

# Attachment I

#### **4.5 Real-Time Market Settlements**

Transmission Customers and Customers taking service under this ISO Services Tariff or the ISO OATT, shall be subject to the Real-Time Market Settlement. All withdrawals and injections not scheduled on a Day-Ahead basis, including Real-Time deviations from any Day-Ahead External Transaction schedules, shall be subject to the Real-Time Market Settlement. Transmission Customers not taking service under this Tariff shall be subject to balancing charges as provided for under the ISO OATT. Settlements with Suppliers scheduling service from External Suppliers to the LBMP Market or to External Loads from the LBMP Market will be based upon scheduled withdrawals or injections. Real-Time Market Settlements for injections by Resources supplying Regulation Service or Operating Reserves shall follow the rules which are described in Rate Schedules 15.3 and 15.4, respectively.

For the purposes of this section, the scheduled output of each of the following Generators in each RTD interval in which it has offered Energy shall retroactively be set equal to its actual output in that RTD interval:

- (i) Generators, except for the Generator of a Behind-the-Meter Net Generation Resource, providing Energy under contracts executed and effective on or before November 18, 1999 (including PURPA contracts) in which the power purchaser does not control the operation of the supply source but would be responsible for penalties for being off-schedule, with the exception of Generators under must-take PURPA contracts executed and effective on or before November 18, 1999 who have not provided telemetering to their local TO and historically have not been eligible to participate in the NYPP market, which will continue to be treated as TO Load modifiers under the ISO-administered markets;

- (ii) Existing topping turbine Generators and extraction turbine Generators producing electric Energy resulting from the supply of steam to the district steam system located in New York City (LBMP Zone J) in operation on or before November 18, 1999 and/or topping or extraction turbine Generators utilized in replacing or repowering existing steam supplies from such units (in accordance with good engineering and economic design) that cannot follow schedules, up to a maximum total of 523 MW of such units.

This procedure shall not apply to Behind-the-Meter Net Generation Resources or a Generator for those hours it has used the ISO-Committed Flexible or Self-Committed Flexible bid mode.

In Sections 4.5.1, 4.5.2, 4.5.3, and 4.5.4 of this Tariff, references to “scheduled” Energy injections and withdrawals shall encompass injections and withdrawals that are scheduled Day-Ahead, unless otherwise noted, as well as injections and withdrawals that occur in connection with real-time Bilateral Transactions. In Sections 4.5.2 and 4.5.3 of this Tariff, references to Energy Withdrawals and Energy Injections shall not include Energy Withdrawals or Energy Injections in Virtual Transactions, or Energy Withdrawals or Energy Injections at Trading Hubs. Generators, including Limited Energy Storage Resources, that are providing Regulation Service shall not be subject to the real-time Energy market settlement provisions set forth in this Section, but shall instead be subject to the Energy settlement rules set forth in Rate Schedule 15.3 of this ISO Services Tariff.

#### **4.5.1 Settlement for Customers Scheduled To Sell Energy in Virtual Transactions in Load Zones**

The Actual Energy Injection in a Load Zone by a Customer scheduled Day-Ahead to sell Energy in a Virtual Transaction is zero and the Customer shall pay a charge for the Energy imbalance equal to the product of: (a) the Real-Time LBMP calculated in that hour for the applicable Load Zone; and (b) the scheduled Day-Ahead Energy Injection of the Customer for that Hour in that Load Zone.

#### **4.5.2 Real-Time Market Settlements for Energy Injections or When Actual Demand Reductions are Less Than Scheduled Demand Reductions**

##### **4.5.2.1 General Rules for Suppliers**

**A Supplier shall pay or be paid for Energy imbalance to account for differences between Actual Energy Injections, real-time Energy schedules and Day-Ahead Energy schedules.**

When the LBMP calculated in that RTD interval at the applicable Generator's bus is positive, the Supplier payment shall be calculated as follows:

$$\text{Supplier payment} = ((\text{MIN}(\text{AE}_{iu}, \text{RTS}_{iu}) - \text{DAS}_{hu}) * \text{LBMP}_{iu}^{RT}) * \frac{S_i}{3600}$$

Where:

- $\text{AE}_{iu}$  = average Actual Energy Injection by Supplier  $u$  in interval  $i$  or average Actual Energy Withdrawal by an Energy Storage Resource  $u$  in interval  $i$ ;
- $\text{RTS}_{iu}$  = (1) real-time Energy scheduled for injection by Supplier  $u$  in interval  $i$  plus Compensable Overgeneration; or (2) real-time Energy scheduled for withdrawal by Energy Storage Resource  $u$  in interval  $i$  plus 3% of the absolute value of the Energy Storage Resource's Lower Operating Limit; or (3) average Actual Energy Withdrawal by an Energy Storage Resource  $u$  in interval  $i$  when it has been designated as operating Out-of-Merit to withdraw at the request of a Transmission Owner or the ISO;
- $\text{DAS}_{hu}$  = Day-Ahead Energy schedule for Supplier  $u$  in hour  $h$  containing interval  $i$ ;
- $\text{LBMP}_{iu}^{RT}$  = real-time price of Energy at the location of Supplier  $u$  in interval  $i$ ;

$S_i$  = number of seconds in RTD interval  $i$ ;

When: (1) the LBMP calculated in that RTD interval at the applicable Generator bus is negative; or (2) the ISO initiates a large event reserve pickup or a maximum generation pickup under RTD-CAM that applies to the Load Zone where the Generator is located; or (3) a Transmission Owner initiates a reserve pickup in accordance with a Reliability Rule, including a Local Reliability Rule, then the Supplier payment shall be calculated as follows:

$$\text{Supplier Payment} = ((AE_{iu} - DAS_{hu}) * LBMP_{iu}^{RT}) * \frac{S_i}{3600}$$

Where:

The variables are defined above in this Section 4.5.2.1.

A Generator that is not following Base Point Signals shall not be compensated for Energy in excess of its Real-Time Scheduled Energy injection if its applicable upper operating limit has been reduced below its bid-in upper operating limit by the ISO in order to reconcile the ISO's dispatch with the Generator's actual output, or to address reliability concerns.

If the Energy injections by a Supplier over an RTD interval are less than the Energy injections scheduled for the Supplier Day-Ahead, and if the Supplier reduced its Energy injections in response to instructions by the ISO or a Transmission Owner that were issued in order to maintain a secure and reliable dispatch, the Supplier may be entitled to a Day-Ahead Margin Assurance Payment, pursuant to Attachment J of this ISO Services Tariff.

Suppliers scheduling Imports shall pay or be paid for Energy imbalance to account for differences between real-time Energy schedules and Day-Ahead Energy schedules. For an Import to the LBMP Market that is only scheduled in the Real-Time Market, or to the extent it is

scheduled to supply additional or less Energy to the LBMP Market in real-time than it was scheduled to supply Day-Ahead, the Supplier payment shall be calculated as follows:

$$\text{Supplier Payment} = ((RTS_{iup} - DAS_{hup}) * LBMP_{ip}^{RT}) * \frac{S_i}{3600}$$

Where:

- $RTS_{iup}$  = real-time Energy scheduled for injection by Supplier  $u$  in interval  $i$  at Proxy Generator Bus  $p$ ;
- $DAS_{hup}$  = Day-Ahead Energy schedule for Supplier  $u$  in hour  $h$  containing interval  $i$  at Proxy Generator Bus  $p$ ;
- $LBMP_{ip}^{RT}$  = real-time price of Energy at the Point of Receipt  $p$  (*i.e.*, the Proxy Generator Bus) in interval  $i$ ;
- $S_i$  = number of seconds in RTD interval  $i$ ;

#### **4.5.2.2 Failed Transactions**

If an Energy injection scheduled by RTC at a Proxy Generator Bus fails in the ISO's checkout process and the checkout failure occurred for reasons within the Supplier's or Transmission Customer's control, it will be required to pay the "Financial Impact Charge" described below. The ISO will determine whether the Transaction associated with an injection failed for reasons within a Supplier's or Transmission Customer's control.

If an Energy injection at a Proxy Generator Bus is determined to have failed for reasons within a Supplier's or Transmission Customer's control, the Financial Impact Charge will equal: (i) the difference computed by subtracting the actual real-time Energy injection from the amount of the Import scheduled by RTC; multiplied by (ii) the greater of the Real-Time Market Congestion Component of the LBMP in the relevant interval, or zero.

If a Wheel Through fails for reasons within a Supplier's or Transmission Customer's control, the Financial Impact Charge will equal the sum of the Financial Impact Charge described in this section and the Financial Impact Charge described below in Section 4.5.3.2.

All Financial Impact Charges collected by the ISO shall be used to reduce the charges assessed under Rate Schedule 1 of this ISO Services Tariff. In the event that the Energy injections for an Import scheduled by RTC or RTD, at a Proxy Generator Bus is Curtailed at the request of the ISO, and (i) the real-time Energy Profile MW is equal to or greater than the Day-Ahead Energy Schedule for that interval, and (ii) the real-time Decremental Bid is less than or equal to the default real-time Decremental Bid amount as established by ISO procedures, then the Supplier or Transmission Customer that is subjected to the Curtailment, in addition to the charge for Energy Imbalance, shall be eligible to receive an Import Curtailment Guarantee Payment for its curtailed Import pursuant to Attachment J of this ISO Services Tariff.

#### **4.5.2.3 Capacity Limited Resources and Energy Limited Resources**

For any hour in which: (i) a Capacity Limited Resource is scheduled to supply Energy, Operating Reserves, or Regulation Service in the Day-Ahead Market; (ii) the sum of its schedules to provide these services exceeds its bid-in upper operating limit; (iii) the Capacity Limited Resource requests a reduction for Capacity limitation reasons; and (iv) the ISO reduces the Capacity Limited Resource's upper operating limit to a level equal to, or greater than, its bid-in upper operating limit; the imbalance charge for Energy, Operating Reserve Service or Regulation Service imposed on that Capacity Limited Resource for that hour for its Day-Ahead Market obligations above its Capacity limited upper operating limit shall be equal to the product of: (a) the Real-Time price for Energy, Operating Reserve Service and Regulation Capacity; and (b) the Capacity Limited Resource's Day-Ahead schedule for each of these services minus the amount of these services that it has an obligation to supply pursuant to its ISO-approved schedule. When a Capacity Limited Resource's Day-Ahead obligation above its Capacity limited upper operating limit is balanced as described above, any real-time variation from its

obligation pursuant to its Capacity limited schedules shall be settled pursuant to the methodology set forth in Section 4.5.2.1.

For any day in which: (i) an Energy Limited Resource is scheduled to supply Energy, Operating Reserves or Regulation Service in the Day-Ahead Market; (ii) the sum of its schedules to provide these services exceeds its bid-in Normal Upper Operating Limit; (iii) the Energy Limited Resource requests a reduction for Energy limitation reasons; and (iv) the ISO reduces the Energy Limited Resource's Day-Ahead Emergency Upper Operating Limit to a limit no lower than the Normal Upper Operating Limit; the Resource may be eligible to receive a Day-Ahead Margin Assurance Payment pursuant to Attachment J of this ISO Services Tariff.

#### **4.5.2.4 Demand Reductions**

When the verified actual Demand Reduction over an hour from a Demand Reduction Provider that is also the LSE providing Energy service to the Demand Side Resource(s) that produced the reduction is less than the Demand Reduction scheduled for that hour, that-LSE shall pay a Demand Reduction imbalance charge consisting of the product of: (a) the greater of the Day-Ahead LBMP or the Real-Time LBMP for that hour and (b) the difference between the scheduled Demand Reduction and the verified actual Demand Reduction in that hour.

When the verified actual Demand Reduction over an hour from a Demand Reduction Provider that is not the LSE providing Energy service to the Demand Side Resource(s) that produced the reduction is less than the Demand Reduction scheduled over that hour, then (1) the LSE providing Energy service to the Demand Reduction Provider's Demand Side Resource(s) shall pay a Demand Reduction imbalance charge equal to the product of (a) the Day-Ahead LBMP calculated for that hour for the applicable Load bus and (b) the difference between the scheduled Demand Reduction and the verified actual Demand Reduction at that bus in that hour,



and (2) the Demand Reduction Provider will pay an amount equal to (a) the product of (i) the higher of the Day-Ahead LBMP or the Real-Time LBMP calculated for that hour for the applicable Load bus, and (ii) the difference between the scheduled Demand Reduction and the verified actual Demand Reduction at that bus in that hour, and (b) minus the amount paid by the LSE providing service to the Demand Reduction Provider's Demand Side Resource(s) under (1), above.

### **4.5.3 Real-Time Market Settlements for Energy Withdrawals Other Than in Virtual Transactions**

#### **4.5.3.1 General Rules**

A Customer (other than a Generator that is eligible to withdraw Energy) shall pay or be paid for Energy imbalance to account for differences between Actual Energy Withdrawals over an RTD interval and its Energy withdrawals scheduled Day-Ahead. The ISO shall charge the Customer as follows for each applicable Load Zone:

$$\text{Customer Charge} = ((AEW_{icz} - DAS_{hcz}) * LBMP_{iz}^{RT}) * \frac{S_i}{3600}$$

Where:

- $AEW_{icz}$  = Actual Energy Withdrawal by Customer  $c$  in Load Zone  $z$  in interval  $i$ ;
- $DAS_{hcz}$  = Day-Ahead scheduled Energy withdrawals by Customer  $c$  in Load Zone  $z$  in hour  $h$  containing interval  $i$ ;
- $LBMP_{iz}^{RT}$  = real-time price of Energy for Load Zone  $z$  in interval  $i$ ;
- $S_i$  = number of seconds in RTD interval  $i$ ;

A Customer LSE providing Energy service to a Demand Reduction Provider's Demand Side Resource in a Load Zone shall be charged the product of: (a) the Real-Time hourly LBMP for that Load Zone; and (b) the actual Demand Reduction at the Demand Reduction Bus in that Load Zone.

If the Generator of a Behind-the-Meter Net Generation Resource is not able to serve the Resource's Host Load at any time, any resulting Actual Energy Withdrawals that serve the Host Load will be charged to the Load Serving Entity responsible for serving the Behind-the-Meter Net Generation Resource.

Customers scheduling Exports shall pay or be paid for Energy imbalance to account for differences between real-time Energy schedules and Day-Ahead Energy schedules. For an Export from the LBMP Market that is only scheduled in the Real-Time Market, or to the extent it is scheduled to withdraw additional or less Energy from the LBMP Market in real-time than it was scheduled to withdraw Day-Ahead, the ISO shall charge the Customer as follows:

$$\text{Customer Charge} = ((RTS_{iup} - DAS_{hup}) * LBMP_{ip}^{RT}) * \frac{S_i}{3600}$$

Where:

- $RTS_{iup}$  = real-time Energy scheduled for withdrawal by Customer  $u$  in interval  $i$  at Proxy Generator Bus  $p$ ;
- $DAS_{hup}$  = Day-Ahead Energy schedule for Customer  $u$  in hour  $h$  containing interval  $i$  at Proxy Generator Bus  $p$ ;
- $LBMP_{ip}^{RT}$  = real-time price of Energy at the Point of Delivery  $p$  (*i.e.*, the Proxy Generator Bus) in interval  $i$ ;
- $S_i$  = number of seconds in RTD interval  $i$ ;

#### **4.5.3.2 Failed Transactions**

If an Energy withdrawal at a Proxy Generator Bus scheduled by RTC fails in the ISO's checkout process and the checkout failure occurred for reasons within the Supplier's or Transmission Customer's control, it will be required to pay the "Financial Impact Charge" described below. The ISO will determine whether the Transaction associated with a withdrawal failed for reasons within a Supplier's or Transmission Customer's control.

If an Energy withdrawal at a Proxy Generator Bus is determined to have failed for reasons within a Supplier's or Transmission Customer's control, the Financial Impact Charge will equal: (i) the difference computed by subtracting the actual real-time Energy withdrawal from the amount of the Export scheduled by RTC; multiplied by (ii) the product of negative one and the lesser of the Real-Time Market Congestion Component of the LBMP in the relevant interval, or zero.

If a Wheel Through fails for reasons within a Supplier's or Transmission Customer's control, the Financial Impact Charge will equal the sum of the Financial Impact Charge described in this subsection and the Financial Impact Charge described above in Section 4.5.2.2.

All Financial Impact Charges collected by the ISO shall be used to reduce the charges assessed under Rate Schedule 15.1 of this ISO Services Tariff.

#### **4.5.4 Settlement for Customers Scheduled To Purchase Energy in Virtual Transactions in Load Zones**

The Actual Energy Withdrawal in a Load Zone by a Customer scheduled Day-Ahead to purchase Energy in a Virtual Transaction is zero and the Customer shall be paid the product of: (a) the Real-Time LBMP calculated in that hour for the applicable Load Zone; and (b) the scheduled Day-Ahead Energy Withdrawal of the Customer for that Hour in that Load Zone.

#### **4.5.5 Settlement for Trading Hub Energy Owner when POI is a Trading Hub**

Each Trading Hub Energy Owner who bids a Bilateral Transaction into the Real-Time Market with a Trading Hub as its POI and has its schedule accepted by the ISO will pay the product of: (a) the hourly integrated Real-Time LBMP for the Load Zone associated with that Trading Hub; and (b) the Bilateral Transaction scheduled MW.

#### **4.5.6 Settlement for Trading Hub Energy Owner when POW is a Trading Hub**

Each Trading Hub Energy Owner who bids a Bilateral Transaction into the Real-Time Market with a Trading Hub as its POW and has its schedule accepted by the ISO will be paid the product of: (a) the hourly integrated Real-Time LBMP for the Load Zone associated with that Trading Hub; and (b) the Bilateral Transaction scheduled MW.

#### **4.5.7 Performance Tracking**

The ISO shall use a Performance Tracking System to compute the difference between the Energy actually supplied and the Energy scheduled by the ISO for all Suppliers located within the NYCA and shall use it to measure compliance with criteria associated with the provision of Energy and Ancillary Services as set forth in the ISO Procedures. The Performance Tracking System shall also be used to report metrics for Loads.