## 32. Market Services Tariff Attachment Q – Energy and Ancillary Services Market Rules for Internal Controllable Lines

Section 32 of the Market Services Tariff sets forth rules and requirements related to the participation of Internal Controllable Lines ("ICL") in the ISO-Administered Energy and Ancillary Services Markets.

### 32.1 Overview of ICL Energy Market Operation and Settlement

An ICL is a controllable transmission facility that connects two terminals that are both located inside the NYCA. ICL may only be eligible to flow power in one direction (unidirectional) or be eligible to flow power in either direction (bidirectional). An ICL is scheduled in the Day-Ahead Market and dispatched in the Real-Time Market based on its Bids or mitigated Bids. An ICL's Bids reflect the minimum amount by which the LBMP at one of its terminals (the "injection bus") must exceed the LBMP at its other terminal (the "withdrawal bus") plus the estimated cost of marginal losses for it to transmit a quantity of Energy from the withdrawal bus to the injection bus. Estimated losses are used for Day Ahead and Real Time Market scheduling and the Day-Ahead settlement. The Real Time Market settlement for an ICL accounts for actual losses.

### 32.2 ICL Operating Parameters

The following operating parameters are required for each ICL.

**Unidirectional or bidirectional operation**—An ICL must specify whether it offers service between its two terminals in only one direction (unidirectional), or in both directions (bidirectional).

**Anticipated predominant direction of flow**—This parameter sets the "positive" (ICL+) and "negative" (ICL-) scheduling directions that are used to evaluate the Bid of a bidirectional ICL. A unidirectional ICL will employ the "positive" direction only. When the schedule or dispatch for a bidirectional ICL is zero MW, the ICL+ generator bus is the injection bus.

The ISO will post the directionality convention for each ICL in an attachment to its Transmission Dispatch and Operations Manual.

**Operating Range in MW**—An ICL's operating range is expressed in injection MW. For a unidirectional ICL it will be from zero MW to the maximum amount of Energy (in MW) the ICL can deliver at the point where it injects Energy back onto the grid. For a bidirectional ICL the Operating Range will be a continuous range covering both the negative (ICL-) and positive (ICL+) scheduling directions, always including zero MW.

**Ramp Limit (in MW/minute)**—ICL technologies may be capable of ramping faster than other Resources are able to respond to the ISO's dispatch signals. Except when directed

by ISO or Transmission Owner system operators, an ICL's ramp rate will be subject to a ramp limit that the ISO is confident the NYCA can support. After the ISO gains operational experience integrating an ICL into the NYCA, the ISO may modify an ICL's ramp limit. Changes may be made over time, and in several steps.

**Loss factor**—the ICL will provide a single, uniform percentage of injection loss factor for the ISO to perform Day-Ahead and real-time scheduling, and to determine Day-Ahead Settlements for an ICL. The ICL may reflect costs caused by expected differences between estimated and actual losses in its Bids, and recognized differences may be incorporated into an ICL's reference levels.

The ISO may unilaterally instruct a temporary change to an ICL's ramp limit to protect system reliability. If an inaccurate loss factor is causing reliability, market or settlement impacts, and the ISO can update the loss factor to produce more accurate results, then the ISO shall consult with the ICL but it may unilaterally update the loss factor after providing the ICL at least one day advance notice of the change. Otherwise, the ISO shall consult with the ICL before it changes any of the operating parameters specified above.

The ICL may propose, but ISO approval is necessary to finalize or to change, the operating parameters set forth above. ICL are both permitted and expected to reflect actual reductions to the physical capability of the ICL (*i.e.*, changes to its available MW range) in Day-Ahead and real-time Bids, in addition to promptly notifying the ISO of any outage or derate.

### 32.3 ICL Energy Market Bidding Requirements

An ICL is required to submit Bids to transmit Energy in the Day-Ahead and Real-Time Markets whenever it expects to be available. The ISO will consider the Bids an ICL submits, or its mitigated Bids, in determining an ICL's Day-Ahead schedule and its real-time dispatch.

ICL Energy Bids include two components, an operating range in MW that must be consistent with the physical transfer capability of the ICL, and up to an eleven-step dollar/MWh curve that reflects an ICL's willingness to be paid or to pay to transmit Energy between its two terminal locations and to inject the Energy onto the grid at a specified terminal. An ICL's economic Bid is evaluated for scheduling or dispatch based on the difference in LBMP between the ICL's two terminal locations and the expected cost of losses.

The dollar Bids submitted by ICL can be positive or negative. For a unidirectional ICL, the Bid steps must be monotonically non-decreasing. A negative dollar offer for such an ICL indicates the amount the ICL is willing to pay to transmit Energy. For a bidirectional ICL the Bid steps must be monotonically non-decreasing in the ICL+ direction. A negative dollar offer in the ICL+ direction indicates the amount the ICL is willing to pay to inject a quantity of Energy at its positive terminal. The absolute value of a negative dollar offer in the ICL- direction indicates the amount the ICL expects to be paid to inject a quantity of Energy at its negative terminal.

ICL are required to offer all of their available capability using the ISO-Committed flexible Bid mode. ICL Bids may not require a minimum quantity of MW in order to be scheduled or dispatched. An ICL is not eligible to submit a Start-Up Bid. The MW range submitted with an ICL's hourly Bid may not be used to self-commit or self-schedule the ICL, or to preclude the ICL from receiving a schedule or dispatch that it is capable of delivering. Failure to offer available capability will be evaluated by the ISO for possible physical withholding. The MW range of an ICL's Bid must always include zero MW.

ICL that suffer an outage or a derate are required to report the outage or derate consistent with Sections 3.5.2 and 5.12.7.2 of the ISO Services Tariff and ISO Procedures, and are expected to timely reflect their limited capability in their real-time Bids for open hours.

## 32.4 ICL Energy Market Settlement Rules

In the Day-Ahead Market ICLs will be charged or paid for their scheduled Energy withdrawals and paid or charged for their scheduled Energy deliveries. In the ~~real~~Real-~~time~~ Time ~~market~~ Market ICLs will be charged or paid for their actual Energy withdrawals~~,~~ and paid or charged for their actual Energy deliveries.

### 32.4.1 Day-Ahead Market Settlement

Each ICL that bids into the Day-Ahead Market will be settled as the daily sum of the product of the hourly MWs scheduled to be delivered to the injection bus and the hourly LMBP, minus the hourly MWs scheduled to be withdrawn from the withdrawal bus, multiplied by a loss factor and the hourly LBMP, in accordance with the following equation:

$$\sum_{h=1}^{N} [(EI_h^{DA} \; x \; LBMPI_h^{DA}) \; - \; (EW_h^{DA} \; x \; LBMPW_h^{DA})]$$

Where:

| | |
|---|---|
| $N$: | Number of Hours in the Dispatch Day |
| $EI_h^{DA}$: | Energy scheduled in the Day-Ahead Market at the injection bus in each hour $h$ |
| $EW_h^{DA}$ | Energy scheduled at the withdrawal bus in the Day-Ahead Market in each hour $h$. Withdrawal energy schedule is equal to the injection energy schedule in the hour multiplied by a loss factor provided by the ICL. |
| $LBMPI_h^{DA}$ | Day-Ahead LBMP at the injection bus in hour $h$, expressed in $/MWh |
| $LBMPW_h^{DA}$ | Day-Ahead LBMP at the withdrawal bus in hour $h$, expressed in $/MWh |

### 32.4.2 Real-time Market Settlement

In the Real-Time Market the ICL will be settled for each hour in accordance with the formula below:

$$\sum_{i=1}^{N}\{[((AEI_i^{\sout{RT}} - EI_i^{DA})\ x\ LBMPI_i^{RT}) - ((AEW_i^{\sout{RT}} - EW_i^{DA})\ x\ LBMPW_i^{RT})]\ x\ [s_i^{\sout{RT}} \div 3600\ seconds]\}$$

Where:

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|---|---|
| $N$: | Number of intervals in the hour |
| $s_i^{\sout{RT}}$: | Length of RTD interval *i*, expressed in seconds. |
| $EI_i^{DA}$: | Energy scheduled Day-Ahead at the injection bus in the hour that includes RTD interval *i*, expressed in megawatts |
| $EW_i^{DA}$: | Energy scheduled Day-Ahead at the withdrawal bus in the hour that includes RTD interval *i*, expressed in megawatts |
| $LBMPI_i^{RT}$ : | Real-t-Time LBMP at the injection bus in interval *i*, expressed in $/MWh |
| $LBMPW_i^{RT}$ : | Real-t-Time LBMP at the withdrawal bus in interval *i*, expressed in $/MWh |
| $AEW_i$ : | Average actual Energy withdrawal in RTD interval *i*, expressed in terms of megawatts |
| $AEI_i$ : | Average actual Energy injection in RTD interval *i*, expressed in terms of megawatts |

### 32.4.3 Deviation Charges

In Real-time Dispatch (RTD) an Internal Controllable Line is expected to follow its ISO-issued dispatch. When an ICL is not following its dispatch, the ICL may be subject to a Deviation Charge. The deviation tolerance shall initially be set at 3% of the upper limit of an ICL's Operating Range for both over and under-injections.

Based on an ICL's demonstrated performance capability, or reliability concerns presented by the ICL's operation, the 3% deviation tolerance may be reduced by the ISO following advance notice to the ICL, but may not be set lower than 1.5%. Except when the ISO is acting to temporarily address an immediate reliability concern, it shall provide at least one full business

day advance notice to the ICL before it reduces the allowed deviation tolerance. If it has been reduced, the deviation tolerance may be increased by the ISO up to the maximum of 3%.

### 32.4.3.1 Over-Injection Charge

For intervals where the Average ~~actual~~ Actual Energy I~~i~~njection~~s~~ (as defined below) exceeds ISO dispatch instructions plus allowed deviation tolerance, the ICL will be assessed a deviation charge equal to the product of the ~~Energy Difference~~deviation in excess of tolerance and the greater of the shortage value of the East Operating Reserve Demand Curve (as defined below) or the LBMP at the injection bus for the relevant interval.

Over-Injection Charge formula:

$$\sum_{i=1}^{N}\left[Max(AEI_i^{\cancel{RT}} - (RTB_i + DT), 0)\ x\ Max\left(\cancel{O}RDC_{East}, LBMPI_i^{RT}\right)\ x\ (S_i^{\cancel{RT}} \div 3600\ seconds)\right]$$

Where,

| | |
|---|---|
| $N$ | = Number of intervals in the hour |
| $AEI_i^{\cancel{RT}}$ | = Average Actual Energy Injection in RTD interval *i*, expressed in megawatts. |
| $RTB_i$ | = RTD Real-time Basepoint in interval *i*, expressed in megawatts |
| $DT$: | = Deviation Tolerance, expressed in megawatts |
| $s_i^{\cancel{RT}}$: | = Length of RTD interval *i*, expressed in seconds. |
| $LBMPI_{\cancel{i}i}^{RT}$ | = Real-~~t~~Time LBMP at the injection bus in interval *i*, expressed in $/MWh |
| $\cancel{O}RDC_{East}$ | = Price on Eastern 30-Minute ~~Operating~~ Reserves ~~D~~demand ~~C~~curve when the 30-minute requirement is less than or equal to the target level of the requirement (the first step of the Eastern 30-Minute Reserves demand curve ~~ORDC~~). |

### 32.4.3.2 Under-Injection Charge

For intervals where the Average ~~actual~~ Actual Energy I~~i~~njection (as defined in Section 32.4.3.1 above~~-~~) i~~s~~ ~~are~~ less than ISO dispatch instructions minus allowed deviation tolerance, the ICL will be assessed a deviation charge equal to the product of the ~~Energy Difference~~deviation in excess of tolerance and the shortage value of the East Operating Reserve Demand Curve, as defined in Section 32.4.3.1 above.

Under-Injection Charge formula

$$\sum_{i=1}^{N}\left[Max\left((RTB_i - DT) - AEI_i^{RT}, 0\right)\ x\ \cancel{O}RDC_{East}\ x\ (S_i^{\cancel{RT}} \div 3600\ seconds)\right]$$

Definitions for this formula are the same as Section 32.4.3.1, above.

In intervals when ~~the~~ an ICL is dispatched OOM to protect system or local reliability, or as provided pursuant to ISO procedures, there shall be no deviation charges for over-injections or under-injections.