

## **15.2 Rate Schedule 2 - Payments for Supplying Voltage Support Service**

This Rate Schedule applies to payments to Suppliers who provide Voltage Support Service to the ISO. Transmission Customers and Customers will purchase Voltage Support Service from the ISO under the ISO OATT.

Suppliers provide Voltage Support Service from eligible providers, which are Generators with ~~an Automatic Voltage Controlling equipment Regulator~~ (“Generators,” for the purpose of this Rate Schedule 2), synchronous condensers, and Qualified Non-Generator Voltage Support Resources. Aggregations are not eligible to provide Voltage Support Service.

Qualified Suppliers of Voltage Support Service shall be referred to as such or as Voltage Support Resources in this Rate Schedule. An RMR Generator operating under an RMR Agreement that provided Voltage Support Service at any time during the most recent twelve (12) months that it participated in the ISO Administered Markets must provide Voltage Support Service during the term of its RMR Agreement, unless it demonstrates to the ISO’s satisfaction that it is no longer capable of providing the service. An Interim Service Provider that is required to keep its generating units in service and that provided Voltage Support Service during the most recent twelve (12) months that it participated in the ISO Administered Markets must continue to provide Voltage Support Service, unless it demonstrates to the ISO’s satisfaction that it is no longer capable of providing the service. The rate provided in this Rate Schedule shall be used to calculate payments to eligible Suppliers providing Voltage Support Service as applied on a technology-specific basis. The ISO shall calculate payments on an annual basis, and make payments monthly.

### 15.2.1 Responsibilities

The ISO shall coordinate the Voltage Support Service provided by Suppliers that qualify to provide such services as described in Section 15.2.1.1 of this Rate Schedule 2. The ISO shall also establish methods and procedures for Reactive Power (MVar) capability testing.

#### 15.2.1.1 Suppliers

To qualify for payments, Suppliers of Voltage Support Service shall provide a Generator that has automatic voltage controlling equipment~~an AVR~~, or a Qualified Non-Generator Voltage Support Resource with automatic voltage controlling equipment, other than the Cross Sound Scheduled Line, ~~an AVR~~, or a synchronous condenser, each of which must be electrically located within the NYCA. Automatic voltage controlling equipment includes but is not limited to an Automatic Voltage Regulator (“AVR”) for non-inverter-based Generators or inverters capable of automatic voltage control for inverter-based Generators. All Suppliers of Voltage Support Service must successfully perform Reactive Power (MVar) capability testing in accordance with the ISO Procedures and prevailing industry standards. The ISO may direct Qualified Suppliers of Voltage Support Service to operate their Voltage Support resources within these demonstrated reactive capability limits. Qualified Suppliers of Voltage Support Service will test their Voltage Support Resources and provide these services in accordance with ISO Procedures.

Voltage Support Service includes the ability to produce or absorb Reactive Power within the Voltage Support Resource’s -tested reactive capability, and the ability to maintain a specific voltage level under both steady-state and post-contingency operating conditions subject to the limitations of the Voltage Support Resource’s stated reactive capability. The requirement for a Voltage Support Resource to absorb Reactive Power may be set aside by the ISO with input from

the Transmission Owner in whose Transmission District the Voltage Support Resource is located, which input may include, at the Transmission Owner's option, an executive level review. To grant an exemption from the requirement that the Voltage Support Resource be able to absorb Reactive Power, the ISO shall have determined that: 1) the Voltage Support Resource is unable, due to transmission system configuration, to absorb Reactive Power; 2) the ability of the Voltage Support Resource to produce Reactive Power is needed for system reliability; and 3) for purposes of system reliability the Voltage Support Resource does not need to have the ability to absorb Reactive Power.

An RMR Generator that is required to provide Voltage Support Service must timely perform the annual testing applicable to all Suppliers of Voltage Support Service described in this Section 15.2.1 and in ISO Procedures so that it remains continuously eligible to provide Voltage Support Service during the term of its RMR Agreement. If such an RMR Generator did not timely perform all of the annual testing required for it to provide Voltage Support Service prior to the start of the term of its RMR Agreement, then the ISO shall permit the RMR Generator to perform Reactive Power (MVar) capability testing in accordance with the ISO Procedures upon entering the RMR Agreement and shall permit the RMR Generator to be a Qualified Supplier of Voltage Support Service. An Interim Service Provider that is required to keep its generating units in service must timely perform the annual testing applicable to all Suppliers of Voltage Support Service described in this Section 15.2.1 and in ISO Procedures so that it remains continuously eligible to provide Voltage Support Service. If such an Interim Service Provider did not timely perform all of the annual testing required for it to provide Voltage Support Service, then the ISO shall permit the Interim Service Provider to perform Reactive Power (MVar) capability testing in accordance with the ISO Procedures promptly upon

becoming an Interim Service Provider and shall permit the Interim Service Provider to be a Qualified Supplier of Voltage Support Service.

### **15.2.2 Payments**

Each month, Suppliers whose Generator(s) meet the requirements to supply Installed Capacity, as described in Article 5 of the ISO Services Tariff, and are under contract to supply Installed Capacity, shall receive one-twelfth (1/12th) of the annual payment calculated under Section 15.2.2.1 of this Rate Schedule for Voltage Support Service.

Each month, Suppliers whose Generators are not under contract to supply Installed Capacity, Suppliers with synchronous condensers, and, except as noted in the following paragraph, Qualified Non-Generator Voltage Support Resources shall receive one-twelfth (1/12th) of the annual payment calculated under Section 15.2.2.1 of this Rate Schedule, pro-rated by the number of hours that the Generator, synchronous condenser, or Qualified Non-Generator Voltage Support Resource operated in that month, as recorded by the ISO.

Each month, the Cross-Sound Scheduled Line shall receive one-twelfth (1/12th) of the annual payment calculated under Section 15.2.2.1 of this Rate Schedule, pro-rated by the number of hours that it is energized in that month, as recorded by the ISO.

#### **15.2.2.1 Annual Payment for Voltage Support Service**

For purposes of the calculation set forth in Section 15.2.2 of this Rate Schedule, the annual payment to Suppliers qualified and eligible to provide Voltage Support Service shall equal the product of the VSS Compensation Rate and the sum of the lagging and the absolute value of the leading MVar capacity of the resource, as evidenced by tests conducted pursuant to ISO Procedures.

For VSS Suppliers that are CSR Generators, compensation for each VSS Supplier shall be limited to the lesser of its Reactive Power capability, demonstrated in accordance with ISO procedures, or the total Reactive Power capability at the CSR's Point of Injection/Point of Withdrawal.

The VSS Compensation Rate of \$2,592/MVAr, as determined in 2014, shall be adjusted annually by the annual average Consumer Price Index of the previous year.

#### **15.2.2.2 Lost Opportunity Costs**

A Supplier of Voltage Support Service from a Generator that is being dispatched by the ISO shall also receive a payment for Lost Opportunity Costs ("LOC") when the ISO directs the Generator to reduce its real power (MW) output below its Economic Operating Point in order to allow the Generator to produce or absorb more Reactive Power (MVAr), unless the Supplier is already receiving a Day-Ahead Margin Assurance Payment for that reduction under Attachment J to this ISO Services Tariff. The Lost Opportunity Cost payment shall be calculated as the maximum of zero or the difference between: (i) the product of: (a) the appropriate MW of output reduction and (b) the Real-Time LBMP at the Generator bus; and (ii) the Generator's Energy Bid for the reduced output of the Generator multiplied by the time duration of reduction in hours or fractions thereof.

The formula below describes the calculation of LOC as applied to each Generator supplying Voltage Support Service.

$$LOC_i = \max \left( \left( LBMP_{RT,i} * (EOP_i - \max(AEI_i, RTS_i, DAS_i)) - \int_{\max(AEI_i, RTS_i, DAS_i)}^{EOP_i} Bid \right), 0 \right) * \frac{S_i}{3600}$$

Where:

$LOC_i$  = Lost Opportunity Cost for interval  $i$

$LBMP_{RT,i}$  = Real-time LBMP for interval  $i$

$EOP_i$  = The Generator's Economic Operating Point for interval  $i$

$AEI_i$  = The Generator's Actual Energy Injection for the interval  $i$

$RTS_i$  = The Generator's Real-Time Energy Schedule for interval  $i$

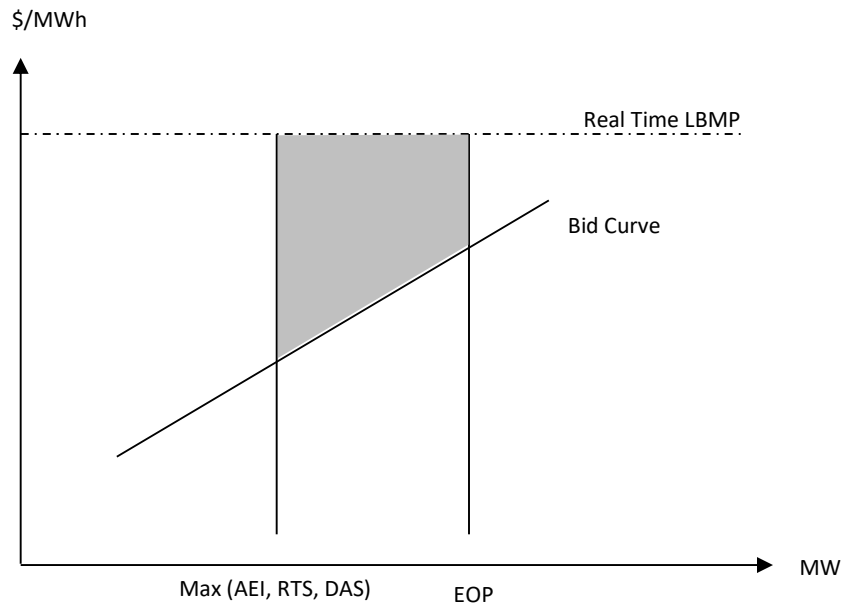
$DAS_i$  = The Generator's Day-Ahead Schedule for the hour containing  $i$

$Bid_i$  = Generator's Bid curve in effect for interval  $i$

$S_i/3600$  = The length of interval  $i$ , containing  $S_i^{seconds}$  in units of hours

Figure 2.0(b) below graphically portrays the calculation of the LOC for a Generator which reduced its MW output to allow it to produce or absorb more Reactive Power (MVar).

**Figure 2.0(b) - Incremental Bid Curve Used to Calculate LOC**



### **15.2.2.3 Other Payments to Synchronous Condensers and Qualified Non-Generator Voltage Support Resources**

If a synchronous condenser or Qualified Non-Generator Voltage Support Resource energizes in order to provide Voltage Support Service in response to a request from the ISO, the ISO shall compensate the facility for the cost of Energy it consumes to energize converters and other equipment necessary to provide that Voltage Support Service.

### **15.2.3 Failure to Perform by Suppliers**

A Generator, synchronous condenser, or a Qualified Non-Generator Voltage Support Resource will have failed to provide voltage support if it:

- 15.2.3.1 when operating at real-power levels consistent with test conditions, fails within ten minutes to be within 5% (+/-) of the requested Reactive Power (MVar) level of production or absorption as requested by the ISO or applicable Transmission Owner unless it was prevented from doing so by transmission

system conditions and except when the Voltage Support Resource is requested not to produce or absorb Reactive Power in which case that Voltage Support Resource fails to provide Voltage Support if the absolute value of its level of Reactive Power production or absorption within ten minutes is greater than 5% multiplied by the sum of the absolute values of (a) that Voltage Support Resource's maximum reactive power production level under test conditions and (b) that Voltage Support Resource's maximum reactive power absorption level under test conditions;

15.2.3.2 when operating at real-power levels consistent with test conditions, fails within ten minutes to be at 95% or greater of the Voltage Support Resource's demonstrated Reactive Power capability (tested pursuant to ISO Procedures) in the appropriate lead or lag direction when requested to go to maximum lead or lag reactive capability by the ISO or applicable Transmission Owner unless it was prevented from doing so by transmission system conditions;

15.2.3.3 fails to provide Voltage Support Service in a Contingency, as defined by ISO Procedures;

15.2.3.4 fails to maintain its automatic voltage ~~controlling equipment regulator~~ (as appropriate) in service and in automatic voltage control mode, or fails to commence timely repairs to the automatic voltage ~~controlling equipment regulator~~.

Suppliers of Voltage Support Service that fail to comply with the ISO Procedures will be assessed charges by the ISO in the manner described in Sections 15.2.4, 15.2.5, and 15.2.6 below.



#### **15.2.4 Failure to Respond to ISO's Request for Steady-State Voltage Control**

Failure: If a Voltage Support Resource fails to comply with the ISO's request for steady-state voltage control, the ISO shall withhold Voltage Support Service payments from the non-complying Supplier equivalent to the VSS Failure to Perform Penalty for that specific Generator, synchronous condenser, or Qualified Non-Generator Voltage Support Resource for that month. The Supplier shall also be liable for any additional cost in procuring replacement Voltage Support Service including LOC incurred by the ISO as a direct result of the Supplier's non-performance.

The formula below describes the monthly VSS Failure to Perform Penalty (VFP)

$$VFP = (VSS \text{ payment for the month}) * (F/R)$$

Where:

$F$  = number of failures in the month

$R$  = number of times the Voltage Support Resource was called upon for Voltage Support in the month

Repeated Failures: In addition to the charges for failure, the non-complying Supplier will also be subject to the charges described in this paragraph. If a Supplier's Voltage Support Resource fails to comply with fifty percent (50%) or more of the ISO's requests for two consecutive months, then the non-complying Supplier will no longer be eligible for Voltage Support Service payments for service provided by that Voltage Support Resource. The ISO may reinstate payments once the Supplier complies with the following conditions to the ISO's satisfaction:

- 15.2.4.1 the Supplier's Voltage Support Resource must successfully perform a Reactive Power (MVar) capability test, and

15.2.4.2 the Supplier's Voltage Support Resource must provide Voltage Support Service for thirty (30) consecutive days without any compliance failures. No payments for Voltage Support Service or LOC will be made to the Supplier on account of Voltage Support Service from such Voltage Support Resource during this period.

**15.2.5 Failure to Provide Voltage Support Service When a Contingency Occurs on the NYS Power System**

If a Supplier's Voltage Support Resource fails to respond to a contingency, based on ISO review and analysis, the ISO shall withhold Voltage Support Service payments from the non-complying Supplier as follows:

Initial Failure: The ISO will withhold from the Supplier one-twelfth (1/12th) of the annual payment for the specific Voltage Support Resource (or an amount equal to the last month's voltage support payment made to it, if it is not an Installed Capacity provider).

Second Failure within the same thirty (30) day period: The ISO shall withhold from the Supplier one-fourth (1/4th) of the annual payment for the specific Voltage Support Resource (or an amount equal to the last three (3) months' voltage support payments made to it, if it is not an Installed Capacity provider). In addition, the Supplier that is in violation shall be prohibited from receiving Voltage Support Service payments for the non-complying Voltage Support Resource until the Supplier complies with the following conditions to the ISO's satisfaction:

15.2.5.1 the Supplier's Voltage Support Resource shall successfully perform a Reactive Power (MVar) capability test, and

15.2.5.2 the Supplier's Generator, synchronous condenser, or Qualified Non-Generator Voltage Support Resource shall provide Voltage Support Service for thirty (30) consecutive days without any compliance failures. No payments for

Voltage Support Service, or LOC shall be made to the Supplier on account of Voltage Support Service from such Generator, synchronous condenser, or Qualified Non-Generator Voltage Support Resource during this period.

**15.2.6 Failure to Maintain ~~an~~ Automatic Voltage Controlling Equipment Regulator or Commence Timely Repairs**

If a Supplier's Voltage Support Resource, other than the Cross Sound Scheduled Line, fails to maintain its automatic voltage controlling equipment~~regulator~~ and fails to notify the ISO, in accordance with ISO procedures, of an outage lasting more than thirty (30) days the Voltage Support Resource will be disqualified as a supplier of Voltage Support Service.

The Supplier will not receive Voltage Support Service payments for the disqualified Voltage Support Resource until the Supplier complies with the following conditions:

- (1) the Supplier provides documentation to the NYISO of the completion of the repairs;
- (2) the Supplier's Voltage Support Resource successfully performs a Reactive Power (MVar) capability test, and;
- (3) the Supplier's Voltage Support Resource provides Voltage Support Service for thirty (30) consecutive days without any compliance failures. No payments for Voltage Support Service or LOC on account of Voltage Support Service from such Generator or Qualified Non-Generator Voltage Support Resource shall be made to the Supplier during this period.

If, in accordance with ISO procedures, a Qualified Supplier of Voltage Support Service notifies the ISO within thirty days of an automatic voltage controlling equipment~~regulator~~ outage that lasts longer than thirty days, but the Supplier fails to commence timely and appropriate repairs, the Voltage Support Resource will remain in the VSS program and will receive one half

its full monthly VSS payment. The Voltage Support Resource will begin receiving full monthly VSS payment when its automatic voltage controlling equipment~~AVR~~ returns to full functionality. The Voltage Support Resource will not be eligible for VSS payment in the next compensation year if it fails to repair its automatic voltage controlling equipment~~AVR~~ and perform an acceptable test in accordance with ISO procedures.

#### **15.2.7 Consistence with Cross-Sound Scheduled Line Protocols**

Nothing in this Rate Schedule shall be construed to change existing protocols between the ISO and ISO New England, Inc. regarding the operation of the Cross-Sound Scheduled Line.