

## **4.4 Real-Time Markets and Schedules**

### **4.4.1 Real-Time Commitment (“RTC”)**

#### **4.4.1.1 Overview**

RTC will make binding unit commitment and de-commitment decisions for the periods beginning fifteen minutes (in the case of Resources that can respond in ten minutes) and thirty minutes (in the case of Resources that can respond in thirty minutes) after the scheduled posting time of each RTC run, will provide advisory commitment information for the remainder of the two and a half hour optimization period, and will produce binding schedules for External Transactions to begin at the start of each quarter hour. RTC will treat Behind-the-Meter Net Generation Resources, [Hybrid Storage Resources](#) and Energy Storage Resources as already being committed and available to be scheduled. RTC will co-optimize to solve simultaneously for all Load, Operating Reserves and Regulation Service and to minimize the total as-bid production costs over its optimization timeframe. RTC will consider SCUC’s Resource commitment for the day, load forecasts that RTC itself will produce each quarter hour, binding transmission constraints, and all Real-Time Bids and Bid parameters submitted pursuant to Section 4.4.1.2 below.

#### **4.4.1.2 Bids and Other Requests**

After the Day-Ahead schedule is published and before the close of the Real-Time Scheduling Window for each hour, Customers may submit Real-Time Bids into the Real-Time Market for real-time evaluation by providing all information required to permit real-time evaluation pursuant to ISO Procedures. If the Supplier elects to participate in the Real-Time Market, and is within a defined electrical boundary, electrically interconnected with, and routinely serves a Host Load (which Host Load does not exclusively consist of Station Power) at

a single PTID, it can only participate in the Real-Time Market as a Behind-the-Meter Net Generation Resource. If a Behind-the-Meter Net Generation Resource submits Bids into the Real-Time Market for real-time evaluation, such Bids shall provide the forecasted Host Load for each hour for which Bids are submitted.

An Energy Storage Resource shall indicate in its Real-Time Bids whether its Energy Level will be ISO- or Self-Managed. An Energy Storage Resource that elects to Self-Manage its Energy Level shall be responsible for managing its Energy Level through its Bids. An Energy Storage Resource, including an Energy Storage Resource that received a Day-Ahead Schedule, may change its Energy Level Management election for each operating hour in the Real-Time Market day.

Co-located Storage Resources can each offer all of their available capability into the Real-Time Market. RTC will account for the CSR Scheduling Limits in the schedules it determines for CSR Generators.

In addition to the parameters that Suppliers submit for Generators, Hybrid Storage Resources must also submit an Operating Reserve Limit with its Real-Time Market Bid to indicate the Operating Reserves that the Hybrid Storage Resource reasonably expects to be capable of sustaining for one hour. A Hybrid Storage Resource is required to update its Operating Reserve Limit to reflect changes to the Hybrid Storage Resource's ability to provide Operating Reserves in real-time. After the Real-Time Scheduling Window closes, Operating Reserve Limit changes must be submitted via the ISO's electronic portal. Changes to the Operating Reserves Limit submitted using the electronic portal after the Real-Time Scheduling Window closes will be capped by the Operating Reserve Limit that the Hybrid Storage Resource submitted with its Real-Time Bid for each Real-Time Market hour. When a Hybrid Storage

Resource submits an update Operating Reserve Limit via the ISO's electronic portal it is required to concurrently submit an updated UOL if the maximum output a Hybrid Storage Resource is capable of achieving is also affected.

After the Real-Time Scheduling Window closes, Hybrid Storage Resources will also be required to submit changes to their Upper Operating Limits and Lower Operating Limit using the ISO's electronic portal to reflect the Hybrid Storage Resource's actual capabilities. Changes to the Upper Operating Limits and Lower Operating Limit submitted using the electronic portal after the Real-Time Scheduling Window closes will be bounded by the minimum Upper Operating Limits and maximum Lower Operating Limit that the Hybrid Storage Resource submitted with its Bid for the relevant Real-Time Market hour. Submission of updated Upper Operating Limits may also require the submission of a corresponding updated Operating Reserve Limit for the Hybrid Storage Resource if the Operating Reserve Limit is also affected.

If the ISO issues an Out-of-Merit dispatch instruction to a Hybrid Storage Resource, the Hybrid Storage Resource will be expected to fully comply with the instruction. Requests to change the Upper Operating Limits, Lower Operating Limit or Operating Reserve Limit while a Hybrid Storage Resource is subject to an Out-of-Merit instruction must be approved by the ISO and should only be effectuated by the Hybrid Storage Resource after the ISO issues a change to the Out-of-Merit instruction.

It is the responsibility of the Hybrid Storage Resource to submit Operating Reserve Limit, Upper Operating Limit and Lower Operating Limit updates in advance so that the ISO uses accurate information to determine a Hybrid Storage Resource's Energy, Regulation Service and Operating Reserve schedules. The risk associated with any delay between the time an updated Operating Reserve Limit, Upper Operating Limits or Lower Operating Limit is

submitted and its implementation in the ISO's market software is the responsibility of the Hybrid Storage Resource.

#### **4.4.1.2.1 Real-Time Bids to Supply or Withdraw Energy and Supply Ancillary Services, other than External Transactions**

Intermittent Power Resources that depend on wind or solar energy as their fuel submitting new or revised offers to supply Energy shall bid as ISO-Committed Flexible and shall submit a Minimum Generation Bid of zero MW and zero cost and a Start-Up Bid at zero cost.

Eligible Customers may submit new or revised Bids to supply or withdraw Energy, and to supply Operating Reserves and/or Regulation Service. Customers that submit such Bids may specify different Bid parameters in real-time than they did Day-Ahead.

A Hybrid Storage Resource may not submit a Lower Operating Limit that exceeds zero MW, or an Upper Operating Limit that is less than zero MW. Hybrid Storage Resources' obligations to submit and update their Operating Reserve Limit, Upper Operating Limits and Lower Operating Limit are addressed in Section 4.4.1.2, above.

Incremental Energy Bids, for portions of the Capacity of Resources that were scheduled in the Day-Ahead Market, and/or Start-Up Bids may be submitted by Suppliers bidding Resources using ISO-Committed Fixed, ISO-Committed Flexible, and Self-Committed Flexible bid modes that exceed the Incremental Energy Bids or Start-Up Bids submitted in the Day-Ahead Market or the mitigated Day-Ahead Incremental Energy Bids or Start-Up Bids where appropriate, if not otherwise prohibited pursuant to other provisions of the tariff.

The ISO will use a Fast-Start Resource's single point Start-Up Bid if one is submitted (or the mitigated Bid, where appropriate). If a Fast-Start Resource does not submit a single point Start-Up Bid in real-time, the ISO will use the point on the Fast-Start Resource's multi-point

Start-Up Bid curve (or its mitigated multi-point Start-Up Bid curve, where appropriate) that corresponds to the shortest specified down time.

Minimum Generation Bids or Regulation Service Bids for any hour in which Resources received a Day-Ahead Energy schedule or a Regulation Service schedule, as appropriate, may not exceed the Minimum Generation Bids or Regulation Service Bids, as appropriate, submitted for those Resources in the Day-Ahead Market. Provided however, a Fast-Start Resource that receives a Day-Ahead schedule may submit Minimum Generation Bids using ISO-Committed Fixed, ISO-Committed Flexible, and Self-Committed Flexible bid modes that exceed the dollar component of the Bids submitted in the Day-Ahead Market, or the dollar component of the mitigated Day-Ahead Bids where appropriate, if not otherwise prohibited pursuant to other provisions of the tariff.

Additionally, Real-Time Minimum Run Qualified Gas Turbine Customers shall not increase their previously submitted Real-Time Incremental Energy Bids, Minimum Generation Bids, or Start-Up Bids within 135 minutes of the dispatch hour. Bids to supply Energy or Ancillary Services shall be subject to the rules set forth in Section 4.2.1 of this ISO Services Tariff. For Behind-the-Meter Net Generation Resources, the ISO will consider only those segments of the Resource's Incremental Energy Bids above the forecasted Host Load and subject to the Injection Limit.

Suppliers bidding on behalf of Generators that did not receive a Day-Ahead schedule for a given hour may offer their Generators, for those hours, using the ISO-Committed Flexible, Self-Committed Flexible, Self-Committed Fixed bid mode or, with ISO approval, the ISO-Committed Fixed bid modes in real-time. For Behind-the-Meter Net Generation Resources, the ISO will consider only those segments of the Resource's Incremental Energy Bids above the

forecasted Host Load and subject to the Injection Limit. Suppliers bidding on behalf of Demand Side Resources that did not receive a Day-Ahead schedule to provide Operating Reserves or Regulation Service for a given hour may offer to provide Operating Reserves or Regulation Service using the ISO-Committed Flexible bid mode for that hour in the Real-Time Market provided, however, that the Demand Side Resource shall have an Energy price Bid no lower than the Monthly Net Benefit Offer Floor. A Supplier bidding on behalf of a Generator that received a Day-Ahead schedule for a given hour may not change the bidding mode for that Generator for the Real-Time Market for that hour provided, however, that Generators that were scheduled Day-Ahead in Self-Committed Fixed mode may switch, with ISO approval, to ISO-Committed Fixed bidding mode in real-time. Generators that were scheduled Day-Ahead in ISO-Committed Fixed mode will be scheduled as Self-Committed Fixed in the Real-Time Market unless, with ISO approval, they change their bidding mode to ISO-Committed Fixed.

Co-located Storage Resources must each submit a CSR injection Scheduling Limit and a CSR withdrawal Scheduling Limit for each hour of the Real-Time Market to indicate the expected capability of the relevant facilities. ~~An Energy Storage Resource~~s that participates ~~in~~ as CSR shall not submit Real-Time Market Bids that would Self-Commit either of the Generators, or both of the Generators together, to inject or to withdraw a quantity of Energy that exceeds an applicable CSR Scheduling Limit.

An Energy Storage Resource that participates as Co-located Storage Resources with a Fast-Start Resource shall not submit Real-Time Market Bids that would Self-Commit the Energy Storage Resource to inject Energy such that the Fast-Start Resource's Minimum Generation (which is equal to the full output of a Fixed Block Unit), plus the Energy Storage Resource's Self Schedule, exceeds the CSR injection Scheduling Limit.

A Supplier's Real-Time Bids for an Energy Storage Resource or Hybrid Storage Resource to withdraw Energy and to inject Energy shall be submitted as a single, continuous, bid curve representing the Capacity, in MW, available for dispatch in the Real-Time Market.

A Generator with a real time physical operating problem that makes it impossible for them: (a) to operate in the bidding mode in which the Generator or Aggregation was scheduled Day-Ahead ; or (b) to provide all of the Energy or Ancillary Services offered in their Bids, or (c) to achieve or comply with applicable operating parameters or other requirements, shall notify the ISO. Hybrid Storage Resources are expected to utilize the ISO's electronic portal to notify the ISO, whenever possible. Additionally, if the Host Load of a Behind-the-Meter Net Generation Resource is greater in real-time than was forecasted Day-Ahead such that it cannot meet its Day-Ahead schedule, it must notify the ISO.

Generators and Demand Side Resources may not submit separate Operating Reserves Availability Bids in real-time and will instead automatically be assigned a real-time Operating Reserves Availability Bid of zero for the amount of Operating Reserves they are capable of providing in light of their response rate (as determined under Rate Schedule 4). RTC and RTD will consider a Hybrid Storage Resource's Operating Reserve Limit when determining the amount of Operating Reserves the Hybrid Storage Resource is capable of providing.

#### **4.4.3 Real-Time Dispatch - Corrective Action Mode**

##### **4.4.3.1.1 Reserve Pickup**

The ISO will enter this RTD-CAM mode when necessary to re-establish schedules when large area control errors occur. When in this mode, RTD-CAM will send 10-minute Base Point Signals and produce schedules for the next ten minutes. RTD-CAM may also commit, or if

necessary de-commit, Resources capable of starting or stopping within 10-minutes. The ISO will continue to optimize for Energy and Operating Reserves, will recognize locational Operating Reserve requirements and Scarcity Reserve Requirements, but will set all Regulation Service schedules to zero. If Resources are committed or de-committed in this RTD-CAM mode the schedules for them will be passed to RTC and the Real-Time Dispatch for their next execution.

Resources that are eligible to provide Operating Reserves and that are available to the ISO for dispatch in real-time are required to be able to meet the energy sustainability requirements set forth in applicable NERC, NPCC and/or NYSRC reliability requirements. When the ISO enters a reserve pickup RTD-CAM mode it will determine sustainable Energy schedules for Energy Storage Resources that are eligible to provide Operating Reserves and that are available to the ISO for dispatch based on their telemetered state of charge. Hybrid Storage Resources are expected to notify the NYISO of limitations affecting their ability to provide Operating Reserves by timely submitting and updating Operating Reserve Limits.

The ISO will have discretion to classify a reserve pickup as a “large event” or a “small event.” In a small event the ISO will have discretion to reduce Base Point Signals in order to reduce transmission line loadings. The ISO will not ordinarily have this discretion in large events, except that it may determine Energy schedules that satisfy Operating Reserve energy sustainability requirements for Energy Storage Resources and Hybrid Storage Resources. The distinction also has significance with respect to a Supplier’s eligibility to receive Bid Production Cost guarantee payment in accordance with Section 4.6.6 and Attachment C of this ISO Services Tariff.