



# **HIGH RIVER ENERGY CENTER**

**Case No. 17-F-0597**

**1001.8 Exhibit 8**

**Electric System Production Modeling**

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## Appendices

Appendix 8-1	Production Modeling Analyses
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## **Exhibit 8: Electric System Production Modeling**

This Exhibit will track the requirements of proposed Stipulation 8, dated August 26, 2019, and therefore, the requirements of 16 NYCRR § 1001.8.

### **8(a) Computer-Based Modeling Tool**

The analyses presented in this section of the Application were developed using a computer-based modeling tool, PROMOD. The Applicant reached out to the New York Public Service Commission (NYPSC) and the New York State Department of Environmental Conservation (NYSDEC) to develop acceptable input data for the simulation analyses. This data includes modeling for the proposed High River Energy Center's output that will be utilized in calculating the projected emissions predicted to be displaced by the Project from other operating generating facilities.

ICF Resources, LLC (ICF) performed the modeling using the PROMOD platform for a security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED) simulation of the Northeast U.S. power market. The Project is located in Zone F of the New York Independent System Operator (NYISO) power market. Two scenarios were considered for simulation, a Base Case and a Change Case. The Base Case represents market conditions without the proposed Project and the Change Case includes the Project. The first full year of operation for the Facility, 2023, was analyzed for this study. The study assessed the impact of the Facility's operation on statewide and regional emission levels, the NYISO zonal power market, and dispatch of existing must-run resources.

ICF's full High River electric system production model report is included as Appendix 8-1 and contains confidential information. Therefore, the Applicant will seek the requisite trade secret and confidential commercial information protection for this information pursuant to Public Officers Law (POL) Section 87(2)(d), 16 NYCRR § 6-1.3, other applicable laws, and/or a protective order as necessary.

#### ***(1) Estimated Statewide and Regional Levels of SO<sub>2</sub>, CO<sub>2</sub>, and NO<sub>x</sub>***

The Project is expected to reduce emissions of sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and carbon dioxide (CO<sub>2</sub>) from the power sector in New York in 2023. Table 8-1 below represents the estimated reduction in emissions.

**Table 8-1. Statewide Emissions With and Without High River Energy Center**

Item	Without Project (Tons)	With Project (Tons)	Reduction in Emission (Tons)	Reduction in Emission (%)
SO <sub>2</sub>	6,128	6,117	(11)	-0.18%
NO <sub>x</sub>	7,657	7,642	(15)	-0.20%
CO <sub>2</sub>	26,619,913	26,570,159	(49,754)	-0.19%

**(2) Estimated Prices for NYISO Zones**

In NYISO Zone F, the average annual price in Change Case (with Project) is expected to be \$43.23/Megawatt Hour (MWh) and in Base Case (without Project) is expected to be \$43.31/MWh. The Project is therefore expected to decrease the annual average zonal prices by approximately \$0.08 \$/MWh in 2021. Modeling showed that production costs in New York State were reduced by \$4.4 million, or 0.2%, with the Project.

**Table 8-2. Annual NYISO Zonal Energy Prices**

Zone	Annual Prices With Project (\$/MWh)			Annual Prices Without Project (\$/MWh)		
	Minimum	Maximum	Average	Minimum	Maximum	Average
A	-1.72	241.36	41.09	-1.73	243.64	41.11
B	5.56	297.83	40.82	5.58	316.14	40.84
C	5.92	304.30	41.63	5.97	323.03	41.66
D	-13.29	86.24	35.57	-13.24	86.24	35.58
E	5.88	295.51	41.34	5.91	313.81	41.38
F	6.03	304.06	43.23	6.04	323.14	43.31
G	6.30	315.21	44.45	6.34	334.33	44.50
H	6.32	316.76	44.64	6.35	336.02	44.68
I	6.31	315.17	44.54	6.36	334.47	44.58
J	6.35	317.18	44.83	6.43	336.30	44.87
K	6.39	345.17	48.34	6.44	345.19	48.37

**(3) Estimated Capacity Factor**

The Project is expected to operate at an annual capacity factor of approximately 20%, with an off-peak annual capacity factor of 12% and an on-peak annual capacity factor of 30%. The annual peak and off-peak generation and capacity factors are shown in Table 8-3. A detailed generation summary by month can be seen in Table III-5 of the ICF Assessment Report in Appendix 8-1.

**(4) Estimated Megawatt (MW) Output Capability Factors**

The Project is expected to generate approximately 159,000 MWh/year, with an annual capacity factor of approximately 20%. The monthly generation is expected to be approximately 6 MW during the off-peak period and approximately 18 MW during the peak period. The monthly peak and off-peak generation and capacity factor are shown in Table 8-3.

**Table 8-3. Monthly Peak and Off-peak Generation and Capacity Factors for the High River Energy Center – 2023**

Month	On-Peak Dispatch		Off-Peak Dispatch	
	Energy (MW)	Capacity Factor (%)	Energy (MW)	Capacity Factor (%)
January	15	16%	6	6%
February	23	25%	9	9%
March	28	31%	10	11%
April	33	37%	13	15%
May	33	37%	14	15%
June	34	38%	14	15%
July	36	40%	15	17%
August	35	39%	13	14%
September	31	35%	12	14%
October	23	26%	9	10%
November	18	20%	6	7%
December	12	13%	5	5%
<b>Annual</b>	<b>27</b>	<b>30%</b>	<b>10</b>	<b>12%</b>

Note: Peak hours are the hours between 7:00am – 11:00pm Eastern Time (Mon – Fri). The remaining hours are categorized as off-peak (including holidays and weekends).

**(5) Estimated Average Annual and Monthly Production Output**

See Table 8-3 above.

**(6) Estimated Production Curve over an Average Year**

The estimated production curve for the Project over an average year is shown in Figure III-1 of the ICF Assessment Report in Appendix 8-1. Trade secret and confidential commercial information protection will be sought for the data and it will also be provided confidentially to NYPSC under separate cover.

**(7) Estimated Production Duration Curve over an Average Year**

The estimated production duration curve for the Project over an average year is shown in Figure III-2 of the ICF Assessment Report in Appendix 8-1. Trade secret and confidential commercial information protection will be sought for the data and it will also be provided confidentially to NYPSC under separate cover.

**(8) Estimate Energy Dispatch of Existing Must-Run Resources**

The Project is estimated to have minimal or no impact on existing must-run generating resources in New York.

**Table 8-4. Dispatch of Must-Run Resources With and Without High River Energy Center**

Generation Type	Base Case				Change Case			
	NYISO Zone				NYISO Zone			
	NYCA	NY-F	NY-GHI	NY-J	NYCA	NY-F	NY-GHI	NY-J
Wind	4,605	-	-	-	4,605	-	-	-
Hydro	27,179	2,461	650	-	27,179	2,461	650	-
Nuclear	27,257	-	-	-	27,257	-	-	-
Cogen	9,984	3,734	31	7,586	9,976	3,725	31	7,584

Note: Cogen = cogeneration facilities

**8(b) Digital Copies of Inputs Used in Simulations Above**

Digital copies of all inputs and outputs used in the simulations required in 16 NYCRR § 1001.8(a) are confidential and will be provided confidentially to NYPSC under separate cover and trade secret and confidential commercial information protection will be sought as well.