



**EIGHT POINT WIND, LLC
115kV TRANSMISSION LINE**

Case No. 18-T-_____

Exhibit E-4

Engineering Justification

Contents

Exhibit E-4: Engineering Justification	1
E-4.1 Summary of Proposed Facility.....	1
E-4.2 Description of Existing Facilities.....	1
E-4.3 Need for Proposed Project: Consistency with State Energy Plan, Clean Energy Standard and Other Long Range Plans	1
E-4.4 Benefits of Proposed Project.....	3
E-4.5 Construction Schedule	3
E-4.6 System Impact Study: Consistency With NYISO Planning Requirements.....	3
E-4.7 Impact on Reliability.....	5

Appendices

Appendix E-4-1 System Reliability Impact Study

Exhibit E-4: Engineering Justification

E-4.1 Summary of Proposed Facility

The transmission line is a critical component of the Eight Point Wind Energy Center (EPWEC) as it interconnects the emission free energy from the generation facility to the New York State transmission grid. Accordingly, from an engineering perspective, the transmission is justified and required in order for EPWEC to operate. For the purposes of this section, the transmission line and EPWEC generation components will collectively be referred to as the Project or Project facilities.

E-4.2 Description of Existing Facilities

The transmission line will pass through the Towns of Greenwood, Hartsville, and Hornellsville in Steuben County, New York. The route begins at the proposed 115-34.5 kV collection substation located in Greenwood, at the corner of Town Line Road and Christian Hollow Road, which is being permitted as part of the EPWEC Article 10 Application (Case 16-F-0062). The transmission line will require installation of steel monopoles, steel 3-pole structures, wood H-frame, and wood 3-pole structures at 143 locations along the route. The majority of the line is comprised of single monopole steel structures, which limit the overall visual and land impacts.

The transmission line will terminate at new Point of Interconnection (POI) facilities within the New York State Electric and Gas (NYSEG) existing Bennett substation. The Bennett substation is located on the east side of NY-36 in the Town of Hornellsville, New York. The existing Bennett substation will be modified to accommodate the new 115 kV transmission line. The Applicant has been in consultation with NYSEG regarding the Project and the required upgrades. The resolution of these consultations will be discussed in the EM&CP.

E-4.3 Need for Proposed Project: Consistency with State Energy Plan, Clean Energy Standard and Other Long Range Plans

The EPWEC as a whole will play an important role in supporting the 2015 New York State Energy Plan (Plan) vision by developing job opportunities, supporting economic growth, and delivering emission-free electricity to the State. The Project will support the Plan's effort to increase energy efficiency and progress toward a clean energy future. The Plan categorizes seven focus areas for initiative including:

- Renewable Energy
- Buildings and Energy Efficiency
- Clean Energy Financing
- Sustainable and Resilient Communities
- Energy Infrastructure Modernization
- Innovation and Research and Development (R&D)
- Transportation

The Project will make a significant contribution to the Renewable Energy Initiative of the Plan by providing emission free energy to New York's energy market. The Plan is based on a set of five Guiding Principles, each of which is supported by the EPWEC:

Market Transformation: With each new, large renewable energy project, the local and regional supply chain is strengthened and expanded. The Project will help stimulate the local economy through direct and indirect spending and the demand for trained wind technicians. Construction of the Project is anticipated to create approximately 143 full-time equivalent (FTE) local project development and on-site construction jobs, approximately 176 FTE turbine construction and supply chain jobs, and approximately 82 FTE induced jobs within New York according to Job and Economic Development Impact (JEDI) model developed for the Project as described in Exhibit 6 of this Application. The operation and maintenance of the Project is expected to generate approximately 8 FTE on-site jobs, approximately 6 FTE local revenue and supply chain jobs, and approximately 7 FTE induced jobs annually within New York based on the JEDI model. These impacts do not include additional jobs that will be created outside of New York by workers from other states. The Project is also helping to transform New York's energy market by moving from a fossil fuel dominated market toward a more diverse market with renewables playing a larger role.

Community Engagement: The Applicant will continue to engage with local and state stakeholders.

Private Sector Investment: The Applicant is making a considerable private investment to develop and construct the Project, of which, over \$28 million will directly benefit New York businesses, communities, and landowners based on the JEDI model. Exhibit 6 of this Article VII Application provides a detailed discussion of the economic benefits of the Project.

Innovation and Technology: The Project will utilize state-of-the-art wind turbine technology that has been developed to increase efficiency while reducing acoustical levels and minimizing impacts on the surrounding environment.

Customer Value and Choice: By developing the Project efficiently and economically and by increasing the amount of wind generated power available in New York, the Applicant will provide clean, renewable energy to New York customers.

The Plan builds on the principles above with additional initiatives, goals, and targets. By adding up to 101.8 MW of clean, renewable wind power into the New York State energy market, the Project is consistent with the Plan and instrumental in meeting the NYPSC's adopted Clean Energy Plan 2030 targets of:

- 40% reduction in greenhouse gas emissions from 1990 levels;
- 50% of electricity generation from renewable energy sources.

To further the State's commitment to renewable energy, the New York State Energy Research and Development Authority (NYSERDA) has proposed a comprehensive Clean Energy Fund (CEF). The CEF is part of the Reforming the Energy Vision (REV) initiative, a 10-year \$5 billion funding program to support clean energy market development and innovation and to secure renewable energy resources as part of

New York's clean energy future. In fact, in January 2017, Governor Cuomo announced that the Eight Point Project had been awarded a contract under NYSERDA's Renewable Portfolio Standard Program Purchase of Renewable Energy Attributes. John Rhodes, the-then President and CEO of NYSERDA, said, "Large-scale renewables are a critical component in achieving Governor Cuomo's nation-leading energy goals of 50 percent renewable power by 2030 and a 40 percent reduction in greenhouse gas emissions over the same time. These projects will provide renewables, aggressively reduce emissions and make energy more affordable for New Yorkers."

As noted above, the NYSPSC adopted a Clean Energy Standard (CES) in August 2016 instituting a timeline for the state to procure 50% of electricity consumed in the state to be generated from renewable energy resources by 2030. The CES also seeks to bring investment, economic development, and jobs to New York State. This CES has been adopted in conjunction with New York State's REV. The Project is consistent with these long-term New York State energy planning objectives.

E-4.4 Benefits of Proposed Project

The Project will produce enough zero emission energy to power approximately 47,000 average households in New York State (based on average annual consumption of 7.2 MWh per household in NY (EIA, 2017)), and will do so with minimal environmental impacts. As explained in Section E-4.3 above, the Project is consistent with New York State's long range energy planning objectives and provides substantial economic benefits to the State.

In addition to the adding jobs during the construction and operation and maintenance phases as described above, the Project is forecast to have a positive effect on zonal prices in the control area load zone in which they are located. New York Independent System Operator (NYISO) Zone C,¹ which includes all of Steuben County and all or portions of adjacent counties, is expected to experience a reduction in the average zonal prices of approximately \$0.15/MWh in 2019 based on modeling using the PROMOD platform. Exhibit 6 describes this analysis in detail.

E-4.5 Construction Schedule

The commencement of operation of the transmission line must be in sufficient time to serve the operation of the EPWEC, which is expected to be in 2020.

E-4.6 System Impact Study: Consistency With NYISO Planning Requirements

The New York Independent System Operator (NYISO) has reviewed the System Reliability Impact Study (SRIS) related to the Project's interconnection of the EPWEC to the New York State bulk transmission grid. The SRIS evaluated a number of power flow base cases, as provided by the NYISO, including expected flows on the system under normal, peak, and emergency conditions in order to evaluate the effects on stability of the interconnection. Additionally, technical analyses of thermal, voltage, short circuit, and stability were performed to evaluate the impact of interconnection.

¹ NYISO Zone C is also referred to as the Capital Zone.

The Applicant is filing a Material Modification Determination request with NYISO updating the items listed below. The changes are:

- Change wind turbines from (32) GE 3.23 MW to (27) GE 3.43 MW plus (4) GE 2.3 MW; and
- Interconnection length change from 10 miles to 16.5 miles.

The Applicant anticipates the proposed changes will be deemed to be non-material, and that there will be no significant adverse impacts to the New York State Transmission System.

The information contained in the SRIS is proprietary; therefore, the Applicant will seek the requisite trade secret and any other protections for this information pursuant to Public Officers Law (POL) Section 87(2) (d) and 16 NYCRR § 6-1.3.

The results presented in the SRIS, which was approved by the OC on February 9, 2017, indicate that the Project will not adversely impact the reliability of the New York State Transmission System. Key assumptions underpinning these results include:

- The Project will be operated in accordance with all NYISO requirements, including all applicable NYISO and Transmission Owner day ahead and real time operational procedures and limits. The NYISO will operate the project in a manner that does not negatively impact the New York State Transmission System; this may include dispatching patterns that eliminate potential reliability issues that may exist during certain system conditions.
- The Project and associated interconnection facilities will be designed in accordance with all the Applicable Reliability Standards.
- The SRIS results and conclusions are based on the studied scenarios and various assumptions related with the study methodologies, system, and project modeling information provided by the Developer.

Based on NYISO approval, the Project has been entered into the 2017 Class Year and has executed the Facility Study.

The SRIS also found that

“Under the Minimum Interconnection Standard (MIS), any potential adverse reliability impact identified by the Interconnection Study that can be managed through the normal operating procedures of the NYISO, will not be identified as a degradation of system reliability or noncompliance with the North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Council (NPCC), or New York State Reliability Council (NYSRC) reliability standards. It is assumed that the owners and operators of the proposed facilities will be subject to, and shall abide by, the applicable NYISO operating procedures (e.g., security constrained economic dispatch, meaning that pre-contingency the system will be dispatched at all times in such way to not violate the post-contingency applicable limits). Consequently, under the NYISO MIS requirements, no System Upgrade Facilities (SUFs) other than local SUFs are required to address them.”

Based on these findings, the SRIS concluded that the Project does not present any significant adverse impacts to the reliability of the affected transmission systems.

E-4.7 Impact on Reliability

The results presented in the SRIS indicate that the Project will not adversely impact the reliability of the New York State Transmission System. Key findings from the numerous analyses performed for the SRIS included:

Power Flow Analysis

The SRIS used New York 2020 summer and winter peak load conditions to complete a power flow analysis. Pre and post contingency analyses did not identify any significant adverse impacts or violations. The SRIS notes that the Project will be subject to the applicable NYISO and/or NYSEG operating procedures such as “security constrained economic dispatch, meaning that pre-contingency the system will be dispatched at all times to be consistent with post-contingency applicable limits.”

Stability Analysis

The SRIS’ normal contingency stability analysis found that “the New York State Transmission System remained stable and positively damped for all contingencies tested under summer peak and light load conditions. The faults studied include four Normal contingencies and four extreme contingencies.”

The local contingency stability analysis found that “the New York State Transmission System remained stable and positively damped for all sixteen local faults tested under summer peak and light load conditions.”

The SRIS performed Critical Clearing Time (CCT) testing on “Pre-Project and Post-Project Summer Light and Summer Peak load cases at the 115 kV Bennett substation along with its adjacent 115 kV buses.” CCT Testing refers to the substation protection time, which in turn corresponds with the maximal fault duration for which a system remains transiently stable. The study tested each of the buses at 5 cycle intervals until either an unstable condition occurred or the testing reached a maximum of 35 cycles. The study found no adverse impacts to the system’s critical clearing time.

Transfer Analysis

The SRIS utilized the pre- and post-Project summer peak cases for its transfer analysis. The thermal transfer limits were increased by 10% for the Dysinger-East, West Central and Volney East normal thermal transfer limits, with an evaluation of system performance for various faults being completed for each case. The analysis showed that “the system remained stable and damped for all faults tested.”

Short Circuit Analysis

Following the NYISO Guideline for Fault Current Assessment, a Short Circuit analysis was conducted by “applying three-phase, double-line to ground and single-line to ground bus faults at various substations in the vicinity of the Project”. While there was an increase in the total bus fault currents at nearby substations due to the Project, “it did not cause any fault current to exceed the available lowest breaker rating at the impacted substations.”

NPCC A-10 Analysis

In accordance with the NPCC Document A-10, “Classification of Bulk Power System Elements”, the SRIS completed NPCC Bulk Power System (BPS) testing for the Bennett, Moraine Road, Meyer, Howard, Bath, and Palmitier Road 115 kV buses. The study found that “there was no significant adverse impact outside of the local area and the Project does not change the BPS classification of Bennett, Moraine Road, Meyer, Howard, Bath, and Palmitier Road 115 kV substations.” As such, the SRIS concluded that these stations should remain as non-BPS stations.

In summary, this SRIS analysis concludes that the Project will not adversely impact the reliability of the New York State Transmission System.