Attachment I

ATTACHMENT I

Responses of the New York Independent System Operator, Inc.

Question 1.a

- In NYISO's proposed tariff changes at 4.1.10.1 you state that "Aggregated (i) Intermittent Power Resources, (ii) Energy Limited Resources, (iii) Capacity Limited Resources, or (iv) Limited Energy Storage Resources shall constitute a single resource type Aggregation only when the individual resources in the Aggregation have the same intermittent, energy limiting, or capacity limiting characteristic (e.g., an Aggregation of only solar resources, or an Aggregation of only pumped storage resources)."
 - a. Please explain the criteria NYISO plans to use to determine whether resources sufficiently share characteristics to such an extent that they are able to form an aggregation of a single resource type. For example, could two battery-based energy storage resources with different charge or discharge ramp rates form a single resource type Aggregation?

Response

The NYISO's June 27 Filing proposed two types of Aggregations:¹ DER Aggregations, which contain a heterogeneous mix of Resource types,² and single Resource type Aggregations.³ The NYISO proposed as a rule, but with certain exceptions, that when all individual facilities within an Aggregation are eligible to participate under a single, existing, participation model (*e.g.*, as Energy Storage Resources, solar Generators, or fossil-fueled Generators), that the Aggregation would be considered a "single Resource type" Aggregation. For example, two battery-based energy storage resources that are eligible (setting aside the minimum size requirements) to participate under the Energy Storage Resource participation model would be considered a "single Resource Type" Aggregation, even if the operating characteristics (*e.g.*, ramp rates, Roundtrip Efficiency, Lower and Upper Operating Limits) were different. The Aggregator representing the battery-based storage resources will be obligated to submit offers in a manner that accurately reflects the entire Aggregation's capability.⁴ Practically speaking, it makes sense to combine the capabilities of similar, but not identical resources. For example, an Aggregation comprising a battery-based energy storage resource with a 10 MWh storage capability

¹ Capitalized terms that are not otherwise defined in this filing letter shall have the meaning specified in Section 1 of the OATT and Section 2 of the Services Tariff, as amended by the June 27 Filing.

² As described in the June 27 Filing, the term "Resource type" means any of the types of facilities identified in the definition of "Resource." *See* June 27 Filing at 13 n. 21. *See also*, Services Tariff Sec. 2.18.

³ Aggregations consisting of only Demand Side Resources will also be considered "DER Aggregations," because the NYISO proposed to replace the existing Day-Ahead Demand Response Program and Demand Side Ancillary Services Program with the DER rules. *See* June 27 Filing at 23, 33-35.

⁴ For example, the Aggregator might choose to submit with its Bid a ramp rate for the entire Aggregation that reflects the slowest rate of all of the individual facilities in the Aggregation in order to ensure that any facility in the Aggregation can timely respond to the NYISO's dispatch signal.

would be treated as having 13 MWh of storage capability for the purposes of state-of-charge management.

The NYISO will determine whether resources sufficiently share characteristics to such an extent that they are able to form a single Resource type Aggregation based on whether or not all of the individual resources in an Aggregation would (setting aside the minimum size requirements), individually qualify to be subject to the unique operation and settlement rules that apply to a particular resource type. For example, Energy Storage Resources are proposed to be defined in Section 2.5 of the Services Tariff as "Generators that receive Energy from the grid at a specified location, and are capable of storing that Energy, for later injection back onto the grid at the same location." The NYISO would treat any Aggregation in which all of the individual facilities satisfy the described conditions as an Energy Storage.

The June 27 Filing, however, identified certain categories of Resources-Intermittent Power Resources, Energy Limited Resources, Capacity Limited Resources, and Limited Energy Storage Resources-for which the NYISO will evaluate additional criteria. The NYISO proposed to require that the individual Resources seeking to be qualified as a single Resource type Aggregation of one of the aforementioned categories to share the same operating characteristic(s) that qualify the Resources as the applicable Resource type. For example, Intermittent Power Resources are defined in Section 2.9 of the Services Tariff as "a device for the production of electricity that is characterized by an energy source that: (1) is renewable; (2) cannot be stored by the facility owner or operator; and (3) has variability that is beyond the control of the facility owner or operator. In New York, resources that depend upon wind, solar energy or landfill gas for their fuel have been classified as Intermittent Power Resources." To determine whether an Aggregation constitutes an Intermittent Power Resource Aggregation, the NYISO will not only review whether all individual Resources satisfy the conditions to be an Intermittent Power Resource, but also whether the particular the individual Resources that comprise the Aggregation share the same fuel type (*i.e.*, solar, wind, or landfill gas). Under the NYISO's proposed rules, an Aggregation of solar generators would qualify as an Intermittent Power Resource Aggregation. Similarly, an Aggregation of landfill gas fueled facilities would qualify as an Intermittent Power Resource Aggregation. However, an Aggregation comprising a solar generator and a landfill gas-fueled facility would not qualify as an Intermittent Power Resource Aggregation because the participating resources do not share the same fuel type. Although the solar generator and landfill gas-fueled generator are both treated similarly as Intermittent Power Resources by the NYISO's tariff, the forecasting and scheduling practices of the solar farm, wind farm, and landfill gas output are sufficiently distinct that blending these different fuel types into a single Resource type Aggregation would compromise the accuracy of the wind and solar forecasts and potentially lead to situations where the forecasted schedule of the Aggregation causes over or under commitment of other resources necessary to maintain reliability.

When an Aggregator proposes a single Resource type Aggregation, the NYISO will review the specific resources within the Aggregation to determine (i) the Resource type under which the individual resources qualify, and (ii) where necessary, whether the individual resources share the same qualifying conditions or capabilities to participate as that Resource type. The NYISO expects to be able to make a determination as to whether the individual facilities qualify as a single Resource type Aggregation based on these factors.

Question 2.a

- 2. In your filing, you state that neither facilities that are participating in the Installed Capacity market through an Aggregation nor Aggregations themselves will be able to request a going-forward cost offer cap determination for the purposes of supplier-side mitigation in the Installed Capacity market, because a going-forward cost determination would not reflect a resource's true avoidable costs when it is part of an Aggregation.
 - a. Noting the previously provided explanation for why it is not appropriate to calculate a going-forward cost offer cap for individual resources that are part of an Aggregation, and given the fact that NYISO will treat an Aggregation's offers into the NYISO market as though it were a single unit, please explain why it is not appropriate to calculate a going-forward cost offer cap for an Aggregation as a whole.

Response

The NYISO's proposed Aggregation rules offer Aggregators the ability to represent a group of individual facilities as a single Resource in the NYISO-administered markets. In most instances, the Aggregator is able to appropriately represent the characteristics of the individual facilities in the Aggregation. A blended going-forward cost of an Aggregation (*i.e.*, a weighted going-forward cost of the individual Resources within the Aggregation), however, does not appropriately reflect the going-forward costs of each of the individual facilities that participate in the Aggregation. A blended going-forward cost, which the Aggregator would need to request at least fifty (50) days prior to the start of an offer period, is unlikely to accurately represent the going-forward costs of the individual resources that are components of the Aggregation that is dispatched by the NYISO.

The NYISO's proposed Aggregation participation model was designed to offer Aggregators flexibility to meet NYISO schedules. An Aggregator may dispatch any combination of individual Resources in the Aggregation to comply with NYISO dispatch. Because Aggregators will not be required to specify the individual resources that will be dispatched, the NYISO will only be able to determine the appropriate weighted costs corresponding to the dispatched individual Resources after the dispatch increment, which is inconsistent with the NYISO's existing *ex ante* evaluation of going-forward costs.

Moreover, Aggregations have the flexibility to alter their participants on a monthly basis. The Aggregator may add or remove individual Resources from an Aggregation for a variety of reasons that are not limited to their project economics. Therefore, even if the NYISO evaluated the going-forward costs of individual Resources within an Aggregation prior to the offer period, there is no assurance that the evaluated Resources would remain in the Aggregation during the delivery month.

The Aggregator's own avoidable cost would essentially be the cost of procuring Resources to participate in an Aggregation. These contracted amounts may change over time and, as described above, individual Resources could switch to participate in another Aggregation. Therefore, an Aggregation's total going-forward costs would be the sum of the Aggregator's avoidable cost and the individual Resources' avoidable costs. Aggregations would not have data that would show the costs that would be avoided if the Installed Capacity Supplier were taken out of service or retired.

Questions 3.a and 3.b.

- 3. In your filing, you propose that Aggregations will be required to measure energy injections, energy withdrawals, and demand reductions separately in order for NYISO to appropriately calculate the corresponding settlements. You also note that a facility that contains multiple assets behind a common point of interconnection (e.g., a facility that combines Demand Reduction from a commercial building and an energy storage resource) will be considered an "individual facility" if the facility is configured to use a single meter to measure all Energy withdrawals and injections. You explain that each of these categories have slightly different treatment when being evaluated for settlements, such as the application of the Monthly Net Benefits Threshold to the demand reduction portion of response.
 - a. If an individual facility with multiple assets behind a single meter has the capability to provide demand reductions and energy injections, how will NYISO differentiate demand reductions from energy injections for the purposes of compliance with Order No. 745? For example, how would NYISO differentiate between demand reductions and energy injections provided by a behind-the-meter energy storage system that can both reduce on-site load and inject energy onto the grid?

Response

An individual facility comprising both Demand Reductions and injection capability (whether from an energy storage system or generator) that seeks to provide the wholesale markets with its entire capability (*i.e.*, the Demand Reduction and injection capability), will be required to separately measure the Demand Reductions and injections. A facility's Demand Reduction will be calculated as the difference between the facility's Economic Customer Baseline Load ("ECBL") and its actual metered Load (until the actual metered Load reaches zero MW at the facility's meter).⁵ Energy Injections will be measured as positive MW measured at the facility's meter. The Aggregator will be required to submit to the NYISO three streams of after-the-fact revenue-quality meter data for the Aggregation: (i) Energy injections, (ii) Energy withdrawals by Withdrawal-Eligible Generators (if appropriate), and (iii) Demand Reductions.⁶

⁵ See DER Energy Market Design: Part 2, Market Issues Working Group Presentation at 49-55 (Feb. 6, 2019), available at:

https://www.nyiso.com/documents/20142/4841804/DER%20Overall%20Energy%20Market%20Design%20Review%20Part%20II.pdf.

⁶ As described in the NYISO's June 27 Filing, the proposed tariff revisions authorize the NYISO to audit the meter data supplied for Aggregations and individual Resources within an Aggregation. June 27 Filing at 56;

The NYISO will therefore be able to ensure Demand Reductions are compensated in accordance with the NYISO's tariff revisions effectuating Order No. 745 (the requirements are described in Question 4.a).

b. If NYISO does not intend to differentiate the performance of these individual assets, and instead plans to subject both injections from an energy storage resource and demand reductions from a demand side resource to the Net Benefits Test at settlement, please explain why this is appropriate.

Response

The NYISO's proposed tariff revisions will differentiate Demand Reduction and injections. See response to Question 3.a.

Question 4.a.

- 4. In your filing, you state that NYISO's proposed Tariff language continues to meet the Order No. 745 requirement that demand reductions be compensated at the Locational Based Marginal Price (LBMP) when two conditions are met: (i) a demand response resource participating in the NYISO-administered energy market can balance supply and demand as an alternative to generation, and (ii) the dispatch of the demand response resource is cost-effective as determined by the Net Benefits Test. You note, however, that NYISO cannot and will not apply a Monthly Net Benefit Offer Floor to bids from Aggregations because the proposal does not require aggregators to distinguish demand reductions from energy injections in their bids. Instead, you propose in your filing to move the tariff language describing the Net Benefits Test from Section 4.2 of the Services Tariff, which provides rules for Day-Ahead Markets and Schedules, to Section 4.5.7 of the Services Tariff, Settlements for Demand Reductions. You state that moving the Net Benefits Test application rules to the new section reflects the change from an offer floor applied to a bid to an after-the-fact evaluation during the settlements process.
 - a. NYISO's current practice is to automatically reject demand reduction bids from Demand Side Resources if the offer is less than the Monthly Net Benefit Offer Floor. Under NYISO's proposal, the Net Benefits Test would be conducted during the settlement process rather than through the application of a price floor to the Aggregation's offer. Please explain how an Aggregation capable of providing both demand reductions and energy injections could adjust its offers and/or operations to ensure that its demand reductions do not respond to NYISO dispatch when the LBMP is less than the Monthly Net Benefits Threshold.

Proposed Services Tariff Section 13.3.2.3.1.

Response

Market Participant Energy offers in the NYISO's Day-Ahead and real-time markets may consist of up to eleven monotonically increasing, constant cost incremental energy steps.⁷ This allows the Market Participant to offer Energy at certain price points that are consistent with its costs or other economic variables.

The June 27 Filing proposes to allow Aggregators to use the same eleven point constant cost incremental energy steps, providing the Aggregator with the flexibility to bid its Aggregation in a manner that meets its needs. If an Aggregation offers Demand Reduction capability, the Aggregator will be able to offer that Demand Reduction capability at one (or more) of the eleven points at a value that is equal to or greater than the Monthly Net Benefit Threshold.

Question 5.a.

- 5. In your proposed tariff changes at 24.2.1.1, you propose to shift the Economic Customer Baseline Load (ECBL) In-Day Adjustment Period from the two hours that occur four hours prior to a demand reduction period to "three consecutive five-minute intervals starting 60 minutes prior to the first operating interval of dispatch and ending 45 minutes prior to the operating interval of dispatch."
 - a. Please provide the rationale for shifting the ECBL In-Day Adjustment Period to three hours closer to the demand reduction period.

Response

The NYISO currently uses the ECBL to measure the performance of Demand Side Resources in the Day-Ahead Demand Response Program ("DADRP").⁸ Because the data used to calculate the ECBL is obtained from operating days leading up to the day in which the Demand Side Resource is scheduled,⁹ the NYISO applies an In-Day Adjustment Factor to reflect in-day conditions prior to the period in which it reduces load.¹⁰ As described in Question 5, the NYISO currently calculates the In-Day Adjustment Factor based on the facility's actual metered load over two hours, beginning four hours before the scheduled Demand Reduction.¹¹

⁷ Services Tariff Sec. 4.2.1.3.2.

⁸ Demand Side Resource performance is measured as the difference between the ECBL for each scheduled hour and the facility's actual metered hourly load for each scheduled hour. Services Tariff Section 24.2.

⁹ If the scheduled Demand Reduction is during a weekday, the ECBL Weekday Window consists of data from the previous ten weekdays. If the scheduled Demand Reduction is on a weekend, the ECBL Weekend Window consists of data from the previous three weekend days of the same type (Saturday or Sunday).

¹⁰ Open Access Transmission Tariff Sec. 24.2.1.2(f).

¹¹ *Id.* at Sec. 24.2.1.1.

Scheduling and dispatch of DADRP resources, however, is materially different than the scheduling and dispatch proposed in the NYISO's June 27 Filing. Demand Side Resources participating in the DADRP are scheduled on an hourly basis in the Day-Ahead Market. The NYISO proposed that Distributed Energy Resources ("DER") and Aggregations be eligible to receive five-minute dispatch signals in the real-time market.¹²

In the course of its market design process, the NYISO evaluated the adequacy of the existing ECBL rules for use in the real-time market. While the In-Day Adjustment Period in place for the DADRP was reasonable considering the scheduling increments and notification timeline that apply to DADRP Resources,¹³ the NYISO determined that load data closer in proximity to the scheduled dispatch was preferred to better reflect real-time operations and to appropriately calculate the in-day ECBL adjustment for DER that are dispatched in five-minute increments.

The NYISO's specific proposal to move the In-Day Adjustment Period to the three consecutive five-minute intervals starting sixty minutes prior to the first operating interval of dispatch was informed by a study conducted by DNV GL that analyzed demand response baselines for ISO New England.¹⁴ In that study, DNV GL concluded that baseline adjustments in real-time perform better when the in-day adjustment window is closer in proximity to the scheduled dispatch, and shorter in duration.¹⁵ After evaluation of the NYISO's proposed market design and the DNV GL study, the NYISO determined that moving the In-Day Adjustment Period closer to the dispatch time and reducing the duration of the evaluated intervals (*i.e.*, three consecutive five-minute intervals starting 60 minutes prior to the first operating interval of dispatch and ending 45 minutes prior to the operating interval of dispatch) would better reflect the DER's load prior to dispatch.

¹² DER Aggregations will also be allowed to participate in the Day-Ahead Market and receive hourly Day-Ahead schedules, but unlike in the DADRP, the Day-Ahead schedules will be reevaluated in real-time and DER Aggregations will receive five-minute dispatch signals that may instruct a Resource to operate in a manner that is not entirely consistent with its Day-Ahead schedule.

¹³ The NYISO posts the Day-Ahead schedules for DADRP participants (as well as other Resources) by 11 a.m. on the day prior to the Dispatch Day.

¹⁴ Analysis of Real-Time Adjustment of Baseline for Load Prediction, DNV GL, https://www.iso-ne.com/static-

assets/documents/committees/comm_wkgrps/mrkts_comm/mrkts/mtrls/2014/may672014/a03_dynamicbaselineadju stment_memo_05_01_14.pdf_(last visited Sept. 17, 2019).

¹⁵ *Id.* at 6.