EIGHT POINT WIND ENERGY CENTER

Case No. 16-F-0062

1001.34 Exhibit 34

Electric Interconnection

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Exhibit 34: Electric Interconnection

The wind power generated by the Project will be connected into the existing transmission grid from low voltage to high voltage using a collection cable system and transmission line conductors interconnected to the existing infrastructure at a New York State Electric & Gas (NYSEG) Bennett substation. Low voltage (690 V) power is produced by each wind turbine. This power is stepped up to a medium voltage (34.5 kV) by a transformer at each wind turbine location. An underground and overhead collection system of medium voltage power is used to collect the power to a collection substation. The medium voltage power is stepped up to high voltage (115 kV) and transported through an overhead high voltage transmission line to the Point of Interconnection (POI) substation which will be the existing Bennett substation owned by NYSEG. The 16.5-mile 115 kV overhead transmission line will be permitted separately under Article VII of the New York Public Service Law. The dead-end structure adjacent to the fence line between the Project collection substation and the 115 kV transmission line shall be the demarcation point between the Project and the Article VII facilities. The Article VII facilities will terminate at the POI which is NYSEG's Bennett Substation.

34(a) Voltage

At each turbine location, a pad mount or internal transformer will step up the voltage of electricity generated from the turbine from 690 volts to 34.5 kilovolts (kV) for the collection system. The collection system utilized will be composed of mostly insulated underground cable and a short section of overhead conductor divided into four feeder circuits terminating at the collection substation. The Project collection substation will be located near the northeast corner of King Hill Road and Christian Hollow West Union Road in the Town of Greenwood, New York where the voltage of the system will be stepped up from 34.5 kV to 115 kV.

The voltage of the 16.5-mile overhead transmission line, which will be permitted separately under Article VII of the New York PSL, will be 115 kV.

34(b) Conductors

The underground collection system will be approximately 33.90 miles containing multiple cable sections connecting each wind turbine back to the collection substation. Each cable section will be comprised of 35 kV tree retardant cross-linked polyethylene (TR-XLPE) insulated, with concentric neutral type cable. Cable sizes will vary from 4/0 thousand circular mil (kcmil) to 1250 kcmil depending on the quantity of turbines the conductor will be supporting. The collection cable will conform to all applicable standards, including but not limited to IECA Publication S-94-649 and AEIC Specification CS8.

The overhead collection system will be 1.32 miles long supported on single wood poles. The overhead collection design will be utilized for a small portion of the collection system where it is not feasible to install underground cable. The transition from underground to overhead will occur on riser poles and will remain above ground for 1.32 miles. Each overhead collection section will contain 3 phases of single Aluminum Conductor, Steel Reinforced (ACSR) conductors. Preliminary design indicates the size of conductor will be 477 kcmil, but may be revised depending on the power the conductors need to support.

At the collection substation the conductors utilized will be both flexible overhead ACSR conductor and rigid bus connections that will meet or exceed the required ampacity.

34(c) Insulator Design

Typical utility-grade ceramic/porcelain or composite/polymer insulators designed and constructed in accordance with ANSI C29, will be utilized on the systems. Insulators on the overhead collection system will typically be polymer suspension and strain insulators. Insulators in the substations will typically be porcelain.

34(d) Length of Transmission Line

The transmission line, which will be permitted separately under Article VII of the New York Public Service Law, will run approximately 16.5 miles generally northward between the Project collection substation and the POI which is the existing NYSEG Bennett Substation.

34(e) Tower Dimensions & Construction Materials

The collection overhead design will incorporate the use of both steel and wood structures. The structures heights will vary between 30-50 feet above ground utilizing a steel or laminate wood cross arm (see drawings in Appendix 34-1).

While the transmission line will be permitted separately under Article VII of the New York Public Service Law, preliminary design of the transmission line incorporates the use of both steel and wood structures. Steel structures will range in height from 70-115 feet above ground utilizing a delta configuration (one phase on top, two phases on bottom). Wood structures will range in height from 55-60 feet above ground utilizing a 2 pole horizontal configuration. These structures will have an average span length of 500 feet. Appendix 34-2 contains transmission line drawings of typical structures. Further detail and specification on structures will be included in the Article VII application.

34(f) Tower Design Standards

Overhead collection line structures, conductors, and hardware will be designed in accordance with the standards below (the Article VII transmission facility will also be designed to these standards).

- ANSI C2-2017 - National Electrical Safety Code (NESC)
- ANSI 05.1.2008 - Wood Poles – Specifications & Dimensions
- ASCE 48-2011 - Design of Steel Transmission Pole Structures
- ASCE MOP 74-2010 - Guidelines for Electrical Transmission Line Structural Loading
- ASCE MOP 91-1997 - Design of Guyed Electrical Transmission Structures
- IEEE 81-2012 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System
- IEEE 516-2009 - IEEE Guide for Maintenance Methods on Energized Power Lines
- IEEE 524-2003 - Guide to the Installation of Overhead Transmission Line Conductors
- IEEE 563-1978 - Guide on Conductor Self-Damping Measurements

- IEEE 644-1994 - Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields From AC Power Lines
- IEEE 656-1992 - Standard for the Measurement of Audible Noise from Overhead Transmission Lines
- IEEE 691-2001 - Guide for Transmission Structure Foundation Design and Testing
- IEEE 738-2006 - Standard for Calculating the Current-Temperature of Bare Overhead Conductors
- IEEE 977-1991 - Guide to Installation of Foundations for Transmission Line Structures
- IEEE 1243-1997 - Guide for Improving the Lightning Performance of Transmission Lines
- IEEE 1313.2-1999 - Guide for the Application of Insulation Coordination
- IEEE Std 1542-2007 - Guide for Installation, Maintenance, and Operation of Irrigation Equipment Located Near or Under Power Lines.

All tangent and guyed terminal structures foundations will be direct embedded. For direct embedded structures, the excavation hole shall be approximately 12 inches greater than the butt diameter of pole. Backfill shall be well compacted in lifts no greater than 12 inches or per the construction specifications. Backfill shall satisfy ASTM C33 size #57 material or approved equivalent. For all down guy wires, anchors will be either grouted rock or pile anchors. The Project will have several self-supporting steel poles on caisson drilled shaft concrete foundations.

34(g) Underground Cable System & Design Standards

Power produced by the wind turbine generators will be collected by the underground cable systems described in section 34(b).

Collection cables will be designed in accordance with the following standards:

- ACI - American Concrete Institute
- ADC - Air Diffusion Council
- AEIC - Association of Edison Illuminating Companies
- AISC - American Institute of Steel Construction
- AMCA- Air Movement Control Association
- ANSI - American National Standards Institute, Inc.
- ARI- American Refrigeration Institute
- ASCE - American Society of Civil Engineers
- ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
- ASTM - American Society for Testing and Materials
- AWS - American Welding Society
- IBC – International Building Code
- ICEA-Insulated Cable Engineers Association
- IEEE - Institute of Electrical and Electronics Engineers
- NEBB - National Environmental Balancing Bureau
- NEC- National Electrical Code
- NEMA- National Electrical Manufacturers Association
- NFPA- National Fire Protection Association
- SMACNA- Sheet Metal and Air Conditioning Contractors National Association

Cable design shall be single aluminum conductor, 70 mil LLDPE jacket, 100% rated tree retardant crosslinked polyethylene (TRXLPE) insulation meeting the requirements of UL 1072, MV 90, ICEA S-94-649/AEIC CS8, except for jacket thickness.

Neutral conductors shall consist of uncoated, round, annealed copper wires concentrically applied directly over the insulation shield.

34(h) Underground Lines Profile & Oil Pumping Stations/Manhole Locations

The underground collection lines and associated material is portrayed in drawings D-11, D-12, D-13, D-15, and D-16 of Appendix 11-3. The cable will be buried at varying depths depending on location and environmental conditions, but generally no less than 36 inches outside of agricultural lands and 48 inches within agricultural lands.

Oil pumping stations and manhole locations are not utilized as part of the 34.5 kV collection cable system. This is typical of pipe-type cable installation.

34(i) Equipment to be installed

The Eight Point collection substation will include 34.5 kV and 115 kV busses, transformers, circuit breakers, capacitor bank, steel structures, a control building, metering units, and air break disconnect switches.

The existing NYSEG Bennett Substation, which is the point of interconnection, will be modified to include an additional bay to facilitate the new 115 kV transmission line which will be permitted separately under Article VII. Additionally, a new take-off structure, breaker, bus work, and ancillary equipment will be required and will be designed in accordance with the requirements of the NYISO facility study and NYSEG, the transmission operator and owner of the Bennett Substation.

The components listed above are necessary for delivery of energy produced by the Project to the electrical power grid.

34(j) Any Terminal Facility

The terminal facilities utilized on this Project are the collection substation and POI, which is at the existing NYSEG Bennett Substation, both as described above.

34(k) Cathodic Protection Measures

Cathodic protection measures are not expected to be required on the underground portion of the Project.

Cathodic protection measures are not expected to be required on the direct embed steel poles utilized on this Project since the environment, soil, and existing underground facilities are not anticipated to cause corrosion to the steel structures.