High Bridge Wind Project

Case No. 18-F-0262

1001.8 Exhibit 8

Electric System Production Modeling

EXHIBIT 8 ELECTRIC SYSTEM PRODUCTION MODELING

(a) Computer-based Modeling Tool

The analyses presented in 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 as such, will be filed under a protective agreement. Given the proprietary nature of this data, it 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 High Bridge Facility for the 2022 study year.

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

Emissions (Short Tons)	Without High Bridge Facility	With High Bridge Facility	Reduction in Emissions
SO_2	0	0	0
NOx	9,629	9,605	24
CO_2	31,576,670	31,509,938	66,732

(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 2022.

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

NYISO Zone	Without High Bridge Facility			With High Bridge 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

The studied project is a 100.8 MW wind farm consisting of 21 Siemens Gamesa turbines each with a capacity of 4.8 MW (SG 4.8-145). Based on the developed 8,760 hourly generation profile, the average annual capacity factor of the wind farm is [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 2022 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 11.1.12. The analysis simulated the effect of energy schedules from energy resources on must-run resources redispatching to reliably serve the grid and avoid curtailment.

Table 8-5 below presents the annual MWh dispatch of the must-run resources for the 2022 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)	Renewables (MWh)	
					Other Renewables (Excluding High Bridge)	High Bridge
2022	Without Proposed Facility	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	With Proposed Facility	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

The results shown in Table 8-5 above show 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.

(9) Effect of the Facility on the Total Variable Production Cost

To evaluate the Total Variable Production Cost of all dispatchable units in NYISO, SNC-Lavalin modeled and ran the NYISO 2022 system to the extent that information is available, with and without the proposed Facility, and compared the production costs associated with each scenario. Table 8-6 presents the total variable production cost in NYISO for the year 2022, with and without the facility.

Table 8-6. Total Variable Production Cost With and Without the Proposed Facility

Study Year	Scenario	Total Variable Production Cost ($)
2022	Without Proposed Facility	[redacted]
	With Proposed Facility	[redacted]