memo

To: NEPOOL Markets Committee

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Subject: Day-Ahead Ancillary Services: Project Scope, Status, and Timeline

In its Annual Work Plan for 2022, the ISO indicated it is developing a revised proposal to incorporate a suite of ancillary services to the day-ahead energy market.[1] This memorandum provides additional detail on this project's scope, status, and anticipated timeline.

Scope

Broadly, the day-ahead ancillary services project seeks to procure and transparently price the ancillary service capabilities needed for a reliable, next-day operating plan with an evolving generation fleet. To this end, the ISO seeks to leverage aspects of the ancillary service design work and stakeholder feedback provided during the prior Energy Security Improvements ("ESI") effort in 2019-2020.[2]

At present, the ISO plans to develop a day-ahead ancillary services proposal with two components. The first component is to incorporate the load forecast into the day-ahead market clearing process, to ensure the day-ahead market schedules physical supply resources that will (in aggregate) provide a reliable next-day operating plan. This involves procuring Energy Imbalance Reserve ("EIR"), a new day-ahead ancillary service, to cover the "gap" when the day-ahead market's physical energy supply awards are below the ISO's forecast real-time load.

The second component is to procure (ten- and thirty-minute) fast-start and fast-ramping capabilities in the day-ahead market, in amounts consistent with applicable reliability standards. These day-ahead services, formerly labeled Generation Contingency Reserve ("GCR"), will now be referred to as the system's day-ahead Flexible Response Services ("FRS"). The ISO relies upon these capabilities to ensure the system is

[1] See *ISO New England's 2022 Annual Work Plan,* rev. October 8, 2021, slide 6, at https://www.iso-ne.com/static-assets/documents/2021/10/2022_awp_final_10_08_21.pdf; see also *Updated 2022 Annual Work Plan,* April 7, 2022, slide 5, at https://www.iso-ne.com/static-assets/documents/2022/04/2022_awp_update_for_04_07_22_pc.pdf.

[2] Importantly, while the Commission rejected the ESI filing in the context of the fuel-security compliance order under which it was filed, it expressly concluded, "We further note that nothing in this order prohibits ISO-NE from proposing a day-ahead reserves market independent of any proposal to address the [fuel security] concerns at issue here." *ISO New England Inc.*, 173 FERC ¶ 61,106 at P 57 (2020).

prepared to recover from sudden source-loss contingencies; it also relies upon resources' ramping capabilities to respond quickly to fluctuations in net load during the operating day.

In managing the project scope to accommodate other Annual Work Plan priorities and to shorten the timeframe to implementation, the ISO plans to defer the assessment of additional new day-ahead ancillary services, such as the Replacement Energy Reserves ("RER") discussed during the 2019-2020 stakeholder process. The ISO continues to expect that such additional ancillary services will become important (in both the day-ahead and real-time markets) to manage operational uncertainties with an increasingly weather-dependent resource mix. However, the detailed design and software implementation work to create longer duration (e.g., 90-minute or more) ancillary services is considerably more involved than to implement EIR and FRS. Thus, the ISO recommends the region address EIR and FRS first, which will enable the ISO to leverage their design and implementation work to develop additional (day-ahead and real-time) ancillary services as needed as a subsequent project.

Status

The development of a proposal for EIR and FRS ancillary services in the day-ahead market involves a number of concurrent, inter-related work streams. These include:

1. **Market design.** Completing the market design, formulations, and performance testing for EIR and FRS, addressing various technical details and elements deferred previously;
2. **Revised impact analysis.** Producing a revised impact analysis to evaluate, principally, the changes in costs to buyers and revenues to suppliers in the integrated day-ahead energy and ancillary service market;
3. **Market power and mitigation procedures.** Evaluating the potential for increased market power in the integrated day-ahead energy and ancillary services market, and developing appropriate enhancements to the day-ahead market's mitigation procedures to address same;
4. **Sunset of the Forward Reserve Market ("FRM")**, anticipated to be concurrent with FRS implementation.

We address each of these work streams in turn presently.

Market Design. Much of the core market design for EIR and FRS (formerly GCR) was completed and reviewed with stakeholders during 2019-2020. The project design team is presently completing the mathematical formulations for the integrated energy and ancillary services design, and completing outstanding work on various technical details that were previously deferred (due to the pressures of the compliance deadline at that time). In addition, and cognizant of outstanding stakeholder questions from 2019-2020, the project design team is also developing a prototype model for day-ahead option strike price determination and evaluating its performance (relative to commercially-available tools); and developing a more complete analysis of competitive energy option offer prices of suppliers.

Following this technical design work, the ISO will perform computational testing and analysis using historical market data and simulated ancillary service offers, an important internal phase in the development of changes to the ISO's (to be co-optimized) day-ahead market design. This is a time-

consuming (multi-month) work phase, as the ISO will address any issues identified in the process and review design details from an implementation and software/system development perspective. The ISO expects to complete this design work in mid-late Q3, and shortly thereafter to commence discussions with the Committee for feedback, input, and design detail review.

Revised Impact Analysis. Since the ISO's revised proposal presently includes only a subset of the day-ahead ancillary services originally proposed in 2019-2020, a revised impact analysis will be needed. Here, the ISO is considering using a new simulation study platform that closely approximates the ISO's day-ahead market production software with enhancements (in development) to model the proposed day-ahead ancillary services.[3] We expect this impact analysis approach will provide informative and complementary information to the results and scenarios previously examined in the prior (2019-2020) impact analysis by an external consultant.[4]

In doing so, the revised impact analysis will also account for any design refinements identified this year, and incorporate the ISO's new models (in development) for energy option strike prices and expected option offers noted above. Initial impact analysis work is expected to commence after completion of the requisite market-clearing mathematical formulations and the simulation study platform modifications for co-optimized unit commitment and scheduling with energy, the load forecast (known as the Forecast Energy Requirement), EIR, and FRS.

Market power and mitigation. Market power evaluations and mitigation-related efforts are a large portion of the outstanding project work ahead. This reflects the fact that the ISO previously deferred work on this area from its April 2020 ESI filing to a subsequent effort (due to the time pressure of the compliance deadline at the time). With the present development of a revised day-ahead ancillary services proposal, the ISO plans to conduct an assessment this year of the potential for market power in an integrated day-ahead energy and ancillary services market, and to develop appropriate enhancements to the day-ahead market's mitigation procedures to address same, for stakeholder review, feedback, and discussion concurrently with the day-ahead market design.

FRM Sunset. During the 2019-2020 stakeholder process, the ISO identified a number of incompatibilities between the existing FRM and day-ahead ancillary services (for ten- and thirty-minute fast-start and fast-ramping capabilities specifically).[5] It brought forward a proposal, ultimately supported by NEPOOL, to

[3] For context, this platform is the Integrated Market Simulator discussed in the *2022 Annual Work Plan* at slide 17, and noted in the *Updated 2022 Annual Work Plan* at slide 4, *supra.*

[4] The prior impact analysis was performed under considerable time constraints to address the compliance deadlines at the time, and made a number of simplifications with respect to the day-ahead market clearing process (e.g., simplified treatments of unit commitment logic, generator startup times, minimum run times, and so forth). With the benefit of additional simulation platform development time, we expect the ISO's study tools will be able to address these limitations and more accurately represent the proposed day-ahead market co-optimized solution calculations and corresponding prices.

[5] Materials explaining these incompatibilities, and the ISO's prior FRM sunset proposal, are available at https://www.iso-ne.com/committees/markets/markets-committee/?open_projects_value=Forward%20Reserve%20Market%20Sunset%20-%20WMPP%20ID:%20146.

sunset the FRM conditional on implementation of these day-ahead ancillary services. The ISO expects to bring forth a similar FRM "conditional sunset" proposal, to take effect concurrent with the implementation of the proposed integrated day-ahead energy and ancillary services market.

Timing

At present, we anticipate beginning discussions on the detailed design proposal with the Markets Committee in early Q4 of 2022. The market power and mitigation subject will be discussed in parallel, but it may start subsequently (e.g., in late Q4) due to the advance work involved this year. As is customary, the ISO plans to review its impact analysis approach at a conceptual level for stakeholder feedback early in the stakeholder process, and will review results with the Committee as they become available in 2023.

Overall, we see benefit in facilitating a robust stakeholder process on this important set of market design enhancements, and anticipate the stakeholder process extending through 2023. The ISO seeks to be able to file a final proposal, inclusive of appropriate enhancements to the day-ahead market's mitigation procedures, by Q4 of 2023.

Given the extensive testing and internal work underway (as discussed above), the ISO is presently targeting implementation of day-ahead ancillary services for Q4 of 2024 / Q1 of 2025. We emphasize, however, that because the final design remains in development and may evolve materially based on stakeholder feedback and input, that target implementation date is subject to change. As the ISO gathers a more complete understanding of the scope of implementation work involved, and reviews same with our external software vendors that support our day-ahead market systems, we will endeavor to provide the Committee with updates on the target implementation date.

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As the ISO's project teams continue to assiduously pursue the work plan summarized above, we would welcome any stakeholders interested in providing us with early feedback or suggestions in preparation for future discussions. Understanding states' and market participants' concerns and questions can be helpful to the ISO in planning for a responsive and informative technical committee process.

We hope you find this memorandum informative, and we appreciate stakeholders' continuing interest and support in bringing new ancillary services to fruition for our evolving grid.