

To: NEPOOL Markets Committee

From: Matthew White, Chief Economist

Date: January 22, 2020

Subject: Energy Security Improvements: Market Power Assessment Analysis Update

At the October and November Markets Committee meetings, the ISO indicated it is undertaking a market power assessment analysis to support the development and design of mitigation-related rules and procedures for the proposed jointly-optimized day-ahead energy and ancillary services markets.¹ The purpose of this memorandum is to provide a brief update on the ISO's market power assessment effort.

Context

As the ISO noted in its November 6, 2019 memorandum to the Committee, the principal purpose of a market power assessment (MPA) is to determine, quantitatively, whether and when market power is an empirically-supported concern. If so, a MPA helps to identify the specific conditions, frequency, and extent to which individual participants may be able to profitably exercise market power and provides useful input into the design of mitigation rules and procedures.

Status Update

In the Energy Security Improvements (ESI) context, a MPA involves conducting detailed day-ahead (DA) market simulations, with the new DA products and constraints modeled as proposed, for sample days when the exercise of market power might be profitable (absent measures to mitigate it).

At a high level, the MPA work involves four major steps. These are:

1. *Co-optimized market clearing software.* The development, coding, and validation of a day-ahead co-optimized market clearing engine model (the "study model"). This model incorporates the functions and logic of the existing day-ahead market, and includes the proposed new day-ahead ancillary services, pricing, and co-optimization clearing logic.
2. *Study cases and input data.* Determining the historical sample days (the "study cases") to model, when the exercise of market power is most likely to be profitable for one or more suppliers

¹ ISO New England Inc., memorandum to NEPOOL Markets Committee, *Energy Security Improvements: Planned Scope of Mitigation-Related Work for Day-Ahead Ancillary Services*, November 6, 2019; at https://www.iso-ne.com/static-assets/documents/2019/11/a4_d_iso_memo_re_esi_mitigation_work.pdf

(absent measures to mitigate it). The MPA is performed for these sample days. The data in the ISO's historical market-clearing input/output archives are then supplemented by calculating all other ISO-supplied inputs necessary to model the new ancillary services requirements as proposed (*e.g.*, day-ahead daily ancillary service demand quantities, strike prices, etc.), and incorporating any changes to the historical conditions inputs that could materially impact day-ahead market power assessments (*e.g.*, known future resource retirements).

3. *Modeling participants' option offers.* This involves modeling individual market participants' energy call option supply offer decisions, and the corresponding option price-quantity offers associated with their supply resources, under the two conditions of interest to assess potential market power: (1) competitive offer behavior, and (2) potential strategic offer behaviors.
4. *Evaluation and analysis of the market clearing outcomes.* This involves analyzing the raw market-clearing output information from all of the study cases, under both competitive and strategic offer behaviors, to determine whether putative efforts to exercise market power by individual participants (that is, strategic offer behavior) are profitable or not; and, if the former applies, the specific conditions, frequency, and impact on the market when it occurs.

Presently, ISO staff have largely completed the first of the foregoing four steps. Specifically, we have developed and coded a market clearing engine study model that mirrors the ISO's day-ahead market clearing engine currently in production use, with the addition of the proposed Forecast Energy Requirement and new day-ahead ancillary services, to achieve co-optimized market clearing outcomes. This study model accounts for resources' physical and economic offer parameters, the day-ahead market's integer unit commitment process, interface transmission constraints, individual units' ramping and reserve capabilities, and other inputs into the current and proposed day-ahead market clearing process. The model also incorporates the co-optimized day-ahead market's pricing logic, as discussed with stakeholders during the ESI development process.

The ISO has made some initial progress on the second of these steps, and is presently developing the additional data inputs necessary to model (quantitatively) the new ancillary services for the study cases. We are concurrently undertaking work on the third of these steps. Considerable work on steps two and three remain ahead, before the analysis team is able to commence work on step four.

A few general points on these steps merit note. The four major steps summarized above are largely a sequential work process, as each builds upon the prior. However, there is some iteration to be expected between certain steps (especially steps 3 and 4) as the analysis proceeds. In practice, initial results and findings can help to refine understanding of potential strategic behaviors; and initial results may warrant evaluating additional study cases (*i.e.*, extending step 2) to better understand the potential frequency or conditions in which market power may arise.

This iterative process helps to develop a more complete MPA analysis, but can take considerable time and effort (*e.g.*, many months) of evaluation work by the analysis team.

The ISO's Market Development, Internal Market Monitor, and External Market Monitor staff are working closely together throughout this MPA analysis process.

Timing Expectations

As noted at the November Markets Committee meeting, the ISO expects its mitigation-related work to continue well into 2020. At this point in time, we are aiming to have quantitative results from the MPA effort, and to begin discussions with stakeholders to review relevant results and implications, in late Q3 or Q4 2020. A firmer timeframe should become available as our work progresses.

In the memorandum from Potomac Economics provided for the January 28, 2020 Markets Committee meeting, Dr. Patton notes some of empirical questions related to mitigation design in connection with the MPA.² We concur with Dr. Patton that the MPA may provide useful information on those empirical questions, and we will endeavor to provide answers concurrent with discussion of the MPA results and implications.

Building upon the MPA and stakeholders' initial discussions of mitigation-related issues with Potomac Economics, the ISO expects to develop a proposal related to mitigation design and associated market rules for stakeholders' consideration and discussion. The specifics of a mitigation design would be informed by the specific results of the MPA, by quantitative evaluation of potential mitigation design components (using the MPA study model), and by taking into account the market monitors' (both Potomac Economics, as External Market Monitor, and the ISO's Internal Market Monitor) guidance concerning offer mitigation for day-ahead energy and ancillary services. The ISO anticipates coordinating with stakeholders on each of these elements and incorporating feedback, with the goal of developing an effective and workable outcome.

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The MPA work underway is time-consuming and technical, and the ISO appreciates stakeholders' patience as our progress continues. We recognize there is considerable interest among stakeholders in achieving well-designed, empirically-supported mitigation rules and procedures for the ISO's markets and the new day-ahead ancillary services in particular. As the ISO's work on the MPA proceeds, we will continue to keep stakeholders apprised of our progress and we look forward to reviewing its implications with stakeholders.

² See especially pp. 6-7 therein (noting, in summary, that the "ISO's market power analysis should provide insight regarding the net effects of these factors and the vulnerability of the proposed day-ahead energy and ancillary services markets to the exercise of market power.")