Bluestone Wind Project

Case No. 16-F-0559

1001.8 Exhibit 8

Electric System Production Modeling

EXHIBIT 8 ELECTRIC SYSTEM PRODUCTION MODELING

(a) Computer-based Modeling Tool

The analyses presented this section of the Application were developed using the *ABB PROMOD/Powerbase Versions 11.1*. The Applicant consulted with the New York State Department of Public Service (DPS) and NYSDEC to develop an acceptable input data set to be used in the simulation analyses, including modeling for the Applicant's proposed Facility and inputs for the emissions analysis. Portions of the data to be provided are proprietary and/or Critical Energy Infrastructure (CEII) and will be filed under a protective agreement. That data is proprietary, which are typically retained as trade secrets, will be provided to DPS under separate cover. The Applicant will seek the requisite trade secret protection for this information pursuant to NY Public Officer's Law Section 87(2)(d) and 16 NYCRR 6-1.4.

(1) Estimated Statewide Levels of Greenhouse Gas Emissions

Table 8-1 below lists the estimated statewide levels of SO_2, NOx, and CO_2 emissions, in short tons, with and without the Bluestone Wind Facility for the 2021 study year.

Table 8-1. Statewide Emissions With and Without the Facility

Emissions (Short Tons)	Without Bluestone Wind Facility	With Bluestone Wind Facility	Reduction in Emissions
SO2	2,183	2,174	9
NOx	14,790	14,737	53
CO2	28,166,063	28,093,234	72,829

(2) Estimated Prices Representative of all NYISO Zones

Table 8-2 below lists the estimated minimum, maximum, and average annual spot prices representative of all New York Independent System Operator (NYISO) zones within the New York Control Area (NYCA), both with and without the Facility for the year 2021.

Table 8-2. Estimated Annual Spot Prices Representative of NYISO NYCA Zones

NYISO Zone	Without Bluestone Wind Facility			With Bluestone Wind Facility		
	Minimum Spot Prices	Maximum Spot Prices	Average Spot Prices	Minimum Spot Prices	Maximum Spot Prices	Average Spot Prices
NY - A	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - B	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - C	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - D	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - E	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - F	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - G	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - H	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - I	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - J	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
NY - K	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

(3) Estimated Capacity Factor

An 8,760-hourly generation profile was developed using on-site meteorological tower wind measurements. For the purposes of this and other analyses presented in this Section, the V 150 -4.2 MW turbine was used to create the generation profile. Typical assumptions for availability, environmental, curtailment and any other potential sources of energy losses are then taken from the gross production to yield a long-term net energy yield and capacity factor of [redacted]%.

(4) Estimated Annual and Monthly Output Capability Factors

Table 8-3 provides the typical annual and monthly on-peak and off-peak megawatt-hours (MWhr) output capability factors for the proposed Facility.

Table 8-3. Monthly and Annual On-Peak and Off-Peak Output Capability Factors for the Proposed Facility

Month	On-Peak		Off-Peak	
	MWh Output	Capacity Factor (%)	MWh Output	Capacity Factor (%)
1	[redacted]	[redacted]	[redacted]	[redacted]
2	[redacted]	[redacted]	[redacted]	[redacted]
3	[redacted]	[redacted]	[redacted]	[redacted]
4	[redacted]	[redacted]	[redacted]	[redacted]
5	[redacted]	[redacted]	[redacted]	[redacted]
6	[redacted]	[redacted]	[redacted]	[redacted]
7	[redacted]	[redacted]	[redacted]	[redacted]
8	[redacted]	[redacted]	[redacted]	[redacted]
9	[redacted]	[redacted]	[redacted]	[redacted]
10	[redacted]	[redacted]	[redacted]	[redacted]
11	[redacted]	[redacted]	[redacted]	[redacted]
12	[redacted]	[redacted]	[redacted]	[redacted]
Annual	[redacted]	[redacted]	[redacted]	[redacted]

(5) Estimated Annual and Monthly Production Output

Monthly energy yield averages were determined from the observed wind production profile data for each month and long-term adjustments were made to the monthly data set. Based on the long-term adjusted average energy yield for each month, a gross monthly energy distribution for the year can be determined. Monthly specific loss assumptions for availability, environmental, and curtailment were subtracted from the gross monthly production distribution to yield the estimated production in MWh for each month. The annual production output was determined from the sum of all monthly net energy yields in MWh. Table 8-4 provides the estimated monthly MWh production output of the Facility as well as the total annual MWh production.

Table 8-4. Anticipated Monthly and Annual Production Output of the Proposed Facility

Month	Production Output (MWh)
1	[redacted]
2	[redacted]
3	[redacted]

Month	Production Output (MWh)
4	[redacted]
5	[redacted]
6	[redacted]
7	[redacted]
8	[redacted]
9	[redacted]
10	[redacted]
11	[redacted]
12	[redacted]
Annual	[redacted]

(6) Estimated Production Curve Over an Average Year

Hourly production of the Facility was calculated using ABB PROMOD and 8,760 hours of wind production profile data provided by the Applicant. Estimates of hourly production and scheduled hourly production in tabular and graphical forms will be filed separately under confidential cover.

(7) Estimated Production Duration Curve over an Average Year

Tables in Appendix A show the hourly of the Facility as well as the hours count for milestones production (production duration only). Also included is a graph showing the production duration curve for the Facility.

(8) Effect of the Facility on the Energy Dispatch of Existing Must-run Resources

In order to assess the estimated effects of the proposed Facility on the energy dispatch of existing must-run resources (which includes existing wind, hydroelectric and nuclear facilities, as well as cogeneration facilities to the extent they are obligated to output their available energy because of their steam hosts), a Generation Dispatch Forecasting Analysis was prepared by SNC-Lavalin. This analysis will be filed separately under confidential cover.

To conduct this analysis, SNC-Lavalin modeled and ran the NYISO 2021 system to the extent that information is available, with and without the proposed Facility, and compared the generation dispatch of must-run resources

between the two scenarios within the NYISO service territory. This comparison was performed using *ABB PROMOD/Powerbase Versions 11.1*. The analysis simulated the effect of energy schedules from energy resources on must-run resources dispatching to reliably serve the grid and avoid curtailment.

Table 8-5 below presents the annual MWh dispatch of the must-run resources for the 2021 study year in the two scenarios (with and without the proposed Facility) evaluated as part of this study.

Table 8-5. Annual Dispatch of Must-Run Resources With and Without the Proposed Facility

Study Year	Scenario	Cogeneration Must Run (MWh)	Nuclear (MWh)	Hydroelectric (MWh)	Wind (MWh)	
					Other Wind (Excluding Bluestone)	Bluestone
2021	Without Proposed Facility	[redacted]	[redacted]	[redacted]	[redacted]	
	With Proposed Facility	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

The results shown in Table 8-5 above illustrate that the proposed Facility would have minimal impact on the production from must-run units as defined above.

(b) Digital Copies of Inputs Used in the Above Simulations

Digital copies of all inputs used in the above simulations required in subdivision are confidential, and have been provided to DPS under separate cover.