



# **TRELINA SOLAR ENERGY CENTER**

**Case No. 17-F-0336**

**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 June 19, 2020, and therefore, the requirements of 16 New York Codes, Rules and Regulations (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 IV. The Applicant consulted with the New York Department of Public Service (NYDPS) on acceptable inputs for the modeling. Public sources such as the New York Independent System Operator's (NYISO) 2019 Load & Capacity Data "Gold Book" and 2018 Phase 2 Congestion Assessment and Resource Integration Study (CARIS) were used to develop acceptable input data for the simulation analyses. This data includes output modeling for the proposed Trelina Solar Energy Center (Project) that were used 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 IV 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 in Zone C of the 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. Based upon consultations with NYDPS, 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.

The full Trelina Solar electric system production model report is included as Appendix 8-1 and contains confidential information. Therefore, the Applicant is seeking the requisite trade secret and confidential commercial information protection for this information pursuant to Public Officers Law (POL) Sections 89(5) and 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 Trelina Solar Energy Center**

Item	Without Project (Tons)	With Project (Tons)	Reduction in Emission (Tons)	Reduction in Emission (%)
SO2	961	946	(15)	-1.56
NOx	7,338	7,315	(23)	-0.31
CO2	26,962,690	26,912,168	(50,522)	-0.19

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

In NYISO Zone C, the average annual price in the Change Case (with Project) is expected to be \$35.26/Megawatt Hour (MWh) and in the Base Case (without Project) is expected to be \$35.32/MWh. The Project, therefore, is expected to decrease the wholesale load-weighted LMP in Zone C by approximately \$0.06/MWh in 2023. Modeling also showed that production costs in New York State were reduced by \$3.7 million, or 0.14%, with the Project (Table 8-3).

**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	-41.6	169.7	27.50	-35.0	179.7	27.51
B	-32.6	231.9	31.84	-33.6	949.3	32.10
C	-30.0	195.4	35.26	-27.0	195.4	35.32
D	-29.6	177.8	34.42	-27.0	178.2	34.42
E	-30.5	189.5	35.87	-27.7	189.4	35.88
F	-31.6	193.9	38.10	-28.6	195.3	38.10
G	-32.4	199.5	39.80	-29.1	199.5	39.79
H	-33.0	199.1	40.49	-29.8	199.2	40.47
I	-33.1	198.8	40.55	-29.9	198.9	40.53
J	-33.5	200.0	41.46	-30.2	200.1	41.44

**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
K	-33.3	201.7	42.61	-30.0	201.7	42.59

**Table 8-3. Production Cost Summary**

Production Costs (millions \$)			
Zone	Base Case	Change Case - Trelina	Cost Savings
<b>NYCA</b>	<b>2,714</b>	<b>2,710</b>	<b>(3.7)</b>
NY-F	607	607	(0.3)
NY-GHI	335	333	(1.3)
NY-J	738	737	(0.7)
NY-K	147	147	(0.3)
NY-AB	141	140	(0.7)
NY-CDE	746	745	(0.5)
<b>Non-NY</b>	<b>41,886</b>	<b>41,885</b>	<b>(1.4)</b>

*(3) Estimated Capacity Factor*

**REDACTED**

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

**REDACTED**

**Table 8-4. Monthly Peak and Off-Peak Generation and Capacity Factors for the Trelina Solar Energy Center – 2023**

Month	On-Peak Dispatch		Off-Peak Dispatch	
	Energy (MW)	Capacity Factor (%)	Energy (MW)	Capacity Factor (%)
January	<b>REDACTED</b>			
February				
March				
April				
May				
June				
July				
<b>August</b>				
<b>September</b>				
October				
November				
December				
Annual				

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 8-4.

***(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 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 NYDPS 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 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 NYDPS under separate cover.

***(8) Estimated 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 8-5. Dispatch of Must-Run Resources With and Without Trelina Solar Energy Center**

Generation Type	Base Case (GWh)	Change Case with Project (GWh)
Wind	<b>REDACTED</b>	
Hydroelectric		
Nuclear		
Solar		
Thermal		

**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 NYDPS under separate cover and trade secret protection.