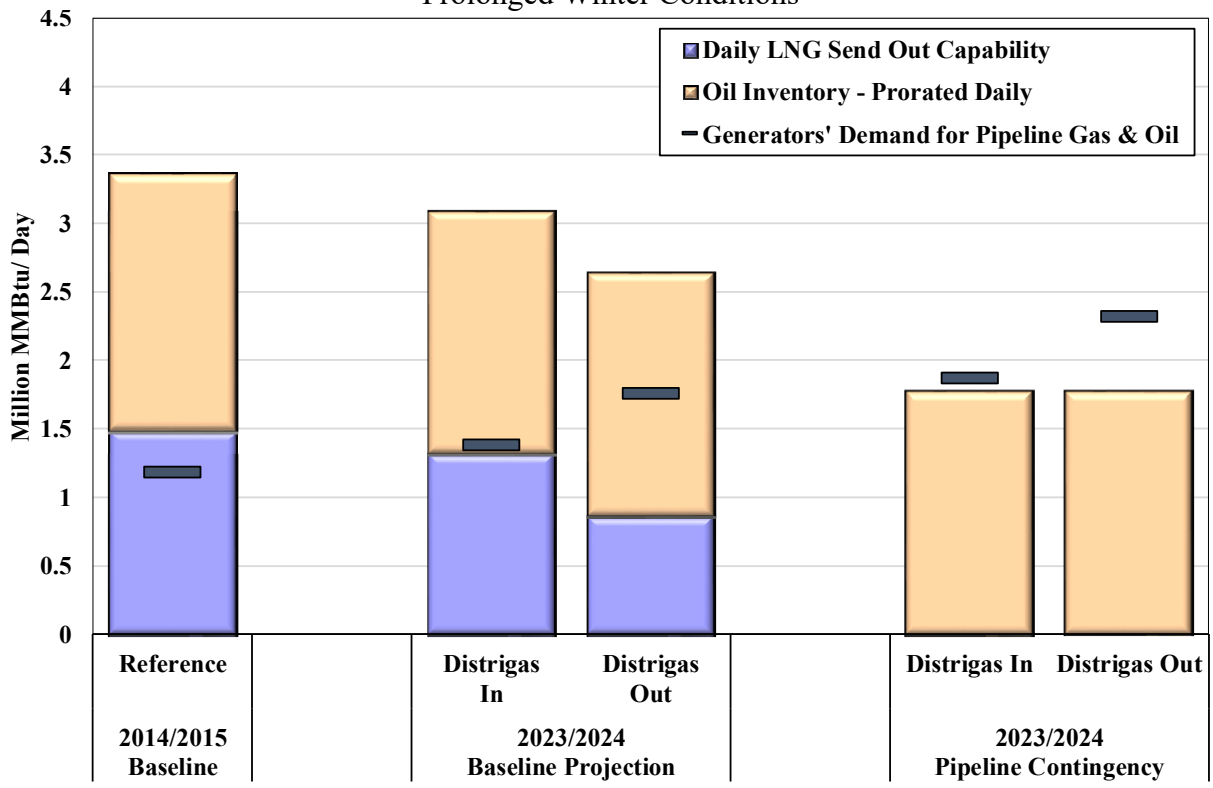
[2] Our 2016 net revenue analysis indicated that although the Winter Reliability Program ("WRP") provides units with sufficient revenues to maintain moderate inventories, the expected returns over the next three years are not (by themselves) sufficient for some units to build or retain the capability. See section II.B of our report *2016 Assessment of the ISO New England Electricity Markets.*

[3] January and February 2015 had the most HDDs of any two month period, with February being the colder of the two months. Electricity generation from oil and LNG based resources exceeded natural gas generation by 18 percent during the second half of February. See https://www.aga.org/knowledgecenter/facts-and-data/annual-statistics/weekly-and-monthly-statistics/heating-degree-day.

- Since the winter of 2014/15, 2.4 GW of non-gas resources have retired. For the winter 2023/24 scenario, we assume that an additional 1.8 GW of non-gas resources (including the remaining coal-fired generation and roughly 1.3 GW of oil-fired capacity) will retire.[4]

For a period of two weeks of severe winter weather in each year/scenario, the following figure compares the supply and demand for oil and pipeline gas supply for generation. The demand indicated by the black lines in the figure includes total amount of fuel needed by oil and pipeline gas generators to satisfy the system's load. This demand does not include other generator fuel types or the Mystic generators in Boston that have a direct source of LNG which does not go through the gas pipeline system. The figure shows potential LNG send out capability and prorated oil storage capacity.

Daily Potential Supply and Demand for Gas and Oil During
Prolonged Winter Conditions[5]



[4] The 1.3 GW of oil-fired steam turbines that submitted delist bids in recent FCAs . For the underlying assumptions for this analysis, see appendix of our report *2016 Assessment of the ISO New England Electricity Markets.*

[5] Between Feb. 15-28, 2015, the total LNG send out exceeded the pipeline gas used by electric generators in New England. Accordingly, we reduced the total LNG capability by the difference between the two values.

In all of these scenarios, the supply of gas imported on the interstate pipeline system is not shown in the figure because it is fully utilized by core gas demand. Furthermore, core gas demand is assumed to take priority over electricity generators, so the figure shows the remaining potential LNG available for generation after core demand is satisfied.[6] This supply shown in the stacked bars is compared to the demand in the black lines, and the amount by which the potential supply exceeds the demand represents the excess capacity.

The economics of the Distrigas terminal are unclear if the Mystic units retire. Since the amount of LNG supply is a key variable for this analysis, we evaluated the impact of retiring the Distrigas terminal in a separate scenario. In this scenario, we remove the Mystic generation (which causes the demand for oil and gas by other generators to rise) along with additional supply of LNG available from Distrigas beyond the amounts assumed to be consumed by the Mystic units. To evaluate the vulnerability of the system to fuel supply disruptions, the figure also shows an additional scenario where the amount of gas available is reduced as a result of a major outage on the Tennessee pipeline.[7]

The excess supply margin between the demand and potential supply of gas and oil is falling as the non-gas generators continue to retire and the core demand for natural gas grows. Hence, the share of total oil inventory and LNG capability needed to satisfy generators' demand is rising:

- In the baseline scenario, 35 percent in 2014/15 and 45 percent in 2023/24 of the total oil and LNG capability would be needed to satisfy generator's demand. This value rises to 67 percent in 2023/24 if Distrigas retires.

---

6 We include the capacities of Canaport, Distrigas and Exelerate facilities in the available LNG capability, so gas from Maritimes & Northeast pipeline is not included in the quantity of gas imported on the interstate pipeline system.

7 Pipeline contingency scenario assumes a loss of 1.32 Bcf/day in 2014/15 and 1.39 Bcf/day in the future.

- In our Pipeline Contingency scenario in 2023/24, the potential supply of oil and gas would be five percent short of demand with Distrigas remaining in service and 31 percent short of the demand if Distrigas retires.

In the Pipeline Contingency scenarios, the LNG capability drops substantially because the LNG send-out capacity is assumed to be consumed by core demand, which generally has first call on the pipeline capacity that would be used to deliver the LNG. The 31 percent shortage in this scenario with Distrigas out would be a catastrophic shortage because it would translate to an average unserved load of roughly 2.5 GW over the two-week period. This is more than 10 percent of all load in New England.

Additionally, the conclusion that aggregate LNG capacity and fuel oil inventory capacity are theoretically sufficient to satisfy the generators' demand over a two week period of severe winter weather absent a pipeline contingency is based on an assumption that the LNG supply and oil inventories are fully utilized, which may not be the case because:

- Significant economic and physical constraints that may limit the availability of LNG below the daily capacities of the LNG terminals. In recent winters, total LNG send out has been far below the maximum capacity.[8]

- Limits on the individual unit tank sizes and run hours can reduce the total useable oil inventory. For instance, an oil tank will be unavailable to the market if the generator it supplies experiences a forced outage.

- Since the oil inventory shown corresponds to all tanks being full, the actually available inventory will reflect the portion of the tanks that suppliers find it economic to fill.

In the Baseline and Pipeline Contingency scenarios, LNG capacity would become pivotal for meeting generators' demand, even if the oil storage is fully utilized. Unfortunately, the ownership of facilities necessary to import LNG is relatively concentrated. This raises competitive concerns in the fuel markets to which the New England electricity markets are

[8] LNG deliveries must be arranged in advance. Physical delivery limitations and competing demands for LNG are constraints that can limit the available LNG once the severe winter conditions arrive.

vulnerable. Such concerns are difficult or impossible for the ISO to address through modifications to its tariff.

Overall, this analysis reveals the essential role that both oil inventories and LNG play in ensuring fuel adequacy in winter. Any major reduction in the availability of either LNG or oil inventories could result in energy shortages. Unlike natural gas, the supply of these two fuels needs to be secured days to months in advance to ensure timely availability. This highlights the importance of advance planning and efficient incentives to ensure fuel adequacy during winter months. In particular, it will be increasingly important for ISO-NE to consider how to ensure reliability as the winter fuel supply margin tightens in the coming years. The following subsections discuss the need to clearly establish the fuel security requirements and the elements of the market design that must be addressed to allow the markets to efficiently satisfy these requirements.

B. The Need to Define the Fuel-Security Requirement

Before designing a market mechanism to ensure fuel security, it is necessary to define a clear reliability requirement that the ISO seeks to satisfy by procuring resources. Accordingly, we recommend that the Commission require the ISO to determine the precise planning standard.

In its filing, the ISO stated that the concurrent loss of Mystic 8 & 9 units and the Distrigas facility would lead to 37 hours of 10-minute reserve depletion and load shedding on five days during the 2022-23 winter even under the most optimistic assumptions for energy imports, LNG, and oil tank replenishment. Additionally, given the limited time available, the ISO indicated its intent to use similar criteria for its fuel security-related reliability reviews of retirement bids for FCA 14 and FCA 15. This implies a standard of zero hours of 10-minute reserve depletion or

load shedding during a winter where the conditions are similar to the ones observed during 2014/15.

Ultimately, however, the requirements should be based on a probabilistic analysis of potential fuel supply contingencies and adopt the one-day-in-10-year standard employed in all other planning studies. Although this will require the development of new study methodologies and assumptions, it is necessary for the ISO to develop the necessary market design changes described in the following subsection.

C. Market Design Objectives

As described above, relying on competitive markets to minimize the costs of satisfy the fuel security needs is the only reasonable long-term solution. This will first require the ISO establish a clear definition of these needs. A product or market can then be designed that best reflects these needs. In designing market-based solutions to satisfy fuel security needs, the ISO should devise a market design that fully consider several key elements discussed below.

Procurement Timeframe

The ISO in its tariff waiver request has discussed a three-year ahead product versus a prompt seasonal product. A three-year ahead product would presumably be procured in the forward capacity market, while a prompt seasonal product would be conducted in the months leading up to each winter. This is a key component of the market design to satisfy ISO-NE's fuel security needs.

A prompt seasonal product has significant advantages because it would provide clear incentives for generators to maintain fuel inventories needed to satisfy seasonal planning objectives for the upcoming winter. It would also be conducted in a time frame that would allow generators to increase or decrease fuel deliveries based on the seasonal market outcome. While a three-year ahead market mechanism could allow the market to directly incent entry or retirement

necessary to meet fuel security requirements, we do not believe that forward procurement is required to meet this objective. The expected revenues associated with a prompt product would allow suppliers to make efficient long-term decisions.

Since the prompt seasonal market would efficiently facilitate short-term fuel procurement and inventory decisions, as well as long-term infrastructure decisions, we believe this is likely the most reasonable and efficient long-term solution. Importantly, since the prompt procurement is conducted only a few weeks or months in advance of the season, such a market could potentially be implemented prior to the 2022/23 and 2023/24 CCPs, which could reduce or eliminate the need for the RMR contract with Mystic. It would also reduce the disparity between the compensation offered to Mystic and the other resources that are contributing to satisfying ISO New England's fuel security needs.

Additionally, such a product would allow future RMR contracts (for FCA 14 and FCA 15) to be needed only as a backstop measure. A prompt product would produce substantial additional revenues for resources needed to satisfy the fuel security needs and, thus, reduce their incentive to retire prematurely while they are still needed. Additionally, these revenues will provide incentives that do not currently exist to build new resources that can contribute to satisfying the fuel security needs.

Required Duration of the Firm-Fueled Energy

The duration for which the ISO would procure firm-fueled energy each winter is a key component of the product definition. For example, if the ISO defined a firm energy product that must be deliverable for up to 14 consecutive days in the winter, then the generator would be obligated to maintain an adequate supply of fuel in proximity to meet this requirement. This element of the product definition is key because it significantly affect the costs of procuring the product, as well as the fundamental trade-off between units with high fuel procurement/inventory

costs (dual-fuel, LNG and oil resources) versus those with low fuel inventory costs (wind, nuclear, etc.).

In its OFSA study, the ISO considered a 90-day winter period, although the need for firm-fueled energy is likely to be significant only during a smaller number of days during the winter. In contrast, our analysis in Section IV.A. of these comments evaluates a 2-week winter peak period. The choice of this period should be informed be the following factors:

- Typical duration of unusually cold periods; and
- Fuel delivery processes and timing for the resources that would typically satisfy the fuel security requirements.

The required duration of the firm-fuel energy deliveries should be as short as possible, while still addressing the fuel supply contingencies that are the basis for the requirement. Extending the duration longer than necessary will increase the costs of procuring the product without a commensurate increase in reliability.

Resource Eligibility and Compensation

Any market solution should be technology neutral, allowing any type of resource that can contribute to satisfying the fuel-security requirement to sell the product and be compensated. However, there is a wide variation in the manner and effectiveness with which certain types of resources mitigate the fuel-security risks. For instance, while solar plus storage and dual-fueled resources could both alleviate fuel security risks, the callability and quantity of energy from these resources under extended fuel scarcity conditions is very different.

Similarly, a gas unit with a firm gas contract could be capable of alleviating tight fuel conditions for an extended period of time, but it may not be as reliable as resources fired by other fuels in the event of a pipeline contingency. Hence, it is important to account for these

differences when defining the market product and obligations, and the extent to which each of these types of resources can provide the product.

Integration with FCM and PFP

Finally, it is important to consider how the fuel security product and requirement will integrate with other reliability products, including FCM and the associated PFP settlements. First, it is important to recognize that ISO-NE's shortage pricing and PFP framework are designed to provide strong incentives for suppliers to be available when fuel supplies are limited. Hence, some of the compensation needed to ensure fuel security is likely provided through the FCM and the ISO's shortage pricing, which may affect the design of market and definition of the product. Additionally, it may be appropriate for the FCM and fuel-security settlements in include offsets to reflect the overlapping nature of the products. These are important aspects of the market design that will need to be evaluated and addressed.

Design and Implementation

Given that reliance on RMR contracts is not a sustainable solution to the fuel security needs confronting ISO New England, it is essential for the ISO to establish the fuel security requirements and design an efficient market to satisfy them. For a variety of reasons, it may be difficult to achieve a timely consensus on an efficient market design through the stakeholder process absent a mandate from the Commission.

Therefore, we recommend that the Commission require the ISO to file a market-based solution by a deadline established by the Commission. This will help ensure that the RMR contracts will only be a temporary measure, and will provide additional impetus for the stakeholders to work together on a market solution. Ideally, such a solution would be implemented prior to the commencement of the RMR contract and obviate the need for it entirely.

V. CONCLUSION AND RECOMMENDATIONS

WHEREFORE, for the foregoing reasons, Potomac Economics, Ltd. respectfully requests the Commission to grant its motion to intervene in this proceeding and accept these comments.

As described in these comments, we agree with the ISO that fuel security is significant concern in New England and support the ISO's waiver filing to allow it to enter into an RMR contract with the Mystic resources. Therefore, we respectfully recommend that the Commission approve the filing, but that it also mandate the development of a longer-term market solution that would be filed on or before a date to be specified by the Commission.

Respectfully submitted,

/s/ David B. Patton

David Patton
President
Potomac Economics, Ltd.

May 25, 2018

CERTIFICATE OF SERVICE

I hereby certify that I have this day e-served a copy of this document upon all parties listed on the official service list compiled by the Secretary in the above-captioned proceeding, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated this 25th day of May, 2018 in Fairfax, VA.

/s/ David B. Patton