Minnesota Public Utilities Commission Certificate of Need Application for a Solar Energy Generating System

Lake Wilson Solar Energy LLC
Murray County, Minnesota
February 9, 2023
Docket No. IP-7070/CN-21-791

Lake Wilson Solar Energy LLC
One Wacker Drive, Suite 1800
Chicago, IL 60606

Project Name:	Lake Wilson Solar Energy Center
Project Location:	The Project encompasses 2,621 acres in Leeds Township in Murray County, Minnesota
Applicant:	Lake Wilson Solar Energy LLC
Authorized Representative:	Dan Litchfield, Vice President, Renewable Development
Signature:	DocuSigned by: Daniel Litchfield E6B7F474EEDF458...

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ABBREVIATIONS AND DEFINITIONS

2020 Quad Report	Minnesota Department of Commerce, Energy Policy and Conservation Quadrennial Report 2020
AADT	Annual Average Daily Traffic
AIMP	Agricultural Impact Mitigation Plan
Alternating Current (AC)	The direction of current flowing in a circuit is constantly being reversed back and forth. See also Direct Current.
Applicant or Lake Wilson Solar	Lake Wilson Solar Energy LLC
Application	Certificate of Need Application
BESS	95 MW/ 380 MWh AC coupled battery energy storage system
BMPs	Best Management Practices
C&I	Commercial and Industrial
CN	Certificate of Need
Commission	Minnesota Public Utilities Commission
CO_2	Carbon Dioxide
dBA	The dBA scale is A-weighted decibels
Decibel (dB)	A logarithmic unit used to express the absolute level of sound pressure, using the ratio between power and intensity.
Direct Current (DC)	The unidirectional flow of electric charge. Direct current is produced by sources such as batteries and solar cells.
DOC-EERA	Minnesota Department of Commerce Energy Environmental Review and Analysis
DPP	Definitive Planning Phase
EIA	United States Energy Information Administration
EPC	Engineering, Procurement and Construction
Exemption Request	Request for Exemption from Certain Certificate of Need Application Content Requirements
FAA	Federal Aviation Administration
Gen-Tie Line	Approximately 200-400 foot long overhead 115 kV overhead HVTL that will connect the Project Substation to the new Xcel Switchyard.
GHG	Greenhouse Gas
GIA	Generator Interconnection Agreement
HVTL	High Voltage Transmission Line
IPaC	Information for Planning and Consultation
IPP	Independent Power Producer

IRA	Inflation Reduction Act
IRPs	Integrated Resource Plans
ITC	Investment Tax Credit
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
L_{10}	Ten Percent of Any Hour
L_{50}	Fifty Percent of Any Hour
LEF	Large Energy Facility
LEGF	Large Electric Generating Facility
LEPGP	Large Electric Power Generating Plant
Leq	Leq is an energy-based time-averaged noise level.
LFP	Lithium Iron Phosphate
LHVTL	Large High Voltage Transmission Line
Xcel Line Tap	Approximately 250-300 foot long 115 kV overhead transmission line that will connect the new Xcel Switchyard to the existing Fenton - Chanarambie 115 kV HVTL at the POI.
MBS	Minnesota Biological Survey
MDA	Minnesota Department of Agriculture
Megawatt (MW)	A megawatt is a unit for measuring power that is equivalent to one million watts.
Megawatt hours (MWh)	Equal to 1,000 kilowatts of electricity used continuously for one hour. It is about equivalent to the amount of electricity used by about 330 homes during one hour.
Minn. R.	Minnesota Rules
Minn. Stat.	Minnesota Statutes
MISO	Midcontinent Independent System Operator
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MWac	Megawatt Alternating Current
NCED	National Conservation Easement Database
NEMA	National Electrical Manufacturers Association
NERC	North American Electric Reliability Corporation
NHIS	Natural Heritage Information System
NHR	Natural Heritage Review

NLEB	Northern Long-eared Bat
NMC	Nickel Manganese Cobalt Oxide
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
POI	Point of Interconnect
PPA	Power Purchase Agreement
Preliminary Development Area	The 1,526-acre area where the Applicant proposes to build the Project
Project	Lake Wilson Solar Energy Center
Project Area	The 2,621-acre area of privately-owned land for which Lake Wilson Solar Energy LLC has leases, easements and purchase options to allow siting and construction of the Project.
Project Substation	A high voltage electric system facility supporting the Project. It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another.
PV	Photovoltaic
RECs	Renewable Energy Credits
RES	Renewable Energy Standards
RFP	Request for Proposal
SCADA	Supervisory Control and Data Acquisition
SES	Solar Energy Standards
SGCN	Species of Greatest Conservation Need
SMMPA	Southern Minnesota Municipal Power Agency
SWPPP	Storm Water Pollution Prevention Plan
TWh	Terawatt hours
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VSMP	Vegetation and Soil Management Plan
WCA	Wetland Conservation Act
Xcel Energy	Northern States Power Company d/b/a Xcel Energy
Xcel Switchyard	The new switchyard to be permitted, constructed, owned, and operated by Xcel Energy

APPLICATION CONTENT REQUIREMENTS COMPLETENESS CHECKLIST

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
7849.0120	**Criteria – Probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, the applicant's customers, or to the people of Minnesota and neighboring states**		
A(1)	Accuracy of the applicant's forecast	4.1/6.0	No
A(2)	Effects of applicant's existing or expected conservation programs and state and Federal conservation programs	4.1	No
A(3)	Effects of promotional practices on demand	4.1/3.2.2	No
A(4)	Ability of current and planned facilities, not requiring certificates of need, to meet future demand	5.2.1.8	No
A(5)	Effect of proposed facility in making efficient use of resources	4.1	No
7849.0120	**Criteria – A more reasonable and prudent alternative has not been demonstrated**		
B(1)	Appropriateness of size, type, and timing	4.2.1	No
B(2)	Cost of facility and its energy compared to costs of reasonable alternatives	4.2.2	No
B(3)	Effects of the facility upon natural and socioeconomic environments compared to the effects of reasonable alternatives	4.2.3	No
B(4)	Expected reliability compared to reasonable alternatives	4.2.4	No
7849.0120	**Criteria – Facility will provide benefits to society**		
C(1)	Relationship of proposed facility to overall state energy needs	4.3.1	No
C(2)	Effects of facility upon the natural and socioeconomic environments compared to the effects of not building the facility	4.3.2	No
C(3)	Effects of facility in inducing future development	4.3.3	No
C(4)	Socially beneficial uses of the output of the facility, including to protect or enhance environmental quality	4.3.4	No
D	Facility or suitable modification will not fail to comply with relevant policies, rules, and regulations of other state and Federal agencies and local governments	4.4	No
7849.0210	**Filing Fees and Payment Schedule**	2.4	No
7849.0240	**Need Summary and Additional Considerations**		
Subp. 1	Need Summary – summary of major factors justifying need for facility	3.1	No
Subp. 2(A)	Additional Considerations – Socially beneficial uses of the output of the facility, including to protect or enhance environmental quality	3.2.1	No
Subp. 2(B)	Additional Considerations – Promotional activities that	3.2.2	Yes

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
	may have given rise to the demand for the facility		
Subp. 2(C)	Additional Considerations – Effects of the facility in inducing future development	3.2.3	No
7849.0250	**Proposed LEGF and Alternatives Application**		
A(1)	Description – Nominal generating capability and effects of economies of scale on facility size and timing	5.1.1	No
A(2)	Description – Anticipated operating cycle, including annual capacity factor	5.1.2	No
A(3)	Description – Type of fuel, reason for selection, projection of availability over life of facility, and alternative fuels	5.1.3	No
A(4)	Description – Anticipated heat rate	5.1.4	No
A(5)	Description – Anticipated areas where facility will be located	5.1.5	No
B(1)	Discussion of Alternatives – Purchased power	5.2.1.1	Yes
B(2)	Discussion of Alternatives – Increased efficiency of existing facilities	5.2.1.2	Yes
B(3)	Discussion of Alternatives – New transmission lines	5.2.1.3	Yes
B(4)	Discussion of Alternatives – New generating facilities of a different size and energy resource	5.2.1.4-10	Yes - partial
B(5)	Discussion of Alternatives – Reasonable combination of alternatives	5.2.1.11	Yes
C	Proposed Facility and Alternatives	5.3	
C(1)	Capacity cost in current dollars per kilowatt	5.3.1	Yes - partial
C(2)	Service life	5.3.2	Yes - partial
C(3)	Estimated average annual availability	5.3.3	Yes - partial
C(4)	Fuel costs in current dollars per kilowatt hour	5.3.4	Yes - partial
C(5)	Variable operating and maintenance costs in current dollars per kilowatt hour	5.3.5	Yes - partial
C(6)	Total cost in current dollars of a kilowatt hour provided by it	5.3.6	Yes - partial
C(7)	Estimate of its effect on rates system-wide and in Minnesota	5.3.7	Yes - partial
C(8)	Efficiency, expressed for a generating facility as the estimated heat rate	5.3.8	Yes - partial
C(9)	Majoring assumptions made in providing information in subitems (1) to (8), including projected escalation rates for fuel costs and operating and maintenance costs, as well as projected capacity factors	5.3	Yes - partial
D	System Map	5.4	Yes - partial
E	Other relevant information about the facility and alternatives that may be relevant to a determination of need	-	-
7849.0270	**Peak Demand and Annual Consumption Forecast**		
Subp. 1	Scope – Application shall contain pertinent data concerning peak demand and annual electrical consumption within the applicant's service area and system	6.0	Yes - partial

Minnesota Rule	Required Information	Application Section(s)	Exemption Granted
Subp. 2	Content of Forecast	6.0	Yes - partial
Subp. 3	Forecast Methodology	6.0	Yes - partial
Subp. 4	Data Base for Forecasts	6.0	Yes - partial
Subp. 5	Assumptions and Special Information	6.0	Yes - partial
Subp. 6	Coordination of Forecasts with Other Systems	6.0	Yes - partial
7849.0280	**System Capacity**	7.0	Yes
7849.0290	**Conservation Programs**	8.0	Yes
7849.0300	**Consequences of Delay**	9.0	Yes - partial
7849.0310	**Environmental Information – Provide environmental data in response to part 7849.0250, Item C, or 7849.0260, Item C, and information as requested in part 7849.0320 to 7849.0340**	10.0, 11.0	No
7849.0320	**Generating Facilities**		
A	Estimated range of land requirements, including water storage, cooling systems, and solid waste storage	11.1	No
B	Estimated amount of vehicular, rail, and barge traffic generated by construction and operation of facility	11.2	No
C	Fossil-fuel facilities – Fuel	11.3.1	No
D	Fossil-fuel facilities – Emissions	11.3.2	No
E	Water Use for Alternate Cooling Systems	11.4	No
F	Sources and types of discharges to water	11.5	No
G	Radioactive releases	11.6	No
H	Types and quantities of solid wastes in tons/year	11.7	No
I	Sources and types of audible noise attributable to facility operation	11.8	No
J	Estimated work force required for facility construction and operation	11.9, 11.10	No
K	Minimum number and size of transmission facilities required to provide a reliable outlet for the generating facility	11.11	No
7849.0330	**Transmission Facilities**	5.2.1.10	Yes
7849.0340	**No-Facility Alternative**	5.2.1.9	Yes - partial

LAKE WILSON SOLAR ENERGY CENTER

1.0 EXECUTIVE SUMMARY

Lake Wilson Solar Energy LLC (Lake Wilson Solar or Applicant) submits this Application (Application) for a Certificate of Need (CN) to the Minnesota Public Utilities Commission (Commission), pursuant to and in accordance with Minn. Stat. § 216B.243 and Minn. R. Ch. 7849. Lake Wilson Solar respectfully requests that the Commission issue a CN for the up to 150 megawatt alternating current (MWac) photovoltaic (PV) solar energy generating facility and associated 95 megawatt (MW) energy storage systems and associated facilities (Lake Wilson Solar Energy Center or Project) planned to be located in Leeds Township, Murray County, Minnesota.

The Project is a "large energy facility" (LEF), as defined in Minn. Stat. § 216B.2421, subdivision 2(1), and a "large electric generating facility" (LEGF) as defined in Minn. R. 7849.0010, subpart 13. Lake Wilson Solar is concurrently applying for a Site Permit pursuant to the Minnesota Power Plant Siting Act (Minn. Stat. § 216E) and Minn. R. Ch. 7850 in Docket No IP-7070/GS-21-792 because the Project is a "large electric power generating plant" (LEPGP) as defined in Minn. R. 7850.1000, subpart 11.

2.0 INTRODUCTION

2.1 THE LAKE WILSON SOLAR ENERGY CENTER

Lake Wilson Solar is a Delaware limited liability company and an affiliate of Invenergy LLC. Lake Wilson Solar is an independent power producer (IPP) that proposes to construct and operate the proposed Project in Leeds Township in Murray County, Minnesota (**Figure 1**). The power generated by the Project will be offered for sale to Minnesota utilities and corporate purchasers that have identified a need for additional renewable energy. For example, Northern States Power Company, d/b/a Xcel Energy (hereinafter referred to as Xcel Energy) has been seeking 900 MW of solar and solar + battery storage to meet Xcel Energy's renewable energy and capacity commitments set forth in its Commission approved Integrated Resource Plan (IRP) completed pursuant to § 216B.1691 subd. 3.[1] If selected by a utility that uses a Commission approved acquisition process, the Project will be exempt from the CN requirement and Lake Wilson Solar will withdraw this CN application.[2]

The Project is located near the city of Lake Wilson in southwestern Minnesota. The overall Project, including the up to 150 MW solar energy generating facility, associated up to 95 MW battery energy storage system (BESS), and transmission line interconnection facilities, is to

[1] See *In the Matter of the 2020–2034 Upper Midwest Integrated Resource Plan of Northern States Power Company d/b/a Xcel Energy*, Docket No. E-002/RP-19-368, Order Approving Plan with Modifications and Establishing Requirements for Future Filings. (April 15, 2022) (Xcel IRP Order); See also Northern States Power Company – Minnesota & Northern States Power Company- Wisconsin, 2022 RFP, Request for Proposals, issued August 1, 2022, available at: https://mn.my.xcelenergy.com/s/renewable/developers/2022-rfp (Xcel Energy RFP).

[2] See Minn. Stat. § 216B.243, Subd. 8(9).

be sited within an approximately 2,621 acres under lease, easement or purchase option (Project Area).

The Project will consist of:

- PV solar panel modules;
- Inverters;
- Step-up transformers (connecting solar panel inverters to collection lines/Project Substation);
- Electrical wiring/cables (connecting PV panels to solar panel inverters);
- Single-Axis Trackers;
- Collection lines (connecting solar panel inverters to Project Substation);
- Security fencing and gates;
- Access roads;
- Stormwater treatment areas (associated with the Project);
- Operations and maintenance (O&M) facility;
- Supervisory Control and Data Acquisition (SCADA) system;
- BESS (including inverters, storage devices, emergency generators and electrical connection to the Project Substation);
- Project Substation;
- Power transformer(s);
- Switchgear;
- Metering equipment;
- Ancillary equipment or buildings as necessary.

Lake Wilson Solar has secured site control for the entire proposed Project via lease and easement agreements, and a purchase option agreement (for the proposed new Switchyard and some additional Project solar and BESS infrastructure). The final Project design is expected to occupy approximately 1,526 acres (Preliminary Development Area), within the overall 2,621-acre Project Area. The Preliminary Development Area is generally defined as the area containing all Project facilities located within the Project security fencing (e.g., arrays, inverters, collection lines, etc.) and includes the access roads extending beyond the Project facility fenced area. It also includes the Project Substation, Project BESS, new switchyard (Xcel Switchyard), and O&M building. The 1,526-acre Project footprint is larger than what is anticipated to ultimately be required to host 150 MWac of solar generating facilities and associated 95 MWac of BESS facilities. The final Project footprint will be dependent on the permitting process, final field surveys, engineering and geotechnical studies, and equipment selection. Lake Wilson Solar will optimize the Project to the degree practicable to minimize the overall impact of the Project.

Lake Wilson Solar filed two queue positions with Midcontinent Independent System Operator (MISO) for the Project. A 150 MWac solar queue position was filed in the MISO Definitive Planning Phase (DPP)-2017-AUG study cycle and a 20 MWac BESS queue position was filed in the MISO DPP-2018-APR study cycle. Lake Wilson Solar initially obtained an executed GIA with MISO in September 2021 for the 150 MWac solar queue position. Working with MISO, the GIA was amended and restated in June 2022 to incorporate both the 150 MWac solar and 20 MWac BESS queue positions. Lake Wilson Solar will work with MISO to pursue an additional

75 MWac BESS capacity via MISO's Surplus Interconnection Process. Lake Wilson Solar is seeking Commission approval for up to 150 MWac of solar generation and an associated 95 MWac BESS.

MISO has made significant progress updating its interconnection process to provide multiple pathways for the interconnection of battery storage facilities, as required by FERC Order 845. One of these pathways, the Surplus Interconnection Process, has specifically enabled more batteries in a hybrid configuration to be interconnected quickly and efficiently in the past year. MISO defines Surplus Interconnection Service as "Interconnection Service that is derived from the unneeded portion of Interconnection Service established in a GIA or in agreement with, or under the tariff of, Transmission Owner prior to integration into MISO, such that if Surplus Interconnection Service is utilized, the total amount of Interconnection Service at the Point of Interconnection would remain the same." Designed to reduce costs for interconnection customers and improve wholesale market competition, the Surplus Interconnection Process allows Lake Wilson Solar to create additional capacity value by leveraging the interconnection facilities and network upgrades necessary to accommodate the solar generation component of the Project. Surplus interconnection requests also proceed through a separate queue process outside of the standard DPP, and thus, review can occur on an expedited timeline.

Lake Wilson Solar will seek MISO approval for the additional 75 MWac of BESS capacity via MISO's Surplus Interconnection Process based on: (1) the energy and capacity levels for the Lake Wilson Solar generation assets during the peak and shoulder times that were incorporated into the MISO studies; (2) the energy and capacity value of the BESS during the summer and shoulder peak that are incorporated into the MISO studies; and (3) MISO's methodology for assigning capacity. The solar and BESS portions of the Project will operate in tandem as one combined, associated facility. This interconnection configuration will provide sufficient outlet to maximize the use of all solar energy generation from the Project.

The Project will include a proposed approximately 200-400-foot long 115 kilovolt (kV) above-ground Gen-Tie Line that is needed to connect the Project Substation to the Xcel Switchyard. The 115 kV overhead Gen-Tie Line will likely exit from the western portion of the Project Substation and route to the Xcel Switchyard. The anticipated route of the Gen-Tie Line is shown on **Figures 3 & 4**. The proposed Gen-Tie Line is planned to be a 115 kV line spanning less than 1,500 feet and thus will not trigger the need for a Route Permit from the Commission. The planned Project Gen-Tie Line is further exempt from CN requirements because it does not meet the voltage and length requirements of a large energy facility under Minn. Stat. §216B.2421, subd. 1.

Lake Wilson Solar proposes to interconnect the Project to the existing Fenton - Chanarambie 115 kV high voltage transmission line (HVTL) (which transects the Project Area) via a 250-300 foot in/out 115 kV transmission line (Xcel Line Tap) from the Xcel Switchyard. Lake Wilson Solar will acquire land rights for the Xcel Switchyard and Xcel Line Tap, and Xcel Energy will design, permit, construct, own and operate the Xcel Switchyard facility and Xcel Line Tap.

Lake Wilson Solar plans to construct the Project on a schedule that facilitates an in-service date in 2026. The actual in-service date will be dependent upon when Lake Wilson Solar is able to secure an off-take agreement for the sale of the power from the Project.

The Project falls within the definition of a Large Electric Power Generating Plant (LEPGP) in the Power Plant Siting Act and therefore requires a Site Permit from the Commission prior to construction. Lake Wilson Solar submitted a request to the Minnesota Department of Commerce, Energy Environmental Review and Analysis (DOC-EERA) for a size determination on November 4, 2021 in accordance with Minn. Stat. § 216E.021. DOC-EERA issued its size determination on December 22, 2021. Lake Wilson Solar plans to file a LEPGP site permit application for the Project under docket number IP-7070/GS-21-792. Minnesota Rules Chapter 7850 provides for three different procedures for obtaining a site permit: full review, alternative review, and local review. In accordance with Minn. Stat. § 216E.04, subd. 2(8), Lake Wilson Solar is seeking approval of its site permit application under the alternative review process provided for under Minn. Stat. § 216E.04 and Minn. R. 7850.2800–7850.3900. Lake Wilson Solar filed a Notice of Intent to Submit a Site Permit Application under the Alternative Permitting Process to the Commission on November 16, 2021. A Commission SP supersedes all local land use, zoning, and building regulations (Minn. Stat. § 216E.10, subd. 1).

2.2 APPLICANT INFORMATION

Lake Wilson Solar is an IPP; it is a Delaware limited liability company and an affiliate of Invenergy LLC, a clean energy infrastructure company. Invenergy, an energy development company with headquarters in Chicago, Illinois is providing development services to Lake Wilson Solar for the Project. Invenergy is one of the leading independent power producers in the United States and internationally, having developed over 30,000 megawatts of natural gas-fueled and renewable power generation with its affiliates. In Minnesota, Freeborn Wind Energy LLC, an affiliate of Invenergy, recently completed development, permitting, and sale of the Freeborn Wind Project located in Freeborn County, MN and Worth County, IA to Xcel Energy in 2019.

2.3 PROJECT CONTACTS

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2.4 FILING FEES AND PAYMENT SCHEDULE (MINN. R. 7849.0210)

The total fee for the CN Application and the schedule of payments are shown in **Table 1**. The fee determination for the Project is based on a capacity of 150 MWac, per the requirements of Minn. R. 7849.0210, subp. 1. The payment schedule is based on Minn. R. 7849.0210, subp. 2.

Table 1: Certificate of Need Application Schedule of Payments

Fee Calculation	Amount
Fee Calculation Equation	$10,000 + $50/MW
Due with CN Application	$4,375.00
Due 45 days after Application submittal date	$4,375.00
Due 90 days after Application submittal date	$4,375.00
Due 135 days after Application submittal date	$4,375.00
Total Calculated Fee	$17,500.00

2.5 EXEMPTION REQUEST

Minnesota Rules Chapter 7849 sets forth the data an applicant must provide in a CN application. An applicant may be exempted from providing certain information if the applicant requests an exemption in writing that shows that the data requirement is either unnecessary to determine the need for the proposed facility or may be satisfied by submitting another document. Minn. R. 7849.0200, subp. 6.

On November 16, 2021, Lake Wilson Solar submitted a Request for Exemption from Certain Certificate of Need Application Content Requirements (Exemption Request). In its Exemption Request, Lake Wilson Solar requested that the Commission grant exemptions, pursuant to Minn. Stat. § 216B.243 and Minn. R. 7849.0200, from certain CN data requirements that are not necessary to determine the need for an independent power production facility or a

renewable energy facility designed to satisfy the Renewable Energy Standards (RES) or the Solar Energy Standards (SES) requirements set forth in Minn. Stat. § 216B.1691, or other clean energy standards.[3]

On January 4, 2022, the Commission issued an order granting Lake Wilson Solar the exemptions it requested in its Exemption Request, consistent with the recommendations filed by the Department of Commerce, Division of Energy Resources.[4] Where appropriate in this Application, Lake Wilson Solar will reference the specific exemptions granted by the Commission.

3.0 NEED SUMMARY AND ADDITIONAL CONSIDERATIONS (MINN. R. 7849.0240)

3.1 NEED SUMMARY

Lake Wilson Solar is proposing to construct this facility to sell energy, capacity and renewable energy credits, either bundled or unbundled, to one or more electric utilities and/or commercial customers. Lake Wilson Solar is actively marketing the Project to a number of potential off-takers and may sell the power in the form of a Power Purchase Agreement (PPA), or the Project could be owned directly by a utility. Utilities and other customers seeking to diversify and build their energy generation portfolios are attracted to solar energy projects because of long-term, fixed, competitive pricing, high-capacity value, environmental benefits, and existing and potential renewable energy policies. The proposed Project would install up to 150 MW of solar generating capacity in Minnesota that would contribute to satisfying utilities' and consumers' demands for renewable energy and meet utility renewable requirements or individual sustainability goals.

The demand for PV in Minnesota has increased rapidly in recent years.[5] According to the Minnesota Department of Commerce's most recent Energy Policy and Conservation Quadrennial Report, Minnesota solar capacity grew rapidly in 2017, adding 403 MWac of capacity compared to 170 MWac in 2016, and increased by 287 MWac in 2018 and 152 MWac in 2019.[6] According to the 2020 Quad Report, preliminary data from Xcel Energy shows that developers added 140 MWac of community solar gardens for a total of more than 1,200 MWac as of December 2020

[3] The Request for Exemption noted a Project size of up to 150 MWac together with an associated BESS of up to 50 MW of storage. Since the Request for Exemption was approved, Lake Wilson Solar determined an associated BESS of up to 95 MW of storage was optimal to maximize the delivery of power generated by the Project. The increase in BESS storage has not impact on the determination of need or Lake Wilson Solar's entitlement to any granted exemption.

[4] *In the Matter of the Application of Lake Wilson Solar Energy LLC for a Certificate of Need for the up to 150 MW Lake Wilson Solar and Battery Storage Project in Murray County, Minnesota*, Docket No. IP7070/CN-21-791, Order (Jan. 4, 2022) (Exemption Order)

[5] Minnesota Department of Commerce, Energy Policy and Conservation Quadrennial Report 2020 at 9 (March 1, 2021), https://mn.gov/commerce-stat/pdfs/20210301_quad_report.pdf (hereinafter, the "2020 Quad Report").

[6] 2020 Quad Report at 133-134.

(based on preliminary estimates).[7] Solar electricity accounted for nearly three percent of electricity generated within Minnesota in 2020.[8]

As Minnesota's utilities strive to achieve ambitious renewable energy targets, "significant renewable additions"[9] will be necessary. For example, Xcel Energy's "Upper Midwest Integrated Resource Plan" alone calls for 86 percent carbon emissions reductions from 2005 levels by 2030, and 100 percent reductions by 2050.[10] By Xcel Energy's estimation, these are "some of the most ambitious carbon reduction goals of any utility in the U.S."[11] Translating these goals into action, Xcel Energy's Commission-approved plan proposes to add 3,150 MW of cost-effective, utility-scale solar generation, with 1,850 MW of the total being added during 2026-2034, and approximately 2,650 MW of wind being added between 2028 and 2034.[12]

Similarly, other Minnesota utilities are advancing efforts to transition to renewable energy. Otter Tail Power will be at 50 percent renewable energy by 2025.[13] ALLETE's Minnesota Power is currently delivering 50 percent renewable energy to its customers and intends to provide 100 percent carbon free energy by 2050.[14] Likewise, Southern Minnesota Municipal Power Agency (SMMPA) announced its plan for a 90 percent reduction in carbon dioxide (CO_2)emissions from 2005 levels and 80 percent carbon-free energy on an annual basis in 2030.[15] Additionally, the Minnesota Transmission Owners' Biennial Transmission Report's compliance filing outlining gaps between existing and planned transmission lines and the transmission system that will be required to meet the companies' publicly stated clean energy goals lists the following clean energy goals of Minnesota utilities:

- Dairyland Power Cooperative is transitioning to a more diverse generation portfolio, with carbon reduction and system reliable stated as "central issues". In 2020, Dairyland's Board of Directors approved a goal of a 50 percent reduction in carbon dioxide intensity by 2030 (from 2005 levels);

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[7] 2020 Quad Report at 134.

[8] 2020 Quad Report at 133.

[9] Xcel Energy, 2020-2034 Upper Midwest Integrated Resource Plan Reply Comments (July 24, 2021), Docket No. E002/RP-19-368, available at: https://www.edockets.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={70F0437A-0000-CF1C-96D6-E7E22CE60B9C}&documentTitle=20216-175386-01

[10] *Id.*

[11] *Id.*

[12] Xcel Energy, 2020-2034 Upper Midwest Integrated Resource Plan Reply Comments (July 24, 2021), Docket No. E002/RP-19-368, available at: https://www.edockets.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={70F0437A-0000-CF1C-96D6-E7E22CE60B9C}&documentTitle=20216-175386-01.

[13] Otter Tail Power, https://www.otpco.com/ways-to-save/renewable-energy-residential/

[14] Minnesota Power (ALLETE), *EnergyForward*, https://www.mnpower.com/Environment/EnergyForward.

[15] Southern Minnesota Municipal Power Agency, *SMMPA plans to be 80% carbon-free in 2030* (Feb. 5, 2020), available at: https://smmpa.com/news/2020/2/5/smmpa-plans-to-be-80-carbon-free-in-2030#:~:text=The%20plan%20would%20result%20in,an%20annual%20basis%20in%202030.

- Great River Energy has a goal to serve its all-requirements member-owner cooperatives with energy that is 50 percent renewable by 2030;

- Minnesota Municipal Power Agency has a goal to deliver 70 percent renewable power supply by 2030, reduce carbon emissions 80 percent by 2035 with a vision for 100 percent carbon free energy by 2050;

- Minnkota Power Cooperative is committed to finding opportunities to reduce carbon emissions; and

- Rochester Public Utilities has a goal to transition to 100 percent renewable energy by 2030.[16]

Lake Wilson Solar is well-positioned to help meet the renewable resource needs of Minnesota's electric utilities.

Beyond aiding with utility compliance towards voluntary renewable commitments and Minnesota's existing RES and SES, Lake Wilson Solar can also help meet other state policies and goals. For example, Minn. Stat. § 216C.05 identifies energy planning and policy goals that include "the development and use of renewable energy resources wherever possible."[17] In addition, Minn. Stat. § 216H.02 sets forth greenhouse gas (GHG) emissions reductions goals and planning requirements. Minnesota has thus far fallen short of reaching these goals, and in the Minnesota Pollution Control Agency's 2021 Greenhouse Gas Legislative Report, the Minnesota Pollution Control Agency (MPCA) details that Minnesota's GHG emissions have declined 8 percent when comparing 2018 to 2005 levels with an increase in emissions after 2018. This is notably below the "goal of a 15 percent emissions reduction by 2015,"[18] and suggests that Minnesota will risk missing its goal of 30 percent reduction by 2025 without significant additional progress. By providing additional, carbon-free generation, Lake Wilson Solar can help further eliminate CO_2 and other greenhouse gas emissions from Minnesota's power sector, where significant emissions continue to originate. Similarly, Governor Walz issued Executive Order 19-37 establishing a Climate Change Subcabinet to "[i]dentify policies and strategies that will put Minnesota back on track or meet or exceed" those goals.[19]

Governor Walz recently announced a set of policy proposals that are designed to lead Minnesota to 100 percent clean energy in Minnesota's electricity sector by 2040.[20] Given that

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[16] Compliance Filing, *In the Matter of the Minnesota Transmission Owners' 2019 Biennial Transmission Projects Report*, Docket No. E002/M-19-205 (Oct. 29, 2021) (eDockets No. 202110-179283-07).

[17] Minn. Stat. § 216C.05, subd. 1.

[18] Minnesota Pollution Control Agency & Minnesota Department of Commerce, *2021 Greenhouse Gas Legislative Report* (Jan. 2021), https://mn.gov/puc-stat/documents/pdf_files/MPCA-DOC%20Greenhouse%20Gas%20Inventory%20Report%20-%202021-1-14.pdf

[19] Executive Order 19-37 (Dec. 2, 2019).

[20] Office of Governor Tim Walz, *Governor Walz, Lieutenant Governor Flanagan, House and Senate DFL Energy Leads Announce Plan to Achieve 100 Percent Clean Energy in Minnesota by 2040* (Jan. 21, 2021), available at: https://mn.gov/governor/news/?id=1055-463873.

just over 25 percent of Minnesota's electric generation came from clean energy at the time of Governor Walz's announcement,[21] Minnesota will need additional renewable generation like that provided by the Project to meet this goal. President Biden issued Executive Order 14008 ("Tackling the Climate Crisis at Home and Abroad") promoting renewable energy development – in addition to directing the United States on a path to achieve "net-zero emissions, economy-wide, by no later than 2050," it sets out to attain "a carbon pollution-free electricity sector no later than 2035." [22]

Clean energy requirements in Minnesota and neighboring states further demonstrate the need for the Project. Thirty-seven U.S. states, 11 of which are MISO states, currently have either mandated or voluntary renewable portfolio standards or policies.[23] This includes Minnesota. The Minnesota Legislature established interim milestones to ensure that utilities make progress toward the "25 by '25" requirement, which includes the requirement to have 20 percent of the electric utility's total retail electric sales be generated by renewable sources by 2020, and 25 percent of sales to be generated by renewable sources by 2025. The Minnesota Legislature recently passed legislation that would require 55 percent of sales to be generated by renewable sources by 2035.[24] As shown in **Table 2**, utilities[25] in Minnesota are also required to provide 1.5 percent of their total retail electrical sales from electricity generated by solar energy by the end of 2020.[26] Minnesota's Legislature has declared that the energy goal of the state is to have 10 percent of the retail electric sales in Minnesota be generated by solar energy by 2030.[27] Renewable resources, such as the Project, are needed to meet these clean energy requirements in both Minnesota and in neighboring states.

Table 2: Solar Energy Standard Milestones

Year	Percent of Retail Electric Sales as Solar
2020	1.5%
2030	10.0%

[21] *Id.*

[22] Executive Order 14008 (Jan. 27, 2021), https://www.govinfo.gov/content/pkg/FR-2021-02-01/pdf/2021-02177.pdf.

[23] National Conference of State Legislatures, *State Renewable Portfolio Standards and Goals* (Apr. 17, 2020), https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx; *MTEP18 MISO Transmission Enhancement Plan*, at 182. Accessed online February 2, 2021. Retrieved from https://cdn.misoenergy.org/MTEP18%20Full%20Report264900.pdf.

[24] See S.F. No. 4, 93rd Legis. (February 1, 2023); https://www.revisor.mn.gov/bills/text.php?number=SF0004&session=ls93&version=latest&session_number=0&session_year=2023. As of the date of this Application, S.F. No. 4 was passed by the Minnesota State Sente and the Minnesota State House of Representatives, but had not been signed into law by Governor Walz.

[25] Minnesota Power, Ottertail Power Company, and Xcel Energy are subject to the SES. The SES statute excludes cooperative and municipal utilities.

[26] Minn. Stat. § 216B.1691, subd. 2f(a).

[27] Minn. Stat. § 216B.1691, subd. 2f(e).

In February 2023, the Minnesota Legislature passed "100 Percent by 2040" legislation[28], a carbon-free energy standard, which is likely to increase Minnesota's renewable energy needs by compelling utilities to obtain additional electricity from renewable sources beyond that currently required by the RES and further reduce carbon from energy sources. The "100 Percent by 2040" standard requires utilities to generate or procure sufficient electricity generated from a carbon-free technology, such as solar, equivalent to at least the percentages of the electric utility's total retail sales to retail customers in Minnesota by the end of the year indicated in **Table 3**.

Table 3: Carbon Free-Standard Milestones

Year	Percent of Retail Electric Sales as Carbon-Free Energy
2030	80% for public utilities; 60 % for other electric utilities
2035	90% for all electric utilities
2040	100% for all electric utilities

Jurisdictions surrounding Minnesota also have renewable policies. For example, in 2021, the North Dakota Legislature enacted a statutory provision adopting a low-emission technology initiative, which establishes a goal that the "agricultural, forestry, natural resources, and working land of the United States should provide energy from low-emission technology and continue to produce safe, abundant, and affordable food, fuel, feed, and fiber."[29] As used in this initiative, low-emission technology includes, among others, wind. Additional renewable resources will be needed to meet the low-emission technology initiative in North Dakota and similarly situated states.

Under current state standards, total United States renewable portfolio standard demand will increase from 310 terawatt hours (TWh) in 2019[30] to 630 TWh in 2030.[31] Given existing renewable energy capacity, an additional 250 TWh increase in renewable resources will be required to meet demand through 2030.[32] In addition, the regional transmission grid is being expanded to deliver wind generation in a cost-effective manner; specifically, MISO's 2011 Multi-Value Project Portfolio is expected to enable 41 million megawatt hours (MWh) of wind

[28] Governor Walz signed the "100 Percent by 2040" legislation into law on February 7, 2023.

[29] *See* N.D.C.C. § 17-01-01.

[30] *See* Lawrence Berkeley National Laboratory, U.S. Renewable Portfolio Standards 2019 Annual Status Report (July 2019), at 24. Retrieved from https://eta-publications.lbl.gov/sites/default/files/rps_annual_status_update-2019_edition.pdf.

[31] Lawrence Berkeley National Laboratory, U.S. Renewable Portfolio Standards, 2021 Status Update (February 2021), at 25. Retrieved from https://eta-publications.lbl.gov/sites/default/files/rps_status_update-2021_early_release.pdf.

[32] Lawrence Berkeley National Laboratory, U.S. Renewable Portfolio Standards, 2021 Status Update (February 2021), at 27.

energy per year to meet renewable energy mandates and goals.[33] Although the current Production Tax Credit and Investment Tax Credit (ITC) for renewables were previously set to begin a phasedown in upcoming years, many utilities in MISO were developing long-term resource plans, which include increased levels of renewable energy such as solar.[34] Recent federal legislation, in the form of the Inflation Reduction Act (IRA), removed the ITC phasedown.[35] The ability for Projects to secure the full ITC indefinitely is likely to only increase the demand for renewable energy generation, such as the Project. In general, alternative energy sources provide lower costs per MW-hour than conventional sources.[36]

Further, in addition to traditional local and regional utility demand for wind energy, a growing number of corporations are turning to renewable energy to save money on energy and meet sustainability goals. Corporate customers either purchase renewable energy directly or obtain renewable benefits and cost savings through financially settled contracts, sometimes called virtual PPAs. In addition, many utilities are creating "green tariffs," which allow customers to purchase up to 100 percent renewable energy from the utility.

Beyond the growing demand from utilities, corporations such as Apple, Google and Meta, along with many others, have recently set goals to obtain 100 percent of their energy from renewables. These clean energy goals fuel the demand for corporate renewables procurement and subsequent PPAs.

According to Wood Mackenzie's report titled an "*Analysis of Commercial and Industrial Wind Energy Demand in the United States,"* the United States is "at the beginning stage of a corporate renewables procurement boom," with approximately "85 gigawatts of renewable energy demand" from the "largest U.S. companies" alone through 2030.[37] Another Wood Mackenzie report titled "*US Corporate Procurement of Wind and Solar 2020*" lists 2019 as "the largest year for megawatts of annual wind and solar commercial and industrial (C&I) capacity additions and the largest year on record for new wind and solar C&I PPAs signed." These growth trends are expected to continue, and 2020 saw an immense demand for C&I renewable energy PPAs. Similarly, according to a 2019 research report, corporate contracts accounted for

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[33] MTEP 18 MISO Transmission Enhancement Plan, at 42.

[34] *MTEP 18 MISO Transmission Enhancement Plan* at 144.

[35] Inflation Reduction Act of 2022. Retrieved at https://www.congress.gov/117/plaws/publ169/PLAW-117publ169.pdf *See also* Reuters, Inflation Reduction Act and renewable energy development: its advantages and limitations (September 23, 2022) Retrieved from https://www.reuters.com/legal/legalindustry/inflation-reduction-act-renewable-energy-development-its-advantages-limitations-2022-09-23/

[36] Lazard, *Lazard's Levelized Cost of Energy Analysis – Version 14.0* (October 2020), at 2. Accessed online September 24, 2021. Retrieved from https://www.lazard.com/media/451419/lazards-levelized-cost-of-energy-version-140.pdf.

[37] Wood Mackenzie, *Corporates usher in new wave of US wind and solar growth* (Aug. 20, 2019), https://www.woodmac.com/our-expertise/focus/Power--Renewables/corporates-usher-in-new-wave-of-u.s.-wind-and-solar-growth/.

22 percent of 2018 power purchase agreements for renewables in the United States.[38] Further, the buyers are not just large corporations; smaller companies are entering into aggregated purchasing models and further driving additional market expansion.[39]

Many of Minnesota's largest companies also have aggressive sustainability and carbon reduction goals, as evidenced by their participation in and support of the Minnesota Sustainable Growth Coalition's *"Clean Energy Vision,"* which calls for "surpassing the State of Minnesota's current economy-wide greenhouse gas emissions targets of 30 percent reduction by 2025 and 80 percent reduction by 2050."[40] The Project will help attract and retain corporate entities with Environmental, Sustainability, and Governance goals in Minnesota by providing reliable renewable energy that helps to reduce greenhouse gas emissions.

Given the demand for renewable energy, a market exists for independently produced electricity generated from solar and other renewables, including the up to 150 MW to be generated by the Project. In sum, Minnesota has a wide array of needs that Lake Wilson Solar can help address. The clean, renewable power that Lake Wilson Solar will produce can help meet utility commitments, achieve GHG reduction targets, address environmental justice needs, and provide much needed short- and long-term economic benefit.

3.2 ADDITIONAL CONSIDERATIONS

3.2.1 Socially Beneficial Uses of Energy Output

Energy produced by the Project will provide significant, numerous, and varied societal benefits. First, the Project will provide a large amount of renewable energy with minimal environmental impact as well as avoided environmental costs, as discussed in Sections 10 and 11 in this Application. Further, regional and national security and energy reliability can be enhanced through the development of diversified generation resources such as solar energy generation from the Project.

The Project is also designed to be socioeconomically beneficial to landowners, local governments, and communities. Landowner compensation is established by voluntary option leases, easements or purchase agreements between the landowners and Lake Wilson Solar for lease, easement or purchase of the land for the Project. Lake Wilson Solar has secured 100 percent land control for the Project, which is the approximate 2,621-acre Project Area comprised of private land under a solar lease or collection easement agreement, as well as a small portion of land under a purchase agreement option. The 2,621-acre land control area includes land which

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[38] Emma Foehringer Merchant, *Corporate Renewables Procurement Accounted for Nearly a Quarter of All Deals in 2018* (Feb. 5, 2019), https://www.greentechmedia.com/articles/read/corporate-renewables-procurements-quarter-ppa-2018.

[39] Emma Foehringer Merchant, *2018 Was Record Year for Corporate Clean Energy Contracts* (Jan. 31, 2019), https://www.greentechmedia.com/articles/read/reports-confirm-a-record-year-for-corporate-clean-energy-contracts#gs.nxat51.

[40] Minnesota Sustainable Growth Coalition, *Clean Energy Vision*, https://environmental-initiative.org/work/minnesota-sustainable-growth-coalition/.

was secured to provide the acreage needed to complete final design, construction and operation of the Project. Lake Wilson Solar estimates that up to approximately 1,526 acres of the 2,621 acres is necessary to accommodate the final design and engineering of the proposed up to 150 MWac Project (i.e., the Preliminary Development Area). As design and engineering is not yet completed for the Project, the excess acreage between the Preliminary Development Area and Project Area allows for planned buffers and flexibility in overall final Project design.

The Project will also create new local job opportunities for various trade professionals that live and work in the area as it is typical to advertise locally to fill required construction positions. Opportunity exists for sub-contracting to local contractors for gravel, fill, and civil work. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes. Lake Wilson Solar plans to issue a Request for Proposal (RFP) to an Engineering, Procurement and Construction (EPC) contractor to construct the Project. Lake Wilson Solar will include preferences for contractor bids that utilize local, union construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. The selected EPC contractor will work with labor unions, local subcontractors, or other vendors to implement a Project construction staffing model that attempts to maximize local hiring and local economic benefits for the Project to the extent practicable, while ensuring the Project is safely built on time and on budget. Moreover, the timing of construction of the Project is also likely to necessitate the payment of prevailing wages during construction and operation of the Project to satisfy new ITC qualification requirements contained within the IRA. 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 250 jobs during the construction and installation phases, and up to 5 onsite jobs and 11 indirect jobs in Murray County, as well as an additional 9 indirect jobs in the State of Minnesota during the operations phase. Temporary construction jobs within Murray County will generate indirect economic benefits as employees spend their income on local goods and services and pay local sales tax. As an operating facility, the Project Center will annually generate an estimated $4.5 million in economic output for the State of Minnesota by supporting onsite and indirect jobs as described, and distributing nearly $1.7 million in earnings.

The Project offers an opportunity to maximize the economic attributes that benefit the local community and deliver an overall cost-competitive energy project. The Project's strong solar resource, proximity to existing electrical and transportation infrastructure, an executed GIA, and ability to create a construction-efficient layout are some of the major benefits of the Project.

3.2.2 Promotional Activities Giving Rise to Demand

Lake Wilson Solar was granted an exemption from Minn. R. 7849.0240, subp. 2(B), which requires that each LEGF CN application contain "an explanation of the relationship of the proposed facility to promotional activities that may have given rise to the demand for the facility." Lake Wilson Solar is not a utility and has not engaged in promotional activities which could have given rise to the need for the Project's anticipated generated electricity. Thus, consistent with its determinations in past CN proceedings, the Commission granted an exemption to Lake Wilson Solar.

3.2.3 Effects of Facility in Inducing Future Development

The Project is not expected to directly affect development in Murray County or hinder future development that can otherwise occur in surrounding agricultural areas.

The Project is designed to be socioeconomically beneficial to landowners, local governments, and communities. Landowner compensation is established by voluntary leases or purchase agreements between the landowner and Lake Wilson Solar for Lake Wilson Solar's lease or purchase of the land. Solar energy infrastructure will also provide an additional source of revenue to the townships and county in which the Project is sited.

The Minnesota solar energy production tax rate is $1.20 per megawatt hour (MWh). The Project is expected to generate an estimated average annual solar energy production and property tax revenue over the life of the project of approximately $330,000 for Murray County and approximately $75,000 for Leeds Township Lease payments will be made by Lake Wilson Solar to the owners of the land used for the Project. These payments will replace the revenue which would have been generated if agricultural production were continued by the landowners. In fact, based upon an analysis completed by Strategic Economic Research in 2021, the land use value of leasing the land for solar far exceeds the value for agricultural use when considering the development of the land for the Project.

As discussed in Section 3.2.1, the Project will create new local job opportunities for various trade professionals that live and work in the area. Construction jobs within Murray County will generate indirect economic benefits as employees spend their income on local goods and services and pay local sales tax. As an operating facility, the Project Center will annually generate an estimated $4.5 million in economic output by supporting approximately 25 direct and indirect jobs in Minnesota and distributing nearly $1.7 million in direct earnings.

General skilled labor is expected to be available in Murray County or Minnesota to serve the Project's basic infrastructure and site development needs. Specialized labor will be required for certain aspects of the Project. It may be necessary to import specialized labor from other areas of Minnesota or neighboring states. The relatively short construction duration often precludes special training of local or regional labor, and much of the workforce needed to construct a solar facility must be comprised of Minnesota licensed electricians. Most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code.

Construction of the Project would provide temporary increases to the revenue of the area through increased demand for housing, lodging, food services, fuel, transportation, and general supplies. Additional personal income will also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes. At the same time the Project is providing income to residents, an increase in renewable energy will also help to lessen wholesale energy market volatility.[41] The development of solar energy technology now

[41] U.S. Dep't of Energy, *The Use of Solar and Wind as a Physical Hedge against Price Variability within a Generation Portfolio*, at 35 (August 2013) (stating that "Solar and wind generation significantly reduces the

makes solar power's relative price competitive with other generators, including natural gas and coal.

4.0 COMPLIANCE WITH CERTIFICATE OF NEED CRITERIA (MINN. R. 7849.0120)

The Commission has established criteria to assess the need for an LEGF in Minn. R. 7849.0120. The Commission must grant a CN to an applicant upon determining that:

> A. (T)he probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states;
>
> B. (A) more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record;
>
> C. (B)y a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health; and
>
> D. (T)he record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.[42]

As discussed further below, the Project satisfies all four of the Commission's criteria for granting a CN for the Project.

4.1 THE PROBABLE RESULT OF DENIAL OF LAKE WILSON SOLAR'S APPLICATION WOULD BE AN ADVERSE EFFECT ON THE ADEQUACY, RELIABILITY, AND EFFICIENCY OF THE REGIONAL ENERGY SUPPLY (MINN. R. 7849.0120(A))

The Project will provide up to 150 MW of nameplate capacity to meet the electricity needs of Minnesota and the region. Lake Wilson Solar plans to negotiate one or more power purchase agreements, or the sale of the Project, with utilities that have a need to purchase or produce renewable energy to serve their customers. Applicant may also offer the Project's output for sale on the wholesale market or to a corporate purchaser. Denying the Application would result in the loss of a significant amount of electricity needed to satisfy state and regional

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exposure of electricity costs to natural gas price uncertainty in fossil-based generation portfolios on a multi-year to multi-decade time horizon.")

[42] Minn. R. 7849.0120.A–D.

demand and would deny utilities and other purchasers the opportunity to purchase clean, low-cost energy that will count toward satisfying applicable renewable energy standard and goals.

As discussed in Section 3.1, there is a significant body of voluntary utility commitments and state legislative policy requiring or otherwise obligating utilities to obtain a certain percentage of their total energy resources from renewable energy, which supports the need for reliable, efficient renewable resources, like the solar energy produced by the Project.

The Project has limited air emissions and extremely low environmental impacts with some environmental benefits. It will displace pollutants emitted by fossil fuel-fired generating resources, including CO_2, which is considered a significant contributor to climate change and GHG emissions. It will meet the needs of many of the state's electric consumers at a competitive cost and assist the off-taker in meeting its renewable energy objectives while enhancing the economic base and energy security in Murray.

In addition to the specific need for renewable energy to serve Minnesota utilities, many other states in the region have similar renewable energy requirements. For example, Illinois requires certain utilities to obtain 25 percent of eligible sales from renewables by 2025.[43] Similarly, the North Dakota Legislature enacted a statutory provision adopting a low-emission technology initiative, which establishes a goal that the "agricultural, forestry, natural resources, and working land of the United States should provide energy from low-emission technology and continue to produce safe, abundant, and affordable food, fuel, feed, and fiber."[44] As used in this initiative, low-emission technology includes, among others, wind. Additional renewable resources will be needed to meet the low-emission technology initiative in North Dakota and similarly situated states.

Under current state standards, total United States renewable portfolio standard demand will increase from 310 TWh in 2019[45] to 630 TWh in 2030.[46] Given existing renewable energy capacity, an additional 250 TWh increase in renewable resources will be required to meet demand through 2030.[47] In addition, the regional transmission grid is being expanded to deliver wind generation in a cost-effective manner.[48] Further, Minnesota's SES requires utilities to provide 1.5 percent of their total retail electrical sales from electricity generated by solar energy

[43] 20 Ill. Comp. Stat. sec. 3855/1-75(c)(1).

[44] *See* N.D.C.C. § 17-01-01.

[45] *See* Lawrence Berkeley National Laboratory, U.S. Renewable Portfolio Standards 2019 Annual Status Report (July 2019), at 24. Retrieved from https://eta-publications.lbl.gov/sites/default/files/rps_annual_status_update-2019_edition.pdf.

[46] Lawrence Berkeley National Laboratory, U.S. Renewable Portfolio Standards, 2021 Status Update (February 2021), at 25. Retrieved from https://eta-publications.lbl.gov/sites/default/files/rps_status_update-2021_early_release.pdf.

[47] Lawrence Berkeley National Laboratory, U.S. Renewable Portfolio Standards, 2021 Status Update (February 2021), at 27.

[48] MTEP 18 MISO Transmission Enhancement Plan, at 42.

by the end of 2020 and 10 percent by 2030.[49] Based on the cumulative needs set forth above, there is a need for more solar power to adequately, reliably, and efficiently meet the region's need for renewable energy than is currently available.

As discussed in more detail in the Site Permit Application, Lake Wilson Solar conducted a detailed analysis to identify the current point of interconnect (POI) and solar site location for development. Lake Wilson Solar proposes to interconnect the Project to the existing Fenton - Chanarambie 115 kilovolt kV HVTL via the Xcel Line Tap and a new Xcel Switchyard that will be permitted, constructed and owned by Xcel Energy. Lake Wilson identified this POI as having available capacity and low interconnection costs. The Project site was chosen due to the capacity of and proximity to the Fenton - Chanarambie 115 kV transmission line (thus minimizing the need for extensive new transmission facilities), willing landowners and community interest in the Project, the lack of farmsteads and rural residences and human settlement impacts, the lack of other environmental constraints, adequate roads for access, flat terrain, and overall need for renewable energy generation. Accordingly, Lake Wilson Solar makes efficient use of the regional transmission system by developing a no-emissions solar energy project at a location with low-cost interconnection and few required upgrades.

4.2 No More Reasonable and Prudent Alternative to the Lake Wilson Solar Energy Center has been Demonstrated (Minn. R. 7849.0120(B))

Minnesota Rule 7849.0120(B) requires a CN applicant to examine possible project alternatives so that the Commission can determine whether a more reasonable and prudent alternative exists. Applying the factors set forth in Minn. R. 7849.0120(B), the Project has many advantages when compared to other renewable alternatives.

4.2.1 Size, Type, and Timing

When evaluating alternatives, the Commission examines whether the project is the appropriate size, whether it is the right type, and whether the timing is appropriate. With respect to renewable energy projects, the Commission has concluded that the proper inquiry in evaluating the size of the project is the appropriateness of the size of the project to the overall state and regional need for renewable energy. As demonstrated in Section 3.1, the need for renewable energy in the coming years, including the 600 MWac of power sought by Xcel Energy[50], far exceeds the amount of energy to be supplied by the Project.

Regarding the type of facility, the Commission granted Lake Wilson Solar an exemption from Minn. R. 7849.0250(B) with respect to evaluating non-renewable alternatives because such alternatives do not meet the Project's objective of providing energy that will satisfy renewable energy and other clean energy standards and goals.

[49] Minn. Stat. § 216B.1691, subd. 2f(a).

[50] Xcel Energy seeks an additional 300 MWac of solar or solar + battery storage within MISO Zone 1, provided that 300 MWac will utilize existing interconnection rights at the Sherburne County Substation, which the Project will not utilize.

With respect to timing, the Project is expected to be on-line and operational by December 2026, depending on completion of regulatory approvals. This will help Minnesota and other electric utilities achieve the necessary renewable energy levels required to meet pending clean energy standards milestones.[51]

4.2.2 Cost Analysis

The Project will also generate electricity at a lower cost per kilowatt hour than would other possible fossil fuel and renewable energy options, such as coal and biomass.[52] Solar generation growth is anticipated to continue because the solar incentives, along with falling technology costs for solar, support significant competition with natural gas for electricity generation and shares of coal and nuclear power generation continue to decrease in the U.S. electricity generation profile.[53] Moreover, energy storage systems, such as the Project's proposed solar-battery hybrid system, will compete with natural gas-fired turbines as sources of back-up capacity for non-dispatchable renewable energy sources.[54] In addition, although the Project has yet to secure arrangements for the sale of energy it will produce, Lake Wilson Solar is confident it will be able to secure long-term purchasers at attractive prices and terms. Importantly, as an IPP, Lake Wilson Solar, rather than the state or its ratepayers, bears the risk of not securing a PPA or otherwise not selling the Project's output.

4.2.3 Potential Environmental and Socioeconomic Impacts

The purpose of this analysis is to compare the potential impacts of various renewable generation options. As demonstrated in Sections 10 and 11 of this Application, the environmental impacts of the Project will be minimal and significantly less than a fossil-fuel based facility. One of the greatest attributes of solar energy is its minimal impact on the environment. The Project will not directly release CO_2, sulfur dioxide, nitrogen oxides, mercury, or particulate matter. It will not require water for power generation and will not discharge wastewater containing any heat or chemicals during operation. It will produce energy without the extraction, processing, transportation, or combustion of fossil fuels. The Project will be sited to minimize environmental impacts. Additionally, recent research on the environmental impacts of solar farms indicates that there could be some net benefits to soil resources over the lifecycle of the Project.[55]

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[51] *Id.*

[52] *See* EIA, LEVELIZED COST AND LEVELIZED AVOIDED COST OF NEW GENERATION RESOURCES IN THE *ANNUAL ENERGY OUTLOOK* 2020 (2020), https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf.

[53] *See* EIA, ANNUAL ENERGY OUTLOOK 2022 at 1 and 18 (Mar. 2020), https://www.eia.gov/outlooks/aeo/pdf/AEO2022_Narrative.pdf

[54] *Id* at 18-20

[55] *See* Jeffrey S. Briberg, *Utility and Community Solar Should Use Native Landscaping* CLEANTECHNICA (Mar. 15, 2016), https://cleantechnica.com/2016/03/15/utility-and-community-solar-should-use-native-landscaping/.

4.2.4 Reliability

The Project will have an average expected annual net capacity factor of approximately 25.3 percent.

4.3 THE LAKE WILSON SOLAR ENERGY CENTER WILL BENEFIT SOCIETY IN A MANNER COMPATIBLE WITH THE NATURAL AND SOCIOECONOMIC ENVIRONMENTS (MINN. R. 7849.0120(C))

Minnesota Rule 7849.0120(C) requires a CN applicant to address whether the proposed project will benefit society in a manner that is compatible with protecting natural and socioeconomic environments, including human health. Applying the factors set forth in Minn. R. 7849.0120(C), the energy produced by the Project will provide significant, numerous, and various societal benefits, with minimal negative impacts.

4.3.1 Overall State Energy Needs

As discussed in Section 3.1 above, utilities continue to require renewable energy to meet clean energy and GHG reduction standards and voluntary goals, as well as to meet consumers' energy demands. Thus, the Project is not only compatible with Minnesota's energy needs, but it is wholly consistent with it.

4.3.2 Potential Environmental and Socioeconomic Impacts Compared to No-Build Alternative

In general, the socioeconomic impacts associated with the Project will be positive. Wages will be paid and expenditures will be made to local businesses and landowners during the Project's construction and operation. The construction and operation of the Project will increase Murray County's tax base. In addition, lease and purchase payments paid to the landowners will offset potential financial losses associated with removing a portion of their land from agricultural production. The Project will impact up to approximately 1,526 acres of agricultural land within the Preliminary Development Area, roughly 0.4 percent of the farmland in Murray County. The Project will not result in a significant impact to land-based economies in the Project vicinity as this acreage constitutes well under one percent of the farmland in Murray County. Of the 461,000 acres in Murray County, the majority (approximately 362,082 acres) is classified as cropland. Impacts to approximately 1,526 acres of agricultural land within the Preliminary Development Area would temporarily reduce the amount of farmland land in the County by roughly 0.4 percent.

Agricultural production would be allowed to continue in certain areas within the Project Area but outside the fence of the Preliminary Development Area during construction and operation of the Project. In addition, taking land that has been farmed for more than 100 years temporarily out of production results in benefits to the soil at the end of the Project's useful life. According to the United States Department of Agriculture, establishing and maintaining permanent cover of either introduced or native grasses, legumes and forbs for nesting cover, winter cover, brood cover, pollinator habitat, and food for wildlife can reduce soil erosion,

improve water and air quality, enhance plant diversity, and increase soil organic matter and overall soil health.[56]

One of the greatest attributes of solar energy is its minimal impact to the environment. Aside from minimal amounts of intermittent emissions from the emergency back up generators, the Project will not release CO_2, sulfur dioxide, nitrogen oxides, mercury, or particulate matter. It will not require water for power generation and will not discharge wastewater containing any heat or chemicals during operation. It will produce energy without the extraction, processing, transportation, or combustion of fossil fuels. The Project will be sited in a way that minimizes environmental impacts.

The development of solar energy has recently become and will continue to be important in diversifying and strengthening the economic base of Minnesota. As discussed in Section 3.2.1, Lake Wilson Solar will issue an RFP to EPC contractors to construct the Project. Lake Wilson Solar will include preferences for contractor bids that utilize local, union construction craft employees to the greatest extent feasible in accordance with the Project's budget, timeline, industry standards and requirements, and corporate safety policies. The selected EPC contractor will be required to work with labor unions, local subcontractors, or other vendors to implement a Project construction staffing model that attempts to maximize local hiring and local economic benefits for the Project, while ensuring the Project is safely built on time and on budget. Additionally, much of the workforce needed to construct a solar facility must be comprised of Minnesota licensed electricians because most of the assembly and wiring work for solar installations is considered electrical work under the Minnesota State Electrical Code, which in turn requires that Minnesota licensed electricians complete that work. Wages and salaries paid to contractors and workers in Murray County will contribute to the total personal income of the region. At least part of the wages paid to temporary and permanent Project workers will be circulated and recirculated within the county and the state. Expenditures made by the Applicant for equipment, fuel, operating supplies, and other products and services will benefit businesses in the county and the state. In addition, lease and purchase payments paid to the landowners will more than compensate for potential financial losses associated with removing a portion of their land from agricultural production, and these payments will diversify and strengthen the local economy.

Long-term benefits to the county's tax base as a result of the construction and operation of the Project will contribute to improving the local economy. For example, the Minnesota solar energy production tax rate is $1.20 per MWh. The Project is expected to generate an estimated average annual solar energy production and property tax revenue over the life of the project of approximately $330,000 for Murray County and approximately $75,000 for Leeds Township. The Project is expected to generate about $12 million in local tax revenues over a 30-year period.

Not building an electrical generation facility would result in no physical impact to the environment in Murray. However, not building the Project would also not provide an additional source of tax revenues to the county, an increase in the income stream to residents and

[56] United States Department of Agriculture, Natural Resources Conservation Service, *Conservation Choices: Conservation Cover*, https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcseprd413671.

businesses, an increase in perennial grasses that is expected to increase carbon sequestration and storage capacity of the soils over the life of the Project, or an increase in the amount of low-cost, clean, reliable renewable energy available to state or regional utilities and their customers. The Project will have a minimal impact on the physical environment, while simultaneously providing significant benefits.

4.3.3 Inducing Future Development

Although the Project is not expected to directly affect development in Murray County, the Project will provide significant benefits to the local economy and local landowners. Landowners in the Project Area will benefit from the purchase, lease and easement payments, and installation of solar energy infrastructure will increase the local tax base in the townships and county in which the Project is sited. The Project will also provide significant income opportunities for local residents through the creation of temporary construction and permanent O&M positions.

4.3.4 Socially Beneficial Uses of Output

The Project will provide up to 150 MW of capacity and roughly 313,000 MWh annually of clean and reliable electricity. The Project will produce affordable, clean, renewable energy that will help meet energy demands and clean energy and carbon reduction standards and voluntary goals. According to the United States Environmental Protection Agency's (USEPA's) Greenhouse Gas Equivalencies Calculator (USEPA, 2022), the Project is expected to offset approximately 489,000,000 pounds (~244,500 short tons) of carbon dioxide equivalent annually and provide electricity for approximately 28,000 homes annually.[57] In addition, the local economy will benefit from the landowner lease, easement and purchase payments for the Project, production taxes, income from jobs created, and local spending. It will also provide carbon-free energy that will assist in meeting carbon and GHG reduction goals.

4.4 The Lake Wilson Solar Energy Center is Consistent with Federal, State, and Local Rules and Policies (Minn. R. 7849.0120(D))

4.4.1 The Project is Consistent with Minnesota Energy Policy

The Project will provide a significant amount of renewable energy, which is consistent with Minnesota's policy to increase renewable energy use. Solar, as renewable energy, is a favored energy resource under Minnesota law.[58] In addition, as discussed previously, the SES

[57] This is based upon the U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator and 313,000,000 kWh (313,000 MWhs) annual production PVsyst model. Environmental Protection Agency. 2022. Greenhouse Gas Equivalencies Calculator. Available online at: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[58] *See* Minn. Stat. § 216B.243, subd. 3a ("The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source. For purposes of this subdivision,

mandates increased electric generation from solar resources.[59] The state has also set a goal to reduce statewide GHG emissions across all sectors producing those emissions to a level at least 80 percent below 2005 levels by 2050.[60] Governor Walz recently announced a set of policy proposals that are designed to lead Minnesota to 100 percent clean energy in Minnesota's electricity sector by 2040.[61] Just over 25 percent of Minnesota's electric generation came from clean energy at the time of Governor Walz's announcement.[62] Adding new sources of electric energy with no emissions, like solar energy, together with battery storage components that can partially offset the need for natural gas peaking plants, is essential to meeting these goals.

Further support for the conclusion that the Project is consistent with state energy policy can be found in the favorable tax treatment that solar energy facilities receive. The state legislature has exempted all real and personal property of solar energy conversion systems from property taxes.[63] Solar energy conversion systems are also exempt from state sales tax.[64]

4.4.2 The Project is Consistent with Applicable Minnesota Statutory Provisions

In addition to the criteria set forth in Minn. R. Ch. 7849, there are several statutory provisions that may apply to a CN application. As discussed below, the Project is consistent with these statutory requirements.

4.4.2.1 *Renewable Preference*

Minnesota Statute Section 216B.243, subd. 3a provides a preference for renewable resources:

> The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive

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"renewable energy source" includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.")

[59] Minn. Stat. § 216B.1691, subd. 2f.

[60] Minn. Stat. § 216H.02, subd. 1.

[61] Office of Governor Tim Walz, *Governor Walz, Lieutenant Governor Flanagan, House and Senate DFL Energy Leads Announce Plan to Achieve 100 Percent Clean Energy in Minnesota by 2040* (Jan. 21, 2021), available at: https://mn.gov/governor/news/?id=1055-463873.

[62] *Id.*

[63] Minn. Stat. § 272.02, subd. 24.

[64] Minn. Stat. § 297A.67, subd. 29.

> (including environmental costs) than power generated by a renewable energy source. For purposes of this subdivision, "renewable energy source" includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.

Minnesota Statute Section 216B.2422, subd. 4, is also applicable:

> The commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need, pursuant to section 216B.243, nor shall the commission allow rate recovery pursuant to section 216B.16 for such a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest.

The Project is consistent with Minnesota's preference for renewable energy and satisfies these statutory criteria by furthering available resources to meet this renewable energy preference.

4.4.2.2 *Distributed Generation*

Minnesota Statute Section 216B.2426 states that:

> The commission shall ensure that opportunities for the installation of distributed generation, as that term is defined in section 216B.169, subdivision 1, paragraph (c), are considered in any proceeding under section 216B.2422, 216B.2425, or 216B.243.

Pursuant to Minn. Stat. § 216B.169, subd. 1(c), "distributed generation" refers to projects of no more than 10 MW. The Project is a utility-scale Project and will not provide distributed energy to the system as defined by Minnesota law. However, Lake Wilson Solar believes that the need for new energy resources is so great that it also will not displace any opportunities for installation of renewable energy. Additionally, the Project's transmission opportunities and economies of scale make it an exceptional electrical resource that will provide great benefits to the state and the local economy.

4.4.2.3 *Innovative Energy Preference*

Minnesota also requires the Commission to consider an innovative energy project[65] before authorizing construction or expansion of a fossil-fueled generation facility.[66] Because the Project is not a fossil-fuel facility, this requirement is not applicable.

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[65] An "innovative energy project" is:

> a proposed energy-generation facility or group of facilities which may be located on up to three sites: (1) that makes use of an innovative generation technology utilizing coal as a primary fuel in a highly efficient combined-cycle configuration with significantly reduced sulfur dioxide, nitrogen

4.4.2.4 *RES and SES Compliance*

Minnesota Statute Section 216B.243, subd. 3(10) requires the Commission to evaluate whether a CN applicant is in compliance with Minnesota's RES and SES. Lake Wilson Solar, however, is not subject to the RES or SES because it has no retail sales of electricity in Minnesota. Therefore, this requirement does not apply to the Project.

4.4.2.5 *Environmental Cost Planning*

Minnesota Statute Section 216B.243, subd. 3(12) requires the Commission to evaluate the extent to which an applicant has considered the risk of environmental costs and regulation. As the Commission and the Department of Commerce have determined, this statute does not apply to renewable generation facilities such as the Project.[67]

4.4.2.6 *Transmission Planning Compliance*

Minnesota Statute Section 216B.243, subd. 3(10) requires the Commission to consider whether a utility seeking a CN complies with certain transmission planning requirements. As an IPP, this statute does not apply to Lake Wilson Solar.

4.4.3 The Project is Consistent with Federal Energy Policy

The Project will provide a significant amount of renewable energy, which is consistent with Federal energy policy favoring renewable projects. Federal energy policy provides significant United States federal tax incentives to attract investment in renewable energy projects, including solar projects like the Project. For example, the solar ITC provided by Section 48 of the Internal Revenue Code permits qualifying entities to elect to claim a credit of 30 percent of qualifying costs for a project that has "begun construction" for federal income tax purposes through 2019. As modified by the Consolidated Appropriations Act, 2021 that was signed into law on December 27, 2020, the amount of the ITC was previously scheduled to step down to 26 percent for projects that begin construction in 2020, 2021 or 2022, and to 22 percent for projects that begin construction in 2023. The IRA again modified the ITC to allow qualifying entities to claim a full credit of 30 percent without the step downs previously included in the Consolidated Appropriations Act, as long as the entity satisfied the requirements of the

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> oxide, particulate, and mercury emissions from those of traditional technologies; (2) that the project developer or owner certifies is a project capable of offering a long-term supply contract at a hedged, predictable cost; and (3) that is designated by the commissioner of Iron Range resources and rehabilitation as a project that is located in the taconite tax relief area on a site that has substantial real property with adequate infrastructure to support new or expanded development and that has received prior financial and other support from the board.

Minn. Stat. § 216B.1694, subd. 1.

[66] Minn. Stat. § 216B.1694, subd. 2(a)(4).

[67] *In the Matter of the Application of Elm Creek Wind, LLC for a Certificate of Need for a Large Energy Facility, the Elm Creek Wind Project in Jackson and Martin Counties*, Order Granting Certificate of Need at 12, Docket No. IP6631/CN-07-789 (Jan. 15, 2008).

IRA, which may include the payment of prevailing wages during construction and operation of the qualifying project. Lake Wilson Solar expects to utilize the tax credits provided for in the IRA as part of the Project's long-term financing structure.

4.4.4 The Project Complies with Federal, State, and Local Environmental Regulation

The Project will meet or exceed the requirements of all applicable federal, state, and local environmental laws and regulations. **Table 14** in Section 12.3 provides a list of approvals the Project may need to obtain from governmental entities to demonstrate full compliance. Lake Wilson Solar is committed to obtaining all necessary environmental and other approvals required under federal, state, and local requirements.

The Project will comply with all relevant requirements and will fulfill important state energy policies with respect to renewable energy and environmental protection. In particular, the facility meets the requirements of Minn. Stat. §§ 216B.2422, subd. 4 and 216B.243, subd. 3a, which state that the Commission may not approve a nonrenewable energy facility unless it determines that a renewable facility is not in the public interest, or more expensive than the nonrenewable facility including consideration of environmental costs. It is further consistent with state policies relating to the reduction of GHGs.

The Project offers a cost-competitive and environmentally superior alternative to fossil fuel generators that is clearly in the public interest and can reliably deliver accredited capacity, energy, renewable energy credits (RECs) and other environmental attributes. Approval of the Project is in the public interest because it meets all of Minnesota's laws supporting acquisition of clean, renewable energy and provides an opportunity for utilities and other customers seeking to diversify and build their energy generation portfolios.

5.0 DESCRIPTION OF PROJECT AND ALTERNATIVES (MINN. R. 7849.0250)

5.1 PROPOSED PROJECT

The Project is an up to 150 MWac solar PV facility and associated energy storage systems located in Leeds Township, Murray County, Minnesota. The overall Project, including a 95 MW BESS and interconnection facilities, is proposed within an approximate 2,621-acre area (Project Area) and would connect to the existing Fenton - Chanarambie 115 kV HVTL that transects the Project boundary. Lake Wilson Solar has secured site control for the entire proposed Project via lease and easement agreements and a purchase option agreement (for the proposed new Switchyard and some additional Project solar and BESS infrastructure). The final Project design is expected to occupy approximately 1,526 acres (Preliminary Development Area), within the overall 2,621-acre Project Area. As design and engineering is not yet completed for the Project, the excess acreage between the Preliminary Development Area and Project Area allows for planned buffers and flexibility in overall final Project design. The Project will include a proposed 115 kV Gen-Tie Line that will be approximately 200-400 feet long and will connect the Project Substation to the Xcel Switchyard (which facilitates the interconnection to the existing Fenton - Chanarambie 115 kV HVTL). The 115 kV overhead Gen-Tie Line will likely exit from the western portion of the Project Substation and route to the

Xcel Switchyard. The Project will interconnect to the grid via a 250-300 foot in/out 115 kV Xcel Line Tap that will extend from the Xcel Switchyard to the existing Fenton - Chanarambie 115 kilovolt kV HVTL (which transects the Project Area).

The Project's primary components include PV panel modules mounted on a one-in-portrait (1-p) single axis tracking system (**Image 1**), centralized inverters, a Project Substation, Project BESS, Project Gen-Tie Line, an O&M facility, fencing, and access roads. For descriptive purposes, an individual tracker row is used as a basic unit of the Solar Facility. A tracker row is made up of panels mounted on a flat beam oriented north-south, with a break in the middle where the gear box is located. The tracker rows, which tilt east-west to follow the sun throughout the day, are connected together in groups and, depending on the manufacturer, served by a single motor. The racking system consists of all the components involved in fastening the panels to the tracker rows, plus the tracker beams, gearboxes, motors, and pier foundations.

Associated facilities include electrical cables and accessories, conduit, inverter pads, switchgears, step-up transformers, SCADA systems, and metering equipment. The Project solar arrays will be fenced/secured and access allowed for authorized personnel via lockable gates. The Project Substation, Xcel Switchyard, and BESS will also be fenced with controlled/locking access gates.

As construction of the Project nears completion, temporary staging and laydown areas and other temporary disturbance areas will be restored. The Project will be graded to natural contours where possible and soil will be de-compacted. Disturbed areas will be reseeded and re-vegetated with specific seed mixes in accordance with the Project Vegetation and Soil Management Plan (VSMP) and the Stormwater Pollution Prevention Plan (SWPPP). The Applicant will work collaboratively with the Minnesota Department of Natural Resources (MNDNR) to maximize the opportunity to establish and manage the vegetation at the Project site pursuant to the Agricultural Impact Mitigation Plan (AIMP) (Site Permit Application, Appendix E) and the VSMP (Site Permit Application, Appendix F).

Image 1: Typical Solar Tracker Row Design.

The solar array at the Project will consist of PV solar panels, a racking system, inverter skids, security fencing, and up to ten weather stations. The weather stations would be up to 15 feet in height.

The Applicant proposes to use panels affixed to tracking mechanisms that would allow the panels to "track" the sun from east to west on a daily basis. The panels and tracking rack system are generally aligned in rows north and south with the PV panels facing east toward the rising sun in the morning, parallel to the ground during mid-day, and then west toward the setting sun in the afternoon. The panels are rotated by a small motor connected to the tracking rack system to slowly track with the sun throughout the day (**Image 2**). The tracking rack system allows the Project to optimize the angle of the panels in relation to the sun throughout the day, thereby maximizing production of electricity and the capacity value of the Project.

When the sun is directly overhead, the PV panels will be at a zero-degree angle (level to the ground) and four to six feet off the ground. The tracker rows will follow the sun from a maximum of 60 degrees east to 60 degrees west through the course of the day (the design tilt may vary). At the maximum 60 degrees (tilted to the highest position), the edge of the modules will be a maximum of 15 feet off the ground. The design will involve no spinning machinery (except for the tracker motor), no thermal cycle, and no water use (except for possible infrequent module washing).

To the extent practical, the racking system foundations will be a driven pier and will not require concrete, although some concrete foundations may be required depending upon site specific soil conditions and geotechnical analysis. Driven pier foundations are typically driven 8-15 feet into the ground depending on site specific soils. The depth pier foundations will be installed for the Project will be determined in final design.

A specific solar module has not yet been selected for the Project. The proposed module at the time of the application submittal is the LONGi LR5 72HBD. Several other manufacturers are under consideration, including modules manufactured by Jinko, Canadian Solar, Hanwha, JA Solar, Risen, Seraphim, Talesun, Hyperion Solar (Runergy), and Trina. All modules under consideration are mono- or poly-crystalline models. Lake Wilson Solar will consider the costs and performance of each technology option as well as environmental and safety standards when making its final selection. This process has been included in the proposed Project timeline and the final selection should not alter the Project scope, timeframe or budget.

A specific racking and tracker selection has not been made. The NexTracker Horizon Gen 3 SPT is under consideration, as well as racking and tracker vendors including: the ATI DuraTrack, GameChange Solar's Genius Tracker, PV Hardware's Axone/Monoline, and Soltect's SF7/SF7 Bifacial model. Racking infrastructure and trackers will be selected closer to the procurement stage to ensure performance standards are met.

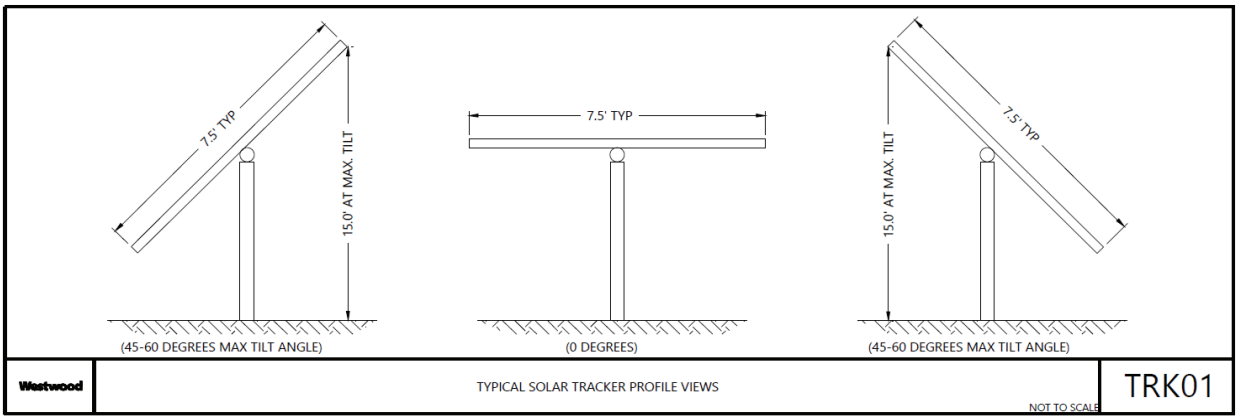

Image 2: Typical Solar Tracker Profile.

Solar energy generation begins with the installed solar modules converting energy from sunlight into direct current (DC) electrical power. Electrical wiring will connect the PV panels to inverters which will convert solar energy generated power from DC to alternating current (AC). A step-up transformer (located with each of the inverters) then converts the AC voltage to an intermediate voltage of 34.5 kV. Collection cables then carry the 34.5 kV power to the BESS and/or Project Substation.

The DC electrical collection cabling will be installed either below ground or underhung beneath the PV solar modules and racking via the CAB system.[68] The CAB system is a cable management system that delivers a safe, strong, and durable support for utility-scale wiring for ground-mount solar power generation facilities. CAB systems are quick and easy to install and provide potential labor and material cost benefits on solar projects. If buried, the underground trench will be approximately 2-5 feet below ground and 1-2 feet wide for AC cabling, or 4-10

[68] In this option some Project construction locations may install the CAB system on pile foundations (without racking) to connect the DC cables to the inverter/equipment pad.

feet wide for DC cabling (**Image 3**). Excavation and refilling the trench will be conducted in accordance with the AIMP.

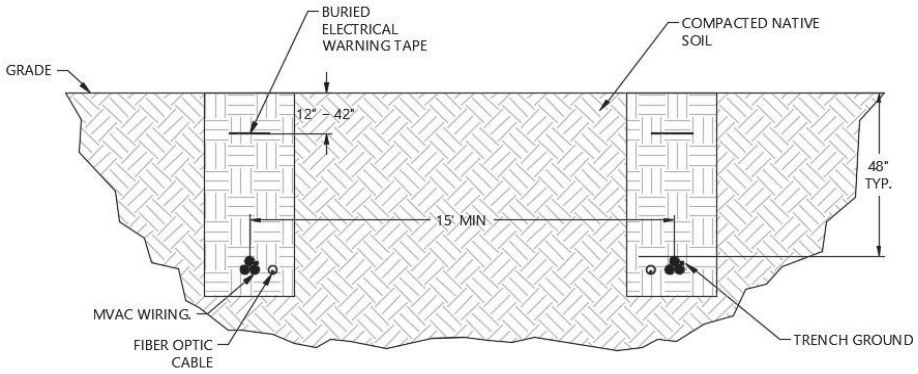

Image 3: Typical Solar Collection Trenches for Cables

Inverter skids will be installed at locations throughout the Preliminary Development Area. Each skid includes a DC to AC inverter and a step-up transformer to which the inverters will feed electricity. The final number of inverters for the Project will depend on the inverter size, as well as inverter and panel availability. To represent maximum potential impacts, the Project's preliminary design proposes 55 inverter skids. Skids provide the steel foundation for the enclosed inverter, step-up transformer, and SCADA system. The height of a skid is approximately 6-10 feet above grade. The skids will be placed atop a poured reinforced concrete slab or pier foundations and will typically measure 10 feet wide by 20 feet long, with final dimensions to be determined during detailed design by the contracted engineer and will be influenced by the inverter make and model. If a concrete pad is used, the selected contractor will provide the concrete pad. Concrete foundations will be poured onsite or precast and assembled off-site. The inverters skids are located within the interior fenced portion of the Project along access roads.

A specific solar inverter has not yet been selected for the Project. Preliminary designs modeled use of the Power Electronics FS4200M Unit. However, several other models and vendors are under consideration, including units manufactured by FIMER, TMEIC, GE, SMA, and Sungrow. Lake Wilson Solar will consider the costs and performance of each option as well as environmental and safety standards when making its final selection.

Each inverter pad will also include one or more transformers to which the inverters will feed electricity (**Image 4** which shows the DC cables buried option). Inverters convert the DC output of the PV modules to AC, which is required for delivery to the electrical grid. After the inverter has converted the electricity it is stepped-up via a transformer from low-voltage to medium or intermediate voltage (stepped up to 34.5 kV). The final number of inverters for the Project will depend on the inverter size, inverter and module availability, as well as the final array configuration. For the purposes of generation estimates, Lake Wilson Solar modelled the Power Electronics FS4200M Unit.

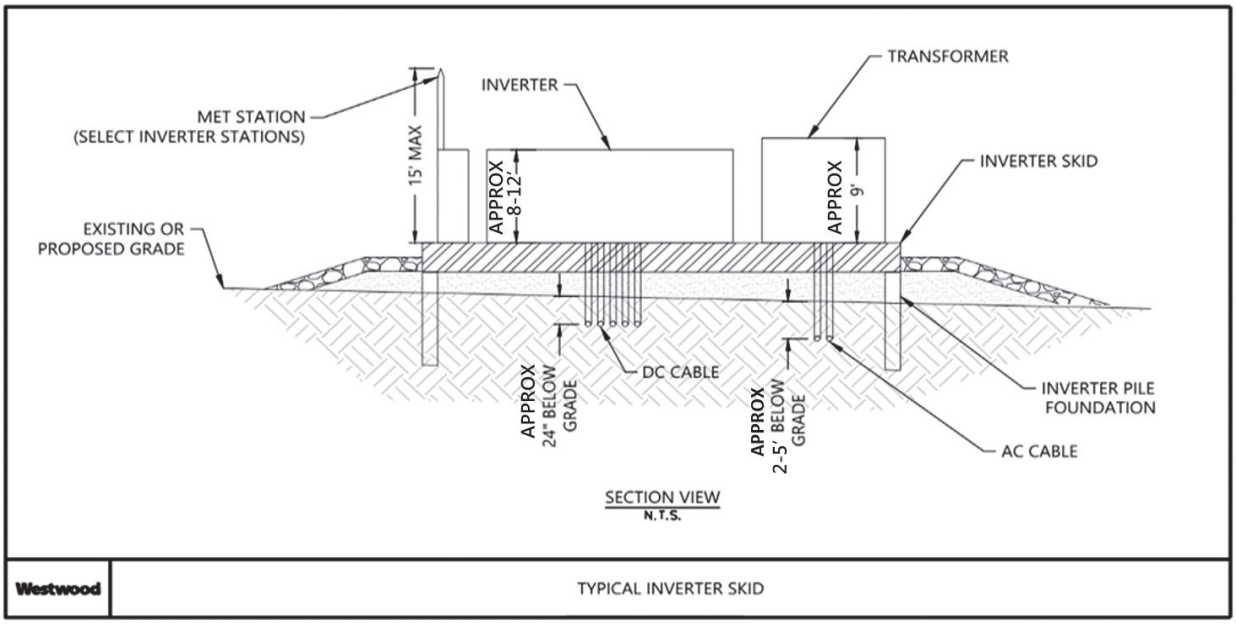

Image 4: Typical Solar Inverter Skid (DC Cables Buried Option)

The AC electrical collection system from the inverters/step-up transformer to the Project Substation will be buried between 2 to 5 feet below ground. The final type of electrical system will be determined prior to construction based on technology, availability of materials, and costs. Below-ground AC electric conductor collection lines will transfer the converted 34.5 kV AC electricity from the inverter equipment (which is assembled on skids and delivered to the Project as a package) to the Project Substation. During trench excavations, the topsoil and subsoil will be removed and stockpiled separately in accordance with the AIMP. Once the electric conductor collection lines are laid in the trench, the trench will be backfilled with subsoil followed by segregated topsoil. Electrical collection technology is changing and will be site-specific depending on geotechnical analysis, constructability, and availability of materials. Final engineering and procurement recommendations will help determine the construction method for the electrical collection system.

The depth to cables may be deeper for installation under existing utilities or other features requiring avoidance. The specific electrical collection technology used will be site-specific depending on geotechnical analysis, constructability, and availability of materials. Final engineering and procurement will help determine the construction method for the electrical collection system. Underground cabling will be installed in accordance with the AIMP.

The Project Substation is proposed in the west-central part of the Project Area. The Project Substation is estimated to occupy approximately 3.7 acres of land. The Project Substation will consist of high voltage electrical structures (i.e., poles), breakers, medium power transformers to step-up the power from the 34.5 kV feeders to the grid voltage of 115 kV, metering and related equipment for connecting to the transmission grid, lightning protection, and control equipment according to the specifications of the GIA with MISO and Xcel Energy. Underground 34.5 kV collector lines from the Project inverters will deliver solar generated energy to the Project Substation. The 34.5 kV collector system voltage will then be stepped up to

the interconnection voltage of 115 kV by medium power transformers located at the Project Substation and transmitted to the Xcel Switchyard via a 200-400 foot long overhead 115 kV Project Gen-Tie Line in a single span between deadend structures. The current design includes a set of A-frame deadend structures (up to 100 feet in height) located within the Project Substation site and in the Xcel Switchyard which will be connected via conductors in a single short span. Final layout and design of these facilities may require use of intermediate tangent structures if the span length is increased from what is expected at this time. In that case, a single dead-end structure will be located within the Project Substation and additional tangent pole structures will route the Project 115 kV Gen-Tie Line from the Project Substation to the Xcel Switchyard. The number of poles and length of 115 kV Project Gen-Tie Line are pending final engineering and design. The tangent structures will likely be made of wood or metal and will be 100 feet tall.

The Project Substation location will be graded and the ground surface dressed with crushed rock, and secondary containment areas for the transformer(s) will be installed. The fenced area of the Project Substation footprint will be approximately 320 feet x 305 feet in size (subject to final substation design and layout). The area within the Project Substation fence will be graveled to minimize vegetation growth and reduce fire risk. The substation will be fenced with a 7-foot chain-link fence topped with one foot of barbed wire in accordance with North American Electric Reliability Corporation (NERC) requirements for security and safety purposes. The Project Substation will include a parking area, secured with a lockable gate, and will be accessible to qualified, trained Project operational personnel or those escorted by such personnel at all times using the Project's access roads.

The Project Substation will also route power to the proposed BESS, used to firm, smooth, or shift energy output generated by the Project as it is distributed to the overall electric grid. Auxiliary power will be routed from the Project Substation to the BESS at 34.5 KV. The BESS component is in part designed to reduce costs for interconnection customers and improve wholesale market competition, allowing Lake Wilson Solar to create additional energy and capacity value by maximizing the use of interconnection facilities and network upgrades necessary to accommodate the solar generation component of the Project. The BESS is intended to maximize the usefulness of the network upgrades by dispatching stored power during times when less solar energy is being produced. For example, during off-peak times, if the Project is producing 100 MWac of solar generation, the BESS could dispatch up to an additional 70 MWac of power to fully utilize the 170 MWac of capacity allowed under the GIA. A BESS is accredited capacity based generally on its ability to provide the energy equivalent of its claimed capacity for a minimum of at least four continuous hours each day.

Project BESS facilities would include commercial-scale lithium-ion (or similar technology) batteries, converters or inverters, pad-mount transformers, and electrical interconnection facilities. The BESS also incorporates backup diesel generators to ensure this function can still be activated when there is a grid failure or power outage. The backup generators will be sized to provide at least two hours of standby power consistent with NFPA requirements and will be mounted on a concrete foundation. Lake Wilson Solar anticipates a centralized, AC-coupled system for the BESS (i.e., all batteries being in one location as opposed to distributed throughout the Project), which would have a footprint of approximately 4 acres by itself, and 6 acres including setbacks and fencing. This type of system allows for more efficient access, monitoring, and maintenance; has more flexible energy and power capacity sizing; and

has more flexible dispatch capabilities. The centralized design is also more technologically developed. The preliminary designs for the BESS components incorporate a modular layout based on currently available technology, which provides a conservative analysis of the potential overall size of the BESS. Battery systems produced by several manufacturers are under consideration for the Project, including but not limited to General Electric and Powin. Lake Wilson Solar will analyze current market offerings during final engineering to make a selection on the specific battery system model.

The BESS will be configured of storage cells (batteries) arranged in modules for efficient operations. The batteries will be housed in racks within a series of steel shipping containers or similar enclosures (see **Image 5**). The BESS will include inverters and medium voltage transformers to transfer the energy to and from the batteries. The BESS will use lithium ion batteries. The BESS industry is currently deploying two main types of lithium ion battery chemistries: nickel manganese cobalt oxide (NMC), and lithium iron phosphate (LFP). Lake Wilson Solar intends to use LFP due to its superior safety profile when compared to NMC.

Image 5: Example of BESS Containers

The proposed new Xcel Switchyard will be used to interconnect the Project to the existing Fenton - Chanarambie 115 kV HVTL which travels north-south along the eastern edge of 70th Avenue, adjacent to the western portion of the Project Area and travels west at the

intersection of 70th Avenue and 91st Street. The Xcel Switchyard will be fenced with a 7-foot chain-link fence topped with one foot of barbed wire in accordance with NERC requirements for security and safety purposes. The Xcel Switchyard will be connected to the existing Fenton - Chanarambie 115 kV HVTL to interconnect the Project to the grid via a new in/out 250-300 foot long Xcel Line Tap. The Xcel Line Tap will be installed in a new easement area from the existing Fenton - Chanarambie 115 kV HVTL to the Xcel Switchyard. The length of the Xcel Line Tap is approximately 250-300 feet and will include installation of either two dead-end pole structures (for single dead-ends) or six dead-ends (for 3-pole dead-ends), depending on Xcel Energy's selected design, and required electric conductors.

Lake Wilson Solar will acquire the land underlying the Xcel Switchyard site (via a purchase agreement) and secure any other land rights that are necessary to facilitate the connection of the Northern States Power Fenton - Chanarambie 115 kV HVTL to the Xcel Switchyard. Lake Wilson Solar will thereafter transfer ownership of this site to Xcel Energy. Xcel Energy will modify the existing Fenton - Chanarambie 115 kV HVTL, installing new deadend structures within the right-of-way to re-direct the circuit in/out of the Xcel Switchyard. These facilities will be network facilities owned and operated by Xcel Energy. Xcel Energy will design, permit, construct, own and operate the Xcel Switchyard facility and the Xcel Line Tap

The Applicant believes that the selected Project location in Murray is advantageous for solar development based upon a good solar resource, willing landowner participants, consistency with local land use designations and zoning, the excellent proximity to existing electric transmission infrastructure, and minimal impact to natural and cultural resources.

5.1.1 Nominal Generating Capability and Effect of Economies of Scale

The Project includes an up to 150 MWac nameplate solar-energy capacity project paired with a 95 MW battery energy storage system. The Project will provide up to 150 MWac of capacity and an average of up to approximately 313,000 MWh annually. The Project will provide enough electricity to power approximately 28,000 homes annually and prevent emission of approximately 489,000,000 pounds (~244,500 short tons) of carbon dioxide equivalent annually.[69] Larger solar projects, such as the Project, can realize some economies of scale by spreading out the relatively fixed transaction, operation, and maintenance costs over the entire Project, resulting in decreased costs per kilowatt hour (kWh) of electricity produced.

Generally, economies of scale (system size) do not affect the generation characteristics of the proposed facilities since the efficiency of a photovoltaic system depends primarily on the characteristics of the individual panels and the inverter. This allows excellent flexibility to adjust system size for the site-specific constraints without impacting the facilities' overall efficiencies.

[69] This is based upon the U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator and 313,000,000 kWh (313,000 MWhs) annual production PVsyst model. See Greenhouse Gas Equivalencies Calculator | Energy and the Environment | US EPA.

The impact to the grid from the integration of a BESS will be positive as the BESS can act to shift the output of the Project from the likely peak of solar generation at noon to a potential peak of electrical demand in the early evening. Depending on final design, the system can furnish other grid services such as frequency response and voltage support and could act as an electrical "suspension" to smooth the output of the Project on partly cloudy days.

The total installed capital cost for the Project is estimated to be approximately $450 to $500 million. Actual capital costs depend on various factors such as construction labor, Project equipment and materials, electrical and communication systems, taxes/tariffs, final design considerations (e.g., access roads, O&M building, etc.), as well as potential ongoing impacts from COVID-19. Operating costs are estimated to be approximately $2.6 million per year. Primary costs for O&M of the Project are associated with operation labor, vegetation management, snow clearing, solar array and BESS inspection and maintenance, applicable overall facility inspections, and other asset management related items.

5.1.2 Annual Capacity Factor

The Project is anticipated to have a net capacity factor of approximately 25.3 percent, with projected average output of up to approximately 313,000 MWh annually of reliable, on peak deliverable energy.

5.1.3 Fuel

The Project will generate electricity from sunlight; therefore, aside from limited amounts of fuel for the back-up generators, no fuel is required.

5.1.4 Anticipated Heat Rate

The conversion of solar to electricity does not generate heat as combustion or nuclear electricity generation facilities would when generating electricity. Therefore, heat rates are not applicable to a solar project.

5.1.5 Facility Location

The Applicant is proposing to build the Project in Leeds Township in Murray County. **Figures 1** and **3** depict the location of the proposed Project, Project facilities, and the interconnection facilities. The Project location is indicated on **Table 4**.

Table 4: Project Location

Township	Range	Section
106N	42W	15-17, 20-22, 27

No incorporated communities are located within the Project Area. There are three cities that are located in close proximity to the Project: Lake Wilson, Hadley, and Chandler. Lake Wilson is located just over one-mile northwest of the Project Area. Hadley is just over one-quarter mile east of the Project Area.

The Project encompasses approximately 2,621 acres (Project Area). Lake Wilson Solar has 100 percent land control for the Project, which is the approximate 2,621-acre Project Area comprised of private land under a solar or collection lease agreement, as well as a small portion of land under purchase agreement. The final Project design is expected to occupy up to approximately 1,526 acres (Preliminary Development Area), within the overall 2,621-acre Project Area. As design and engineering is not yet completed for the Project, the excess acreage between the Preliminary Development Area and Project Area allows for planned buffers and flexibility in overall final Project design.

Figures 3 and **4** depict the preliminary layout and associated infrastructure of the proposed Project. The Project's facilities will include solar panel modules and racking, inverters, security fencing, access roads, an O&M building, Project Substation, transformers, electrical collection and communication lines, up to ten weather stations, BESS, Gen-Tie Line, laydown areas, and ancillary equipment or buildings as necessary. The locations of the weather stations are not yet final and not shown on **Figures 3** and **4**. This preliminary layout reflects Lake Wilson Solar's effort to maximize the Project's energy production, follow applicable setbacks, and minimize impacts to the land, environment, and surrounding community. Although Lake Wilson Solar expects the final layout to remain similar to the preliminary layout, changes may occur as a result of ongoing site evaluation, permitting processes, landowner preferences, and engineering activities.

5.2 AVAILABILITY OF ALTERNATIVES (MINN. R. 7849.0250(B))

Minnesota Rule 7849.0250(B)(4) requires an applicant to discuss the availability of new generating facilities of a different size or using a different energy source as an alternative to the proposed facility. The objective of this alternatives analysis is to determine whether there are other energy sources that can better satisfy the need identified for the Project. The Commission granted Lake Wilson Solar a partial exemption from this data requirement, and Lake Wilson Solar will discuss only renewable alternatives as outlined in that exemption.

Developing and operating generating sources that are cost-effective and use proven technology is particularly important to an IPP like Lake Wilson Solar. Lake Wilson Solar does not have access to ratepayer funds that could provide a resource for retirement of capital investments. In addition, Lake Wilson Solar must keep its prices—and thus, its costs—low enough to remain competitive. For these reasons, Lake Wilson Solar must exercise diligence in deciding where and when to pursue opportunities for capital investment in new power-generating facilities. As indicated in this Application, the current pricing for solar energy is cost effective when compared to other renewable and non-renewable sources of electricity.

Commercial feasibility and reliability with respect to the generation output needed are important considerations in selling the power generated, and solar is a reliable resource. However, with respect to the alternatives discussed below, without a guarantee of long-term reliability and cost-effectiveness, it is difficult or impossible to convince customers than an unproven technology should be selected for purchase.

A solar project of smaller or larger size may be competitive within the marketplace, but Lake Wilson Solar believes the proposed Project size provides a number of advantages.

Invenergy, Lake Wilson Solar's parent company, has generally found that 100 MW is the threshold at which construction costs are competitive for solar projects connecting at transmission level voltages and economies of scale can be realized on the procurement of the project's components. For this site, the transmission interconnection costs are very competitive for a 150 MW solar project. As compared to a smaller solar farm, the Project provides economies of scale which the Applicant believes will reduce per megawatt hour costs of energy by spreading fixed costs over more MWh and provides efficiencies in transmission capacity utilization.

A larger solar farm, by contrast, may present additional construction cost and equipment procurement economies of scale, but at this site and at many others across the MISO region, interconnection costs are much higher on a per MW basis for a larger solar project due to expected network upgrades.

As it relates to the environmental impacts, a smaller or larger solar farm would be similar on a per solar panel basis but adjusted at scale to the size of the project.

In this rapidly growing solar market, the availability of projects of varying sizes provides cost-effective solar solutions to a wider range of potential customers, as not every potential customer has the capacity to purchase energy from a larger project, while many large customers may find a 150 MW project ideal for their needs.

5.2.1 Alternatives Considered (Minn. R. 7849.0250(B))

5.2.1.1 *Purchased Power*

Lake Wilson Solar is an IPP and does not purchase power. Instead, Lake Wilson Solar will sell power to utilities or other potential customers. As such, this data requirement is not applicable, and the Commission granted Lake Wilson Solar an exemption.

5.2.1.2 *Upgrades to Existing Resources*

Lake Wilson Solar has no existing facility in Minnesota for which it might seek improved operating efficiency. As such, this data requirement is not applicable, and the Commission granted Lake Wilson Solar an exemption.

5.2.1.3 *New Transmission*

Lake Wilson Solar has no plans to become involved in owning or operating transmission lines beyond the collection, and feeder lines that will be needed for interconnection of the Project. The development, construction, and operation of transmission and distribution lines designed to deliver power to end use customers will be left to utilities with defined service area obligations to retail customers. As such, this data requirement in not applicable, and the Commission granted Lake Wilson Solar an exemption.

5.2.1.4 *Wind Power*

Minnesota has a significant and important wind resource that can and is being used for energy and capacity services within the state's generating portfolio. Although wind is a good energy resource, solar is a good capacity resource. As a result, these two technologies complement each other and are not true substitutes. There is need for both wind and solar energy in Minnesota's renewable portfolio, and Lake Wilson Solar will be increasing the state's solar generation as part of an effort to increase solar energy's contribution to that portfolio.

5.2.1.5 *Hydroelectric Power*

Hydropower is also not an alternative to the Project. In 2015, hydropower in Minnesota produced 849,054 MWh of power, up slightly from 840,410 MWh in 2010, and compared to 774,729 MWh in 2005.[70] According to the 2016 Quad Report, issues with hydropower relate to "[c]osts of maintaining and operating dams compared to other sources of energy . . . as well as increased concern about the potential negative effect dams can have on Minnesota's river ecosystems."[71] There is not sufficient new hydro resources in Minnesota to replace the output of the Project.

5.2.1.6 *Biomass*

Minnesota communities do have accessible and low-value biomass feedstocks. However, the costs of these feedstocks vary widely, and the supply of biomass feedstock is limited.[72] Further, the environmental impacts of a biomass facility may be greater than those of the Project, due to both the facility itself and the machinery and equipment needed to gather and transport the biomass fuel. For these reasons, a biomass plant is not a good alternative to the Project.

5.2.1.7 *Emerging Technologies*

New renewable emerging power generation technologies are being developed, and Lake Wilson Solar believes that the current approaches are not sufficiently mature to provide the output needed to match the nameplate capacity of the Project or to be cost-effective and reliable.

5.2.1.7.1 Pumped Storage

The proposed site is not suited to a pumped storage application because the topography of the site is relatively flat with slopes ranging from 0 to 40 percent (with 90 percent ranging from 0 to 6 percent), and pumped storage requires the storage of large amounts of water in an elevated reservoir. Therefore, pumped storage is only commercially and technically viable in locations with certain existing geology for water storage and large (*i.e.*, steep) elevation changes. In

[70] Minnesota Department of Commerce, *Energy Policy and Conservation Quadrennial Report 2016* (hereinafter, 2016 Quad Report), at 28.

[71] 2016 Quad Report at 28.

[72] 2016 Quad Report at 27.

addition, there is currently no net new generation from pumped storage in Minnesota.[73] This technology is therefore not an alternative to the Project.

5.2.1.7.2 Compressed Air

Highly specialized geological sites are needed to make use of compressed air technology. Such sites are scarce in Minnesota. This technology has been implemented on a limited basis and creates no net new energy generation. Compressed air is therefore not an alternative to the Project.

5.2.1.7.3 Thermal Storage

This technology, which makes use of accumulated heat transferred to insulated repositories, is not yet commercially proven. Moreover, the Project is intended to generate electricity and thermal storage is intended to store energy. The Project BESS would store solar generated electrical energy (generated by the solar generation component of the Project) and release it to the grid when desired. The BESS would be a complement to the solar energy generation facility. Accordingly, thermal storage is not an alternative to the Project.

5.2.1.7.4 Hydrogen and Fuel Cells

Hydrogen, and its use in fuel cells, has received a lot of attention for its potential to impact energy production and use. Fuel cells can be used to produce energy in the form of electricity and heat. This energy can be applied to power vehicles and buildings. Fuel cells use a chemical reaction rather than a combustion reaction. Fuel cells have a similar level of efficiency as natural gas combustion sources and, when using hydrogen as fuel, have nearly no pollution. Hydrogen, however, is expensive, as it requires substantial amounts of energy to produce. While much research is being done regarding hydrogen and fuel cells, the technology is not yet available on a commercial scale.

5.2.1.7.5 Battery Storage

Battery storage is not a true alternative to the Project, since the purpose of the Project is to increase the supply of available renewable energy and the purpose of the Project BESS is to firm, smooth, or shift energy output generated by the Project by dispatching stored power during times when less solar energy is being produced. As such, a BESS acts as a capacity asset as opposed to a generation asset. The BESS component is designed to reduce costs for interconnection customers and improve wholesale market competition, allowing Lake Wilson Solar to create additional energy and capacity value by maximizing the use of interconnection facilities and network upgrades necessary to accommodate the solar generation component of the Project. The BESS system is intended to maximize the usefulness of the network upgrades by dispatching stored power during times when less solar energy is being produced. The BESS

[73] EIA, ELECTRIC POWER MONTHLY: HYDROELECTRIC (PUMPED STORAGE) POWER BY STATE BY SECTOR (Aug. 25, 2020), https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=table_1_12_a.

would not generate energy, but simply store solar generated electrical energy and release it to the grid when desired. The BESS would be a complement to the solar energy generation facility.

5.2.1.8 *Non-CN Facilities (Minn. R. 7849.0120(A)(4))*

Under Minn. Stat. §§ 216B.2421 and 216B.243, subd. 2, and Minn. R. Ch. 7849, a CN is required for the Project because it is an LEF, *i.e.*, larger than 50 MW. As an IPP, Lake Wilson Solar must compete with other available technologies to sell power on the wholesale market, if necessary. Due to the size of the Project, Lake Wilson Solar has the advantage of additional economies-of-scale not available to smaller, non-CN facilities.

5.2.1.9 *No Facility Alternative (Minn. R. 7849.0340)*

The Commission granted Lake Wilson Solar a partial exemption from Minn. R. 7849.0340, which requires an applicant to submit data for the alternative of "no facility," including a discussion of the impact of this alternative on the applicant's generation and transmission facilities, system, and operations. The rule also requires an analysis of "equipment and measures that may be used to reduce the environmental impact of the alternative of no facility."[74]

Lake Wilson Solar does not have a "system," nor does it have other generation and transmission facilities in Minnesota. As such, the requirements of Minn. R. 7849.0340 are not applicable to the Project and are not necessary to determine need for the facility. Instead, Lake Wilson Solar will provide data regarding the impact of the "no facility" alternative on its potential customers and the region in accordance with the Commission's order granting Lake Wilson Solar a partial exemption from Minn. R. 7849.0340.

Given that the Project is designed to increase the amount of energy available for purchase on the wholesale market that will satisfy clean energy standards, not building the facility is not an alternative. Not building the facility would result in no increase in renewable energy and, in turn, no opportunity for utilities to purchase the Project's output to satisfy clean energy standards. Such an outcome is contrary to Lake Wilson Solar's objective for the Project and will not satisfy the state and regional need for renewable energy.

5.2.1.10 *Facility Information for Alternatives Involving Construction of an LHVTL (Minn. R. 7849.0330)*

The Commission granted Lake Wilson Solar an exemption from Minn. R. 7849.0330, which requires the applicant to provide certain data for each alternative that would involve construction of a Large High Voltage Transmission Line (LHVTL). Transmission facilities are not true alternatives to the Project, since the purpose of the Project is to increase the supply of available renewable energy. Lake Wilson Solar does not currently plan on installing any facilities that would be defined as an LHVTL. Thus, it is anticipated that the electricity generated will be transmitted via facilities owned or operated by others. For these reasons, Minn. R.

[74] Minn. R. 7849.0340(C).

7849.0330 is not applicable, and the Commission granted Lake Wilson Solar an exemption from this data request.

5.2.1.11 *Combinations*

No combination of the aforementioned alternatives would be appropriate because, as compared to the Project, they would not enable Lake Wilson Solar to more efficiently or cost-effectively produce electric output to be purchased by utilities or private corporations to provide needed energy and satisfy clean energy and carbon reduction commitments and standards. The Commission granted Lake Wilson Solar an exemption from this data request.

5.2.2 Economic Comparison

Table 5 below, taken from the United States Energy Information Administration (EIA), demonstrates that solar energy generated by a PV tracking facility has a competitive capital cost when compared to other types of renewable resources. The Project will generate electricity at a lower cost per kWh than would other possible fossil fuel and renewable energy options, such as coal and biomass.[75] As discussed in Sections 4.2.2 and 4.4.3, even though the ITC will phase down over the next several years, solar generation growth is anticipated to continue because the costs for solar have been falling faster than costs for other sources.[76]

Table 5: Renewable Technology Costs[77]

Technology	Size (MW)	Total Overnight Cost (2020$/kW)
Fuel Cells	10	6,866
Biomass	50	4,078
Conventional Hydropower	100	2,769
Wind	200	1,846
Solar PV – tracking	150	1,248
Solar Thermal	115	7,116

5.2.3 Alternatives Summary

The Project is the best alternative for meeting the capacity and renewable energy needs in Minnesota and the region in the near term. All other potential alternatives reviewed by Lake

[75] *See* EIA, ANNUAL ENERGY OUTLOOK 2021, Narrative at 19 (2021), https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf.

[76] EIA, ANNUAL ENERGY OUTLOOK 2021, Narrative at 7, 16 (2021), https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf.

[77] The figures in Table 5 are taken from EIA's Assumptions to AEO2021: Electricity Market Module at 6 (Feb. 2021), https://www.eia.gov/outlooks/aeo/assumptions/pdf/electricity.pdf.

Wilson Solar fall short in one or more categories. Lake Wilson Solar's analysis demonstrates that the Project is a cost-effective energy resource; the Project uses commercially proven and reliable generating technology for the electrical generation output needed. Moreover, the Project is the energy source appropriate for the site selected for the Project.

5.3 DISCUSSION OF PROPOSED FACILITY AND ALTERNATIVES (MINN. R. 7849.0250(C))

The Commission granted Lake Wilson Solar a partial exemption from Minn. R. 7849.0250(C)(1)-(9), which requires a discussion of various details regarding both the proposed facility and each of the alternatives discussed in response to Minn. R. 7849.0250(B). Consistent with the Commission granting Lake Wilson Solar a partial exemption from the data requirements in Minn. R. 7849.0250(B), thereby limiting the discussion required to only renewable alternatives, the Commission also limited the information required under this data requirement to only those renewable alternatives discussed in response to Minn. R. 7849.0250(B)(4). As discussed above, no reasonable alternatives exist. Therefore, only information regarding the Project is applicable.

5.3.1 Capacity Cost

Solar energy projects are accredited by MISO on a seasonal basis at a percentage of nameplate capacity. MISO provides accreditation of 50 percent of its Network Resource Interconnection Service value in the Summer, Fall, and Spring seasons for projects with no operating history. Once operating data is obtained, the Project receives capacity credit based on its output in the peak hours of each season. Nevertheless, costs for renewable energy generation facilities are typically not expressed in terms of capacity costs. For the solar generation portion of the Project, the Project will likely deliver energy and accredited capacity to the off-taker on an as-generated basis and will receive payment for both in the form of a single $/MWh payment. However, the associated BESS is a capacity asset and not an energy generation asset, therefore payment for will likely be received for the available capacity in a $/kw-month payment. Lake Wilson Solar's estimated costs for both the solar and BESS portions of the Project per kilowatt (kW) are provided in Appendix A, Section 5.3.1, which has been designated trade secret. The largest components in the total cost of the Project will be the solar panels, tracking rack system, batteries, battery racking, and installation labor; however, infrastructure costs for access roads and electrical collection systems also are factors.

5.3.2 Service Life

With proper maintenance, service, and replacement of parts, the expected life of the Project is 35 years or longer. Lake Wilson Solar is confident that its maintenance program will result in excellent longevity for the Project.

5.3.3 Estimated Average Annual Availability

Lake Wilson Solar estimates that the Project facilities will be available approximately 99 percent of the year, which is consistent with industry standards.

5.3.4 Fuel Costs

There are no fuel costs associated with the Project. Rights to the land on which the Project will be located will require annual lease payments. Nominal purchases of electricity will be necessary to run the Project, and that power will be acquired from local electricity utility, similar to any other commercial or industrial business, or supplied by the Project's own generation equipment.

5.3.5 Operating and Maintenance Costs

The expected average variable O&M costs per kWh for the Project are provided in Appendix A, Section 5.3.5. An advantage of solar energy facilities is that they typically are not required to go completely offline for maintenance. Small sections of the solar array can be serviced while the rest of the facility continues to deliver energy.

5.3.6 Total Cost

Lake Wilson Solar's estimated total capital cost per kWh for the solar energy generation portion of the Project (i.e., non-BESS portions of the Project) is provided in Appendix A, Section 5.3.6, which has been designated trade secret. The solar energy generation portion of the Project provides a generation asset and the associated BESS provides a capacity asset, which is available when variable forms of energy such as solar and wind are not. In this way, as Minnesota moves towards de-carbonization, a BESS can act like a peaking plant which enables for a partial like-to-like replacement of natural gas peaking plants. The BESS is a non-energy producing asset; accordingly, energy would not be sold from the BESS to the off-taker, but would instead be provided as available capacity. As such, payment for the BESS would not be received in terms of $/MWh or $/kWh, but are likely to be in a $/kW-month, a set rate per month for the proposed 95 MW of available capacity for a 4-hour system, on a once per day cycle. In this way, the off taker would be able to pick and choose when to store energy in the BESS, and when to discharge it to the grid. The estimated total cost per kw-month of the BESS portion of the Project at the stated capacity and duration, is provided in Appendix A, Section 5.3.6, which has been designated as trade secret. These estimates assume typical solar farm design, construction, and operational data for a 35-year estimated service life.

Energy storage provides dispatchable capacity that compliments and facilitates renewables integration. One of the major benefits of energy storage is the ability to shift the deployment of energy from off peak hours to peak hours, and therefore attain a higher price for the energy. Larger energy storage systems such as the one being proposed for this Project can deliver energy when it is in higher demand and allow for additional hours of firm capacity even after sunset. The BESS in this way, can also act to firm and smooth the energy output generated by the Project as it is distributed to the overall electric grid. Flexible capacity has become increasingly valuable as increasing renewable penetration decreases renewable capacity accreditation and increases generation and price volatility. Furthermore, storage can mitigate renewable curtailment and alleviate grid constraints that may arise due to high renewable penetration.

Lake Wilson Solar is preparing this permit application in a time of unprecedented volatility in the marketplace, which is driven by post-pandemic supply chain issues, government action and other macro-factors. As such, a range of pricing has been provided based on what Lake Wilson Solar considers to be reasonable market data points. Lake Wilson Solar remains hopeful markets will continue to recover and pricing will be on the lower end of the provided range when the time comes to construct these projects. The price for which Lake Wilson Solar will sell the energy will be determined as a result of negotiations with purchaser(s).

5.3.7 Estimate of Facility's Effect on Rates

Minnesota Rule 7849.0250(C)(7) requires an applicant to estimate its proposed project's "effect on rates system-wide and in Minnesota, assuming a test year beginning with the proposed in-service date." The Commission granted Lake Wilson Solar a partial exemption from this requirement because it does not have a "system" as defined by the rules, and it is not a utility with retail rates for the power it plans to generate. As such, the data are neither available to Lake Wilson Solar nor necessary to determine the need for the Project. Instead, Lake Wilson Solar proposes to submit data on the Project's impact on state or regional wholesale prices.

The Project's energy production will be modest in comparison to the annual energy consumption of Minnesota and the region and will likely not have a measurable effect on rates. However, the Project could ultimately play a role in stabilizing or even lowering rates by offering an alternative to conventional generation sources.[78] For instance, utilities could purchase output from the Project to partially replace energy from generation sources with higher or more volatile pricing, such as natural gas plants. In addition, the Project will not face the same cost-increasing hurdles to construction (*e.g.*, potential carbon regulation and higher permitting costs due to increased regulatory scrutiny) faced by conventional fossil-fuel generation sources. For example, the Project is consistent with the State of Minnesota's goal of reducing carbon emissions. Minnesota and other states are moving forward with implementing clean energy policies, and it is anticipated that existing coal plants will be retired in an effort to comply with the state's clean energy policies.[79]

5.3.8 Efficiency

Because no fuel is burned in the production of energy at the Project, this information is not available.

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[78] *See e.g.*, Christian Roselund, *Renewables reduced wholesale power costs by $5.7 billion in Texas*, pv magazine (Nov. 6, 2018) (reporting that wind, and to a lesser degree solar, "are bringing down wholesale power prices and making them more stable"); Union of Concerned Scientists, *Benefits of Renewable Energy Use* (Updated Dec. 2017); Good Energy, *Wind and solar reducing consumer bills*, (Oct. 2015) (analyzing impact of renewable energy usage on electric rates in the United Kingdom).

[79] *See, e.g.*, NRDC Issue Paper, *Clean Energy and Efficiency Can Replace Coal For a Reliable, Modern Electricity Grid* (Mar. 2017) (available at: https://www.nrdc.org/sites/default/files/clean-energy-replace-coal-modern-electricity-grid-ip.pdf); Xcel Energy, 2020-2034 Upper Midwest Resource Plan Supplement, at 7, 26 (June 30, 2021); EIA, *Nuclear and coal will account for majority of U.S. generating capacity retirements in 2021* (Jan. 12, 2021) (available at: https://www.eia.gov/todayinenergy/detail.php?id=46436.).

5.4 MAP OF SYSTEM (MINN. R. 7849.0250(D) AND MINN. R. 7849.0260(D))

The Commission granted Lake Wilson Solar an exemption from Minn. R. 7849.0250(D), which requires an applicant to include a map showing the applicant's system. As an IPP, Byron Solar does not have a "system." The information requested is thus not available to Lake Wilson Solar nor relevant to the determination of need for the Project. Instead, maps showing the proposed site of the Project and its location relative to the power grid are included as **Figure 5.**

6.0 PEAK DEMAND AND ANNUAL CONSUMPTION FORECAST (MINN. R. 7849.0270).

The Commission granted Lake Wilson Solar a partial exemption from Minn. R. 7849.0270, subps. 1-6, which require the applicant to provide "data concerning peak demand and annual electrical consumption within the applicant's service area and system." Lake Wilson Solar does not have a "service area" or "system" and, as such, the requested data are inapplicable.

As an alternative to the requested data, Lake Wilson Solar provides the following data regarding the regional demand, consumption, and capacity data from credible sources to demonstrate the need for the independently produced renewable energy that will be generated by the Project. If a PPA is executed for the Project's output, Lake Wilson Solar will also provide the Commission with additional system-specific information.

A review of utilities' IRPs, requests for proposals, and similar documents demonstrates that utilities will seek additional renewable generation resources in the next several years.[80] Xcel Energy has announced plans to reduce carbon emissions at least 86 percent carbon emissions reductions from 2005 levels by 2030, and 100 percent reductions by 2050.[81] To reach this goal, Xcel Energy plans to eliminate all coal generation on its system by 2030, and to add 3,150 MW of cost-effective, utility-scale solar generation, with 1,850 MW of the total being added during 2026-2034, and approximately 2,650 MW of wind being added between 2028 and 2034.[82] Similarly, in an October 29, 2021 filing, the Minnesota Transmission Owners summarized their

[80] Xcel Energy, 2020-2034 Upper Midwest Resource Plan , at 5, 2020-2034 Upper Midwest Integrated Resource Plan Docket No. E002 /RP-19-368; Xcel Energy, 2020-2034 Upper Midwest Resource Plan Supplement, at 2 (June 30, 2021), Xcel Energy, 2020-2034 Upper Midwest Resource Plan Reply Comments, at 119 (June 25, 2021); *see also* Minnesota Power, 2015 Integrated Resource Plan (available at: http://www.mnpower.com/Content/documents/Environment/2015-ResourcePlan.pdf) (approved by the Minnesota Public Utilities Commission on June 10, 2015); Otter Tail Power Company, Application for Resource Plan Approval 2017-2031 (available at: https://www.otpco.com/media/838904/resource-plan.pdf).

[81] *Id.*

[82] Xcel Energy, 2020-2034 Upper Midwest Integrated Resource Plan Reply Comments (July 24, 2021), Docket No. E002/RP-19-368, available at: https://www.edockets.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={70F0437A-0000-CF1C-96D6-E7E22CE60B9C}&documentTitle=20216-175386-01.

publicly-stated clean energy goals, which generally included increasing carbon-free energy and a discussion of the transmission system that will be needed to do so.[83]

More broadly, retirements of coal-based generating units are expected across the MISO region, and renewable generation resources are expected to fill the resulting capacity needs.[84] Additional demand is being driven by corporate and industrial consumers, who are increasingly entering into longer power purchase agreements for renewable energy.[85]

7.0 SYSTEM CAPACITY (MINN. R. 7849.0280)

Minnesota Rule 7849.0280 requires a CN applicant to provide information on the ability of its existing system to meet the forecasted demand. As an IPP, Lake Wilson Solar does not have a "system" as defined by the rule. Accordingly, the Commission granted Lake Wilson Solar an exemption from this requirement and permitted Lake Wilson Solar to instead provide regional demand, consumption, and capacity data from credible sources to demonstrate the need for the independently produced renewable energy that will be provided by the Project. This information is provided in Section 3.0.

8.0 CONSERVATION PROGRAMS (MINN. R. 7849.0290)

The Commission granted Lake Wilson Solar an exemption from Minn. R. 7849.0290, which requires an applicant to describe its energy and conservation plans, including load management, and the effect of conservation in reducing the applicant's need for new generation and transmission facilities.

9.0 CONSEQUENCES OF DELAY–SYSTEM (MINN. R. 7849.0300)

The Commission granted Lake Wilson Solar an exemption from Minn. R. 7849.0300, which requires the applicant to "submit data on the consequences of delay on the potential customers and the region." Lake Wilson Solar is not a utility and has no "system" as defined by the rule. Thus, this data requirement is inapplicable to Lake Wilson Solar and is unnecessary to determine the need for the Project. Instead, Lake Wilson Solar provides the following data on the consequences of delay to Minnesota and the region.

The primary consequences of delaying construction of the Project would be the failure for Xcel Energy and other utilities to meet their renewable energy and carbon reduction goals

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[83] Compliance Filing, *In the Matter of the Minnesota Transmission Owners' 2019 Biennial Transmission Projects Report*, Docket No. E002/M-19-205 (Oct. 29, 2021) (eDockets No. 202110-179283-07).

[84] U.S. Energy Information Administration, *Annual Energy Outlook 2017*, at 22 (available at: https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf); NRDC Issue Paper, *Clean Energy and Efficiency Can Replace Coal For a Reliable, Modern Electricity Grid* (Mar. 2017) (available at: https://www.nrdc.org/sites/default/files/clean-energy-replace-coal-modern-electricity-grid-ip.pdf).

[85] American Wind Energy Association, *Consumer demand drives record year for wind energy purchases* (Jan. 30, 2019) (available at: https://www.awea.org/resources/news/2019/consumer-demand-drives-record-year-for-wind-energy); *see also* Business Renewables Center, *Corporate Renewable Deals 2014-2018* (available at: https://businessrenewables.org/corporate-transactions/#wpcf7-f942-p471-o1).

and requirements. In addition, delay negatively impacts the state's interest in achieving its renewable energy and climate change goals as quickly as possible.

10.0 Environmental Information for Proposed Project and Alternatives (Minn. R. 7849.0310)

10.1 Visual Impacts and Mitigation

Siting utility-scale solar projects in rural environments can change the overall aesthetics of the landscape by introducing a commercial-like facility into an otherwise agricultural setting. Similar to wind farms, solar arrays may be viewed by some as a disruption to the existing agricultural landscape, and by others as a welcomed complimentary use to farming practices (harvesting solar energy, soil resting and pollinator-friendly habitats). Consequently, aesthetics related to utility-scale solar is largely one of personal perspective and preference.

Land use in the Project Area is characterized as primarily agricultural (95 percent). Most of the agricultural land in the Project Area is subject to row-crop agriculture, such as corn and soybeans. The topography of the Project Area is generally flat with elevations ranging from 1620 to 1784 feet above sea level. Farmsteads in the area (often containing a farmhouse with barns, machine sheds and grain storage) are sprinkled across the landscape approximately 0.25 to 1 mile apart. Most farms have planted windbreaks consisting of trees and shrubs around them. Untilled lines of trees and shrubs can be seen along fence rows.

The Project Area is located on approximately 2,621 acres of land, immediately adjacent to Xcel Energy's existing 115 kV HVTL. Additionally, a number of utility scale wind energy facilities and projects are located in the vicinity of the Project including the Northern Wind, Rock Aetna, Fenton, and East Ridge wind projects. *See* **Figure 5**. The Northern Wind and Rock Aetna Wind Projects replaced the Chanarambie Wind Project.

There are two farmsteads within the Project Area; there are 25 residences and farmsteads within 0.25 of the Project Area. *See* **Figure 6**. **Table 6** provides distances to the nearest residences to the Project, including approximate distance to the Preliminary Development Area boundary and approximate distance to the edge of solar arrays based upon the current preliminary design.

Table 6: Proximity of Residences within 0.25 mile of the Project Area

Residence	Distance to Development Boundary (feet)	Distance to Solar Arrays (feet) [1]	Distance to Nearest Inverter (feet)	Vegetative Screening from Solar Facilities
1	1514	1597	1940	Residence has existing vegetation on the western side of the property.
2	389	516	1046	Residence has existing vegetation on the western side of the property.
3	309	335	762	Residence has existing vegetative screening along the western side of the property, screening the residence from the solar panels.

Table 6: Proximity of Residences within 0.25 mile of the Project Area

Residence	Distance to Development Boundary (feet)	Distance to Solar Arrays (feet) [1]	Distance to Nearest Inverter (feet)	Vegetative Screening from Solar Facilities
4	337	527	884	Residence has existing vegetative screening along the property, screening the residence from the solar panels.
5	370	406	1337	Residence has some existing vegetative screening along the southwestern side of the farmstead, screening the residence from a majority of the solar panels.
6	2408	2452	3398	Residence has some existing vegetative screening along the west side of the farmstead, screening the residence from a majority of the solar panels.
7	586	2291	3074	Residence has existing vegetative screening along the north side of the property. The residence will likely have views of the solar panels from all other angles.
8	1752	1801	2452	Residence is screened is surrounded by existing vegetative screening along all sides of the farmstead.
9	238	238	844	Residence has scattered existing vegetative screening along the northern side of the property. The residence will likely have views of the solar panels from all other angles.
10	355	699	1364	Residence has scattered existing vegetative screening along the Northwest side of the property.
11	2511	2634	3743	Residence has existing vegetation and will be screened from the proposed solar facilities.
12	863	899	1347	Residence has some existing vegetative screening along the west side of the farmstead, screening the residence from majority of the solar panels.
13	2184	2215	2683	Residence has existing vegetative screening along all sides, which will fully screen the residence from the solar panels.
14	273	319	787	Residence has some existing vegetative screening along all sides of the farmstead, screening the residence from majority of the solar panels.
15	2394	2431	3039	The existing vegetation on the western side of the property will likely screen the residence from the proposed solar facilities.
16	1584	1642	2087	The existing vegetation on the eastern side of the property will likely screen the residence from the proposed solar facilities.
17	2127	2138	2336	Residence has existing vegetative screening along all sides of the property.
18	2165	2358	2711	Residence has existing vegetation on the northern side of the property and will likely be screened from the proposed solar facilities.
19	3178	3236	3762	Residence has existing vegetation on the northern side of the property and will likely be screened from the proposed solar facilities.

Table 6: Proximity of Residences within 0.25 mile of the Project Area

Residence	Distance to Development Boundary (feet)	Distance to Solar Arrays (feet) [1]	Distance to Nearest Inverter (feet)	Vegetative Screening from Solar Facilities
20	2193	2302	3363	Residence has existing vegetation on the northern side of the property and will likely be screened from the proposed solar facilities.
21	1539	1659	2327	Residence has existing vegetative screening along all sides of the property and will likely be screened from a majority of the proposed solar facilities.
22	679	719	1430	Residence has existing vegetative screening along the northern side of the property and will likely be screened from a majority of the proposed solar facilities.
23	1765	1935	2449	Residence has existing vegetation on the southeastern side of the property and will likely be screened from the proposed solar facilities.
24	3034	3699	4053	Residence does not have any existing vegetation that would screen the property from the proposed solar facilities
25	1731	4768	5002	Residence has some existing vegetation on the northern side of the property, however, it will likely not be screened from proposed solar facilities.
[1] Residences 7, 9 and 12 are within the Project Area.				

It is expected that there will be minimal visual impacts from the Project. Most of the facility, including the solar arrays, will be low-profile, typically less than 12 feet, but no more than 15 feet tall. While the proposed substation, BESS, Switchyard and O&M Facility are similar in visual impacts to existing electrical facilities and buildings in the area, the Project solar arrays will create new aesthetic impacts, changing the viewscape in these areas from crops to solar arrays. Since the Project Area and vicinity are generally flat and due to existing trees along agricultural fields and vegetative cover along wind rows, the visual impact of the Project is expected to be limited to higher elevation points, as well as immediately surrounding land, which is mitigated to an extent by existing vegetative screening at most residences as indicated in **Table 6**. The feedback that Lake Wilson Solar has gathered so far from public outreach efforts completed for the Project to date has not indicated aesthetic or visual concerns associated with the Project from the surrounding landowners or community.

The Project Substation and Xcel Switchyard will contain transmission pole A-frame deadend structures that will support above ground conductors. The deadend structures will be up to 100 feet tall. These transmission facilities will be grouped together and connect to the existing Fenton-Chanarambie 115 kV HVTL that travels north-south along the eastern edge of the Project Area. They will be visible from the local roadways and about 0.5 mile from the nearest residence. From outside the facility these structures would be most visible from 70th Avenue and 81st Street. Other power poles with heights up to 100 feet are located in the vicinity of the Project and adjacent to roadways. The addition of Project transmission facilities is not expected to significantly alter the viewshed or increase visual impacts.

The Project solar arrays (surrounded by security fence) will be visible from adjacent roadways and parcels up to approximately 0.5 mile given their relative low profile and color. Project fencing around the solar arrays will look similar to existing agricultural field fencing. While relatively few trees exist within the Project Area, Lake Wilson Solar has designed the Project to avoid tree clearing which will somewhat break up the view of the arrays in some areas.

Exterior security lighting will be installed at the O&M building, Project Substation, BESS and Xcel Switchyard; as needed by maintenance personnel, lights will be used if work or maintenance is required after dark. A motion sensing, down casting security light will be installed at the locked entrance of the Project. Switch activated lights will be placed at each inverter for repair purposes. Impacts to light-sensitive land uses are not anticipated given the rural Project location coupled with minimal required lighting for operation of the Project.

10.2 WILDLIFE

Impacts to wildlife are expected to be minimal. The proposed establishment of stable, year-round herbaceous cover post-construction will likely benefit many wildlife species. Common species of wildlife adapted to agricultural land use may be present in the Project Area such as white-tailed deer, common raccoons, striped skunks, various small rodents like deer mice and meadow voles, woodchuck, ring-necked pheasant, red-winged blackbird, a variety of sparrows and other small perching birds, common raptors such as Red-tailed Hawks, common garter snake, northern leopard frog, and American toad.

The Project layout is designed to avoid those portions of the Project Area and Preliminary Development Area with the highest concentration of high-quality habitat and water resources. Best management practices (BMPs) concerning wetlands and vegetation will serve to protect, prevent and mitigate potential impacts to vegetation within the Project Area. The SWPPP, AIMP and VSMP plans will also be implemented during construction, post-construction and operational phases of the Project. With vegetation being converted from row crop production to perennial grasses, habitat will become permanent for the life of the Project. The establishment of native perennials will reduce soil erosion and runoff, introduce nutrients into the soil, reduce the use of pesticides and herbicides, and provide beneficial habitat to a variety of wildlife species.

Overall, construction of the Project is expected to minimally impact wildlife or their populations. During operations, any potential impacts to wildlife are also expected to be minimal. Movement of large mammals, such as white-tailed deer, will not be impeded within the Project Area. Lightweight agricultural woven wire fencing extending approximately 8 feet above grade will be used around the Project arrays/construction units for safety and security purposes to prevent larger wildlife and the public from access Project electrical equipment. There will be wide corridors between fenced areas throughout the Project Area. The arrangement of the fenced areas of the Project array relative to existing roads and utilities provide various pathways through the Project Area which would allow wildlife to cross. These corridors will allow larger wildlife various options to cross unimpeded through the Project Area. As the potential impacts to wildlife are anticipated to be minimal or temporary, no species-specific mitigation is proposed.

The potential for bird collision with the overhead transmission line would depend on the line's location. Avian collision risk may be greater for certain at-risk species (e.g., waterfowl, waterbirds) during certain behaviors such as flushing, courtship displays, and aerial displays, potentially increasing risk if birds are distracted. Collision risk may increase if a power line bisects daily movement corridors (such as between roost, feeding, or nesting areas).

Electrocution risk is minimized with the 115 kV transmission line, based on the increase in horizontal space between lines when compared with smaller transmission lines. To reduce the potential for avian collisions or exposure during line operation, the Applicant will consider implementing measures to increase overhead shield wire and other suggested practices outlined by Avian Power Line Interaction Committee's collision manual.

10.2.1 Federal and State Listed Species

Project coordination was first initiated with the MNDNR in December of 2017; a meeting with the MNDNR was also held in September of 2021 to discuss the proposed Project details and address agency questions. Westwood also submitted formal MNDNR Natural Heritage Information System (NHIS) and Natural Heritage Review (NHR) data requests for earlier versions of the Project Area on July 14, 2020, October 6, 2021, and June 6, August 8, and October 10, 2022. The most recent data request for the proposed Project Area is shown in **Appendix H** of the Site Permit Application. In response, the MNDNR reviewed the proposed Project and stated that no state-listed endangered or threatened species have been documented in the vicinity of the Project Area, though it stated that an exhaustive review of the area had not been completed by the agency. The MNDNR also provided recommendations to avoid impacts to ecologically significant areas (i.e., MBS Sites of Biodiversity Significance, calcareous fens, DNR rare native plant communities), state-listed species of special concern, and federally listed species, if they occur within the Project Area.

In support of the NHR request, a review of the MNDNR NHIS database licensed to Westwood (MNDNR, 2021b) was conducted for records of federal or state-listed rare, threatened or endangered species or habitats in, and within one mile of the Project Area. One vascular plant, the red three-awn (Aristida purpurea var. longiseta) was identified. No other vascular plants, vertebrate animals, invertebrate animals, animal assemblages, or terrestrial communities were identified in a one-mile buffer surrounding the Project Area boundary.

The red three-awn is a mid-height perennial grass that is considered a special concern species in Minnesota. No federal protections are afforded to the red three-awn species. Species of special concern are not protected by Minnesota's Endangered Species Statute or the associated rules. However, the NHR recommends avoiding impacts to these species. Based on the lack of suitable habitat within the Project Area as assessed during the native prairie assessment, likelihood of occurrence of this species within the Project Area is considered to be low.

Project coordination took place with the United States Fish and Wildlife Service (USFWS) in October 2017 using an earlier version of the Project boundary. A meeting with the USFWS was also held on September 15, 2021, reviewing an earlier version of the Project Area boundary. The USFWS provided comments in October 2021. USFWS Information for Planning and Consultation (IPaC) responses were received on November 8, 2021, and June 6, August 8,

and October 10, 2022. In the most recent IPaC using the current Project Area, one federally threatened species, the northern long-eared bat (Myotis septentrionalis; NLEB)[86] and one candidate species, the monarch butterfly (Danaus plexippus), was mapped as potentially occurring within or near the Project Area. Preferred NLEB summer habitat consists of mature forests, although this species is also known to forage in wooded areas near water sources and within cleared forest tracts (MNDNR, 2018; USFWS, 2022). The Project Area is heavily dominated by agricultural land use with limited areas of individual trees or small tree stands, and according to MNDNR and USFWS (2021), there are no known NLEB maternity roost trees or hibernaculum in Murray County or any of the surrounding counties. Therefore, the probability of occurrence for NLEB is considered low.

The monarch butterfly is a candidate species with no federal protections at this time. The eastern, migratory population of monarch butterflies are common in the summer months in areas with floral resources or milkweeds. These areas include pastures, roadsides, and grasslands. Common milkweed was observed during field surveys, but broadleaf herbicide use in agricultural fields have greatly reduced the likelihood of milkweeds occurring in the Project Area.

The Bald Eagle (Haliaeetus leucocephalus) is no longer a federally-listed threatened species; however, disturbances to the Bald Eagle are to be regulated under the Bald Eagle and Golden Eagle Protection Act (16 U.S.C. §668, 2010). Bald Eagles are highly associated with aquatic habitats (e.g., coastal areas, rivers, lakes, and reservoirs) for both breeding and wintering. Large, higher-canopy trees that are open and accessible are required for both roosting and nesting. While eagles have the potential to utilize the Project Area for stopover or foraging, the limited suitable nesting substrate and comparatively fewer water resources within the Project Area suggests a low likelihood that Bald Eagle nests are present. Further, no Bald Eagle nests were observed in the Project Area during field surveys.

10.2.2 Wildlife Action Network and Minnesota Wildlife Action Plan Species

The Wildlife Action Network is comprised of areas with high concentrations or persistent or viable populations of Species of Greatest Conservation Need (SGCN). SGCN are defined as native animals with rare, declining, or vulnerable populations and species for which the state has a stewardship responsibility. Minnesota's State Wildlife Action Plan (2015-2025) proactively addresses the state's conservation needs and catalyzes actions in an attempt to prevent species from needing to be listed under the state's endangered species law. No SGCN was documented within the Project Area.

[86] On November 29, 2022, the USFWS announced a final rule to reclassify the NLEB as an endangered species. As announced on January 25, 2023, the rule is set to take effect on March 31, 2023.

10.2.3 MNDNR High Value Habitats

The Applicant reviewed the MNDNR Commercial Solar Siting Guidance (Solar Guidance) that recommends identification of high value resources during Project development.

The National Conservation Easement Database (NCED) provides a comprehensive picture of privately owned conservation easement lands in the U.S. A review of this data indicated there are no NCED areas within the Project Area.

The Minnesota Biological Survey (MBS) includes areas of the State with varying levels of native biodiversity and may contain high quality native plant communities, rare plants, animals, and/or animal aggregations. Two MBS sites were mapped either partially or wholly within the Project Area.

MBS site Leeds 21S of moderate biodiversity significance (totaling 4.1 acres) is mapped partially within the Project Area. About 3.8 acres of the site are within the Project Area, and based on field reconnaissance, were determined to be dominated by nonnative species, which likely means rare species are not supported in this site.

MBS site Leeds 16 of below biodiversity significance (totaling 27.4 acres) is mapped wholly within the Project Area. These sites lack occurrences of rare species or natural features or do not meet Minnesota County Biological Survey standards. Field reconnaissance showed this site is partially cropped. Most of the MBS sites of biodiversity significance appear to encompass grassland or wetland habitats.

11.0 Facility Information for Proposed Project and Alternatives Involving Construction of an LEGF (Minn. R. 7849.0320)

11.1 Land Use and Requirements (Minn. R. 7849.0320(A))

The Project is located within a rural landscape, and therefore the primary land use in the Project Area is agricultural (95%; Dewitz and U.S. Geological Survey, 2021). The remainder of the Project Area consists of developed land (3.1%) and a small amount of herbaceous or hay/pastureland (1.6%). The remaining identified land uses include deciduous forest (<0.1%), emergent herbaceous wetlands (<0.1%), pasture/hay (0.2%) (refer to **Table 7**).

Table 7 summarizes the land use types within the Project Area. Most of the agricultural land in the Project Area is subject to row-crop agriculture, such as corn and soybeans. Developed land within the Project Area generally consists of public roads, namely 81st Street, 91st Street, 70th Avenue, 80th Avenue, MN State Highway 30, and 90th Avenue. The areas of hay/pasture and herbaceous lands within the Project Area (4.4 acres) is associated with roadside ditches, uncultivated areas, and near rural residences. Areas of emergent herbaceous wetlands are found in the south-central portion of the Project Area. The small amount of deciduous forest surrounds the rural residence located in the southeastern portion of the Project Area.

Table 7: Land Use Within the Project Area (in acres)

Land Use Type	Acres in Project Area	Percent of Total Acreage
Cultivated Crops	2,491.1	95.0
Developed (open space, low/med/high intensity)	80.9	3.1
Grassland/Herbaceous	42.6	1.6
Hay/Pasture	4.4	0.2
Emergent Herbaceous Wetlands	1.6	<0.1
Deciduous Forest	0.2	<0.1
Total	**2,620.8**	**100.0%**

Farmsteads are sparsely scattered throughout of the Project Area generally situated near public roads. All proposed Project facilities have been sited away from the residence and setbacks implemented. Based on review of available aerial photography, there are eight residences located on parcels adjacent to the Project Area.

The Project will temporarily change the land use from agricultural to solar energy generation use within the Preliminary Development Area (**Figure 2**). The temporary conversion of agricultural land to the solar facility will have a relatively minimal impact on the rural character of the surrounding area or Murray County. Of the 461,000 acres in Murray County, the majority (i.e., 362,082 acres) is classified as agricultural land. Impacts to 1,526 or less acres of agricultural land within the planned Project facility would reduce the amount of agricultural land in the County by less than 1/2 of 1%. Expected land use impacts within the Preliminary Development Area are provided in **Table 8**.

Table 8: Expected Land Use Impacts – Preliminary Development Area

Land Use Type	Acres in Preliminary Development Area	Percentage of Total Acreage
Cultivated Crops	1,478.7	97.01%
Developed (open space, low/med/high intensity)	32.33	2.04%
Grassland/Herbaceous	15.0	0.95%
Deciduous Forest	<0.1	<0.1%
Emergent Herbaceous Wetlands	0	0
Pasture/Hay	0	0
Total	**1,526.0**	**100.0%**

Even though Lake Wilson Solar proposes impacting a relatively small percentage of available farmland in Murray County with the Project, Lake Wilson Solar has coordinated with DOC-EERA, Minnesota Department of Agriculture (MDA), and other applicable stakeholders concerning the Project AIMP (Site Permit Application, Appendix E) and VSMP (Site Permit Application, Appendix F). The AIMP has been designed to incorporate BMPs into siting procedures; pre-construction, construction, and post construction methods; operational procedures; and decommissioning and restoration procedures to avoid and minimize impacts to soil and site productivity such that pre-construction agricultural productivity (anticipated use, appropriate management) is rapidly returned to the site following decommissioning. The VSMP was developed to address revegetation of the Project site in accordance with DOC-EERA draft guidelines and other applicable agency concerns. Lake Wilson Solar met with MDA staff on December 10, 2021, to discuss the AIMP and VSMP plan contents and site-specific characteristics.

Normal agricultural activities can continue within some portions of the Project Area not converted to solar modules, access roads, O&M building, BESS, transmission facilities, and fencing. After the useful life of the Project, the current agricultural land use would be restored by decommissioning the Project pursuant to the Decommissioning Plan prepared by Lake Wilson Solar (Site Permit Application, Appendix G). The Project is not anticipated to preclude current or planned land use on adjacent parcels. Upon decommissioning and removal of the Project, the affected parcels may be returned to the existing agricultural use or transitioned to other planned land uses.

Lake Wilson Solar reviewed Murray County's Comprehensive Plan during preparation of the Project design. As feasible, the Project has been designed in compliance with the Comprehensive Plan for Energy Facilities and Infrastructure as a future land use in Murray County. Agricultural activities can be resumed upon decommissioning of the Project. There are currently no planned extensions of water, sewer, or other services in the Site Control Area. Construction of the Project would not preclude the future orderly extension of these services across property under Lake Wilson Solar's control as these extensions would likely be accomplished by utilizing existing public rights-of-way which will not be impacted by the Project.

Because the Site Permit supersedes local permits, no zoning or land use permits are required for construction of the Project from Murray County or associated townships. Based on the Murray County Zoning Map (Murray County, 2019a. Large solar energy systems (exceeding 40 kilowatts) are conditionally permitted on lands zoned agricultural in Murray County, subject to the Murray County Renewable Energy Ordinance (Murray County, 2019c). The Murray County Renewable Energy Ordinance applies to solar energy systems that are not otherwise subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act (Minnesota Statutes 216E). Lake Wilson Solar has designed the Project to meet or exceed the County's setback requirements as provided in the Renewable Energy Ordinance, Zoning Ordinance, and Buffer Ordinance. Lake Wilson Solar sited and designed the Project taking into account the County's setbacks, in addition to State requirements. Lake Wilson Solar is committed to working with the County to meet setback requirements where feasible.

As the Project is subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act, the CN and SP to be issued by the MPUC will serve as approval of the Project. Lake Wilson Solar will continue to coordinate with Murray County on other potential permits for the Project (e.g., road use agreement, driveway permits, etc.).

Because no permanent land use or zoning impacts are anticipated, no additional mitigation measures are proposed beyond those described in the prepared AIMP.

11.2 TRAFFIC (MINN. R. 7849.0320(B))

Access to the Project will be via existing county and township roads. The major roadways in the area include MN State Highway 30 (Hiawatha Pioneer Trail) and County Highway 28 (80th Avenue). Other roads that surround the Project Area are local County or township roads. The Project Area is bordered by MN State Highway 30 in the northern portion of the site. County Highway 28 travels to the west of the Project Area in a north to south direction. Lake Wilson Solar will work with Murray County and Leeds Township on a road use agreement to address road use and related concerns. This agreement will be completed prior to start of construction.

During the construction phase, temporary impacts are anticipated on some public roads within the vicinity of Project facilities, primarily through additional construction worker traffic, equipment and material deliveries and potentially slow-moving construction vehicles. Lake Wilson Solar will secure necessary local permits for road access and other ancillary aspects of the Project.

Overall construction traffic will use the existing State and County roadway system to access the Project site and facilities to deliver construction materials and personnel. Traffic during construction is estimated to average approximately 150 trips per day for daily construction personnel commuter traffic. This traffic will consist of pickup trucks, cars, and/or other types of employee vehicles arriving onsite for the majority of construction and takes into account carpooling. This traffic will be dispersed across the Site Control Area depending on the construction activities at the time. Approximately 2-15 semi-trucks per day will be used for delivery of facility components during construction. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment.

For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day (AADT). Since the area roadways have AADTs that are well below capacity, this increased traffic may be perceptible to area residents, but the slight increase in volume is not expected to affect traffic function. Traffic congestion during construction will be minimal, and any traffic congestion will be managed, minimized, or mitigated to the extent practicable. To the extent site conditions allow, delivery trucks will be off loaded near the point of use to minimize double handling and the amount of trucking. Signage will be installed to guide trucks to the appropriate roads, after conferring with local officials. Trucks will not be allowed to stage or block public roads. If trucks cannot exit a road in a timely fashion, they will be directed to a designated staging area. Major component deliveries will be required to stagger delivery times and dates so the on-site teams are not overwhelmed with a surge of trucks at one time. Trucks will be directed off major roads, onto secondary roads or the site to minimize the

potential for traffic congestion. Traffic delays should be limited to the time it takes for delivery trucks to turn on or off public roads. Lake Wilson Solar will work with Murray County and Leeds Township staff on a road use agreement to address road use and related concerns. This agreement will be completed prior to start of construction. Except for the delivery of the main transformer(s) in the Project Substation, overweight or oversized loads are unlikely given the type of construction and materials required for the Project if there becomes a need for overweight or oversized loads, Lake Wilson Solar, the equipment vendor, or the transportation company delivering the equipment will obtain the appropriate approvals prior to the delivery of the overweight or oversized loads in accordance with the requirements of the authority having jurisdiction over the roads that will be used for the move.

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.

No active or abandoned railways were identified in the Project Area or immediate vicinity. An abandoned railway was identified more than a quarter-mile north of the Project Area. Because no railways are located in the Project Area, no crossing or encroachments agreements will be required prior to construction. No impacts are anticipated and no mitigation measures have been considered with respect to railways.

According to the Federal Aviation Administration (FAA), there are no FAA-registered airports located within three nautical miles of the Project Area. Therefore, no mitigation is needed or planned concerning airports.

11.3 Information Pertaining to Fossil-Fueled Activities (Minn. R. 7849.0320(C)–(D))

11.3.1 Fuel

The Project is not a fossil-fueled facility. Except for minimal amounts of fuel required for the emergency back-up generators, the Project will be fueled by the sun.

11.3.2 Emissions

The Project is not a fossil-fueled facility and, except for the emergency back-up generators, will not release any emissions from the power generation process.

Minor temporary effects on air quality are anticipated during construction of the proposed Project as a result of exhaust emissions from construction equipment and other vehicles, and from fugitive dust from wind erosion of agricultural land that becomes airborne during dry periods of construction activity.

The magnitude of air emissions during construction is influenced by weather conditions and the type of construction activity. Exhaust emissions, primarily from diesel and other carbon-based fueled equipment, will vary with the phase of construction. Emissions from construction vehicles will be minimized by using modern equipment with lower emissions ratings and

properly functioning exhaust systems. Adverse effects on the surrounding environment are expected to be negligible because of the short and intermittent nature of the emission and dust-producing construction phases. These effects will most likely be less than the historic emissions from farm machinery and fugitive dust produced during normal farming operation that would otherwise typically occur within and near the Project site.

Post-development emissions will be less than current and historic emissions due to the cessation of farming and the installation and maintenance of perennial native plantings and other vegetation planned at the Project site under solar panels and other areas disturbed by construction. The soil fertility at the site is suitable for the planned perennial mixture, therefore, the use of any fertilizers is not anticipated and will therefore not contribute to any emissions. In accordance with the VSMP, herbicide application will be limited to spot treatment and will be conducted in such a manner to minimize potential drift; as such, herbicide application will negligibly contribute to emissions, if at all. While some dust may be produced from use of planned gravel access road from O&M vehicles, this emission is expected to be minimal, temporary and infrequent throughout the year. Emissions generated during operational activities will further be limited in duration and frequency from use of relatively few trucks, cars and other related O&M vehicles as part of O&M activities associated with the Project. The normal operations of the emergency generators will be limited to once-a-month testing, consisting of a 30-minute run time for each unit.

Applicable BMPs will be used during construction and operation of the Project to minimize dust emissions. Additional BMPs will be implemented as part of the VSMP and AIMP which will also address emissions (e.g., mulching exposed soils, installing and maintaining vegetative cover, engineering controls, reducing vehicle and equipment speed, maintaining equipment and exhaust/mufflers, etc). Additional practices may include watering or treating haul and access roads and other exposed dust producing areas, containment of excavated material, protection of exposed soil, soil stabilization, and treating stockpiles to control fugitive dust. As part of the required construction stormwater permit that will be obtained for the Project, a National Pollutant Discharge Elimination System (NPDES)/State Disposal System construction stormwater permit and associated SWPPP will be developed prior to construction and implemented during construction that will include BMPs to minimize to potential for fugitive dust.

The Project is expected to have an overall effect of improving air quality by replacing electrical generation produced from the burning of fossil fuels. This is expected to reduce harmful greenhouse gas and other pollutant emissions detrimental to air quality. Additionally, since agricultural operations at the Project site will no longer occur during construction and operation of the facility, reduced particulate emissions, dust and farm equipment exhaust would occur and further improve air quality at and in the vicinity of the site. Following construction, the facility will not generate pollutant emissions.

The Project will have no air emissions and will avoid emissions associated with fossil generation facilities, except for those emissions associated with the limited use of emergency generators.

11.4 WATER USAGE FOR ALTERNATE COOLING SYSTEMS (MINN. R. 7849.0320(E))

The Project will not use any water for alternate cooling systems. Minimal to no washing is anticipated to be needed at Project facilities due to the naturally occurring and frequent precipitation.

11.5 WATER DISCHARGES (MINN. R. 7849.0320(F))

No wastewater discharges will occur as a result of the construction or operation of the Project except for domestic-type sewage discharges of Project personnel. Temporary sanitary facilities will be provided during construction, which will be installed in accordance with applicable regulations.

Temporary dewatering may be required during construction. Water may be used during construction to provide dust control and water for concrete mixes, if applicable, and other construction purposes. If temporary dewatering is required during construction activities, discharge of dewatering fluid will be conducted under the NPDES permit program and addressed by the Project's SWPPP as required.

11.6 RADIOACTIVE RELEASES AND WASTE (MINN. R. 7849.0320(G))

The Project will not generate any radioactive or solid waste under normal operating procedures. No parts require greasing or oiling on a regular basis.

11.7 SOLID WASTE (MINN. R. 7849.0320(H))

The Project is not expected to generate significant quantities of solid waste during operation. The Project may occasionally require use of certain petroleum products such as gear box oil, hydraulic fluid, and gear grease. These materials will be recycled or otherwise stored and disposed of in accordance with applicable State and Federal regulations. These materials will also be stored, recycled, and/or disposed of in accordance with applicable local, state, and federal regulations.

11.8 NOISE (MINN. R. 7849.0320(I))

Noise is defined as unwanted sound. It may be made up of a variety of sounds of different intensities, across the entire frequency spectrum. Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The A-weighted scale (dBA) is used to reflect the selective sensitivity of human hearing. This scale puts more weight on the range of frequencies that the average human ear perceives, and less weight on those that we do not hear as well, such as very high and very low frequencies.

Common sound sources within an agricultural and/or rural environment include, but are not limited to, sound from farm equipment such as tractors and combines, sound generated from traffic on roadways, sounds from birds, and wind rustling through the vegetation. Typically, the ambient acoustic environment of a rural or agriculturally oriented community has equivalent

continuous sound levels (Leq, which is an energy-based time-averaged noise level) ranging from 30 dBA to 60 dBA.

The background noise in the vicinity of the Project facilities is typically a result of farming equipment/operations, wind, and vehicles. A comparison of typical noise-generating sources is outlined in **Image 6.**

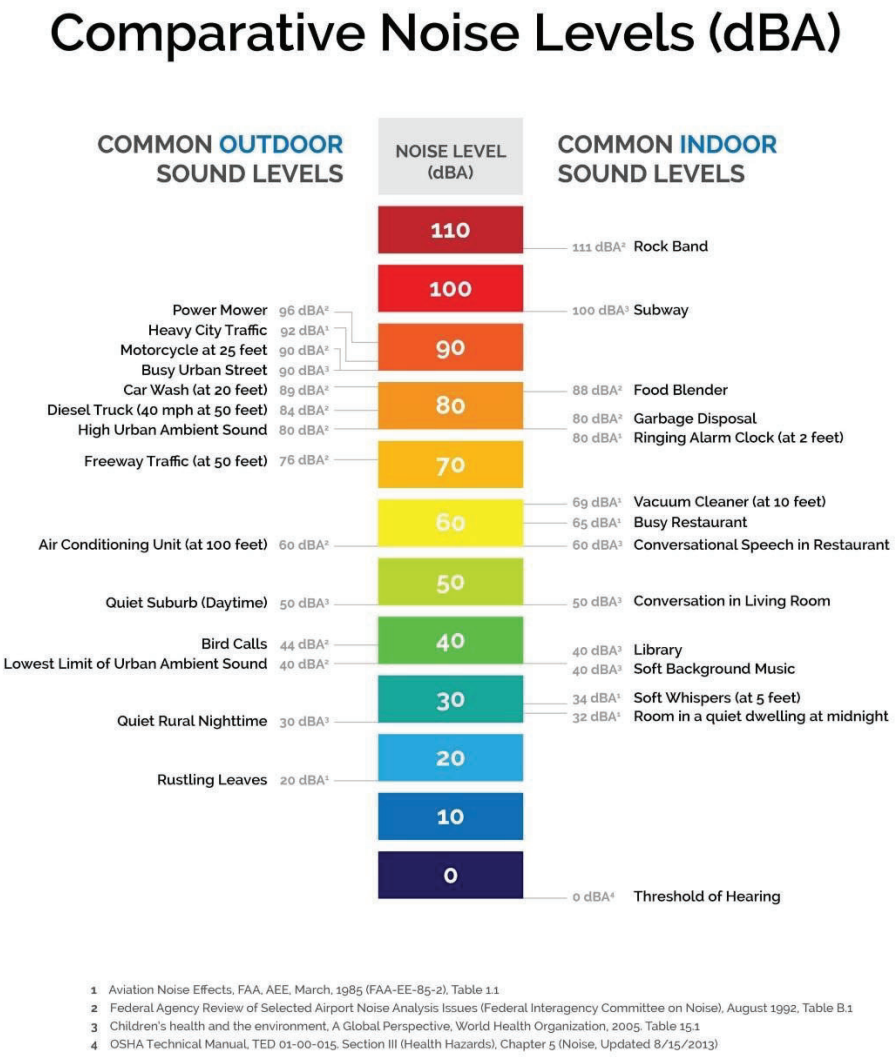

Image 6: Common Noise Sources

Construction Noise

During construction, intermittent noise will be emitted by the construction vehicles and equipment, including pile drivers for installation of piers. These noise impacts will be temporary, and the amount of noise will vary based on what type of construction is occurring at the Project on a given day. **Table 9** shows the maximum and minimum sound pressure levels at 25 meters

and 15 meters dBA for construction equipment such as bulldozers, bobcats, and scrapers (FWHA, 2017).

Table 9: Typical Sound Levels from Construction Equipment

Equipment	Max Sound Pressure Level at 25 meters (82 feet) dBA	Max Sound Pressure Level at 15 meters (50 feet) dBA
Excavator	76	85
Dozer	76	85
Grader	76	85
Roller	76	85
Dump Truck	75	84
Concrete Mixing Truck	76	85
Concrete Pumper Truck	73	82
Man-lift	76	85
Flatbed Truck	75	84
Large Crane	76	85
Small Crane	74	83
Trencher	72	83
Compactor (Vibratory)	69	80
Forklift	75	85
Boom Truck	75	84
Small Pile Driver	73	84

Noise Standards

The MPCA has the authority to adopt noise standards pursuant to Minn. Stat. §116.07, subd. 2(c). The adopted standards are set forth in Minn. R. Ch. 7030. The MPCA standards require A-weighted noise measurements. Different standards are specified for daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours. The noise standards specify the maximum allowable noise volumes that may not be exceeded for more than 10 percent of any hour (L_{10}) and 50 percent of any hour (L_{50}). Portions of the Project Area comprised of residential homes are considered a Noise Area Classification 1 with daytime noise allowances of 60 dBA and nighttime noise allowances of 50 dBA according to the Minn. Stat. §116.07 and Minn. R. Ch. 7030 noise ordinance. **Table 10** depicts the MPCA state noise standards.

Table 10: MPCA State Noise Standards - Hourly A-Weighted Decibels

Noise Area Classification	Daytime (7:00 a.m. – 10:00 p.m.)		Nighttime (10:00 p.m. – 10:00 a.m.)	
	L_{10}	L_{50}	L_{10}	L_{50}
1 – Residential	65	60	55	50
2 – Commercial	70	65	70	65
3 – Industrial	80	75	80	75

Source: Minn. R. 7030.0040

These limits are expressed as L50 and L10, which are statistical noise level metrics representing the sound level that is exceeded 50% and 10% of the measurement period, respectively. Noise modeling most accurately predicts Leq levels, which is the equivalent continuous sound level or the overall average sound level over the measurement period. L10 levels are, on average, 3 dBA higher than Leq levels, while L50 levels are typically below Leq levels. As such, modelled Leq levels can be used as a conservative metric for ensuring compliance with the L50 levels specified in Minn. R. 7030.0040. Therefore, if Leq limits are assumed to be the same as the L50 limits, any modelled sound level below the Leq limits would be below the L50 limits prescribed by Minn. R. 7030.0040.

A sound propagation model was developed and run for the Project. CADNA-A (a sound modelling software in compliance with ISO 9613-2) was used to calculate cumulative Project sound at all occupied residences within ¼ mile of the proposed Project fence line. A conservative ground absorption coefficient of 0.5 was assumed to account for the varying surface properties of the ground throughout the year (e.g., hard, frozen ground in winter vs. porous ground covered by vegetation in summer). Marginal changes in the ground absorption coefficient will have a negligible effect of less than 1 dB. As described below, predicted maximum total sound levels as a result of Project operation do not exceed the applicable nighttime limit of 50 dBA set forth in Minn. Admin. R. 7030.0040. Accordingly, minimal sound impacts, within regulatory limits, are expected from Project operation.

The proposed Project inverters, transformers, BESS containers, and HVAC systems were modeled as point sources, with sound source data taken from manufacturer cut sheets and NEMA (National Electrical Manufacturers Association) standards. Where specific equipment specifications were not available, data from similar equipment was used. Project equipment and layout configuration details are shown below in **Table 11**. Unweighted octave-band sound power levels are listed in **Table 12** along with overall A-weighted sound pressure levels. Levels represent the maximum sound output for Project components.

Table 11: Project Equipment and Layout Configuration

Noise Source	# of Units	Equipment Model/Reference	Sound Pressure Level @ 1 m (Single Unit)	Source Height AGL	Distance to Sound Pressure Level of 50 dBA (Single Unit)
Solar Inverter	55	Power Electronics PE FS4200M	79 dBA	2.89 m	27 m
Main Power Transformer	2	NEMA TR1	90 dBA	4.00 m	95 m
Auxiliary Transformer	12	Eaton Pad-Mounted (NEMA TR1)	61 dBA	1.85 m	4 m
BESS Power Conversion System	34	GE FlexInverter 1590	79 dBA	1.10 m	27 m
Battery Container HVAC Unit	204	Trane Voyager 3 – 30 ton RTU	81 dBA	1.10 m	32 m
Emergency Generator	3	CAT C15 (Sound Attenuated Enclosure) – 500 kW	90 dBA	2.80 m	91 m

Table 12: Project Equipment Spectral and Overall Data (CADNA-A Inputs)

Noise Source	Unweighted Octave Band (Hz) Sound Power Levels (dB L_w)								Sound Pressure Level at 1 m (dBA L_p)
	63	125	250	500	1000	2000	4000	8000	
Solar Inverter	80.9	89.6	86.6	83.6	79.9	77.8	79.6	72.1	79
Main Power Transformer	100.6	102.6	97.6	97.6	91.6	86.6	81.6	74.6	90
Auxiliary Transformer	71.6	73.6	68.6	68.6	62.6	57.6	52.6	45.6	61
BESS Power Conversion System	80.9	89.6	86.6	83.6	79.9	77.8	79.6	72.1	79
Battery Container HVAC Unit	88.7	89.6	83.6	3.4	84.3	82.0	77.0	73.0	81
Emergency Generator	95.5	93.0	94.4	94.1	93.2	90.9	84.8	79.7	90

A background ambient level of 40 dBA was assumed according to ANSI 12.9-2013 Table C.1 – A- weighted day, night, and day-night average sound levels in decibels and corresponding approximate population densities as indicated, which provides 40 dBA as the Day level for the "very quiet suburban and rural residential" residential land use category. In order to determine predicted total sound levels, the assumed background ambient level of 40 dBA was added to the predicted sound levels. These summed levels represent the predicted total sound level at each receptor.

As stated, the Project will create some intermittent noise during construction and the amount of noise will vary based on what type of construction is occurring at the Project on a given day. Construction associated noise will likely be perceptible at nearby residences. According to the Federal Highway Administration Construction Noise Handbook, the majority of the construction equipment that could be used on the site such as grading equipment and bobcats is anticipated to generate noise between 72-85 dBA. Sound levels from grading equipment are not dissimilar from the typical tractors and larger trucks used in agricultural communities during planting or harvest. Lake Wilson Solar anticipates impact driving of the piles for rack supports (foundations for the solar panels) to be the most significant source of construction noise at roughly 101 dBA at 50 feet (FHWA, 2017). Installation of each rack support takes between thirty seconds to a few minutes depending on the soil conditions; Lake Wilson Solar anticipates this activity will take up to 3-6 months (depending on construction crew size), however, construction noise will not be concentrated in the same location but will rotate around the Project site during that time as each stage of construction is completed in sequence; for example, site preparation at some array locations may occur while pile driving is occurring at others. The noise from construction activities would dissipate with distance and be audible at varying decibels, depending on the locations of the equipment and receptor. As shown in **Table**

13 below and **Figure 6**, the average distance from the 25 homes within 0.25 miles of the proposed solar arrays is 1,752 feet with the closest being 238 feet.

Construction noise will be relatively minimal and will be temporary in duration with sound returning to background levels once construction is finalized. Lake Wilson Solar plans to limit construction and staging activities to daylight hours and run vehicles and equipment only when necessary. Equipment used for construction will be in good working condition and will be equipped with properly functioning mufflers and associated noise-control devices to reduce sound generation to the greatest extent practicable. Lake Wilson Solar will provide notice of construction to all properties adjacent to the project prior to the commencement of construction. The notice shall include the contact information for a dedicated project contact person to answer questions about construction.

During operation, as shown in **Table 13**, modeling results indicated the highest predicted Project sound contribution to existing ambient sound was 38 dBA, and the highest predicted total sound level (i.e., inclusive of the assumed 40 dBA background level) was 42 dBA. These levels are well below the residential land use nighttime limit of 50 dBA set forth in Minn. Admin. R. 7030. The scenario modeled represents the single worst case, indicating that the Project will be in full compliance. Therefore, no mitigation is proposed at this time.

Table 13: Sound Modeling Results

Receptor ID	UTM Coordinates (Zone 15N)			Predicted Project Noise Level (Leq dBA)	Predicted Total Noise Level (Leq dBA, assuming 40 dBA ambient)
	X (m)	Y (m)	Z (m)		
R01	266748	4875131	500	20.1	40.0
R02	267686	4875169	500	27.5	40.2
R03	269142	4875019	516	28.5	40.3
R04	269201	4874963	518	29.2	40.3
R05	269832	4875038	527	20.3	40.0
R06	270356	4875384	527	14.7	40.0
R07	266630	4874183	503	22.1	40.1
R08	267002	4873485	512	24.6	40.1
R09	268703	4873870	516	28.8	40.3
R10	269416	4873697	530	26.8	40.2
R11	271004	4873693	542	15.9	40.0
R12	268654	4872968	518	27.9	40.3
R13	270920	4872355	554	18.4	40.0
R14	270141	4871928	539	28.8	40.3
R15	270930	4871826	551	17.1	40.0
R16	265007	4872054	506	38.2	42.2
R17	266864	4872108	521	29.2	40.3

R18	265580	4871453	515	27.5	40.2
R19	266885	4871373	518	25.8	40.2
R20	267220	4871493	527	25.1	40.1
R21	268274	4871391	527	22.3	40.1
R22	268815	4871290	524	23.0	40.1
R23	266710	4875355	499	19.3	40.0
R24	266130	4875331	500	18.2	40.0
R25	265755	4874936	502	21.1	40.1

11.9 Construction and Operation Work Force (Minn. R. 7849.0320(J))

The Project will create approximately 250 jobs during the construction and installation phases, and up to 5 full time jobs onsite during the operations phase, and an additional 20 indirect jobs in Murray County and the rest of Minnesota.

11.10 Lake Wilson Solar will manage the overall Operations and Maintenance of the Project

The Project will be professionally maintained and operated by Lake Wilson Solar, an affiliate or a qualified contractor. Operations and maintenance activities for the BESS will be performed in coordination with the solar facility. Lake Wilson Solar and its affiliate will hire employees or other appropriate contractors to complete operations and maintenance tasks.

11.11 Number and Size of Transmission Facilities (Minn. R. 7849.0320(K))

Electrical wiring will connect the panels to inverters, inverters will transform the power from DC to AC current. Underground 34.5 kV collector lines from the Project will deliver solar generated energy to the Project Substation. The collector system voltage will then be stepped up from 34.5 kV to 115 kV by the transformer(s) located at the Project Substation and transmitted to the Xcel Switchyard via the 115 kV overhead Gen-Tie Line. The proposed new Xcel Switchyard will be used to interconnect the Project to the existing Fenton - Chanarambie 115 kV HVTL.

The interconnection details will be determined as a result of studies, discussions, and agreements with MISO. Access to transmission facilities beyond interconnection will be arranged by the entity or entities purchasing the Project's energy output and will depend on the buyer and the ultimate destination for the energy output.

12.0 Other Filings and Permits

12.1 Environmental Report

Pursuant to Minn. R. 7849.1000–.2100, the DOC-EERA is required to prepare an environmental report for any LEF for which a CN must be obtained. In addition, DOC-EERA

must prepare an environmental assessment for any LEPGP, such as the Project, being reviewed under the alternative permitting process.[87] Accordingly, DOC-EERA may elect to prepare an environmental assessment in lieu of an environmental report.[88] If the environmental assessment is prepared in lieu of the environmental report, the environmental assessment must include an analysis of the alternatives to the Project that would otherwise be required in an environmental report.[89]

12.2 SITE PERMIT

Lake Wilson Solar will also submit to the Commission a Site Permit Application pursuant to the Minnesota Power Plant Siting Act (Minnesota Statutes Section 216E) and Minnesota Administrative Rules Chapter 7850.

12.3 OTHER PROJECT PERMITS

Project permits and approvals that may be necessary to complete the Project are listed in **Table 14**. Lake Wilson Solar will obtain these approvals, as necessary, prior to Project construction.

Table 14: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
Federal			
U.S. Army Corps of Engineers (USACE)	Section 404 Permit	Dredging or filling jurisdictional Waters of the United States (wetlands/waterways).	To be obtained prior to construction as needed. Project layout currently avoids all jurisdictional waters, therefore a Section 404 permit is not expected to be needed for the project.
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasures Plan	Project facilities with oil storage of more than 1,320 gallons.	To be prepared prior to construction as needed for construction related storage of fuel. To be prepared prior to operation for operation related storage of fuel if storage exceeds applicability thresholds.

[87] Minn. R. 7850.3700 and Minn. R. 7850.2800-3900.

[88] Minn. R. 7849.1900

[89] Id.

Table 14: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
State			
Minnesota Public Utilities Commission	Certificate of Need	Required for LEFs (electric power generating plant or combination of plants at a single site with a combined capacity of 50 MWs or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system).	To be obtained prior to construction, CN Application filed concurrent with the SP Application.
	Site Permit	Required for LEFs 50 MW or greater.	To be obtained prior to construction, SP Application filed concurrent with the CN Application.
Minnesota Pollution Control Agency	Section 401 Water Quality Certification	Required for Section 404 Individual and Nationwide Permits.	To be obtained prior to construction as needed. Project layout currently avoids all jurisdictional waters, therefore a Section 401 permit is not expected to be needed for the project.
	National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater Permit and Stormwater Pollution Prevention Plan	Construction activity that disturbs one or more acre of land.	To be obtained/prepared prior to construction.
	State Air Registration Permit	Required if back-up generators if selected generators do not qualify for an exemption under Minn. R. 7007.0300, Subp. 1(B)	To be obtained prior to installation of a back-up generator if exemptions do not apply to chosen generators.

Table 14: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
	Storage Tank Registration	Required for back-up generator aboveground storage tanks exceeding 500 gallons and underground storage tanks exceeding 110 gallons	To be obtained prior to operation if storage tanks exceeding registration thresholds are installed.
Minnesota Department of Health	Well Construction permit	Installation of a water supply well.	To be obtained prior to construction of a well (if needed for O&M building), as needed.
Minnesota Department of Labor and Industry	Request for Electrical Inspection	Necessary to comply with state electrical codes.	Inspection to be conducted after installation of electrical equipment during construction and prior to operation.
Minnesota Department of Natural Resources	Water Appropriation Permit	Required for all users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (dewatering).	Temporary Water Appropriation Permit, for Temporary Dewatering: To be obtained, as needed, if water withdrawals exceed 10,000 gallons per day or 1 million gallons per year. Permanent Appropriation Permit, for well at O&M Building: Not expected to be needed, expected water use will be under the threshold
	Public Water Work Permit	Placement of structures in public waters.	To be obtained prior to construction of structures in public waters, as needed. Project layout currently avoids all MNDNR Public Waters, and a Public Water Work Permit is not expected to be needed for the project.
MNDNR, Division of Lands & Minerals	Utility Crossing License	Required to cross state land with utility infrastructure.	To be obtained prior to crossing state land with utility infrastructure, as needed. Project layout currently avoids all State Lands and therefore a Utility Crossing License is not expected to be needed for the project.

Table 14: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
Minnesota State Historic Preservation Office	Cultural and Historic Resources Review; State and National Register of Historic Sites Review	Projects that require State permits or affect State registered properties or require Section 106 compliance.	Obtain concurrence on Phase I inventory prior to construction.
Minnesota Department of Transportation (MnDOT)	Application for Utility Accommodation on Trunk Highway Right-of-Way	Installing utilities along, across or within trunk highway right-of-way.	To be obtained prior to installation of utilities within MnDOT right-of-way, as needed. Project layout currently avoids all MnDOT Right-of-Way with any utilities, therefore an Application for Utility Accommodation on Trunk Highway Right-of-Way is not expected to be needed for the project.
	Access (Driveway) Permit	Required for construction of a driveway/access road utilizing MnDOT rights-of-way.	To be obtained prior to construction of driveway on MnDOT right-of-way, as needed. Project layout currently avoids all MnDOT Right-of-Way with access roads, therefore no MnDOT Access Driveway permits are expected to be needed for the project.
	Oversize/Overweight Permit	Vehicles delivering equipment, materials and supplies that exceed applicable MnDOT height/length limits and weight limits.	To be obtained prior to equipment deliveries, as needed.
County/Local			

Table 14: Potential Permits/Approvals/Plans

Agency	Permit/Approval/ Plan	Applicability	Status and Timing
Murray County, MN	Minnesota Wetland Conservation Act (WCA) Approval (in conjunction with Murray County Soil and Water Conservation District)	Activities affecting water resources.	To be obtained prior to construction in jurisdictional waters, if needed. Project layout currently avoids all WCA jurisdictional waters and a WCA permit is not expected to be needed for the project.
	Individual Sewage Treatment Systems Permit	Required prior to installation of any individual sewage treatment system in Murray County.	To be obtained prior to construction, as needed.
	Driveway/Entrance Permit	Required for constructing a new driveway access to county roads.	To be obtained prior to construction, as needed.
	Utility Permit	Required for installation of utility infrastructure in a county road right-of-way.	To be obtained prior to construction, as needed.
	Work in the Right-of-Way Permit	Required to work within public road right-of-way.	To be obtained prior to construction, as needed.
	Tile Crossing Permit	Required for boring or open cut of tile for utility crossings.	To be obtained prior to construction, as needed.
	Overweight Permit	Use of overweight/oversized vehicles on County roadways.	To be obtained prior to equipment deliveries, as needed.