

Memorandum

TO: NEPOOL

FROM: David Patton and Jeff McDonald

DATE: November 20, 2018

RE: Differences in Pivotal Supplier Test Results in the IMM's and EMM's Annual Market Assessment Reports

The purpose of this memo is to provide a written explanation to the request of New England Power Generators Association, Inc. ("NEPGA") and its members, regarding the different findings of the IMM and EMM in their assessment of market power in ISO-NE's energy markets.¹

Both the IMM and EMM evaluate the structural market power in ISO-NE's energy market in their annual market assessment reports. Both reports examine several indicators of market concentration and presence of market power in the real-time energy market. Generally, these reported indicators are consistent across both reports. However, one indicator of the presence of market power – the frequency of hours with at least one pivotal supplier – differs significantly between the IMM and EMM reports. For instance, the IMM reported nearly 58 percent of hours with at least one pivotal supplier in 2017 while the EMM reported only 13 percent of such hours. Although both the IMM and EMM use a similar approach, a Pivotal Supplier Test ("PST"), to identify the presence of a pivotal supplier, they use some different input data and assumptions in their tests. This memo identifies three primary factors that lead to above-mentioned difference in pivotal hours: assumptions about the type of supply that can be used to exercise market power, how the overall available supply is measured, and the frequency and timing of when the PST is performed.

The IMM and EMM use different methodologies because of differences in the application of the PST. The EMM uses the PST in a general market power study that is designed to identify geographic areas where structural market power is most likely to exist for sustained periods. The IMM uses the PST in its application of the market power mitigation measures as an initial trigger criterion. Specifically, the market power mitigation measures are designed to impose supply offer caps when both of the following conditions apply:

¹ At the June 27-29, 2018, Summer NEPOOL Participants Committee meeting, NEPGA noted the apparent disagreement between the IMM and EMM on the assessment of the opportunity for Market Participants to exercise structural market power in the energy markets, with the IMM reporting a relatively high potential and the EMM reporting a lower potential, and requested "*the IMM and EMM report to NEPOOL stakeholders the resolution of their discussion on this matter prior to the winter 2018-2019 season*".

- **Behavioral Criteria** – When one or more generators offer in a manner that departs significantly from behavior expected in a workably competitive market. This is known as the “conduct test.”
- **Structural Criteria** – When potential withholding identified by the conduct test is likely to have a significant impact on market clearing prices. These structural market power criteria are known as the “impact test.” Because impact testing is computationally-intensive, trigger criteria are ordinarily used to identify periods when structural market power is most likely to exist. The IMM uses data on transmission constraints to trigger local mitigation measures, and it uses a PST to trigger New England-wide mitigation measures.²

The memo first outlines the general formulation of the pivotal supplier test, then discusses the three primary factors that drive the difference in reported numbers, and finally discusses potential changes to improve the existing reporting on pivotal suppliers.

A. Pivotal Supplier Test

The pivotal supplier test evaluates whether a supplier is pivotal during a given operating period. When a portion of the supplier’s capacity is needed to meet demand and reserve requirements, the supplier is considered a “pivotal supplier” and has market power. The PST compares the system supply margin (as defined below) to a supplier’s generation portfolio. If the supplier’s total available capacity is greater than the system supply margin then the supplier is determined to be pivotal.³

$$\begin{aligned} \textit{System Supply Margin} \\ &= \textit{Total Available Supply} + \textit{Net Imports} - \textit{System Load} \\ &\quad - \textit{Reserve Requirement} \end{aligned}$$

Both the IMM and EMM use this general methodology to identify a pivotal supplier but differ in ways of using data and making assumptions in their PSTs, which is discussed next.

B. Factors Responsible for Reporting Differences

The IMM and EMM identify the following three factors as primary contributors to the difference between their reported numbers.⁴

- **Treatment of Portfolios with Nuclear Generation**: The IMM treats all types of generating capacity equally for potential withholding, while the EMM uses different

² See Section III.A.5.2 in Appendix A of Market Rule 1.

³ In the real-time market, the total available capacity includes capacity from online resources and available offline fast-start resources that are able to respond to instructions within 10 or 30 minutes.

⁴ There are other differences in the data sources and assumptions. For example, the IMM’s PST uses forecast load and scheduled imports while the EMM’s PST uses actual load and imports. These differences are not separately listed because they tend to have smaller impact than the three major ones.

assumptions for large portfolios with small quantities of non-nuclear generation. The EMM has found that including these portfolios in its PST results leads to a significant number of off-peak hours when a supplier is pivotal solely because of its nuclear output (and its non-nuclear units would not be economic).

- **Assumptions about Supply Availability:** Both methods consider the Economic Maximum (EcoMax) of online and offline fast-start units as available supply. The IMM's method excludes portions of supply under certain conditions, such as the headroom from units that are in start-up/shut-down mode, the offline capacity from fast-start units that have not finished their minimum down time, and the headroom from postured units. However, the EMM's methodology does not make such exclusions. As a result, system supply margin tends to be lower in the IMM's PST, increasing its likelihood of identifying a pivotal supplier.
- **Frequency of PST evaluation:** The IMM does the PST at the UDS-interval level using data from each approved UDS run. Since a UDS run is approved once every 10 to 15 minutes, 4 to 6 PSTs are performed for each hour. However, the EMM performs the PST only once per hour, using hourly integrated quantities, which smooth out the interval-level volatility in supply and demand. Therefore, if the system margin is sufficiently high on an hourly average level but is temporarily low in one UDS interval because of some transient system conditions, a pivotal supplier will likely be identified in the IMM's PST but not in the EMM's PST. Since transient tight system conditions are often observed in the real-time market, this leads the reported hours with pivotal suppliers in the EMM report to be lower than the number in the IMM report.

These differences reflect the different purposes of the IMM's and EMM's PSTs. The IMM's PST serves more as a trigger in the energy market for a system-wide mitigation evaluation. The identified pivotal suppliers are subject to the impact test and potential mitigation when failing the conduct test. Therefore, the IMM's PST measures the supply availability more precisely at the UDS interval level and makes relatively conservative withholding assumptions. It intends to identify the transient capability and opportunity for a supplier to exercise market power. While the EMM's PST is a more general assessment of structural market power, which focuses more on a supplier's overall market share and how that affects its consistent capability to exercise market power.

C. Potential Improvements

Given the different use of their PSTs, the IMM and EMM do not plan to reconcile all differences in their methodology. However, there are a number of ways that could be considered to improve the methodologies, even though these improvements will not necessarily converge the reported numbers.

1. Incorporating Ramp Limits

Currently both methods ignore the ramp of available units while calculating total available supply. In order to meet load during constantly changing generation profile, the system needs sufficient amount of generation as well as ramp capability. The ramp constraint is determined by

the rate of change in system load. By ignoring the ramp constraint, the pivotal supplier test overestimates the total available supply. This also results in an inaccurate accounting of the supply controlled by individual participants as it leads to over-counting of slow ramping units' generation - these generating units may not be able to reach their economic maximum in a 30-minute period.

2. Treatment of Postured Units

The ISO may choose to posture some generating units so that enough reserves are available to meet the requirement. When units are postured, they provide reserves but the IMM methodology ignores the supply of reserves by these units. This underestimates the overall supply and the supply of individual participant whose units are being postured.

Feel free to contact us with any questions.

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