

METERING AGREEMENT between GREEN MOUNTAIN POWER (GMP), VERMONT ELETRIC COOPERATIVE (VEC), AND VERMONT ELECTRIC POWER COMPANY (VELCO)
(Collectively the Parties)
REGARDING THE METERING FOR KINGDOM COMMUNITY WIND (KCW)

RECITALS

WHEREAS, the Parties agree that the losses caused by KCW generation will occur on the VEC system and that such losses should be shared between VEC and GMP according to relative purchased share of the KCW generation; and

WHEREAS, the Parties agree that the KCW revenue metering at the Lowell substation will capture both the KCW net generation and the KCW compensated net generation, which can be used to calculate the approximate losses caused by KCW generation; and

WHEREAS, the Parties agree that the compensation parameters programmed into the KCW revenue metering can be easily changed periodically to improve the calculation of approximate losses caused by KCW generation; and

WHEREAS, the Parties agree the 46 kV system in this area will be loop connected to both the Transco Jay and Irasburg Substations, that there will be a normally open point on the 46 kV line between Richford and Highgate, the C53 breaker (Lowell to Irasburg) will normally be open, and that KCW will not be allowed to generate with the C53 breaker closed. However, the C53 breaker can be used to provide KCW station service when KCW is not generating; and

WHEREAS, when the Net Generation produced by KCW that exceeds the local load Excess Generation occurs); and

WHEREAS, the losses to be allocated resulting from the Excess Generation of KCW will be calculated as the Net Generation less Compensated Net Generation multiplied by one minus the square of the result of the Local Load divided by the Net Generation, as shown in Appendix 1; and

WHEREAS, GMP and VEC currently have a 25 year purchase power agreement (PPA) that allocates 55/63 to GMP and 8/63 to VEC; and

WHEREAS, in the event any new generation is added to the transmission system within the area that excess generation is calculated or any normally closed/open points change their normal operating status, this agreement will be revisited and adjusted, as required, to not unduly burden KCW or VEC with unwarranted losses.

DEFINITIONS

Net Generation is equal to the gross generation less station service and line losses to the metering point in the Lowell substation, as provided by the uncompensated revenue quality metering at that substation's connection to the KCW collector substation.

Calculated Load Line Loss is the energy value in MWh in all subtransmission line sections of the VEC Subsystem for the sum of all hourly values over a representative period of integral months, as calculated in the Hourly Loss Analysis for the case without KCW generation.

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Calculated Total Line Loss is the energy value in MWh in all subtransmission line sections of the VEC Subsystem for the sum of all hourly values over a representative period of integral months, as calculated in the Hourly Loss Analysis for the case with KCW generation.

Compensated Net Generation is equal to the Net Generation compensated for 46 kV line, as provided by the compensated revenue quality metering in the Lowell substation at that substation's connection to the KCW collector substation, where the Compensation Parameters are programmed into that meter.

Compensation Parameters are the numerical values programmed into the compensated revenue quality metering.

Excess Generation results when the sum of the three meters at the VELCO Delivery Points show a net export to the VELCO system. Excess Generation shall equal the sum of the three VEC to VELCO (OUT) meters subtracted by the sum of the three VELCO to VEC (IN) meters, for the three aforementioned meters. If the preceding formula produces a negative number, the result shall be set to zero.

Hourly Loss Analysis is a spreadsheet calculation that calculates hourly line losses in every line section of the VEC Subsystem under for the two cases of Calculated Total Line Loss and Calculated Load Line Loss. Such analysis shall include actual hourly real and reactive load data for each point at which VEC load is served on VEC Subsystem, the load at the VELCO Delivery Points. The analysis shall also include each line section impedance and assumed constant voltage at Jay and Irasburg 46 kV busses.

KCW Share GMP is 55/63, as defined by the KCW PPA.

Local Load is equal to the Net Generation minus the three VEC to VELCO (OUT) meters subtracted by the sum of the three VELCO to VEC (IN) meters, for the VELCO Delivery Points metering equipment.

Excess Generation Losses are the losses attributable to the Excess Generation.

PTF Interconnection is the 46 kV electrical locations at which the VEC Subsystem interconnects at the VELCO Delivery Points, which represents a point on the Vermont Transco (Transco) system that is on the Independent System Operator of New England (ISO-NE) defined Pool Transmission Facility (PTF) system.

SLAL is the hourly load adjustment in MWh that is calculated and used by VELCO to account for subtransmission losses that must be allocated among the hourly load of Vermont utilities for ISO-NE settlement purposes.

SLAL KCW Adjustment is the hourly value in MWh that is subtracted from the VEC hourly load and added to the GMP hourly load for hourly load of Vermont utilities for ISO-NE settlement purposes.

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VEC Subsystem is the VEC 46 kV system to which the KCW is connected, which consists of all 46 kV lines from the VELCO Delivery Points to the GMP Lowell substation and the radial line to the VEC Richford substation (to normal open point with 46 kv circuit from Highgate). The VEC Subsystem excludes the 46 kV line from the KCW collector substation to the GMP Lowell substation and all transformers connected to the VEC Subsystem.

VELCO Delivery Points are the three 46 kV breakers as follows: H10 and H11 at the Jay Substation and H15 at the Irasburg Substation, which include revenue quality metering equipment at each breaker that measures real and reactive hourly energy both from VELCO to VEC (OUT) and from VEC to VELCO (IN) at each meter.

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NOW, THEREFORE, BE IT RESOLVED that the parties agree as follows:

1. The Parties wish to calculate the losses resulting from Excess Generation on an hourly basis to be allocated among GMP and VEC based on their respective share of the PPA.
2. That the Generation will be submitted to ISO-NE and the Excess Generation losses will be allocated to GMP and VEC's ISO-NE settlement loads.
3. That VELCO shall calculate the hourly load of GMP and VEC for ISO-NE settlement purposes by subtracting the SLAL KCW Adjustment from the VEC hourly load and adding the SLAL KCW Adjustment to the GMP hourly load.
4. That the SLAL KCW Adjustment shall be calculated according to the formula in Appendix 1, which is based on the KCW Share GMP.
5. The initial Compensation Paramenters will be based on the sum of the 46 kV line impedance from the KCW meter to the PTF Interconnection.
6. The Compensation Paramenters may be changed from time to time, based upon an Hourly Loss Analysis.
7. VEC shall verify that compensation parameters programmed into the VEC compensated meters for all points where radial load is connected to the VEC Subsystem include both transformer loss parameters and 46 kV line impedance from the transformer to the connection to the VEC Subsystem.
8. Both GMP and VEC shall review and approve the Hourly Loss Analysis, based on data provided by VELCO.
9. The Hourly Loss Analysis will also verify that the actual Compensated Generation is based on the Compensation Parameters based on the formulae and parameters used by the compensated meter.
10. The Parties will review results of the Hourly Loss Analysis to determine if the Compensation Paramenters should be increased or decreased to more closely provide actual hourly losses.
11. The Parties agree to change this agreement if any substantial change occurs that affects losses on the VEC Subsystem.

Approved and adopted this _____ day of October 2012.

Green Mountain Power

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Vermont Electric Cooperative

Vermont Electric Power Company

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APPENDIX 1

Excess Generation Loss Calculation

Formula

Net Generation = NG
 Compensated Net Generation = CG
 Excess Generation = EG
 Local Load = LL
 Excess Generation Losses = EGL

If EG is greater than Zero:

$$EGL = (1 - (\frac{LL}{NG})^2) \times (NG - CG)$$

If EG is Zero or Negative:

$$EGL = -0-$$

Examples

Example	Conditions	Calculation
1	NG = 10 CG = 9.8 EG = 0 LL = 10	EGL = -0-
2	NG = 20 CG = 19.2 EG = 10 LL = 10	$EGL = (1 - (10/20)^2) \times (20 - 19.2) = 0.6 \text{ MW}$
3	NG = 30 CG = 28.2 EG = 20 LL = 10	$EGL = (1 - (10/30)^2) \times (30 - 28.2) = 1.6 \text{ MW}$
4	NG = 40 CG = 36.8 EG = 30 LL = 10	$EGL = (1 - (10/40)^2) \times (40 - 36.8) = 3.0 \text{ MW}$
5	NG = 50 CG = 45 EG = 40 LL = 10	$EGL = (1 - (10/50)^2) \times (50 - 45) = 4.8 \text{ MW}$
6	NG = 60 CG = 52.8 EG = 50 LL = 10	$EGL = (1 - (10/60)^2) \times (60 - 52.8) = 7.0 \text{ MW}$

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