December 20, 2019

By Electronic Delivery

Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: New York Independent System Operator, Inc.; Compliance Filing; Docket No. EL18-33-000, ER20-____-000

Dear Ms. Bose:

The New York Independent System Operator, Inc. ("NYISO") respectfully submits this filing in compliance with the Federal Energy Regulatory Commission's ("Commission's") *Order on Paper Hearing* ("Order"), which was issued on April 18, 2019.[1] The NYISO proposes to revise its Market Administration and Control Area Services Tariff ("Services Tariff") and Open Access Transmission Tariff ("OATT") to comply with the directives of the Order.[2] Consistent with the Commission's instructions, the proposed tariff revisions will allow fast-start resources' commitment costs (*i.e.*, start-up costs and minimum generation (no-load) costs) to be reflected in prices and will allow the relaxation of all dispatchable fast-start resources' minimum operating limits by up to 100 percent for the purpose of setting prices.

I. Background

On December 21, 2017, the Commission issued an Order Instituting Section 206 Proceeding and Commencing Paper Hearing Procedures and Establishing Refund Effective Date issued on December 21, 2017 ("2017 Order"),[3] which preliminarily concluded that NYISO should modify its fast-start pricing logic. The Commission identified necessary modifications to the NYISO Tariffs and pricing logic to allow the start-up costs and minimum generation (no-load) costs of fast-start resources to be reflected in prices.[4] The 2017 Order also instructed the NYISO to modify its fast-start pricing rules and software to include dispatchable fast-start resources in the price setting logic; similar to the NYISO's pricing treatment of block-loaded,

[1] *Order on Paper Hearing*, Docket No. EL18-33-000, 167 FERC ¶ 61,057 (April 18, 2019).

[2] Capitalized terms that are not otherwise defined in this filing shall have the meaning specified in Section 2 of the NYISO Services Tariff or in the attached proposed revisions to Services Tariff Section 2.6.

[3] *New York Independent System Operator, Inc.*, 161 FERC ¶ 61,294 (2017).

[4] *Order* at P 11.

fast-start resources.[5] In particular, the Commission states that NYISO should modify its tariffs to "[r]elax the economic minimum operating limit of all dispatchable fast-start resources by up to 100 percent for purpose of setting prices" in addition to relaxing the economic minimum operating limit of block-loaded, fast-start resources.

The NYISO filed an Initial Brief on February 12, 2018[6] describing how the NYISO expected to revise its Services Tariff to address the Commission's findings. The NYISO anticipated that it would revise its tariffs and modify its fast-start pricing logic to include fast-start resources' start-up costs and minimum generation costs as an adjustment to the resource's incremental energy cost curve in the Day-Ahead Market ("DAM") and Real-Time Market ("RTM") software ideal dispatch. Adding the minimum generation cost and, when appropriate, the start-up cost to the incremental energy curve would enable the NYISO to incorporate the costs into its calculation of Locational Based Marginal Prices ("LBMPs") and may also affect NYISO's co-optimized regulation and reserve prices.

The Order issued by the Commission on April 18, 2019 largely adopted the findings of the 2017 Order and directed the NYISO to proceed in a manner consistent with the Initial Brief. However, the Commission (1) did not require any changes to the NYISO's offline fast-start pricing or its rules addressing over-generation, and (2) did not direct the NYISO to adopt a specific methodology for amortizing commitment costs and, instead, intends to consider the methodology the NYISO proposes in this submission.[7] The NYISO discussed fast-start pricing with stakeholders at a number of working group meetings over the last seven months.[8] Based on the NYISO's further analysis and several discussions with stakeholders, the NYISO submits this filing and proposes tariff revisions to comply with the Order as described below.

II. Overview

A. Fast-Start Resources

The NYISO proposes to expand the scope of its fast-start pricing to incorporate the pricing logic modifications directed by the Commission. The NYISO will continue to require Fast-Start Resources to be able to start, synchronize to the grid, and inject Energy in 30 minutes or less.[9] Fast-Start Resources will also be required to have a minimum run time of one hour or less. When Fast-Start Resources meeting these criteria submit economic Energy offers into the market for evaluation, the NYISO will relax the economic minimum operating limit by 100 percent for purposes of determining LBMPs in both the DAM and RTM, and will include the

[5] *See* Order at P 14.

[6] NYISO Initial Brief.

[7] *See* Order at PP 11 and 36.

[8] NYISO staff discussed fast-start pricing with stakeholders at working group meetings on May 30, 2019, September 26, 2019, October 18, 2019, October 28, 2019, and November 21, 2019.

[9] *See* Order at FN 39 ("This proceeding does not propose to change NYISO's start-up time requirement for fast-start resources.").

commitment costs of the resources in the price setting processes in the manner described below. Consistent with the Order, the NYISO proposes to exclude Fast-Start Resource self-schedules from the offers used to establish prices.[10] All Resources must submit flexible, economic energy offers to have their offers considered for purposes of price setting in the NYISO's Energy market.

In order to effectuate the fast-start pricing logic modifications directed by the Commission, NYISO will modify the market software systems that calculate Day-Ahead and Real-Time LBMPs. The Security Constrained Unit Commitment ("SCUC") software,[11] Real-Time Commitment ("RTC") software,[12] and Real-Time Dispatch ("RTD")[13] software pricing passes, referred to as the "ideal" passes, will model all eligible, Fast-Start Resources as dispatchable between zero and their upper operating limit to determine price. For dispatchable, Fast-Start Resources, the ideal dispatch will relax minimum generation constraints to zero and model the resources as dispatchable between zero and the upper operating limit. The ideal dispatch will also treat fast-start storage resources as dispatchable between zero and their maximum load level when charging or pumping if they submit economic withdrawal offers. In addition, the incremental dispatch costs of Fast-Start Resources that Bid ISO-Committed Flexible will be adjusted to include start-up costs as described below, so the ideal passes can reflect the start-up costs and minimum generation (no-load) costs of such resources in market clearing prices.

The NYISO also proposes to allow Fast-Start Resources to increase the dollar component of their Minimum Generation Bids and Regulation Service Bids in the Real-Time Market, compared to Day-Ahead Bids, when the Fast-Start Resources received a Day-Ahead schedule. All Generators are currently permitted to increase their Real-Time Market offers for DAM-committed incremental Energy to allow real-time LBMPs to more accurately reflect in-day Energy production costs in the NYISO's commitment and dispatch.[14] Generators that are not Fast-Start Resources are not permitted to increase their Minimum Generation Bids in real-time because the NYISO relies on the Day-Ahead commitment of sufficient Generators to serve expected Load. However, reevaluating accurate Bid costs in real-time, including minimum generation costs, is appropriate for Fast-Start Resources because they can be started-up by the Real-Time Market software even if a Fast-Start Resource's real-time commitment diverges from its Day-Ahead schedule. The fast-start pricing logic modifications proposed in this filing will allow real-time LBMPs to reflect all of the in-day production costs for Fast-Start Resources, including start-up costs, minimum generation costs, and incremental Energy costs. If a Fast-Start

[10] Order at P. 25.

[11] SCUC is the NYISO's day-ahead economic commitment and scheduling software.

[12] RTC schedules Imports, Exports and internal (NYCA) resources every 15 minutes over a forward-looking 2.5 hour commitment window.

[13] RTD optimizes the NYISO's dispatch every 5 minutes over a forward-looking one hour dispatch window.

[14] *See* Services Tariff Section 4.4.1.2.1. *See also New York Independent System Operator, Inc.*, 132 FERC ¶ 61,271 (2010), Docket No. ER10-1977-000 *et al.*

Resource receives a Day-Ahead schedule but is not scheduled in real-time because it increased the dollar component of its Minimum Generation Bid, the Resource will face balancing market obligations for the Day-Ahead scheduled MWs that were not physically delivered in real-time. Presenting accurate in-day production costs to the Real-Time Market will further improve market efficiency by making more up-to-date cost information available to the commitment and dispatch software.

B. Start-Up Costs

The NYISO proposes to include the start-up cost component from a Fast-Start Resource's Bid, or mitigated Bid, as an adjustment to the resource's incremental Energy cost curve for a defined period of time, based on when the resource is scheduled to start. A Fast-Start Resource's start-up costs will be included in the LBMP calculations when it is the price-setting resource during intervals that fall within the relevant pre-defined time period.

For the Day-Ahead Market, the start-up cost component will be included in the Fast-Start Resource's incremental Energy cost curve for the hour it is scheduled to start. Hourly intervals are used for all evaluations in the DAM. Day-Ahead Generator offers are submitted and Day-Ahead LBMPs are set in hourly increments. If the Fast-Start Resource receives a multi-hour schedule, its offers, and corresponding incremental Energy cost curve, will not include the start-up cost component after the hour in which the Generator is scheduled to start-up.

For the Real-Time Market, the start-up cost component will be included in the Fast-Start Resource's incremental Energy cost curve for each RTD interval that starts within the first 15 minutes after it is scheduled to start. The NYISO and Potomac Economics reviewed historical data for fast-start gas turbine commitments in 2017 and September 2018 through August 2019.[15] The data demonstrated that the majority of fast-start gas turbine commitments are to satisfy immediate energy needs, *i.e.*, within 15 minutes of the resource's scheduled start. The NYISO also reviewed how start-up costs compare to the total commitment costs[16] and net commitment costs[17] of Fast-Start Resources in order to avoid allocating a disproportionately large percentage of commitment costs to the first 15 minutes of a Fast-Start Resource's schedule. Historically, start-up costs generally account for less than 10 percent of Fast-Start Resources' as-Bid commitment costs and are about 21 percent of Fast-Start Resources' net commitment costs on average. Based on these analyses and NYISO's stakeholder presentations,[18] the NYISO is

[15] NYISO staff reviewed data from September 2018 to August 2019 as the most recent one-year period prior to its September 26, 2019 stakeholder presentation.

[16] Fast-Start Resource commitment costs include start-up costs and minimum generation costs for the length of the resource's minimum run time.

[17] The net commitment cost of a Fast-Start Resource is the difference between the (1) total cost of committing that Resource to run at its minimum generation level for its minimum run time, and (2) the value of the Energy it will produce while running at its minimum generation level for its minimum run time.

[18] *See*, https://www.nyiso.com/documents/20142/8414685/Enhanced%20Fast%20Start%20Pricing_MIWG_09262019_final.pdf/1a29ab7a-6e8b-493c-a8b1-32881b95fbc4 at slides 10-19 and

proposing to front-load the start-up cost amortization to approximately the first fifteen minutes that the Fast-Start Resource is scheduled to operate. The RTM software will limit start-up cost inclusion to only the RTD intervals that begin within the first fifteen minutes after a Fast-Start Resource is scheduled to start-up.[19] The start-up cost component will be included in the incremental Energy cost curve for evaluation in the software pricing passes for each relevant RTD interval. The software pricing passes will not consider the start-up cost component in any RTD interval that begins more than 15 minutes after the Fast-Start Resource is scheduled to start.

C. Minimum Generation Costs

The NYISO proposes to include the minimum generation cost component from a Fast-Start Resource's Bid, or mitigated Bid, as an adjustment to the resource's incremental Energy cost curve for all time intervals in the software's ideal dispatch.

The NYISO will include a Fast-Start Resource's minimum generation cost component as an adjustment to the resource's incremental Energy cost curve for price-setting purposes in all DAM and RTM intervals. Therefore, a Fast-Start Resource's minimum generation costs will be included in the LBMP calculations for all intervals it is the price-setting resource, even when the resource is running beyond its minimum run time.

D. Incremental Dispatch Costs

The incremental Energy cost curve, or the dispatch costs, of Fast-Start Resources that Bid ISO-Committed Flexible will be adjusted to include start-up costs and minimum generation costs based on the Start-Up Bids and Minimum Generation Bids or mitigated Start-Up Bids and Minimum Generation Bids of each such Resource ("Adjusted Dispatch Costs") before the cost curve is presented to the market software pricing pass. The NYISO will determine a Fast-Start Resource's Adjusted Dispatch Costs for each pricing interval in the DAM and RTM for use in the software pricing passes. First, the NYISO will determine the average as-offered cost of operating that Generator, which includes that Generator's minimum generation cost, its incremental Energy offers if applicable, and the applicable portion of its start-up costs for the interval, for each output level between and including that Generator's minimum generation level and its upper operating limit. Second, the NYISO will determine the cost-minimizing output level, which is the output level where the average as-offered cost of operating that Generator is minimized. This output level may be the Generator's minimum generation level, its upper operating limit, or any operating point in between. The average cost, when operating at the cost-minimizing output level in a given interval, is the "minimum average cost" for that Generator in that interval. The pricing pass will utilize a Generator-specific Adjusted Dispatch Cost curve for price-setting evaluation in each interval that is: (1) the price on the Adjusted Dispatch Cost curve equal to the minimum average cost for that Generator in that interval for all output levels that are

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https://www.nyiso.com/documents/20142/8922912/4%2020191028%20NYISO%20-%20Enhanced%20Fast%20Start%20Pricing%20MIWG%20vFinal.pdf/ef026101-6b7e-c6ec-a2ac-9f90213a4375 at slide 13.

[19] RTD intervals are generally 5 minutes; however, the exact duration may vary.

less than or equal to the cost-minimizing output level; or (2) the price on the Adjusted Dispatch Cost curve equal to the incremental Energy cost curve for that Generator in that interval for all output levels that are above the cost-minimizing output.

The NYISO provides a simplified example of the Adjusted Dispatch Cost curve calculation for the Day-Ahead Market below.[20]

The Fast-Start Resource Bid components for this example are:

- Minimum generation level: 20 MW
- Upper operating limit: 50 MW
- Minimum generation cost: $1,000/hour
- Start-up cost: $500
- Amortization period: 1 hour for the Day-Ahead Market or 0.25 hours for the Real-Time Market
- Incremental Energy curve point 1: $40/MWh to increase output from 20 MW to 40 MW
- Incremental Energy curve point 2: $60/MWh to increase output from 40 MW to 50 MW

First, the NYISO calculates the average as-offered cost of operating that Generator for each output level between and including that Generator's minimum generation level and its upper operating limit:

- At the minimum generation level (20 MW), this equals (minimum generation cost * amortization period + start-up cost) / (minimum generation level * amortization period) or ($1,000/hr * 1 hr + $500) / (20 MW * 1 hr) = $75/MWh.

- At 40 MW, this equals ((minimum generation cost + $40/MWh * 20 MW) * amortization period + start-up cost) / (40 MW * amortization period) or (($1,000/hr + $40/MWh * 20 MW) * 1 hr + $500) / (40 MW * 1 hr) = $57.50/MWh.

- At 50 MW, this equals ((minimum generation cost + $40/MWh * 20 MW + $60/MWh * 10 MW) * amortization period + start-up cost) / (60 MW * amortization period) or (($1,000/hr + $40/MWh * 20 MW + $60/MWh * 10 MW) * 1 hr + $500) / (50 MW * 1 hr) = $58.00.

[20] A description of the Adjusted Dispatch Costs calculation as well as other illustrative examples were presented to NYISO stakeholders in September. *See* the "Fast Start Pricing Proposal" available at https://www.nyiso.com/documents/20142/8414685/Fast-Start%20Pricing%20Proposal.pdf/ee8fa72a-f6cd-1ca9-9e61-418da1c1fc4e and the "An Alternative Procedure Would Better Address These Concerns" section on pages 5-9 of the meeting materials available at https://www.nyiso.com/documents/20142/8414685/Alternative%20Procedure%20for%20Determining%20Adjusted%20Offer%20Curves%20Used%20for%20Fast-Start%20Pricing.pdf/c4208a62-62be-a1b2-ad0b-abbef58cd72a.

Second, the NYISO will determine the cost-minimizing output level, which is the output level where the average as-offered cost of operating that Generator is minimized.

- In this example, the cost-minimizing output level is 40 MW.

Therefore, the Adjusted Dispatch Cost curve for this Generator for this interval will be presented to the software pricing pass as follows:

- Adjusted Dispatch Cost for output levels up to and including 40 MW equals $57.50/MWh (this value is based on the average as-offered cost of operating calculation because the $57.50/MWh is above the Bid cost to provide 40 MW)

- Adjusted Dispatch Cost for 41 MW up to and including 50 MW equals $60.00/MWh (this value is based on the Generator's Bid because the $60.00/MWh is above the average as-offered cost of operating at 50 MW)

III. Documents Submitted

Along with this filing letter, the NYISO respectfully submits the following documents:

1. A clean version of the proposed revisions to the NYISO's Services Tariff ("Attachment I");

2. A blacklined version of the proposed revisions to the NYISO's Services Tariff ("Attachment II");

3. A clean version of the proposed revisions to the NYISO's OATT ("Attachment III"); and

4. A blacklined version of the proposed revisions to the NYISO's OATT ("Attachment IV").

IV. Description of Proposed Tariff Provisions

The NYISO proposes to define Fast-Start Resource in Services Tariff Section 2.6 consistent with the discussion above.

> **Fast-Start Resource**: A Generator that (1) submits Start-up Bids and/or Minimum Generation Bids in the Day-Ahead or Real-Time Markets, (2) can respond to instructions to start, synchronize to the NYS Power System and inject Energy within thirty (30) minutes, and (3) has a minimum run time of one hour or less. Fast-Start Resources include but are not limited to Fixed Block Units.

Also in Services Tariff Section 2.6, the NYISO proposes to revise the definition of Fixed Block Unit to indicate that it is one type of Fast-Start Resource.

> **Fixed Block Unit:** A Fast-Start Resource ~~unit~~ that, due to operational characteristics, can only be dispatched in one of two states: either turned completely off, or turned on and run at a fixed capacity level.

The NYISO proposes to revise OATT Section 1.6 to indicate that 'Fast-Start Resource' and 'Fixed Block Unit' are defined terms in the Services Tariff.

The NYISO proposes revisions to Section 4.4.1.2.1 of its Services Tariff to allow a Fast-Start Resource that receives a Day-Ahead schedule to submit Real-Time Market Minimum Generation Bids or Regulation Service Bids that exceed the dollar component of the Bids submitted in the Day-Ahead Market, or the mitigated Day-Ahead Bids where appropriate, if not otherwise prohibited pursuant to other provisions of the tariff.

The NYISO proposes revisions throughout Section 17.1 of its Services Tariff, including a new Section 17.1.1.2, to describe how the Day-Ahead and Real-Time LBMP calculations will incorporate the fast-start pricing logic discussed in the Order and this filing. The proposed revisions describe: (1) how the incremental dispatch costs of Fast-Start Resources that Bid ISO-Committed Flexible will be adjusted such that the start-up costs and minimum generation costs Bid by Fast-Start Resources will flow into the LBMP calculations of the pricing passes; and (2) how the software will treat Fast-Start Resources as dispatchable between zero MW and their upper operating limit.

The NYISO also proposes revisions throughout Services Tariff Section 17.1 specifying whether certain discrete provisions apply to all of the newly defined "Fast-Start Resources" or only to the subset of Fast-Start Resources that are called "Fixed Block Units." The Fixed Block Unit references are still required to identify the set of Resources that are subject to NYISO's offline fast-start pricing program. In its Order, the Commission did "not require NYISO to make any changes to its offline fast-start pricing."[21]

The NYISO also proposes to clarify language in Services Tariff Section 17.1.2.1.2.1.2 describing how the Lower Dispatch Limits are determined in real-time for Intermittent Power Resources that depend on wind as their fuel. While the NYISO was reviewing the software logic and tariff language that establishes dispatch limits for Fast-Start Resources, the NYISO identified the need to clarify this Section by incorporating a Resource's response rate into the Lower Dispatch Limit.

[21] *See* Order at P 11.

Finally, the NYISO proposes a few ministerial and formatting corrections in Services Tariff Sections 4.4 and 17.1. These corrections include spacing and internal section reference edits.

V. Effective Date

The NYISO respectfully requests Commission action by March 1, 2020; *i.e.*, within sixty (60) days of the December 31, 2019 compliance filing due date. Commission action within sixty days will allow the NYISO to confidently proceed with developing and deploying the software changes necessary to implement the fast-start pricing logic.

The NYISO requests a flexible effective date during the fourth quarter of 2020 for the Tariff revisions proposed herein. The Order requires the NYISO to implement these changes by December 31, 2020.[22] The NYISO cannot propose a precise effective date before the software changes are finished and adequately tested. The NYISO proposes to submit a compliance filing at least two weeks prior to the proposed effective date that will specify the date on which the revisions will take effect. The compliance filing will provide adequate notice to the Commission and Market Participants of the Q4 2020 implementation date for the fast-start pricing mechanism discussed in this filing.

VI. Service

The NYISO will send an electronic link to this filing to the official representative of each party to this proceeding, to the official representative of each of its customers, to each participant on its stakeholder committees, to the New York Public Service Commission, and to the New Jersey Board of Public Utilities. In addition, a complete copy of the documents included with this filing will be posted on the NYISO's website at www.nyiso.com.

VII. Communications

Communications and correspondence regarding this filing should be directed to:

Robert E. Fernandez, Executive Vice President & General Counsel
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[22] Order at P. 54.

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VIII. Conclusion

The NYISO respectfully requests that the Commission accept this compliance filing by March 1, 2020.

Respectfully submitted,

/s/ James H. Sweeney
James H. Sweeney, Senior Attorney
New York Independent System Operator, Inc.

cc: Anna Cochrane
James Danly
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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Rule 2010 of the Rules of Practice and Procedure, 18 C.F.R. §385.2010.

Dated at Rensselaer, NY this 20th day of December, 2019.

/s/ Mohsana Akter

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