Appendix D

Responses to Data Requests

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Response to Energy Environmental Review and Analysis

Questions for Development of Environmental Review

In the Matter of the Application for a Certificate of Need for the Proposed 250 MW Sherco 3 Solar Project

PUC Docket No.	E-002/GS-23-217	Directed To:	Ellen Heine
EERA Question No.	1	Please Respond By:	April 5, 2024

Note: Energy Environmental Review and Analysis staff intends to use information provided in this response to develop an environmental review document and is a public document. Responses to these questions will be considered to be public information unless otherwise designated by the respondent as nonpublic information pursuant to Minnesota Stat. § 13.02.

Question(s): Climate Change and Resilience

1. *Consistent with the guidance provided by the Minnesota Environmental Quality Board, please provide to following information on greenhouse gas (GHG) emissions and climate resilience.:*
   a. *An estimate of GHG emissions related to construction and operation, and decommissioning of the solar facility using https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator as a guide*.

      See attached tables.

   b. *Describe the impacts of climate change on the project. Discuss anticipated changes to the climate in the project area and how project design and construction (adaptation and resiliency planning) account for such changes. Include information about the makeup of the PV panels and discuss the impacts of potential damage from climate-related disasters can on the integrity of the structures and nearby groundwater or soil resources.*

      According to the MN Department of Natural Resources[1] the state's climate, including the region where the Project is located, is getting warmer and wetter, with more damaging rain events, while also experiencing increased risk of heat waves and droughts. These climate trends are not expected to have a significant impact on the Project because the site is being designed based on local hydrology and topography. The nature of the site, with sandy soils that infiltrate stormwater effectively, will mitigate the impacts that extreme rain events might have. Rainfall infiltration is calculated to increase once the Project is completed, when native prairie vegetation will replace seasonal row crops across most of the site.

      The FEMA National Risk Index[2] rates Sherburne County as having "relatively moderate" risk for hail. The solar panel modules selected for the Project are designed to withstand wind and hail events and have undergone hail impact testing showing they can withstand impacts from hailstones greater than an inch in diameter. The tracking systems are also designed to automatically stow the panels in

[1] https://arcgis.dnr.state.mn.us/ewr/climatetrends/

[2] Map | National Risk Index (fema.gov)

the safest position based on the weather conditions (wind, hail, flooding, deep snow, etc.). For example, panels are stowed in a nearly vertical position during hail events by re-orienting the trackers, which limits direct impacts between hailstones and the panels. Tempered glass used in the panel construction also limits the potential for cracked glass to escape the panel enclosures if they do become broken. The panels have also undergone TCLP (toxicity characteristic leaching procedure) testing to ensure the panels will not pose a danger to the environment. TCLP testing is the EPA-approved method for determining whether a hazardous substance is likely to leach from solar panels into the ground and ground water. In other words, no hazardous materials leached from the tested solar panels resulting in leachate concentrations above the EPA's regulatory thresholds. In light of the panels being fully encapsulated, unlikely to shatter and not expected to leach hazardous materials into the environment, the risk to the environment from the contents of the PV solar panels will be minimal.

c. *Discuss the potential impacts of a warmer, wetter, more energetic climate on the solar facility. Discuss how the Applicants consider the potential impacts of climate change in its project design, equipment selection and engineering. Section 4.7.9 and Appendix E, response to Question 4 of the Combined Environmental Assessment and Report: Byron Solar Project (https://apps.commerce.state.mn.us/eera/web/file-list/14943) provide an example of this discussion for a solar project.*

Climate and weather impacts are taken into account in the design of the facility and include impacts from extreme storms such as stormwater runoff, strong winds and hail. As mentioned above safety stow tracking systems will be utilized to reduce structural loads by moving the panels into safety stow positions during weather events. A stormwater report, including hydraulic and hydraulic analysis was completed for the site and used to inform site design and grading. Site grading has been designed to enhance infiltration of stormwater across the site. Inverters will be installed on concrete pads off of the ground and no facilities are placed within areas of flood risk.

d. *Propose mitigation measures that would minimize or eliminate potential significant effects to the project from climate change*.

See safety stow systems and site grading for infiltration described in b and c above.

Sherco Solar 3 Fuel Estimates

Sherco Solar 3 250 MWac	**From SPA - Section 3.2.10.2 Impacts and Mitigation (Public Services and Infrastructure)**	Traffic during construction of the solar facility is estimated to average 275-350 pickup trucks, cars, and/or other types of employee vehicles and approximately 30-40 semi-trucks per day for component delivery onsite for the estimated 12 month duration of construction. Approximately 30-40 semi-trucks per day will be used for delivery of facility components. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment.
Sherburne County, MN	**From SPA - Section 3.2.6.2 Impacts and Mitigation (Socioeconomics) and Section 2.2.5 Project Operation and Maintenance**	Typical onsite construction staff levels will depend on the number of concurrent tasks being performed and the phasing of the Project. The Project will create approximately 490 construction jobs (average of approximately 300 jobs over 19 months) during the peak construction and installation phases, and up to 12 full time jobs during the operations phase. After construction is complete, traffic impacts during the operational phase of the Project are expected to be negligible. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the facilities as needed; traffic function in the Project Area will not be impacted as a result.

Equipment Fuel Consumption Estimate

Phase	Equipment Type	No. of Equipment	Days	Duration (hours/day)	Fuel Consumption (gal/hour)	Fuel Type	Est. Total Gallons	Notes/Assumptions
Construction	Bulldozer	4	132	8	7.6	Diesel	32,102	Caterpillar D6T Medium Load
Construction	Wheel Scraper	4	110	8	9.06	Diesel	31,891	CAT 631k Scraper
Construction	Motor Grader	4	264	8	5.6	Diesel	47,309	Caterpillar 140M Medium Load
Construction	Backhoe	1	176	8	3.1	Diesel	4,365	Caterpillar 422F2 Low Load
Construction	Vibratory compactor	4	176	8	5	Diesel	28,160	Caterpillar CS56/CP56 High Load
Construction	100 HP Tractors	4	220	8	7	Diesel	49,280	Mowing, sitework, trench backfill
Construction	Dump Truck	2	66	8	10	Diesel	10,560	Tandem Axle 10-14 CY
Construction	Excavator	10	176	8	8.1	Diesel	114,048	Caterpillar 336D Medium Load
Construction	Concrete truck and boom	1	66	8	12	Diesel	6,336	Primarily Substation
Construction	High-reach bucket truck	1	66	8	6	Diesel	3,168	Primarily Substation
Construction	Semi truck/trailer	2	220	8	10	Diesel	35,200	Standard size and weight semitruck for equipment deliveries (non-peak)
Construction	Semi truck/trailer	25	110	8	10	Diesel	220,000	Standard size and weight semitruck - volume during peak delivery of modules and racking
Construction	Tracked Loader	4	220	8	4	Diesel	28,160	953 Tracked Loader
Construction	Skid steer	4	264	8	3.3	Diesel	27,878	Caterpillar 299D Medium Load
Construction	Fork lift (all terrain)	10	154	8	2.9	Diesel	35,728	JLG 1255 Medium Load or telehandler
Construction	Pile driver	7	110	8	7.1	Diesel	43,736	Hercules HMC STR20
Construction	Truck-mounted auger/drill	1	44	8	12	Diesel	4,224	Primarily Substation
Construction	Medium duty crane	2	44	4	18.8	Diesel	6,618	120T RT Telescopic Crane (This may end up being a 90 ton RTC or work split the a 120 & 90 ton)
Construction	Watering truck	5	220	9	11	Diesel	108,900	
Construction	Generator	10	264	8	1	Gasoline	21,120	Honda EB10000 Half Load Average
Construction	Light-duty pickup truck (on-site)	20	220	8	3.6	Gasoline	126,720	
Construction	ATVs	40	220	8	0.4	Gasoline	28,160	Club Car 4 Seater ATV
Construction	Construction contractor vehicles (commute to/from site)	225	220	1	2.5	Gasoline	123,750	Assume bulk of the workforce lives within 30 minutes of site, average of 300 employees over a 10 month period. Assume 75% carpool.
	TOTAL GALLONS GAS (per year)						**299,750**	
	TOTAL GALLONS DIESEL (per year)						**837,663**	

Phase	Equipment Type	No. of Equipment	Days/Year	Duration (hours/day)	Fuel Consumption (gal/hour)	Fuel Type	Est. Total Gallons	Notes/Assumptions
Operation	Light-duty pickup truck (commute to/from site) - 3 full time staff	4	50	0.5	2.5	Gasoline	250	4 Solar Technicians performing maintenance checks.
Operation	ATV (on-site) - 3 full time staff	2	217	8	0.4	Gasoline	1,389	**Inverter Checks** Twice/Yr. Assume 71 solar inverters, and maintenance checks at 2/day (35.5 days) for 1 Crew of 2. 2nd Crew of 2 will perform **Tracker Maintenance** for 182 days at 40 trackers/day. Most trackers will require only a cursory visual inspection/routine maintenance; some are assumed to required additional maintenance.
Operation	O&M contractor vehicles (commute to/from site)	1	12	0.8	2.5	Gasoline	23	2 HV Technicians assumed from St. Cloud, MN, 46 min round trip.
Operation	O&M contractor vehicles (on-site)	1	12	8	1	Gasoline	96	1 HV Contractor performing monthly checks on Substation. 1 full 8hr day for Monthly Maintenance. Vehicle is parked at Substation and not used for maintenance checks.
Operation	Mower	1	50	8	1	Gasoline	400	
	TOTAL GALLONS GAS (per year)						**2,158**	
	TOTAL GALLONS DIESEL (per year)						**-**	

Sherco Solar 3 Greenhouse Gas Estimate

Construction		**KG of CO2 per Gallon Diesel**	**KG of CO2 per Gallon Gas**	**Total KG**		
Total Diesel	837,663	10.19		8,535,788		https://www.eia.gov/environment/emissions/co2_vol_mass.php
Total Gas	299,750		8.78	2,631,805		https://www.eia.gov/environment/emissions/co2_vol_mass.php
			Total - KG	11,167,593	0.00110231	Conversion Factor KG to Tons
			Total - Tons	12,310		

Annual Operation		**KG of CO2 per Gallon Diesel**	**KG of CO2 per Gallon Gas**	**Total KG**		
Total Diesel	0	10.19		0		https://www.eia.gov/environment/emissions/co2_vol_mass.php
Total Gas	2,158		8.78	18,945		https://www.eia.gov/environment/emissions/co2_vol_mass.php
			Total - KG	18,945	0.00110231	Conversion Factor KG to Tons
			Total - Tons	21		

Response to Energy Environmental Review and Analysis

Questions for Development of Environmental Review

In the Matter of the Application for a Certificate of Need for the Proposed 250 MW Sherco 3 Solar Project

PUC Docket No.	E-002/GS-23-217	Directed To:	Ellen Heine
EERA Question No.	2	Please Respond By:	April 5, 2024

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Question(s): PV Panel Integrety

Please provide the following information

a. *A description of materials in PV panels, including any hazardous materials*

See attached TCLP testing report

b. *An assessment of potential PV panel destruction from severe weather. Include a discussion of mitigation measures employed by the panel manufacturer and Xcel Energy to minimize potential impacts to adjacent properties.*

Please see answer to EERA question 1.b in part:
The FEMA National Risk Index[1] rates Sherburne County as having "relatively moderate" risk for hail. The solar panel modules selected for the Project are designed to withstand wind and hail events and have undergone hail impact testing showing they can withstand impacts from hailstones greater than an inch in diameter. The tracking systems are also designed to automatically stow the panels in the safest position based on the weather conditions (wind, hail, flooding, deep snow, etc.). For example, panels are stowed in a nearly vertical position during hail events by re-orienting the trackers, which limits direct impacts between hailstones and the panels. Tempered glass used in the panel construction also limits the potential for cracked glass to escape the panel enclosures if they do become broken.

c. *An assessment of the risk of contamination to water resources (groundwater, surface water, and wetland) and soils that may result from panel degradation or destruction from broken PV panels. Include a discussion of mitigation measures employed by the panel manufacturer and Xcel Energy to minimize potential impacts to these resources.*

Please see answer to EERA question 1.b, in part:

[1] Map | National Risk Index (fema.gov)

The nature of the site, with sandy soils that infiltrate stormwater effectively, will mitigate the impacts that extreme rain events might have. Rainfall infiltration is calculated to increase once the Project is completed, when native prairie vegetation will replace seasonal row crops across most of the site.

The panels have also undergone TCLP (toxicity characteristic leaching procedure) testing to ensure the panels will not pose a danger to the environment. TCLP testing is the EPA-approved method for determining whether a hazardous substance is likely to leach from solar panels into the ground and ground water. In other words, no hazardous materials leached from the tested solar panels resulting in leachate concentrations above the EPA's regulatory thresholds. In light of the panels being fully encapsulated, unlikely to shatter and not expected to leach hazardous materials into the environment, the risk to the environment from the contents of the PV solar panels will be minimal.

Response to Energy Environmental Review and Analysis

Questions for Development of Environmental Review

In the Matter of the Application for a Certificate of Need for the Proposed 250 MW Sherco 3 Solar Project

PUC Docket No.	E-002/GS-23-217	Directed To:	Ellen Heine
EERA Question No.	3	Please Respond By:	April 15, 2024

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Question(s): Project Cost

The Applicant has designated that the project cost estimate provided in Table 2.1-2 in the application text and Appendix B as nonpublic data in accordance with Minnesota Rules, part 7829.0500 and Minn. Sta. Ch. 13. The Applicant contends that release of Project cost information "would have a detrimental effect on the Applicant by providing potential competitors, commercial parties and others with valuable information not otherwise readily ascertainable and from which these persons would obtain economic value."

The Department has not evaluated this claim; however, high-level cost estimates are provided by other applicants for site permits. Please provide a summary of the Project's capital cost similar to those provided by applicants for other recent site permits for solar facilities (e.g., Louise Solar Project - Site Permit Application, Table 4; Table 2.5.2, Elk Creek Solar Amended Application; Timberwolf Solar Project Site Permit Application, Table 2.5.1; Lake Wilson Solar Energy Center Site Permit Application, Table 5; Byron Solar Project Joint Site and Route Permit Application, Table 4).

Typical cost categories used in the above-cited examples include engineering, procurement, and construction; development; interconnection; financing; and transmission.

See below for the project cost estimate. There is no transmission line and no point of interconnect upgrades associated with this project.

Estimated Project Costs

Task	Cost
Engineering, Procurement, Construction Contractor	$ 386,291,000
Development Expense	$ 20,485,000
Interconnection	$ -
Financing (AFUDC)	$ 27,073,000
Total	**$ 433,849,000**

Response to Energy Environmental Review and Analysis

Questions for Development of Environmental Review

In the Matter of the Application for a Certificate of Need for the Proposed 250 MW Sherco 3 Solar Project

PUC Docket No.	E-002/GS-23-217	Directed To:	Ellen Heine
EERA Question No.	4	Please Respond By:	April 15, 2024

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Question(s): Cumulative Potential Effects

The Environmental Assessment will address the cumulative potential effects of the proposed Sherco 3 Solar Project as it relates to current and future projects that might reasonably be expected to affect the same environmental resources.
Minnesota Rule 4410.0200, subp. 11a defines cumulative potential effects as impacts to the environment that result from "the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects."
Please provide a brief overview of Xcel Energy projects anticipated over the next five years in the general project area. EERA staff is also seeking this information from local governments, the Environmental Quality Board project database, and the Minnesota Department of Transportation.

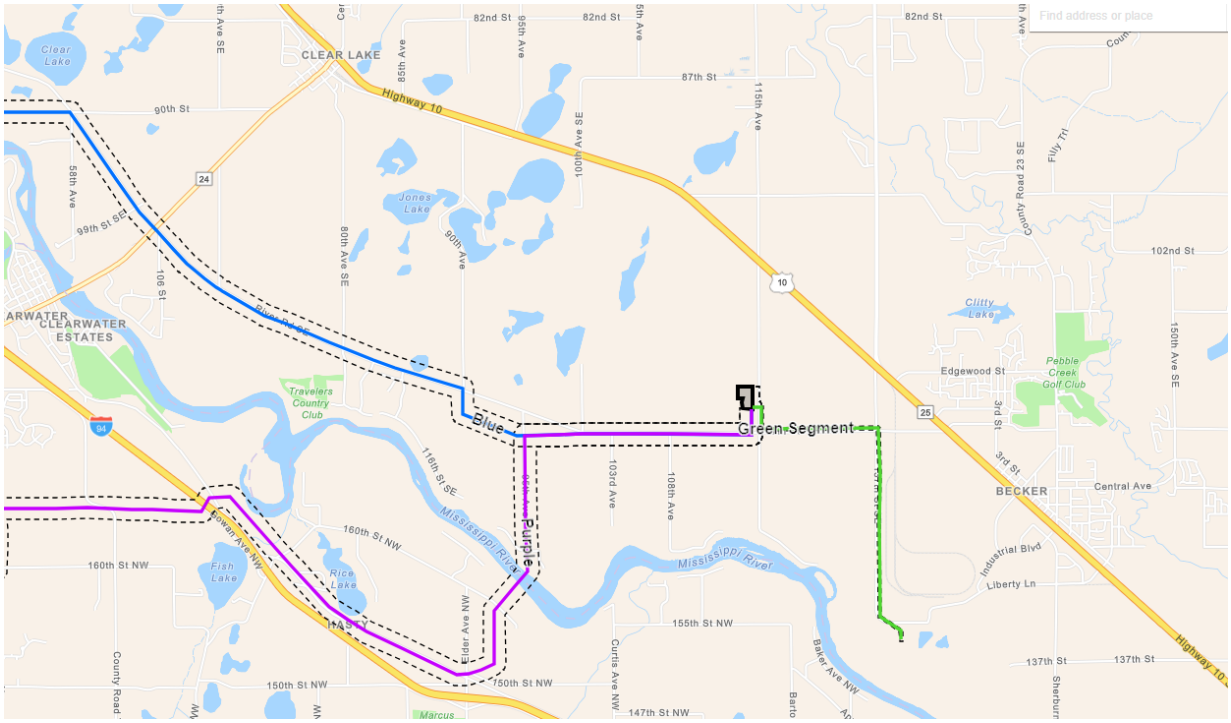
In addition to the proposed Sherco Solar 3 Project Xcel Energy is aware of the following projects in the general project area.

- Future solar project: Xcel Energy is currently in the process of developing a potential solar facility which would be located on approximately 800 acres of land about 1.75 miles north of the Sherco Solar 3 facility. This project would be bid into the Xcel Energy Solar RFP in 2024 and evaluated through that process. If selected it would also require a PUC site permit and a route permit to connect to the transmission system which would be expected to be filed in 2025.

- Future battery projects: In MPUC Docket CN-23-212 three battery projects which would be located near the Sherco 3 project area have been bid into the competitive resource acquisition process for firm dispatchable generation. Xcel Energy recommends reviewing filings within that docket to understand potential impacts to environmental resources. Xcel Energy also recently permitted a battery project through the City of Becker which would be located on Sherco Plant property. Information on that project can be found in Docket LR-23-367.

- Minnesota Energy Connection Project (MNEC): Xcel Energy has applied to the PUC for a certificate of need (CN-22-131) and a route permit (TL-22-132) to construct the MNEC Project, a new 345-kilovolt (kV) double-circuit transmission line between the existing Sherco Substation in the city of Becker, Minnesota and a new substation proposed in Lyon County, Minnesota. There are two route alternatives that would both connect at the Sherco Solar West collector substation which is located at the Sherco Solar Project West Block (Sherco Solar 1). From that point it would double-circuit with the West HVTL back to the Sherco Substation as shown in the screenshot below.

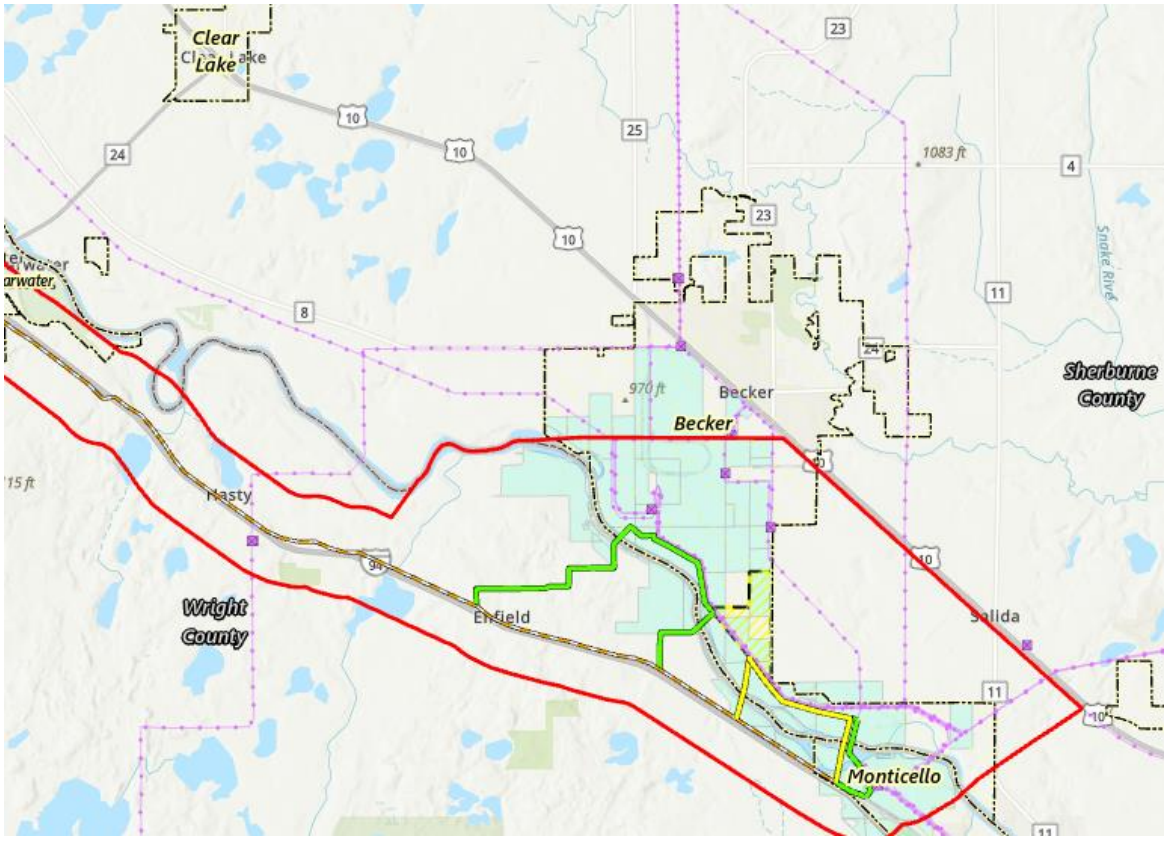
  MNEC Near Sherco Solar 3



[Maps – Xcel Minnesota Energy Connection (mnenergyconnection.com)]

- Alexandria to Big Oaks Transmission Project: Xcel Energy has applied for a certificate of need and route permit (TL-23-159) for the Alexandria-Big Oaks segment (the east portion of the Big Stone to Alexandria to Big Oaks Project) a majority of the line would involve adding a second circuit to existing poles on the opposite side of the Mississippi River from Sherco Solar 3, and would cross to the east side of the river southeast of Sherco Solar 3 near the Sherco Plant as shown in the screenshot below

Alexandria to Big Oaks Near Sherco Solar 3



alexandriatobigoaks.com

- Economic development projects in Becker: Microsoft recently bought 295 acres of land from Xcel Energy within the City of Becker to develop a data center (see Xcel Energy sells land in Becker to Microsoft for data center | MPR News). Elk River Technologies, LLC has an option to purchase 348 acres of land west of Northern Metals in Becker Minnesota with the intended use of a data center. Xcel Energy continues to market land on the west side of the Sherco plant for a potential data center. See below map for locations.

Economic Development Projects