Minnesota Public Utilities Commission Certificate of Need Application for a Large Wind Energy Conversion System

Big Bend Wind, LLC
Cottonwood and Watonwan Counties, Minnesota
Submitted November 9, 2020
Docket No. IP-7013/CN-19-408

Big Bend Wind, LLC

8665 Hudson Blvd. N, Ste. 110
Lake Elmo, MN 55042

Project Name:	Big Bend Wind Farm
Project Location:	Cottonwood and Watonwan Counties, with a footprint of approximately 43,523 acres in portions of Delton, Selma, Carson, and Midway Townships in Cottonwood County and Butterfield Township in Watonwan County; with a 161 kV transmission line in portions of Midway, Mountain Lake, Odin, and Cedar townships in Cottonwood, Watonwan, and Martin Counties, Minnesota
Applicant:	Big Bend Wind, LLC
Authorized Representatives:	Ken Young, Chief Operating Officer of the Manager of the Sole Member of the Sole Member of Applicant
Signature:	
Project Contact:	c/o Apex Clean Energy, Inc. Attn: Brenna Gunderson, Director of Development 8665 Hudson Blvd. N., Ste. 110 Lake Elmo, MN 55042 Phone: 612-260-6614 Fax: 434-220-3712 Email: Brenna.gunderson@apexcleanenergy.com

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ACRONYMS

AADT	Annual Average Daily Traffic
AC	Alternating current
ACSR	Aluminum conductor steel-reinforced cable
ADLS	Aircraft Detection Lighting System
AMPS	Amperage
Apex	Apex Clean Energy Holdings, LLC
Applicant	Big Bend Wind, LLC
ARMER	Allied Radio Matrix for Emergency Response
AWWI	American Wind Wildlife Institute
BBCS	Bird and Bat Conservation Strategy
Biennial Report	2019 Biennial Transmission Projects Report
Big Bend Wind	Big Bend Wind, LLC
BMPs	Best management practices
BOP	Balance of Plant
BWSR	Board of Soil and Water Resources
C&I	Commercial and industrial
CN	Certificate of Need
CN Application	Big Bend Wind CN Application
Commission	Minnesota Public Utilities Commission
CREP	Conservation Reserve Enhancement Program
DC	Direct current
DOE	U.S. Department of Energy
ECS	Ecological Classification System
Exemption Request	Request for Exemption from Certain Certificate of Need Application Content Requirements
FAA	Federal Aviation Administration
GHG	Greenhouse gas emissions
IPP	Independent power producer
IRP	Integrated Resource Plan
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
LEGF	Large Electric Generating Facility

LHVTL	Large High Voltage Transmission Line
LiDAR	Light Range Detecting Unit
LWECS	Large Wind Energy Conversion System
Minn. R.	Minnesota Rules
Minn. Stat.	Minnesota Statutes
MISO	Midcontinent Independent System Operator
MNDNR	Minnesota Department of Natural Resources
MNDOC	Minnesota Department of Commerce
MNHS	Minnesota Historical Society
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	Megawatt
Mwh	Megawatt hour
NESC	National Electrical Safety Code
NLEB	Northern long-eared bat
NPC	Native Plant Communities
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PPA	Power Purchase Agreement
PV	Photovoltaic
Quadrennial Report	Minnesota state energy policy and conservation report prepared under Minn. Stat. §216C.18
Red Rock Solar	Red Rock Solar, LLC
RES	Renewable Energy Standard
RFP	Request for Proposal
RIM	Reinvest in Minnesota
RP	Route Permit
SHPO	Minnesota State Historic Preservation Office
SMMPA	Southern Minnesota Municipal Power Agency
SOBS	Sites of Biodiversity Significance
SoDAR	Sonic Range Detecting Unit
SP	Site Permit
THPO	Tribal Historic Preservation Officer
USFWS	United States Fish and Wildlife Service
WNS	White-nose syndrome

Minnesota Rule	Required Information	Application Section(s)	Exemption Requested
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, considering:**	4.1	--
A(1)	Accuracy of the applicant's forecast	6.0	Yes
A(2)	Effects of applicant's existing or expected conservation programs and state and federal conservation programs	8.0	No
A(3)	Effects of promotional practices on demand	3.2.2	Yes
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, 5.3.1.8	No
7849.0120	**Criteria – A more reasonable and prudent alternative has not been demonstrated**	4.2	--
B(1)	Appropriateness of size, type, and timing	4.2.1, 5.2	Yes-partial
B(2)	Cost of facility and its energy compared to costs of reasonable alternatives	4.2.2, 5.2.2, 5.3.1	No
B(3)	Effects of the facility upon natural and socioeconomic environments compared to the effects of reasonable alternatives	4.3	No
B(4)	Expected reliability compared to reasonable alternatives	4.2.4, 5.2, 5.3.1	No
7849.0120	**Criteria – Facility will provide benefits to society**	3.2	--
C(1)	Relationship of proposed facility to overall state energy needs	3.1, 4.1, 4.3	No
C(2)	Effects of facility upon the natural and socioeconomic environments compared to the effects of not building the facility	4.3	No
C(3)	Effects of facility in inducing future development	4.3.3, 3.2.3	No
C(4)	Socially beneficial uses of the output of the facility, including to protect or enhance environmental quality	4.3.4, 3.2.1	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, 12.0	No
7849.0210	**Filing Fees and Payment Schedule**	2.4	No
7849.0240	**Need Summary and Additional Considerations**	3.0	--
Subp. 1	Need Summary – summary of major factors justifying need for facility	3.0, 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, 4.3	No

Minnesota Rule	Required Information	Application Section(s)	Exemption Requested
Subp. 2(B)	Additional Considerations – Promotional activities that may have given rise to the demand for the facility	3.2.2	Yes
Subp. 2(C)	Additional Considerations – Effects of the facility in inducing future development	3.2.3, 4.3	No
7849.0250	**Proposed LEGF and Alternatives Application**	5.0	--
A(1)	Description – Nominal generating capability and effects of economies of scale on facility size and timing	5.1.1.1	No
A(2)	Description – Anticipated operating cycle, including annual capacity factor	5.1.1.2	No
A(3)	Description – Type of fuel, reason for selection, projection of availability over life of facility, and alternative fuels	5.1.1.3	No
A(4)	Description – Anticipated heat rate	5.1.1.4	No
A(5)	Description – Anticipated areas where facility will be located	5.1.1.5	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	Yes
B(5)	Discussion of Alternatives – Reasonable combination of alternatives	5.2.1.11	Yes
C	Proposed Facility and Alternatives	5.3	Yes
C(1)	Capacity cost in current dollars per kilowatt	5.3.1.1	Yes
C(2)	Service life	5.3.1.2	Yes
C(3)	Estimated average annual availability	5.3.1.3	Yes
C(4)	Fuel costs in current dollars per kilowatt hour	5.3.1.4	Yes
C(5)	Variable operating and maintenance costs in current dollars per kilowatt hour	5.3.1.5	Yes
C(6)	Total cost in current dollars of a kilowatt hour provided by it	5.3.1.6	Yes
C(7)	Estimate of its effect on rates system-wide and in Minnesota	5.3.1.7	Yes
C(8)	Efficiency, expressed for a generating facility as the estimated heat rate	5.3.1.8	Yes
C(9)	Major 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
D	System Map	5.4	Yes
E	Other relevant information about the facility and alternatives that may be relevant to a determination of need	--	--
7849.0260	**Proposed LHVTL and Alternatives Application**	5.0	--

Minnesota Rule	Required Information	Application Section(s)	Exemption Requested
A(1)	Description – Design Voltage	5.1.2.1	No
A(2)	Description – Number, the sizes, and the types of conductors	5.1.2.2	No
A(3)	Description – expected losses under projected maximum loading and under projected average loading in the length of the transmission line and at terminals and substations	5.1.2.3	N/A
A(4)	Description – approximately length of the proposed transmission line and the portion of that length in Minnesota	5.1.2.4	No
A(5)	Description – approximate location of AC substations, which information shall be on a map of the appropriate scale	5.1.2.5	No
A(6)	Description – list of all counties reasonably likely to be affected by construction and operation of the proposed line	5.1.2.6	No
B(1)	Discussion of Alternatives – New generation of various technologies, sizes, and fuel types	5.3.2.1	N/A
B(2)	Discussion of Alternatives – Upgrading of existing transmission lines or existing generating facilities	5.3.2.2	No
B(3)	Discussion of Alternatives – Transmission line with different design voltages or with different numbers, sizes, and types of conductors	5.3.2.3	No
B(4)	Discussion of Alternatives – Transmission lines with different terminals or substations	5.3.2.4	No
B(5)	Discussion of Alternatives – Double circuiting of existing transmission lines	5.3.2.5	No
B(6)	Discussion of Alternatives – DC transmission line	5.3.2.6	No
B(7)	Discussion of Alternatives – Underground transmission line	5.3.2.7	No
B(8)	Discussion of Alternatives – any reasonable combinations of the alternatives list in subitems (1) to (7)	5.3.2.8	No
C(1)	Discussion of Project and Alternatives – total cost in current dollars	5.3.2.9	No
C(2)	Discussion of Project and Alternatives – service life	5.3.2.10	No
C(3)	Discussion of Project and Alternatives – estimated average annual availability	5.3.2.11	No
C(4)	Discussion of Project and Alternatives – estimated annual operating and maintenance costs in current dollars	5.3.2.12	No
C(5)	Discussion of Project and Alternatives – estimate of its effect on rates systemwide and in Minnesota, assuming a test year beginning with the proposed in-service date	5.3.2.13	N/A
C(6)	Discussion of Project and Alternatives – efficiency, expressed for a transmission facility as the estimated	5.3.2.14	N/A

Minnesota Rule	Required Information	Application Section(s)	Exemption Requested
	losses under projected maximum loading in the length of the transmission line and at the terminals or substations, or expressed for a generating facility as the estimated heat rate.		
C(7)	Discussion of Project and Alternatives – major assumptions	5.3.2.15	No
D	System Map	5.4	N/A
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**	6.0	Yes
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
Subp. 2	Content of Forecast	6.0	Yes
Subp. 3	Forecast Methodology	6.0	Yes
Subp. 4	Data Base for Forecasts	6.0	Yes
Subp. 5	Assumptions and Special Information	6.0	Yes
Subp. 6	Coordination of Forecasts with Other Systems	6.0	Yes
7849.0280	**System Capacity**	7.0	Yes
7849.0290	**Conservation Programs**	8.0	Yes
7849.0300	**Consequences of Delay**	9.0	Yes
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	No
7849.0320	**Generating Facilities**	11.0	No
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	No
K	Minimum number and size of transmission facilities required to provide a reliable outlet for the generating facility	11.10	No
7849.0330	**Transmission Facilities**	5.2.1.10	Yes

Minnesota Rule	Required Information	Application Section(s)	Exemption Requested
7849.0340	**No-Facility Alternative**	5.2.1.9	Yes

1.0 EXECUTIVE SUMMARY

Big Bend Wind, LLC ("Big Bend Wind" or "Applicant") submits this Certificate of Need ("CN") application ("CN Application") for a CN to the Minnesota Public Utilities Commission ("Commission") pursuant to and in accordance with Minnesota Statutes § 216B.243, and Minnesota Rules Chapter 7849. Big Bend Wind respectfully requests that the Commission issue a CN for the up-to-308-megawatt ("MW") large wind energy conversation system (the "Wind Farm") and related 161-kilovolt ("kV") transmission line ("Transmission Line") (collectively, the Wind Farm and Transmission Line are referred to as the "Project"). The Project is a "large energy facility" as defined in Minn. Stat. § 216B.2421, subd. 2(1).[1]

2.0 INTRODUCTION

2.1 THE BIG BEND WIND FARM PROJECT

Big Bend Wind is an independent power producer ("IPP") that proposes to construct and operate the Project. The power generated by the Project will be offered for sale to wholesale customers, including Minnesota utilities and cooperatives that have identified a need for additional renewable energy.

The Wind Farm will be located in Cottonwood and Watonwan Counties, and its footprint spans approximately 43,523 acres in portions of Delton, Selma, Carson, and Midway Townships in Cottonwood County and Butterfield Township in Watonwan County. Big Bend Wind has not made a final selection on wind turbine generators but is proposing to utilize between 54 and 55 turbines ranging from 5.5 to 5.7 MW per turbine. In addition to the wind turbines, the Project will consist of new gravel access roads and improvements to existing roads; underground and/or aboveground electrical collection and communication lines; operations and maintenance ("O&M") facility; one Project substation; one permanent meteorological tower; sonic Detection and Ranging ("SoDAR") or Light Detection and Ranging ("LiDAR") unit; one laydown area; aboveground electrical feeder line; up to four Aircraft Detection Lighting Systems ("ADLS") radars; one temporary batch plant area, if needed, for construction of the Project, and other infrastructure typical of a wind farm.

The Transmission Line is needed to interconnect the Wind Farm to the transmission grid. The Transmission Line will consist of approximately 18 miles of 161 kV transmission line located within Midway, Mountain Lake, Odin, and Cedar Townships in Cottonwood, Watonwan, and Martin Counties, Minnesota. The Transmission Line will interconnect with the Blue Lake-Wilmarth-Interstate Junction 345 kV transmission line in Martin County.

[1] Minnesota Statute § 216B.2421, subd. 2(1) defines a "large energy facility" as any electric power generating plant or combination of plants at a single site with a combined capacity of 50,000 kilowatts or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system. The Project is also a Large Wind Energy Conversion System ("LWECS"), as defined in Minn. Stat. § 216F.01, subdivision 2.

Big Bend Wind plans to construct the Project on a schedule that facilitates an in-service date in 2022.

2.2 PROJECT OWNERSHIP

Big Bend Wind is an affiliate of Apex Clean Energy Holdings, LLC ("Apex"), an independent renewable energy company based in Charlottesville, Virginia. Since its founding in 2009, Apex has become one of the fastest-growing companies in the industry. More than a dozen Apex-originated wind and solar facilities are now operating around the country, totaling nearly 3 GW, with another 1 GW scheduled to be brought online in the coming months. Operating assets under management have grown to 1.6 GW. Apex has signed contracts for the sale of more than 20 projects totaling over 6 GW of capacity, and our development portfolio of approximately 20 GW of wind, solar, and storage projects is one of the largest in the United States. Apex's mission-driven team of more than 200 renewable energy experts uses a data-focused approach to create solutions for the world's most innovative and forward-thinking customers. The Project is the first clean energy project proposed by Apex in Minnesota.

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 for payment are shown in Table 1. The fee determination for the Project is based on a capacity of up to 308 MW, 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	$6,350
Due 45 days after CN Application submittal date	$6,350
Due 90 days after CN Application submittal date	$6,350
Due 135 days after CN Application submittal date	$6,350
Total Calculated Fee	$25,400

2.5 EXEMPTION REQUEST

Minn. R. Ch. 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 July 19, 2019, Big Bend Wind submitted a Request for Exemption from Certain Certificate of Need Application Content Requirements and Rule 7829.2550 HVTL Notice Plan ("Exemption Request"). In its Exemption Request, Big Bend Wind requested that the Commission grant its exemptions, pursuant to Minn. R. 7849.0200, subp. 6, 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 Standard ("RES") requirements set forth in Minn. Stat. § 216B.1691, or other clean energy standards.

On September 24, 2019, the Commission approved the exemptions requested by Big Bend Wind.[2] Where appropriate in this CN Application, Big Bend Wind will reference the specific exemptions granted by the Commission.

2.6 REQUEST FOR JOINT PROCEEDINGS

Big Bend Wind, together with Red Rock Solar, LLC ("Red Rock Solar") are proposing the state's first utility-scale hybrid renewable energy facility and shared transmission line. Together, the Project and the Red Rock Solar Project will generate up to 335 MW of renewable energy (275 MW of wind and 60 MW of solar) or up to 308 MW of only wind. In addition to this CN Application, Big Bend Wind has applied for a Site Permit ("SP") Application for the Wind Project in Docket No. IP7013/WS-19-619 and a Route Permit ("RP") in Docket No. IP7013/TL-19-621. Red Rock Solar has filed a Site Permit Application in Docket No. IP-7014/GS-19-620 and Certificate of Need in Docket No. IP-7014/CN-19-486.

Minnesota Statute § 216B.243, subd. 4, and Minn. R. 7849.1900, subp. 4 permit the Commission to hold joint proceedings for the Certificate of Need, Site Permit, and Route Permit in circumstances where a joint hearing is feasible, more efficient, and may further the public interest. Big Bend Wind respectfully requests that the Commission order a joint regulatory review process for the Big Bend Wind Route Permit, Site Permit, and Certificate of Need applications, and Red Rock Solar Site Permit and Certificate of Need applications. Holding a joint proceeding is in the public interest because it will make it easier for members of the public to participate in the proceedings, provide a comprehensive record of all benefits, impacts, and minimization measures related to this hybrid renewable energy project, and improve administrative efficiency.

[2] Order Approving Exemptions to Certain Filing Requirements, *In the Matter of the Application of Big Bend Wind, LLC and Red Rock Solar, LLC for a Certificate of Need for an up to 335-MW Wind Project and an up to 75-MW Solar Large Energy Facility with an Associated 30-mile, 161-kV High Voltage Transmission Line in Cottonwood, Martin, and Jackson Counties*, Docket No. IP-7013/CN-19-408 (Sept. 24, 2019), eDockets Doc. ID 20199-156040-03.

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

3.1 NEED SUMMARY

The Project represents an opportunity to add up to 308 MW of clean, renewable energy to Minnesota's power grid.

As Minnesota's utilities strive to achieve ambitious renewable energy targets, "aggressive renewable additions"[3] will be necessary. For example, Xcel Energy's "Upper Midwest Integrated Resource Plan" alone calls for 80 percent carbon emissions reductions by 2030, and 100 percent reductions by 2050. By Xcel Energy's estimation, these are "some of the most ambitious carbon reduction goals of any utility in the U.S."[4] Translating these goals into action, Xcel Energy's preferred plan "proposes to add 4,000 MW of cost-effective, utility-scale solar generation and approximately 1,200 MW of cumulative wind resource additions."[5]

Similarly, other Minnesota utilities are advancing efforts to transition to renewable energy. Otter Tail Power will be at 30 percent renewable energy by 2022, and ALLETE's Minnesota Power is targeting 50 percent renewables by end of 2021.[6]

Most recently, Great River Energy, the generation and transmission electric cooperative that serves 28 distribution cooperatives across the state, including the service territory in which Big Bend Wind is located, has announced similarly aggressive plans to procure clean wind power. After setting a goal of 50 percent renewable energy by 2030 in June of 2018,[7] Great River Energy recently announced its intention to retire the 1,151 MW Coal Creek Station in 2022 and add 1,100 MW of wind power by the end of 2023. Likewise, Southern Minnesota Municipal Power Agency ("SMMPA") announced its plan for a 90 percent reduction in carbon dioxide emissions from 2005 levels and 80 percent carbon-free energy on an annual basis in 2030.[8]

Big Bend Wind is well-positioned to help meet the resource needs of Minnesota's electric utilities.

Beyond aiding with utility compliance towards voluntary renewable commitments and Minnesota's existing renewable energy standards, Big Bend Wind can also help meet other state

[3] Xcel / Northern States Power. July 01 2019. "2020-2034UPPER MIDWEST INTEGRATED RESOURCE PLAN". Accessible at: https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/The-Resource-Plan-No-Appendices.pdf . Viewed May 28, 2020.

[4] Ibid.

[5] Ibid.

[6] Minnesota Power (ALLETE). No Date. "EnergyForward". Accessible at: https://www.mnpower.com/Environment/EnergyForward . Viewed May 28 2020.

[7] Great River Energy. June 6, 2018. Accessible at: https://greatriverenergy.com/great-river-energy-sets-50-renewable-energy-goal-for-2030/. Viewed June 3, 2020.

[8] SMMPA, SMMPA plans to be 80% carbon-free in 2030 (Feb. 5, 2020), *available at* https://smmpa.com/smmpa2-0.

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."[9] In addition, Minn. Stat. § 216H.02 sets forth greenhouse gas emissions ("GHG") reductions goals and planning requirements. Minnesota has thus far fallen short of reaching these goals, and in the Minnesota Pollution Control Agency's 2019 Greenhouse Gas Legislative Report, the Minnesota Pollution Control Agency ("MPCA") details that Minnesota's GHG reductions thus far have declined 12 percent versus 2005 levels. This is notably below "goal of a 15% emissions reduction by 2015,"[10] 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, Big Bend Wind can help further eliminate carbon dioxide and other GHG 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.[11]

Governor Walz also outlined "One Minnesota Path to Clean Energy", which proposes policies that are designed to help Minnesota reach 100 percent clean energy by 2050.[12] Given that just over 25 percent of Minnesota's electric generation came from clean energy at the time of Governor Walz's announcement,[13] Minnesota will need additional renewable generation like that provided by the Project to meet this goal.

Further, in addition to traditional utility demand for renewable energy, a growing number of corporations are turning to renewable energy to save money on energy and meet sustainability goals. Commercial and industrial ("C&I") customers either purchase renewable energy directly or obtain renewable benefits and cost savings through financially settled contracts, sometimes called virtual power purchase agreements ("PPAs"). In addition, many utilities are creating "green tariffs," which allow customers to purchase up to 100 percent renewable energy from the utility. Corporations such as Apple, Google and Facebook, 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

[9] Minn. Stat. § 216C.05, subd. 1.

[10] Minnesota Pollution Control Agency & Minnesota Department of Commerce. January 2019. "2019 Greenhouse Gas Legislative Report". Accessible at : https://www.pca.state.mn.us/sites/default/files/lraq-2sy19.pdf . Viewed May 29, 2020.

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

[12] Minnesota Commerce Department. March 4, 2019. "Walz, Flanagan propose plan to achieve 100 percent clean energy in Minnesota by 2050". Accessible at: https://mn.gov/commerce/media/news/?id=17-374074 . Viewed May 29, 2020.

[13] Ibid.

demand" from the "largest U.S. companies" alone through 2030.[14] 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 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 has already seen an immense demand for C&I renewable energy PPAs. Corporate PPA volumes in Midcontinent Independent System Operator ("MISO") have increased each of the past five years and Minnesota has seen an increase in cumulative operational and in-development C&I capacity, which highlights the broader trend of increased demand for renewables across the United States. Similarly, according to a 2019 research report, corporate contracts accounted for 22 percent of 2018 PPAs for renewables in the United States.[15] It has been estimated that in 2018 non-utility customers purchased more than 4,000 MWs of wind power capacity through long-term PPAs.[16] This more than doubled the number of contracts in the prior year for wind capacity from non-utility customers, with new buyers accounting for 45 percent of non-utility wind deals signed in 2018.[17] Further, the buyers are not just large corporations; smaller companies are entering into aggregated purchasing models and further driving additional market expansion.[18]

Additionally, many of Minnesota's largest companies 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."[19] To attract and retain corporate entities with Environmental, Sustainability, and Governance goals, Minnesota needs to continue to demonstrate its commitment to being a renewable energy hub. Apex Clean Energy, with an office in Lake Elmo, Minnesota, hopes to help the state do exactly that with projects like Big Bend Wind.

Given the demand for renewable energy, a market exists for independently-produced electricity generated from wind and other renewables, including the up to 308 MW to be generated

[14] Wood Mackenzie. Aug. 20, 2019. "Corporates usher in new wave of US wind and solar growth". Accessible at: https://www.woodmac.com/our-expertise/focus/Power--Renewables/corporates-usher-in-new-wave-of-u.s.-wind-and-solar-growth/ . Viewed May 29, 2020.

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

[16] 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).

[17] *Id.*; Emma Foehringer Merchant, *2018 Was Record Year for Corporate Clean Energy Contracts* (Jan. 31, 2019) (available at https://www.greentechmedia.com/articles/read/reports-confirm-a-record-year-for-corporate-clean-energy-contracts#gs.nxat51)/ *See also* Business Renewables Center, Corporate Renewable Deals 2014-2018, available at https://businessrenewables.org/corporate-transactions/#wpcf7-f942-p471-o1.

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

[19] Minnesota Sustainable Growth Coalition. "Clean Energy Vision". Accessible at: https://environmental-initiative.org/work/minnesota-sustainable-growth-coalition/. Viewed June 3, 2020.

by the Project. In sum, Minnesota has a wide array of needs that Big Bend Wind can help address. The clean, renewable power that Big Bend Wind 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. Further, regional and national security and energy reliability can be enhanced through the development of diversified generation resources such as wind.

The Project will also provide a supplementary source of income for the rural landowners and farmers on whose land the Project will be sited. The landowners in the Project footprint who host turbines will receive annual lease payments for each turbine sited on their property. Over the life of the Project, the annual easement payments to project participants are expected to exceed $70 million. Because only a portion of the land will be used for the Project, farming operations can continue largely undisturbed. Specifically, although the Project will be sited over an area spanning approximately 43,500 acres, less than one half of one percent of those acres will be removed from agricultural use over the life of the Project.

3.2.2 PROMOTIONAL ACTIVITIES GIVING RISE TO DEMAND

Big Bend Wind 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." Big Bend Wind has not engaged in promotional activities which could have given rise to the need for the electricity to be generated by the Project. Thus, such information is non-existent and, consistent with its determinations in past CN proceedings, the Commission granted an exemption to Big Bend Wind.

3.2.3 EFFECTS OF FACILITY IN INDUCING FUTURE DEVELOPMENT

The Project is not expected to directly affect development in Cottonwood or Watonwan Counties. The area is largely rural, with small communities such as Butterfield, Mountain Lake, Bingham Lake, Windom, Jeffers, Comfrey, Darfur, and others. However, additional wind energy infrastructure in the Project area may nonetheless provide significant benefits to the local economy and local landowners. Landowners in the Project area will benefit from annual lease payments. Additional wind energy infrastructure will also provide an additional source of revenue into the county and townships in which the Project is sited. For instance, the Project is estimated to provide annual production tax revenue of approximately $35.7 million over the life of the Project in Cottonwood and Watonwan Counties.

The Project will also provide significant income opportunities for local residents not affiliated with Project ownership. The Project is anticipated to generate approximately

316 construction jobs and up to 14 permanent operations and maintenance ("O&M") positions. The Project has already created consulting, management, and environmental work.

At the same time the Project is providing income to local residents, it will also help contribute to making the energy those residents rely upon less susceptible to volatility.[20] The development of wind energy technology now makes wind power's relative price competitive with new natural gas and coal generation.[21] The development of wind energy in Minnesota reduces dependence on turbulent fossil fuel markets and helps keep energy dollars in Minnesota.[22]

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.

[20] U.S. Dept. of Energy, *Wind Vision: a New Era for Wind Power in the United States*, at iivi (March 2015) ("Increased wind power adds fuel diversity, making the overall electric sector 20% less sensitive to changes in fossil fuel costs.") U.S. Dept. of Energy, *2013 Wind Technologies Market Report*, at 62 (Aug. 2014) (stating that wind power can provide a "hedge against rising and/or uncertain natural gas prices").

[21] Coley Girouard, *The Numbers Are In and Renewables Are Winning On Price Alone,* Advanced Energy Perspectives (Dec. 5, 2018) (available at https://blog.aee.net/the-numbers-are-in-and-renewables-are-winning-on-price-alone); Dominic Dudley, *Renewable Energy Costs Take Another Tumble, Making Fossil Fuels More Expensive Than Ever*, Forbes.Com (May 29, 2019) (available at https://www.forbes.com/sites/dominicdudley/2019/05/29/renewable-energy-costs-tumble/#38ff0978e8ce).

[22] *See* AWEA, *Wind Energy in Minnesota* (2020) (available at https://www.awea.org/Awea/media/Resources/StateFactSheets/Minnesota.pdf).

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 BIG BEND WIND'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 308 MW of nameplate capacity to meet the electricity needs of Minnesota and the region. Big Bend Wind plans to negotiate one or more PPAs or sell the Project to utilities and non-utility customers with a need and/or policy or goal to purchase additional renewable energy, or to offer the Project's output for sale on the wholesale market. Denying the CN Application would result in the loss of a significant amount of electricity needed to satisfy state and regional demand, and would deny utilities and other customers the opportunity to purchase clean, low-cost energy that will count toward satisfying the RES and/or other clean energy standards and goals.

As discussed in Section 3.1, there is a significant body of state legislative policy requiring 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 wind energy produced by the Project.[23]

While coal generation made up 73 percent of total generation in the MISO region in 2009, due to retirements, coal facilities are expected to supply only 36 percent of MISO demand by 2030.[24] The generation fleet in the MISO region is in transition, and MISO is engaged in active analysis and planning to enable the transition to lower carbon resources.[25] The Project is only one part of the transition to less carbon intensive energy, and this shift to new generation technology will continue, even absent the Project. MISO can deploy both generation and capacity resources to support reliability, and the Project will be able to function as a capacity resource to load-serving entities in Minnesota, in addition to MISO Planning Resource Zone 1. To the extent MISO implements a sub-annual resource adequacy construct, the Project's output in the winter season will be important to the reliability of the grid in Minnesota.

The Project has been designed to efficiently utilize the region's strong wind resources. As discussed in further detail in Section 9.0 of the Big Bend Wind Site Permit Application, the area has a strong wind resource. The Project layout has been designed to efficiently utilize this wind resource while minimizing potential human and environmental impacts. The Project is estimated to have a net capacity factor of approximately 41 to 44.5 percent based on its planned design.

[23] *See, e.g.*, 20 Ill. Comp. Stat. sec. 3855/1-75(c)(1); N.D. Cent. Code. § 17-01-01; *see also* S.D.L.C 49-34A-101.

[24] 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). *See also* Xcel Energy, Upper Midwest Resource Plan 2020-2034, at 5, 2020-2034 Upper Midwest Integrated Resource Plan Docket No. E002 /RP-19-368 (planning for Minnesota-based retirements).

[25] *See* MISO, *Aligning Resource Availability and Need: Changing Reliability Requirements for an Evolving Fleet* (Aug. 2020).

4.2 NO MORE REASONABLE AND PRUDENT ALTERNATIVE TO THE BIG BEND WIND PROJECT HAS BEEN DEMONSTRATED (MINN. R. 7849.0120(B))

Minn. R. 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 other proposed wind 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 far exceeds the amount of energy to be supplied by the Project.

Regarding the type of facility, the Commission granted Big Bend Wind an exemption from Minn. R. 7849.0250(B) with respect to evaluating fossil fuel alternatives because such alternatives do not meet the Project's objective of providing energy that will satisfy the RES and other clean energy standards.

With respect to timing, the Project is expected to be on-line and operational by the end of 2022, depending on completion of regulatory approvals, securing a power purchaser, and the MISO interconnection process. This will help Minnesota and other electric utilities achieve the necessary renewable energy levels required to replace retiring generators and further transition the generation fleet to cleaner, renewable energy resources.

4.2.2 COST ANALYSIS

The Project will generate electricity at a lower cost per kilowatt hour ("kWh") than would other possible renewable energy options, such as solar and biomass.[26] In addition, although Big Bend Wind has not yet secured PPAs for the sale of the energy to be produced by the Project, it is confident that it will be able to secure long-term purchasers at attractive prices and terms. Importantly, as an IPP, the risk of not securing PPAs or otherwise not selling the Project's output lies entirely with Big Bend Wind, and not with the State of Minnesota or ratepayers.

4.2.3 POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS

The purpose of this analysis is to compare the potential impacts of various renewable generation options. The Commission and the Minnesota Department of Commerce ("MNDOC") have previously concluded that the environmental impacts of a wind power project are minimal

[26] *See* Energy Information Agency, *Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2015* (predicting that in 2020, the cost per megawatt hour of wind energy would be lower than that of other renewable energy options) (available at https://www.eia.gov/forecasts/aeo/electricity_generation.cfm).

and significantly less than a fossil-fuel based facility. At the same time, the socioeconomic benefits of a utility-scale wind power project are considerable, as described in Section 4.3 below. For example, the Project will allow landowners to continue to use over 96 percent of the existing cropland for agricultural and other uses.

4.2.4 RELIABILITY

The Project will be available approximately 97 percent of the time, consistent with other utility-scale wind projects.

4.3 THE BIG BEND WIND PROJECT WILL BENEFIT SOCIETY IN A MANNER COMPATIBLE WITH THE NATURAL AND SOCIOECONOMIC ENVIRONMENTS (MINN. R. 7849.0120(C))

Minn. R. 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 varied 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 the RES and other clean energy standards and their own stated clean energy goals, in addition to the increasing demands for wind power to meet the needs of corporate and industrial consumers.

Minn. Stat. § 216B.243, subd. 2(3) requires that the Commission consider the relationship of the proposed facility to other state energy needs as described in the most recent state energy policy and conservation report prepared under Minn. Stat. § 216C.18 (the "Quadrennial Report"). The most recent Quadrennial Report states:

> Minnesota is a leader in greenhouse gas emission reduction and other clean energy policies, and adding low-cost, no emission renewable resources such as wind energy have been identified as a means to achieve these environmental quality policies. As stated by DOC-DER in its most recent Quadrennial Report:
>
> Readily available, reliable, clean and competitively priced electricity is critical for the economic vitality, public health, and well-being of all Minnesotans. Because it has no natural deposits of coal, natural gas, or oil products, state policy makers have a long history of supporting local, efficient, and clean electricity to reduce dependence on, and offset economic and environmental effects from, fossil fuel imports.
>
> Ensuring that Minnesotans have reliable, reasonably priced and environmentally sensitive electric service is one of the guiding principles of

> Minnesota's energy policy and will remain among the Department's top priorities in the coming years.[27]

The Quadrennial Report discusses not only utility efforts to meet RES requirements, but also voluntary green pricing programs. Green pricing programs provide Minnesota ratepayers the option to voluntarily purchase energy from renewable sources to meet all or a portion of their energy requirements. The Quadrennial Report also describes the GHG reduction goals in Minn. Stat. § 216H.02 and the role renewable energy has and continues to play in driving down the carbon intensity of electricity generated in Minnesota.

Thus, as a source of competitively priced, no emission, wind energy, the Project is compatible with Minnesota's energy needs.

4.3.2 POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS COMPARED TO NO-BUILD ALTERNATIVE

Negative impacts to socioeconomic resources will be relatively minor. Only approximately 49.5 acres of agricultural land will be permanently removed from production, and the areas surrounding each turbine will still be able to be farmed. Project construction will not negatively impact leading industries within the Project area. There is no indication that any minority or low-income population is concentrated in any one area of the Project.

One of the greatest attributes of wind energy is its minimal impact on the environment. The Project will not release carbon dioxide, 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 permanently impact less than one percent of the total acreage within the Project's boundaries, and will be sited so as to minimize environmental impacts.

The development of wind energy has been and will continue to be important in diversifying and strengthening the economic base of Cottonwood and Watonwan Counties and the region. Local contractors and suppliers will be used for portions of construction. Wages and salaries paid to contractors and workers in Cottonwood and Watonwan Counties and the region 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. Landowners with turbines or other Project facilities on their land will receive annual lease payments anticipated to total approximately $70 million over the life of the Project, 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 Project will pay a

[27] Quadrennial Report, available at: https://mn.gov/commerce/policy-data-reports/energy-data-reports/?id=17-313072 at 49-50 (accessed Oct. 21, 2020).

Wind Energy Production Tax to the local units of government of $0.0012 per kWh of electricity produced, resulting in an annual Wind Energy Production Tax of approximately $35.7 million over the life of the Project.

Not building an electrical generation facility would result in no physical impact to the environment in Cottonwood and Watonwan Counties. 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 residences and businesses, 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 Cottonwood or Watonwan Counties, the Project will provide significant benefits to the local economy and local landowners. Landowners in the Project area will benefit from annual lease payments, and installation of wind energy infrastructure will increase the local tax base in the county and townships 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 produce affordable, clean, renewable energy that will help meet energy demands and the RES and other clean energy standards. It will produce enough energy to meet the energy needs for over 100,000 average Minnesota households annually. In addition, the local economy will benefit from the landowner lease payments for turbine siting, production taxes, income from jobs created, and local spending.

4.4 THE BIG BEND WIND PROJECT 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. Wind, as renewable energy, is a favored energy resource under Minnesota law.[28] In addition, as discussed previously, the RES includes the "25 by '25" requirement, which mandates increased electric generation from renewable

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

resources.[29] The state has also set a goal to reduce statewide GHG across all sectors producing those emissions to a level at least 30 percent below 2005 levels by 2025 and to a level at least 80 percent below 2005 levels by 2050.[30] Similarly, Minnesota has recognized a "vital interest in providing for . . . the development and use of renewable energy resources wherever possible."[31] Adding additional sources of electric energy with no emissions, like wind energy, 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 wind energy facilities receive. The state legislature has exempted all real and personal property of wind energy conversion systems from property taxes.[32] Wind energy conversion systems, as well as the materials used to manufacture, install, construct, repair, or replace wind systems, are also exempt from state sales tax.[33]

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 a number of 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

Minn. Stat. § 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 (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.

Minn. Stat. § 216B.2422, subd. 4, is also applicable:

[29] Minn. Stat. § 216B.1691, sub. 2a.

[30] Minn. Stat. § 216H.02.

[31] Minn. Stat. § 216C.05, subd. 1.

[32] Minn. Stat. § 272.02, subd. 22.

[33] Minn. Stat. § 297A.68, subd. 12.

> 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

Minn. Stat. § 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" references projects of less than 10 MW. Big Bend Wind assumes that it will need to compete with distributed generation alternatives if it seeks a PPA from a utility. The Project's transmission opportunities and economies of scale make it competitive when compared to these alternatives.

4.4.2.3 Innovative Energy Preference

Minnesota also requires the Commission to consider an innovative energy project[34] before authorizing construction or expansion of a fossil-fueled generation facility. Minn. Stat. § 216B.1694, subd. 2(a)(5). Because the Project is not a fossil-fuel facility, this requirement is not applicable.

4.4.2.4 RES Compliance

Minn. Stat. § 216B.243, subd. 3(10) requires the Commission to evaluate whether a CN applicant is in compliance with Minnesota's RES. Big Bend Wind, however, is not subject to the RES because it has no retail sales of electricity in Minnesota. Therefore, this requirement does not apply to the Project. The Project will, however, serve as a resource for utilities that must meet the RES requirements.

4.4.2.5 Environmental Cost Planning

Minn. Stat. § 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

[34] An "innovative energy project" is defined as a coal-burning facility employing innovative technology and located on the Iron Range. Minn. Stat. § 216B.1694, subd. 1.

Commission and the MNDOC have determined, this statute does not apply to renewable generation facilities such as the Project.[35]

4.4.2.6 Transmission Planning Compliance

Minn. Stat. § 216B.243, subd. 3(10) requires the Commission to consider whether a utility seeking a CN is in compliance with certain transmission planning requirements to meet the RES. As an IPP, this statute does not apply to Big Bend Wind.

4.4.3 THE PROJECT IS CONSISTENT WITH FEDERAL ENERGY POLICY

The project is consistent with federal policy interests, including in affordable and secure domestic energy production, as well as conservation of environmental resources.[36] According to the United States Department of Energy ("DOE"), affordable and long-term fixed price agreements for wind energy are expected to diminish sector-wide the price volatility currently associated with carbon-based energy sources, such as natural gas and coal.[37] This is anticipated to save consumers $280 billion dollars by 2050 nationwide.[38] In that same time period, DOE predicts that wind energy will provide over 600,000 jobs nationwide and increase local tax revenues by more $3 billion annually.[39] In addition to the economic benefits, wind energy reduces both air pollution emissions and preserves water resources. DOE predicts that by 2050, wind energy could avoid the emission of 12.3 gigatonnes of greenhouse gases and save 260 billion gallons of water.[40] Thus, wind energy is consistent with stated federal energy policy goals.

The Project has also pre-qualified for the federal production tax credit. If the Project is able to achieve commercial operation prior to December 31, 2022, it will meet the deemed

[35] *Elm Creek*, Docket No. IP6631/CN-07-789, Commission Order Granting Certificate of Need (Jan. 15, 2008), at 12.

[36] Congressional Research Service, Energy Policy: 114th Congress Issues (2016), at Summary (available at https://fas.org/sgp/crs/misc/R42756.pdf) ("Energy policy in the United States has focused on three major goals: assuring a secure supply of energy, keeping energy costs low, and protecting the environment).

[37] U.S. Department of Energy, *Wind Vision: A New Era for Wind Power in the United States* (2015), at 139 (available at https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf).

[38] U.S. Department of Energy, *Wind Vision: A New Era for Wind Power in the United States* (2015), at 139 (available at https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf).

[39] U.S. Department of Energy, *Wind Vision: A New Era for Wind Power in the United States* (2015), at 139 (available at https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf). *See also* Trieu Mai, *et al*, *The Value of Wind Technology Innovation: Implications for the U.S. Power System, Wind Industry, Electricity Consumers and Environment*, Nat'l Renewable Energy Laboratory (Sept. 2017) at 30-35 (predicting addition of more than 500,000 by the late 2040s) (available at https://www.nrel.gov/docs/fy17osti/70032.pdf); Lu Nelsen, *U.S. Wind energy generates more than $1 billion in tax revenue payments*, the Laurel Outlook (Jun. 6, 2019) (available at https://www.laureloutlook.com/content/us-wind-energy-generates-more-1-billion-tax-revenue-payments).

[40] U.S. Department of Energy, *Wind Vision: A New Era for Wind Power in the United States* (2015), at 139 (available at https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf). *See also* Trieu Mai, *et al*, *The Value of Wind Technology Innovation: Implications for the U.S. Power System, Wind Industry, Electricity Consumers and Environment*, Nat'l Renewable Energy Laboratory (Sept. 2017) at 30-35 (predicting avoidance of GHG and water savings of 16-19% by 2050) (available at https://www.nrel.gov/docs/fy17osti/70032.pdf).

continuous construction threshold for 80 percent federal production tax credit. Qualifying for the production tax credit adds significant economic value to the Project for potential purchasers.

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. Tables 7 and 8 in Section 12.4 provides a list of approvals the Project may need to obtain from governmental entities to demonstrate full compliance. Big Bend Wind is committed to obtaining all necessary environmental and other approvals required under federal, state, and local requirements.

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

5.1 PROPOSED PROJECT

The Project will consist of new gravel access roads and improvements to existing roads; underground and/or aboveground electrical collection and communication lines; O&M facility; one Project substation; up to one permanent meteorological tower; SoDAR or LiDAR unit; one laydown area; aboveground electrical feeder line; up to four ADLS radars; one temporary batch plant area, if needed, for construction of the Project, other infrastructure typical of a wind farm; a 161 kV transmission line (approximately 18 miles long); and, a switching station. The turbines will be interconnected by communication and electric power collection cables within the wind farm. *See* Figure 1.

Each turbine will be accessible via all-weather gravel roads that are approximately 16-18 feet wide, depending on the turbine size selected, and will extend from public roads to the turbines. Big Bend Wind estimates that approximately 17 miles of gravel access roads will be constructed, depending on the size of the turbine selected and the final design. Land will be graded on-site for the turbine pads. Drainage systems, access roads, storage areas, and O&M facilities will be installed as necessary to fully accommodate all aspects of the construction, operation, and maintenance of the Project.

Big Bend Wind has not made a final selection on wind turbine generators, but is proposing to utilize between 54 and 55 turbines ranging from 5.5 to 5.7 MW in size. Big Bend Wind will make its final turbine selection based on optimization of wind and land resources, as well as cost-efficiency. The turbine selected will have Supervisory Control and Data Acquisition communication technology, which permits automatic, independent operation, and remote supervision that allows simultaneous control of the wind turbines. In addition, Big Bend Wind will maintain a computer program and database to track each wind turbine's operational history.

Each tower will be secured by a concrete foundation that can vary in design depending on the soil conditions. A control panel inside each turbine tower will house communication and electronic circuitry. Each turbine will be equipped with a wind speed and direction sensor that communicates to the turbine's control system to signal when sufficient winds are present for operation. The turbines feature variable-speed control and independent blade pitch to assure aerodynamic efficiency.

At the base of each turbine, a step-up transformer will be installed to raise the voltage to power collection line voltage of 34.5 kV. Generally, the electrical lines will be buried in trenches and run to the edge of the site. At the public road, the power collection lines will either rise from underground to overhead lines or continue as underground lines. The collection lines will occasionally require an aboveground junction box when the collection lines from separate spools need to be spliced together.

Power generated by the Project will reach the electric grid by traveling through approximately 10 34.5 kV feeder lines to the newly constructed project substation. The substation will connect to the proposed 161 kV Transmission Line, which will be approximately 18 miles long. The Transmission line will interconnect Blue Lake-Wilmarth-Interstate Junction 345 kV transmission line approximately 10 miles south of the Project Area. The electrical system design and interconnection details will be determined as a result of studies currently being conducted by, and agreements with, MISO.

5.1.1 WIND FARM (MINN. R. 7849.0250(A))

5.1.1.1 Nominal Generating Capacity and Effect of Economies of Scale

Each turbine will have a net nominal rating of between 5.5 and 5.7 MW. Larger wind projects, such as the Project, can realize economies of scale by spreading out the relatively fixed transaction, operation, and maintenance costs over the entire project, resulting in decreased costs per kWh of electricity produced.

5.1.1.2 Annual Capacity Factor

A net capacity factor of approximately 41 to 44.5 percent, with projected average annual output of between approximately 1129 and 1225 GWh, is anticipated for the Project.

5.1.1.3 Fuel

The wind turbines will be powered by the wind.[41]

5.1.1.4 Anticipated Heat Rate

Heat rates are not applicable to a wind project.

5.1.1.5 Facility Location

The Wind Farm will be located within portions of Delton, Selma, Carson, and Midway Townships in Cottonwood County and Butterfield Township in Watonwan County. The closest city to the Wind Farm area is Mountain Lake, Minnesota. The Wind Farm area spans approximately 43,523 acres, of which approximately 35,000 are currently leased or pending leases

[41] Minn. R. 7849.0250(A)(3) also requests information projecting the availability of the Project's fuel source and alternative fuels. The Commission has determined that these data requirements are inapplicable to a wind facility. *See, e.g., In the Matter of the Application of High Prairie Wind Farm II, LLC for a Certificate of Need for a Large Energy Facility*, Docket No. PT-6556/CN-06-1428, Order (Dec. 11, 2006).

for the Project. With respect to turbine pads and access roads, only approximately 42 acres will be converted for the Project. Up to an additional 10 acres will be used for construction of the Project substation and O&M building.

The Project area is rural with an agricultural-based economy. The Project site was selected based on its excellent wind resources, its close proximity to existing transmission infrastructure and substations, and the landowners' interest in participating in the Project.

5.1.2 TRANSMISSION GENERATION-TIE ASSOCIATED FACILITY (MINN. R. 7849.0260(A))

5.1.2.1 Design Voltage

The generation-tie line will be a 161 kV transmission line.

5.1.2.2 Number, Size, and Types of Conductors

The electrical system design will be determined as a result of studies currently being conducted by, and agreements with, MISO.

5.1.2.3 Expected Losses

Minn. R. 7849.0260(A)(3), requires the applicant to provide information on ". . . the expected losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations." As noted by MNDOC, because the Transmission Line is "not considered to be a facility separate from" the Wind Farm, the data requirement of this rule part is not applicable.[42]

5.1.2.4 Approximate Length

The length of the generation tie-line will be approximately 18 miles, so as to interconnect the Project to the existing Blue Lake-Wilmarth-Interstate Junction 345 kV transmission line. The entire length of the transmission line is located in Minnesota.

5.1.2.5 Approximate Location of Terminals or Substations

The generation-tie line will require a new substation located at the Big Bend Wind Farm project site. The electrical system design and the interconnection details will be determined as a result of studies currently being conducted by, and agreements with, MISO.

[42] DOC-DER Comments, at 8 (July 22, 2019) eDockets ID 20197-154575-01. As noted by DOC-DER, the same analysis applies to Minn. R. 7849.0260(A)(3) and (C)(6) (Details Regarding Alternatives), Minn. R. 7849.0260(B)(1) (Alternatives to LHVTL), Minn. R. 7849.0260(C)(5) (Details Regarding Alternatives), and Minn. R. 7849.0260(D) (Map of the Applicant's System).

5.1.2.6 List of all Counties Reasonably Likely to be Affected

Cottonwood, Watonwan, and Martin Counties, Minnesota, are the counties reasonably likely to be affected by construction and operation of the proposed transmission line.

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

The objective of this alternatives analysis is to determine whether there are other energy sources that can satisfy the need identified for the Project. As noted above, Big Bend Wind intends to develop a generation source that will aid utilities and non-utility customers in satisfying the renewable energy need, including that created by the Minnesota RES and other federal and state renewable and clean energy standards. Therefore, non-renewable energy sources have been excluded from this alternatives analysis.[43] The criteria used in this analysis include: (1) is the energy source cost-effective; (2) is the energy source commercially-proven and reliable for the electrical generation output needed; and (3) is the energy source appropriate for the site selected.

Developing and operating generating sources that are cost-effective and use proven technology is particularly important to an IPP, like Big Bend Wind. Big Bend Wind does not have access to ratepayer funds that could provide a resource for retirement of capital investments. In addition, as a seller of electricity to utilities, Big Bend Wind must keep its prices – and, thus, its costs – low enough to remain competitive. For these reasons, Big Bend Wind must exercise diligence in deciding where and when to pursue opportunities for capital investment in new power-generating facilities.

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

5.2.1 ALTERNATIVES CONSIDERED

5.2.1.1 Purchased Power

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

[43] Minn. R. 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 Commission granted Big Bend Wind a partial exemption from this data requirement, and Big Bend Wind will discuss only renewable alternatives.

5.2.1.2 Upgrades to Existing Resources

Big Bend Wind 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 Big Bend Wind an exemption.

5.2.1.3 New Transmission

Big Bend Wind has no plans to become involved in owning or operating transmission lines beyond what could 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 is not applicable, and the Commission granted Big Bend Wind an exemption.

5.2.1.4 Solar Power

Minnesota has a significant and important solar resource that can and is being used for capacity services within the state's generating portfolio. Solar is a good capacity resource, whereas wind is a good energy resource. Additionally, on average, wind and solar production profiles complement each other given the inverse nature of high winds and a bright sun. Using the solar and wind hybrid generation model can raise the renewable energy penetration level than solar or wind generation alone. As a result, these two technologies complement each other and are not true substitutes. There is a need for both wind and solar energy in Minnesota's renewable portfolio. Apex, through its subsidiary Red Rock Solar, LLC, is proposing an up to 60 MW solar energy generation system to be potentially developed and constructed with Big Bend Wind as one of the state's first utility-scale hybrid renewable projects, and one that is fairly close to the Twin Cities, making it that much more attractive from a demand perspective. Pairing the solar with the larger wind farm is significantly more cost efficient than developing solar as a standalone resource. Most of the larger substation and transmission infrastructure serves both solar and wind. Hence, the capital expenditure to procure the solar panels and photovoltaic ("PV") inverters is significantly offset by the shared balance of plant facilities on a hybrid project relative to a standalone solar project. The hybrid project would also qualify for both the wind Production Tax Credit as well as the solar ITC credit.

5.2.1.5 Hydropower

Hydropower is also not an alternative to the Project. In 2015, hydropower in Minnesota produced 849,054 megawatts hours ("MWh"), which represents "a modest 10 percent increase over the last 10 years."[44] According to the 2016 Quad Report, the modest growth is primarily due 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."[45] While there may be potential for low-impact hydropower at existing non-powered

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

[45] 2016 Quad Report, at 28.

dams along the Mississippi River, there are not sufficient hydropower resources to replace the power offered by Big Bend Wind.

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.[46] Indeed, in 2018, the Commission gave Xcel Energy permission to buy out and close two biomass facilities because terminating the facilities was more economical to ratepayers than continuing with the PPA.[47] Further, the environmental impacts of a biomass facility may be greater than 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 an alternative to the Project.

5.2.1.7 Emerging Technologies

New renewable emerging power generation technologies have been developed, and Big Bend Wind believes that the current approaches are not sufficiently mature to either provide the output needed or to be cost-effective and reliable.

5.2.1.7.1 Pumped Storage

The proposed site in Cottonwood and Watonwan Counties is not suited to a pumped storage application because of the need to store large amounts of water in an elevated reservoir. In addition, there is currently no net generation from pumped storage in Minnesota.[48] Accordingly, this technology is 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, and those that do exist are not located in the vicinity of the site. This technology is not yet commercially proven and creates no net new energy generation. Accordingly, it is not an alternative to the Project.

5.2.1.7.3 Superconducting Magnets

This technology, which makes use of coils that can store electric energy, is not yet commercially-proven. Accordingly, it is not an alternative to the Project.

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[46] 2016 Quad Report, at 27.

[47] Order Approving Petitions, Approving Cost Recovery Proposals, and Granting Variances, *In the Matter of Xcel Energy's Petition for Approval to Terminate the Power Purchase Agreement (PPA) with Benson Power, LLC, Acquire the Benson/Fibrominn Plant, and Close the Facility*, Docket No. E-002/M-17-530 and *In the Matter of Xcel Energy's Petition for Approval to Terminate the PPA with Laurentian Energy Authority I, LLC*, Docket No. E-002/M-17-551 (Jan. 23, 2018), eDockets Doc. ID 20181-139242-02.

[48] EIA, *Net Generation from Hydroelectric (Pumped Storage) Power by State by Sector* (available at http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_12_a).

5.2.1.7.4 Hydrogen and Fuel Cells

Hydrogen and its use in fuel cells has received attention for its potential to impact energy production and use. Fuel cells can be used to make electricity and heat to operate vehicles and buildings. Fuel cells use a chemical reaction rather than a combustion reaction, are more efficient than generation from combustion sources, and have nearly no pollution. Hydrogen, on the other hand, is an energy carrier, not an energy source. As such, its potential to "store" electricity is being explored.

Although research is being done regarding hydrogen and fuel cells, the technology is not yet available on a commercial scale. It is possible, however, that as research and commercial applications advance, this technology may be used with and enhance other renewable technologies, such as the Project.

5.2.1.7.5 Battery Storage

As prices for the technology fall, lithium-ion batteries have begun to receive attention for their potential to store energy at low demand times for use during times of peak demand. However, grid-scale lithium-ion battery projects have been minimal across the United States to date, and the majority have been deployed for power quality benefits supporting the electric grid, a different purpose than electric generation. Batteries do not generate their own energy, and therefore batteries are not an alternative the Project.

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 a "large energy facility," i.e., larger than 50 MW. As an IPP, Big Bend Wind must compete with other available technologies to secure a PPA with a utility or non-utility customer. Big Bend Wind will be compared to other non-CN facilities at the time it submits bids to utilities, and the utility will select a resource based on a variety of factors, including price. Big Bend Wind 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 Big Bend Wind an 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." Minn. R. 7849.0340(C).

Big Bend Wind 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, Big Bend Wind will provide data regarding the impact of the "no facility" alternative on the wholesale market.

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 and non-utility customers to purchase the Project's output to satisfy the RES and other clean energy standards. Such an outcome is contrary to Big Bend Wind'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 a LHVTL (Minn. R. 7849.0330)

The Commission granted Big Bend Wind 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 proposed Big Bend Wind generation-tie line, since the purpose of the generation-tie line is to deliver the output from the facility to increase the supply of renewable energy to the purchaser to meet its renewable, clean energy, or sustainability obligations. Access to transmission facilities beyond the point of interconnection will be arranged by the utility or utilities purchasing the Project's energy output and will depend on the buyer and the ultimate destination for the energy output. Thus, except for the 161 kV transmission line necessary for interconnection, it is anticipated that the electricity generated will be transmitted via facilities owned or operated by others. For these reasons, Minn. R. 7849.0330 is not applicable, and the Commission granted Big Bend Wind 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 Big Bend Wind to more efficiently or cost-effectively produce electric output to be purchased by utilities to provide needed energy, and satisfy the RES and other clean energy standards.

5.2.2 ECONOMIC COMPARISON

Table 2 below, taken from the EIA, demonstrates that wind energy has both a lower capital cost and a lower operating cost than other types of renewable resources. Wind continues to be among the most practical of all renewable generation technologies

Table 2: Renewable Technology Costs[49]

Technology	Size (MW)	Total Overnight Cost (2019 $/kW)	Variable O&M (2019 $/MWh)	Fixed O&M (2019 $/kW/yr.)
Fuel Cells	10	7,339	0.56	30.65

[49] The figures in this table are taken from a report of the U.S. Energy Information Administration, *Cost and Performance Characteristics of New Generating Technologies, Annual Energy Outlook 2020* (Jan. 2020), at 2 (available at https://www.eia.gov/outlooks/aeo/assumptions/pdf/table_8.2.pdf). *See also* Lazard, *Lazard's Levelized*

Technology	Size (MW)	Total Overnight Cost (2019 $/kW)	Variable O&M (2019 $/MWh)	Fixed O&M (2019 $/kW/yr.)
Biomass	50	4,104	4.81	125.19
Conventional Hydropower	100	2,752	1.39	41.63
Wind	200	1,319	0.00	26.22
Solar Thermal	115	7,191	0.00	85.03
Solar PV-Tracking	150	1,331	0.00	15.19

5.2.3 ALTERNATIVES SUMMARY

The Project is the best alternative for meeting the renewable energy needs in Minnesota and the region in the near term. All other potential alternatives reviewed by Big Bend Wind fall short in one or more categories. Moreover, as an IPP, Big Bend Wind does not have the right to sell its electricity to anyone. Instead, Big Bend Wind will compete with alternative sources of energy to obtain a purchase agreement. In this manner, the Project will have at least one other comparison to alternatives prior to its construction and operation.

5.3 DISCUSSION OF PROPOSED FACILITY AND ALTERNATIVES

5.3.1 WIND FACILITY (MINN. R. 7849.0250(C))

The Commission granted Big Bend Wind 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). Because the Commission granted Big Bend Wind a partial exemption from the data requirements in Minn. R. 7849.0250(B), thereby limiting its discussion 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) that could provide electric power at the asserted level of need. As discussed above, no such alternatives exist. Therefore, only information regarding the Project is applicable.

5.3.1.1 Capacity Cost

Wind energy projects are accredited by MISO at a fairly low rate (currently about 16.6 percent of nameplate) and are most often used as energy resources. Thus, costs for wind energy facilities are typically not expressed in terms of capacity costs. The Project will deliver energy and accredited capacity to utilities on an as-generated basis and will receive payment for both in the form of a single $/kWh payment. Big Bend Wind's estimated cost for the Project per kW is provided in Appendix A, Section 5.3.1, which has been designated trade secret. The largest

Cost of Energy Analysis—Version 13.0 (Nov. 2019), *available at* https://www.lazard.com/media/451086/lazards-levelized-cost-of-energy-version-130-vf.pdf.

component in the total cost of the Project will be the wind turbines; infrastructure costs for access road construction and electrical collection systems also are factors.

5.3.1.2 Service Life

A service life of 30 years has been assumed to estimate annualized capital costs. With proper maintenance, service, and replacement of parts, the expected life of the Wind Farm is 30 years. Big Bend Wind is confident that its maintenance program will result in excellent longevity for the Project.

5.3.1.3 Estimated Average Annual Availability

Big Bend Wind estimates that the Project will be available at least 41 percent of the year, which is consistent with industry standards.

5.3.1.4 Fuel Costs

The Project will be fueled by wind, which is free. The easements for the wind rights on the land where the turbines will be located will require annual lease payments. Nominal purchases of electricity will be necessary to run the Project, with Big Bend Wind ultimately selling the Project's net output.

5.3.1.5 Variable Operating and Maintenance Costs

Fixed maintenance cost is provided in Appendix A, Section 5.3.1.5. An advantage of wind energy facilities is that they typically are not required to go completely offline for maintenance. Individual turbines can be serviced while the rest of the facility continues to deliver energy.

5.3.1.6 Total Cost

Big Bend Wind's estimated total capital cost per kWh for the Project is provided in Appendix A, Section 5.3.6, which has been designated trade secret. This estimate assumes typical wind farm design, construction, and operational data for a 30-year estimated service life. The price for which Big Bend Wind will sell the energy will be determined as a result of negotiations with the purchasing utilities.

5.3.1.7 Estimate of Facility's Effect on Rates

Minn. R. 7849.0250(C)(7) requires an applicant to estimate its proposed project's "effect on rates systemwide and in Minnesota, assuming a test year beginning with the proposed in-service date." The Commission granted Big Bend Wind an 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 Big Bend Wind nor necessary to determine the need for the Project. Instead, Big Bend Wind 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.[50] For instance, utilities would have the option of purchasing output from the Project to partially replace energy from generation sources with 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.

5.3.1.8 Efficiency

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

5.3.2 HVTL (MINN. R. 7849.02 0260(B))

5.3.2.1 Alternatives to LHVTL

Because the Transmission Line is not a facility separate from the Wind Farm, Minn. R. 7849.0260(B)(1), which requires a discussion of new generation alternatives to the LHVTL, does not apply.[51] The Big Bend Wind generation-tie line is proposed to connect the Big Bend Wind Farm to the transmission grid, and thus, there is no new generation alternative that can be a true substitute for the proposed generation-tie line. Unlike a traditional utility that is adding a LHVTL to the transmission system for purposes of addressing system reliability or congestion, for which a new generation resource may be an alternative, the Big Bend Wind generation-tie line is proposed solely to interconnect the Big Bend Wind Farm to the transmission grid.

5.3.2.2 Upgrading of Existing Transmission Lines or Existing Generating Facilities

There are no existing high voltage transmission lines in proximity to the Big Bend Wind Farm that has sufficient capacity or could be upgraded to deliver the wind energy from the Big Bend Wind Farm. Upgrading existing generation facilities is also not a reasonable alternative because, as noted in Section 5.3.2.1, the need for the transmission line is to deliver energy from a new wind farm.

5.3.2.3 Transmission Lines with Different Voltages, Numbers, Sizes, and Types of Conductors

The transmission line must provide sufficient capacity to serve an up to 308 MW wind farm. Big Bend Wind evaluated higher and lower voltage lines and determined that amperage ("AMPs") not to exceed 1,200 AMPs would be required. This amperage limit can only be

[50] *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"); Good Energy, *Wind and solar reducing consumer bills* (Oct. 2015) (analyzing impact of renewable energy usage on electric rates in the United Kingdom); Union of Concerned Scientists, *Clean Power Green Jobs*, (2009) (analyzing impacts of meeting "25 by '25" nationally on consumer electric rates);

[51] DOC-DER Comments, at 8 (July 22, 2019) eDockets ID 20197-154575-01.

facilitated by voltage 161 kV and higher. Therefore, Big Bend Wind determined that lower voltage 69 kV facilities would not meet the need.

Big Bend Wind concluded that the most appropriate voltage was 161 kV consisting of tangent, angle and dead-end structures carrying 1590 aluminum conductor steel-reinforced cable ("ACSR") conductor or equivalent, which provides an approximate capacity of 1354 amperes (amps). This capacity will meet the current project needs and provide capacity for future generation and may be increased with the final conductor selection and arrangement. The 161 kV voltage was also preferred because:

- At higher voltages (typically 230 kV and above) corona becomes an issue due to the higher electric fields and corona resistant equipment would be needed along the transmission line along with multiple conductors per phase to spread out the fields;

- A 161 kV line can generally use shorter transmission structures because there are lower ground clearances to the conductor per National Electrical Safety Code ("NESC") 232C;

- Based on project active power size, conductor capacity selection at 161 kV is preferred based on ratings of most commonly used ACSR conductors;

- The wood monopole structures can be used at more locations and would not be feasible at higher voltages due to ground clearances, phase-phase spacing requirements, basic insulation levels, and structure sizes; and

- The transmission line route may require a section to be underground. This is much more advantageous at lower voltages than extra-high voltages due to capacitive effects of the underground lines and it is much more complex to underground higher voltage lines.

5.3.2.4 Transmission Lines with Different Terminals or Substations

No other alternative terminal or substation studied offers the same benefits as the proposed substation and switching station. One newly constructed collector substation will serve as the point of initiation and is the necessary origination point for the generation tie line. A switching station on the 345 kV Blue Lake-Wilmarth-Interstate Junction transmission line near the Great River Energy Lakefield Junction Station is the end point and provides a path for the wind energy to be delivered to markets where it is needed. The point of interconnection is the closest and most efficient terminals for the closest high-voltage line capable of transmitting the energy from the wind farm.

5.3.2.5 Double Circuiting of Existing Transmission Lines

There is no existing transmission line that is located to deliver the energy from the Big Bend Wind Farm's collector substation to the existing 345 kV Blue Lake-Wilmarth-Interstate Junction transmission line transmission line near the Great River Energy Lakefield Junction Station, and, thus, the double circuiting of an existing transmission line is not feasible.

5.3.2.6 The Use of DC Transmission Line

A direct current ("DC") transmission line is generally employed to deliver generation over a considerable distance, in some instances several hundred miles, to a load center. The DC technology is not technically viable for a wind project delivering over short distances, such as for the proposed 18-mile generation-tie line.

5.3.2.7 Use of Underground Transmission Lines

Big Bend Wind is proposing to build a very short segment of the transmission line underground to avoid potential impacts to an existing adjacent landing strip. However, it would not be cost-effective or feasible, due to the land use impacts, cost, and distance to construct the entire 18 miles underground. Undergrounding for the entire distance would also be inconsistent with industry standard practice, as it is more typical in areas not suitable for overhead transmission, such as in large cities, and at a much lower voltage, such 69 kV.

5.3.2.8 Any Reasonable Combination of Factors

There is no reasonable combination of the factors in Minn. R. 7849.0260(B) that could result in an alternative approach to the development, construction, and operation of the Big Bend Wind Farm generation tie line.

5.3.2.9 Total Cost

The estimated total cost of the transmission line ranges from $12-14 million depending on the route selected in the RP proceeding.

5.3.2.10 Service Life

The service life of the generation tie line is 30 years.

5.3.2.11 Estimated Annual Availability

The transmission line has an estimated annual availability in excess of 99 percent.

5.3.2.12 Annual O&M

The anticipated annual operating and maintenance costs for the 161 kV transmission line are approximately $1,500 per mile. The principal O&M costs include inspections, which are typically ground-based and occasionally done by aerial inspections, generally on a yearly basis.

5.3.2.13 Estimate of System-Wide Rates

Because the Transmission Line is not a facility separate from the Wind Farm, Minn. R. 7849.0260(C)(5), which requires an applicant to estimate its proposed project's "effect on rates systemwide and in Minnesota, assuming a test year beginning with the proposed inservice date"

does not apply.[52] Big Bend Wind is not a Minnesota public utility whose rates are regulated by the Commission. Rather, as an IPP providing its electrical output to a single purchaser, Big Bend Wind cannot derive a systemwide rate effect, nor do so for the entirety of the State of Minnesota.

5.3.2.14 Efficiency of the Transmission Line

Because the Transmission Line is not a facility separate from the Wind Farm, Minn. R. 7849.0260(C)(6), which requires that an applicant provide a discussion of the Project's ". . . efficiency, expressed for a transmission facility as the estimated losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations, or expressed for a generating facility as the estimated heat rate. . . ." does not apply to the Project.[53] Unlike a traditional utility transmission line, the LHVTL associated with the Project is a generation-tie line that has the sole purpose of delivering the output of the wind facility to the transmission grid. As such, the generation-tie line is a radial line that will not impact losses on the transmission system as would a more typical utility-LHVTL that is part of the integrated transmission system.

5.3.2.15 Major Assumptions

There are no specific assumptions other than those already identified that impacted the provision of information in response to Minn. R. 7849.0260(C)(1-6).

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

The Commission granted Big Bend Wind an exemption from Minn. R. 7849.0250(D), which requires an applicant to include a map showing the applicant's system.[54] As an IPP, Big Bend Wind does not have a "system." The information requested is not available to Big Bend Wind or relevant to the determination of need for the Project. Instead, maps showing proposed site of the Project and its location relative to the power grid are included as Figure 1.

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

The Commission granted Big Bend Wind an 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." Big Bend Wind does not have a "service area" or "system" and, as such, the requested data is inapplicable. Moreover, Big Bend Wind will sell power generated by the Project at wholesale to one or more buyers affiliated with different systems and serving different areas. Given that Big Bend Wind does not yet know who the buyer or buyers will be, Big Bend Wind cannot reasonably forecast peak demand for those buyers' service areas and systems. As an alternative to the requested data, Big Bend Wind provides the following data regarding the regional demand, consumption, and capacity data from credible

[52] DOC-DER Comments, at 8 (July 22, 2019) eDockets ID 20197-154575-01.

[53] DOC-DER Comments, at 8 (July 22, 2019) eDockets ID 20197-154575-01.

[54] As noted by DOC-DER, Minn. R. 7849.0260(D) does not apply to the Transmission Line. DOC-DER Comments, at 8 (July 22, 2019) eDockets ID 20197-154575-01.

sources to demonstrate the need for the independently produced renewable energy that will be generated by the Project. Upon execution of a PPA for the Project's output, Big Bend Wind will also provide the Commission with additional system-specific information.

A review of utilities' integrated resource plans ("IRPs"), requests for proposals, and similar documents demonstrates that utilities will seek additional renewable generation resources in the next several years.[55] Xcel Energy has announced plans to reduce carbon emissions 80 percent Company-wide by 2030, and to provide 100 percent carbon-free electricity across its service territory by 2050.[56] To reach this goal, Xcel Energy plans to eliminate all coal generation on its system by 2030, and to add 4,000 MW of renewable energy, in addition to approximately 1,200 MW of cumulative wind by 2034 to replace wind that is set to retire. 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.[57] Additional demand is being driven by corporate and industrial consumers, who are increasingly entering into longer power purchase agreements for renewable energy.[58]

7.0 SYSTEM CAPACITY (MINN. R. 7849.0280)

Minn. R. 7849.0280 requires a CN applicant to provide information on the ability of its existing system to meet the forecasted demand. As an IPP, Big Bend Wind does not have a "system" as defined by the Rules. Accordingly, the Commission granted Big Bend Wind an exemption from this requirement and permitted Big Bend Wind 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 Big Bend Wind an exemption from Minn. R. 7849.0290, which requires an applicant to describe its energy and conservation plans, including load management,

[55] Xcel Energy, Upper Midwest Resource Plan 2020-2034, at 5, 2020-2034 Upper Midwest Integrated Resource Plan Docket No. E002 /RP-19-368. *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).

[56] Xcel Energy, Upper Midwest Resource Plan 2020-2034, at 5.

[57] 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).

[58] 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 the effect of conservation in reducing the applicant's need for new generation and transmission facilities.

9.0 CONSEQUENCES OF DELAY (MINN. R. 7849.0300)

The Commission granted Big Bend Wind an exemption from Minn. R. 7849.0300, which requires the applicant to discuss the "anticipated consequences to its system, neighboring systems, and the power pool should the proposed facility be delayed one, two, and three years, or postponed indefinitely." Big Bend Wind is not a utility and has no "system" as defined by the Rules. Thus, this data requirement is inapplicable to Big Bend Wind and is unnecessary to determine the need for the Project. Instead, Big Bend Wind provides the following data on the consequences of delay to its potential customers and the region.

The data presented regarding the need for additional renewable energy resources provides evidence that the energy to be generated by the Project is needed. Delaying an up to 308 MW wind project has the potential to jeopardize utility and non-utility customers' efforts to obtain the necessary renewable energy in a cost-effective and reliable manner.

10.0 ENVIRONMENTAL INFORMATION FOR PROPOSED PROJECT AND ALTERNATIVES (MINN. R. 7849.0310)

Big Bend Wind is submitting Site and Route Permit Applications, in addition to this CN Application. Included below is a summary of some of the impacts to key resources found within the Project area, including visual resources, land use, and wildlife. Additional environmental information is provided in Section 11, below, and in the SP and RP Applications.

10.1 WIND FACILITY

10.1.1 VISUAL IMPACTS AND MITIGATION

The introduction of wind turbines and the substation has the potential to alter the existing visual resource where they are most perceptible. During construction, visual impacts associated with the Project facilities would include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, and machinery and tool storage. Other visual effects could result from the removal or alteration of vegetation that may currently provide a visual barrier, or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture. There are 13 existing wind turbines that are part of three wind developments immediately adjacent to the southern portion of the Project Area (Mountain Lake Wind, one turbine; Bingham Lake, eight turbines; and Farmers' Coops/Westridge, four turbines). Generally, existing wind development is visually apparent south and west of the Project Area. Other orientations (i.e., north or east) generally lack development in the immediate Project Area, visual scale is uniform, with little contrast in line, form, color, or texture, and no dominant features. Construction in flat terrains would disrupt and dominate foreground and middle ground views with the introduction of equipment, materials, and spoil piles.

During operation, visual impacts associated with wind energy facilities in the Project Area include the presence of wind turbine structures, movement of the rotor blades, shadow flicker, turbine marker lights, and other lighting on control buildings; and other ancillary structures, roads, vehicles, and workers conducting maintenance activities. The Federal Aviation Administration ("FAA") requires obstruction lighting or marking of structures more than 200 feet above ground to provide safe air navigation, which is synchronized flashing of red lights for wind turbines (FAA, 2005). Big Bend Wind will coordinate with the FAA on implementation of ADLS radar to minimum visual impacts at night.

The impact of the Project's aesthetics is based on subjective human responses. For some viewers, the Project could be perceived as a visual intrusion; for other viewers, the Project may have positive aesthetic qualities. While people living in or traveling through the area are accustomed to viewing wind turbines associated with the several existing wind farms west and south of the Project Area, the Project will add to the cumulative visual impacts by adding up to 55 new turbines in the area. Additionally, numerous electrical distribution lines parallel some unpaved and paved roads that contribute to the visual elements. Additional discussion assessment of visual impacts is provided in the SP Application.

Big Bend Wind will implement the following mitigation measures for visual resources:

- Wind turbines will exhibit visual uniformity in the shape, color, and size of rotor blades, nacelles, and towers.
- Collection cables or lines on the site will be buried in a manner that minimizes additional surface disturbance (e.g., collocating them with access roads, where feasible).
- For ancillary buildings and other structures, low-profile structures will be chosen whenever possible to reduce their visibility.
- Turbine foundations and roads have been designed to minimize and balance cuts and fills.
- Facilities, structures, and roads will be located in stable fertile soils to reduce visual contrasts from erosion and to better support rapid and complete regrowth of vegetation.
- Lighting for facilities will not exceed the minimum required for safety and security, and full-cutoff designs that minimize upward light pollution will be selected. Big Bend Wind will install lights that are off until aircraft approach.
- Commercial messages and symbols on wind turbines will be avoided.
- Additionally, Big Bend Wind will coordinate with the FAA on implementation of ADLS radar(s). With this radar system, turbine lighting (synchronized flashing red lights) is off until the radar detects an aircraft within a prescribed distance to the Project, at which time, the blinking red lights turn on. After the aircraft is safely

beyond the Project, the blinking lights are again turned off. Implementation of this radar system will depend on FAA review and approval.

10.1.2 SHADOW FLICKER IMPACTS AND MITIGATION

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity at a given stationary location (or "receptor"), such as the window of a home. In order for shadow flicker to occur, three conditions must be met: (1) the sun must be shining with no clouds to obscure it; (2) the rotor blades must be spinning and must be located between the receptor and the sun; and (3) the receptor must be sufficiently close to the turbine to be able to distinguish a shadow created by it (generally 1500 feet because the shadow, at this distance, is sufficiently diffused that it's not seen as a solid obstruction). Shadow flicker intensity and frequency at a given receptor are determined by a number of interacting factors:

- **Sun angle and sun path**: As the sun moves across the sky on a given day, shadows are longest during periods nearest sunrise and sunset, and shortest near midday. They are longer in winter than in summer. On the longest day of the year (the summer solstice), the sun's path tracks much farther to the north and much higher in the sky than on the shortest day of the day (the winter solstice). As a result, the duration of shadow flicker at a given receptor will change significantly from one season to the next.

- **Turbine and receptor locations**: The frequency of shadow flicker at a given receptor tends to decrease with greater distance between the turbine and receptor. The frequency of occurrence is also affected by the sightline direction between turbine and receptor. A turbine placed due east of a given receptor will cause shadow flicker at the receptor at some point during the year, while a turbine placed due north of the same receptor at the same distance will not, due to the path of the sun at Big Bend Wind's latitude.

- **Cloud cover and degree of visibility**: As noted above, shadow flicker will not occur when the sun is obscured by clouds. A clear day has more opportunity for shadow flicker than a cloudy day. Likewise, smoke, fog, haze, or other phenomena limiting visibility would reduce the intensity of the shadow flicker.

- **Wind direction**: The size of the area affected by shadow flicker caused by a single wind turbine is based on the direction that the turbine is facing in relation to the sun and location of the receptor. The turbine is designed to rotate to face into the wind, and as a result, turbine direction is determined by wind direction. Shadow flicker will affect a larger area if the wind is blowing from a direction such that the turbine rotor is near perpendicular to the sun-receptor view line. Similarly, shadow flicker will affect a smaller area if the wind is blowing from a direction such that the turbine rotor is near parallel to the sun-receptor view line.

- **Wind speed**: Shadow flicker can only occur if the turbine is in operation. Turbines are designed to operate within a specific range of wind speeds. If the wind speed is too low or too high, the turbine will not operate, eliminating shadow flicker.

- **Obstacles**: Obstacles, such as trees or buildings, can have a screening effect and reduce or eliminate the occurrence of shadow flicker if they lie between the wind turbine and the receptor.

- **Contrast**: Because shadow flicker is defined as a change in light intensity, the effects of shadow flicker can be reduced by increasing the amount of light within a home or room experiencing shadowing flicker.

- **Local topography**: Changes in elevation between the turbine location and the receptor can either reduce or increase frequency of occurrence of shadow flicker, compared to flat terrain.

- Currently, shadow flicker impacts are not regulated by state and federal law.

Shadow flicker frequency calculations for the Project were modeled for 969 residences (receptors) with WindPRO based on all turbines in each layout. These receptors are those within the Project Area and one-mile buffer that could receive shadow flicker. As demonstrated in Table 3, all non-participating residences are expected to experience below 30 hours per year of shadow flicker.

Table 3
Maximum Shadow Flicker (hours/year)

Turbine Model	Maximum Shadow Flicker (hours/year)	
	Participating	Non-Participating
Nordex N-163	59:36	20:31
Vestas V162	59:11	20:19
GE-158	56:07	19:39

The shadow flicker modeling is conservative and does not take in consideration several factors including:

- availability of the turbines (i.e., whether they are operating or not based on meteorological conditions and/or maintenance);

- turbines not operating below cut-in and above cut-out wind speeds;

- obstacles (like trees or buildings) obstructing shadow flicker from a receptor; and

- dust or aerosols in the air which reduce the impact of shadow flicker.

Big Bend Wind has sited turbines to minimize impacts to residences. Based on the results of the Project's shadow flicker modeling, no specific mitigation is currently proposed. To the

extent that a residence experiences inordinately more flicker than anticipated by modeling during Project operation, mitigation would be addressed at that time. However, because of the conservative methods used for the modeling, it is highly unlikely that more flicker than modeled will occur. In order to assess site-specific mitigation measures, flicker occurrences should be documented daily for several consecutive months including location, date, time of day, and duration. Mitigation measures will be considered and implemented based on individual circumstances of residences experiencing shadow flicker, and as a reasonable function of the amount of flicker experienced. Such mitigation measures may include Big Bend Wind taking the following actions:

- Providing education to landowners about how to minimize the effect of shadow flicker.
- Providing indoor screening, such as curtains or blinds in windows, where appropriate and reasonable.
- Providing exterior screening, such as a vegetation buffer or awnings over windows, where appropriate and reasonable.
- Implementing Turbine Control Software programmed to temporarily shut down a specific turbine for a few minutes if conditions are present to create flicker.

10.1.3 CULTURAL RESOURCES IMPACTS AND MITIGATION

Cultural resources can be defined as physical evidence or place of past human activity and include archaeological and historic architectural resources that provide important information about the history of human occupation and alteration of the landscape over time. Archaeological resources include prehistoric and historic artifacts, structural ruins, and earthworks or rock art that are typically found either partially or completely below the ground surface. Historic architectural resources include standing structures, such as buildings and bridges, as well as historic districts and landscapes.

Big Bend Wind sent an initial letter to the Minnesota State Historic Preservation Office ("SHPO") in November 2017 asking for a record search for the initial proposed Project boundary plus a two-mile buffer. Following a meeting between Big Bend Wind and SHPO in November 2017, SHPO recommended that areas identified with a high probability for cultural resources be identified and field surveyed. Additionally, SHPO recommended Big Bend Wind consult directly with the Minnesota Historical Society ("MNHS") regarding appropriate measures to avoid and/or minimize impacts to the Jeffers Petroglyph site, which was located within the Project boundary at the time. The Jeffers Site is an historic site, listed in Minn. Stat. § 138.662, subd. 17, and part of the State's Historic Sites Network. SHPO noted that a viewshed analysis of the Jeffers Site and Red Rock Ridge may warrant management consideration. Through further coordination, in January 2018, SHPO indicated that a 1.5 mile visual area of potential effect around the proposed turbines should be used to assess concerns about National Register of Historic Places ("NRHP") eligible or listed structures.

Big Bend Wind voluntarily initiated coordination with stakeholders including Native American tribes, Red Rock Ridge Research Group, the Minnesota Indian Affairs Counsel, local elected officials, MNHS, and SHPO to actively generate feedback from all interested parties regarding the Project, including input regarding the Project's location in proximity to the Jeffers Site and the surrounding Red Rock Ridge, which were initially located within the 2018 Project area. Big Bend Wind's goal in soliciting feedback from these stakeholders was to understand the significance of the Jeffers Site and Red Rock Ridge and to work collectively with the stakeholders to develop appropriate buffers from these areas that provide a balance of limiting impact on these areas while still meeting the operational goals for the Project. A full summary of input provided by stakeholders and Big Bend Wind's responses is included in Appendix G of the SP Application.

Phase I surveys were initiated in 2019 and are ongoing. The informal results of the 2019 field survey were submitted to Native American tribes for review in December 2019; additional reports of Phase I Survey results will be submitted to SHPO, MNHS, and Native American tribes after additional surveys are completed. If archaeological or historic architectural resources that are determined to be eligible or potentially eligible for listing on the NRHP are identified as a result of field surveys, Big Bend will work with SHPO and Native American tribes to identify measures to avoid or mitigate any effects to these resources

Avoidance of resources may include minor adjustments to the Project design and designation of environmentally sensitive areas to be left undisturbed by the Project. If archaeological resources are discovered during construction, measures will be implemented in accordance with the Project's UDP and may include halting construction and/or notification of the SHPO and THPOs if appropriate. Additionally, if unanticipated human remains are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. § 307.08 and construction will cease in that area until adequate mitigation measures have been developed between Big Bend and the State Archaeologist

Big Bend has mitigated long-term visual impacts on the Jeffers Site through reducing the numbers of turbines from 64 to 55, increasing the buffer between Project turbines and the Jeffers Site from approximately 2.4 miles to more than 5 miles, and proposing the use of ADLS to reduce visual impacts on the night sky. In addition, in response to comments received through early coordination, Big Bend has eliminated potential shadow flicker, noise and vibration impacts to the Jeffers Site. Finally, Big Bend has provided a decommissioning plan, which provides financial surety and detail plans to remove the wind turbines at the end of the Project's life. As such, Big Bend has taken significant and meaningful measures to avoid and minimize the potential for adverse impacts to cultural resources, including at the Jeffers Site. Additional analysis regarding the Project's potential visual impacts is included in Appendix A to the SP Application, *Visual Impact Assessment Report*.

10.1.4 IMPACTS TO LAND USE

The Wind Farm area includes a total of approximately 43,500 acres, and Big Bend Wind currently has site control over approximately 37,400 acres. Of acres within the Project area, less than one percent will be permanently converted from agricultural fields to sites for wind turbines, access roads, and transformer pads. With respect to turbine pads and access roads, only

approximately 10 acres will be converted for the turbines. Approximately 32 acres will be converted for access roads, and up to an additional 10 acres will be used for construction of the Project substation and O&M building. The existing land use will continue on the remainder of the land. No relocation of people or businesses will be necessary for the Project. Thus, land use impacts will be minimal.

Construction and operation of the Transmission Line is also not expected to have a significant impact on land use within Cottonwood, Watonwan, and Martin Counties. Existing land uses along the Proposed Route will experience minimal, short-term impacts during the period of construction. Big Bend Wind sited the Application Alignment to be co-located with roads or property lines for the majority of its length to minimize impacts to non-developed areas. When transmission line construction is complete, Big Bend Wind will restore Project workspaces, and land uses will be allowed to continue as before. No additional mitigation measures are proposed.

10.1.5 IMPACTS TO WILDLIFE

Development of the Project, including the construction and operation, is expected to produce a minimal impact to wildlife. Based on studies of existing wind power projects in the United States and Europe, the impact to wildlife would primarily occur to avian and bat populations. Although Big Bend Wind preconstruction surveys are ongoing, it can be expected that, similar to other wind developments, there is a high likelihood that individual bird and bat fatalities will occur at the Project. However, it is unlikely that Big Bend Wind will affect species at the population level.

Project survey results indicate that development of the Project Area is unlikely to adversely impact small or large bird populations, including diurnal raptors or species of concern. Most species observed are prevalent and abundant, and their populations are therefore at low risk of adverse impacts from the Project. Analysis of data collected during raptor and eagle surveys suggests there is minimal potential for the Project to create instability in local or regional nesting diurnal raptor populations.

Although the northern long-eared bat ("NLEB") were not documented as occurring within the Project Area during the acoustic bat surveys, Big Bend Wind will implement best management practices ("BMPs") recommended by United States Fish and Wildlife Service ("USFWS") and Minnesota Department of Natural Resources ("MNDNR") to minimize take for all bat species (Baerwald et al. 2008, Arnett et al. 2010, Good et al. 2011), including siting turbines more than 1,000 ft (305 m) from suitable NLEB habitat, minimizing tree removal to the greatest extent possible and focusing any necessary tree removal to winter, and locking or feathering blades up to manufacturer's cut-in speed from April 1 to October 31 for the life of the Project.

Recent post-construction data are available from other wind facilities in southern Minnesota with comparable landscapes to Big Bend Wind from which to draw correlative inferences about potential impacts on birds and bats from Project operations. Overall, adjusted fatality rates for all bird species vary between three to six birds/MW/year for the majority of post-construction fatality studies nationwide. Fatality estimates are relatively constant across the country except for in the Great Plains, where there appears to be lower avian fatality rates, and the Pacific region, where there may be slightly higher fatality rates. Most avian fatalities due to wind

turbines are small passerines, about 60 percent of avian fatalities in publicly available reports in the United States. Fatality rates of migratory passerines increase in the spring and fall during migration (AWWI, 2017). The majority of avian species have a low risk of impacts at the population level (Allison et al., 2019). Based on the post-construction fatality studies outlined above, national averages for post-construction fatalities, and American Wind Wildlife Institute ("AWWI's") conclusions about geographic trends, Big Bend Wind anticipates that unavoidable avian fatalities due to collision will be at or below the national average and may result in limited localized impacts to some groups of birds, such as small passerines.

Potential unavoidable impacts from the Project on bats are expected to be similar to the post-construction fatality rates at the above-wind facilities, based on the similar land uses within the Project Area, geographic proximity of the projects, and similarities in species composition. Migratory tree-roosting bats (e.g., hoary bat, silver-haired bat, and eastern red bat), which were detected during the Project's pre-construction studies, may have the highest risk of collision based on previous bat fatality studies (AWWI, 2017). Unlike birds, wind facilities may present a risk to populations of migratory tree-roosting bats; in addition, although impacts from wind facilities on cave-roosting bats are typically low, even a small impact can be a risk to populations already impacted by white-nose syndrome (Allison et al. 2019). Overall, risk of mortality to bats in the Project Area is likely to be greatest on nights during fall migration, when the number of bats moving through the area are the highest. During the fall migration, weather conditions that are most conducive to higher mortality rates occur with warm temperatures (greater than 50 degrees Fahrenheit) and low wind speeds (less than 6.5 m/s or 14mph) (Baerwald and Barclay, 2009; Arnett et al., 2011; Good et al., 2011; Cryan and Brown, 2007). In addition, risk may be higher on the first night following the passage of a low-pressure system when the prevailing wind shifts from a southerly to a northerly direction (Cryan and Brown, 2007; Good et al., 2011). Additional impacts may include a small reduction in the available habitat that some wildlife uses for forage or cover; however, operation of the Project will not significantly change the existing land use.

Big Bend Wind will implement the following measures to the extent practicable to minimize and/or avoid potential impacts to wildlife in the Project Area during Project design, construction, and operation:

- Prioritize turbine siting in cultivated cropland.
- Avoid siting turbines in mapped native prairie, Native Plant Communities ("NPCs"), and Sites of Biodiversity Significance ("SOBS") (all ranks).
- Maintain, at a minimum, the three by five times the rotor diameter setback from adjacent wildlife management areas to reduce risk to waterfowl/waterbirds and grassland-associated birds when siting turbines in the Project Area.
- Avoid siting turbines within a 1,000-foot habitat connectivity buffer of forested areas for NLEB.
- Avoid or minimize disturbance to individual wetlands or drainage systems during Project construction. Field delineations will be conducted prior to construction to

identify the limits of wetland and other Waters of the United States boundaries in the vicinity of Project activities.

- Conduct a minimum of one year of post-construction Project monitoring to assess operational impacts to birds and bats.

- Protect existing trees and shrubs by avoiding tree removal for turbines, access roads, and underground collector lines. These will be identified based on aerial photos and during field surveys.

- Maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. To minimize erosion during and after construction, BMPs for erosion and sediment control will be used. These practices include silt fencing, temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod stabilization.

- Construct wind turbines using tubular monopole towers.

- Light turbines according to FAA requirements, which may include ADLS radar.

- Revegetate non-cropland and pasture areas disturbed during construction or operation with an appropriate native seeding mix.

- Inspect and control noxious weeds in areas disturbed by the construction and operation of the Project.

- Prepare and implement a Bird and Bat Conservation Strategy ("BBCS") during construction and operation of the Project. This BBCS consists of Apex's corporate standards for minimizing impacts to avian and bat species during construction and operation of wind energy projects. The BBCS has been developed in a manner that is consistent with the guidelines and recommendations of the USFWS Wind Energy Guidelines (USFWS, 2012). It includes Big Bend Wind's commitments to wind project siting and transmission route suitability assessments, construction practices and design standards, operational practices, permit compliance, and construction and operation worker training. It also includes additional avoidance and minimization measures that may be implemented in consultation with the USFWS and MNDNR if avian and bat mortalities exceed an acceptable level.

- Prepare a draft Eagle Management Plan to proactively address potential eagle impacts resulting from construction and operation of the Project.

Big Bend Wind is committed to minimizing wildlife impacts within the Project Area. Big Bend Wind has designed the layout to minimize avian impacts by siting all turbines in cultivated crops and avoiding high use wildlife habitat (woodlands adjacent to farmsteads), using tubular towers to minimize perching, placing electrical collection lines underground as practicable, and

minimizing infrastructure. Big Bend Wind continues to consult with the Commission, USFWS, and MNDNR regarding appropriate mitigation measures for wildlife impacts.

10.2 TRANSMISSION GEN TIE ASSOCIATED FACILITY

10.2.1 PROJECT STUDY AREA

The 161 kV transmission line will connect the Wind and Solar Project Substations at the intersection of 366th Street and 590th Avenue in Midway Township of southeastern Cottonwood County to the Crandall Switching Station in Cedar Township of northwestern Martin County, approximately 10 miles southeast. The Proposed Route is located in Midway and Mountain Lake Townships in Cottonwood County, Odin Township in Watonwan County, and Cedar Township in Martin County.

Big Bend Wind anticipates constructing the new single-circuit 161-kV transmission line and structures using a design and span lengths that require a variable right-of-way. When paralleling existing road rights-of-way, Big Bend Wind will utilize a right-of-way width of 150 feet, 50-feet wide on the roadside and 100-feet wide on the non-roadside of the alignment. Big Bend Wind proposes to place poles on adjacent private property, within approximately 15 feet of the existing road right-of-way. These pole placements allow the transmission line right-of-way to share existing road rights-of-way to the greatest extent feasible and will reduce the overall size of the easement required from the private landowner along roads. Pole placement and offset distances may vary in areas such as highway interchanges due to county or state design requirements and in areas of planned future road expansion. Where the transmission line is not parallel to existing road rights-of-way, Big Bend Wind will generally utilize a right-of-way width of 100 feet. This narrower right-of-way will help minimize impacts to the agricultural fields the Proposed Route typically crosses when not paralleling a road. However, there are three locations where the Proposed Route is not parallel to a road and has a 150-foot right-of-way to better facilitate current farming practices.

Big Bend Wind will build a Step-up Substation on a five-acre parcel currently under option to purchase agreement for the Project near the intersection of 230th Street and 30th Avenue in Martin County. The Step-up Substation location is on the opposite side of 230th Street from the Crandall Switching Station. A less-than 1,500 foot 345-kV segment will connect the Step-up Substation to the existing transmission grid via the Crandall Switching Station. The Step-Up Substation will require a construction workspace of approximately 5.0 acres, with the final fenced-in area anticipated to be approximately 350 feet by 350 feet. For the purposes of this CN Application, Big Bend Wind conservatively assumed permanent impacts to the 5.0-acre construction workspace. The Step-up Substation components will be mounted on concrete pads. For electrical and fire safety, the Step-up Substation will be graveled to maintain the area free of vegetation. The area will be fenced to prevent unauthorized entry by individuals and wildlife.

A Project overview map for the transmission line is provided in Figure 2.

10.2.2 DESCRIPTION OF ENVIRONMENTAL SETTING

The MNDNR and the U.S. Forest Service have developed an Ecological Classification System ("ECS") for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features (MNDNR, n.d.-a). Through the ECS, the State of Minnesota is split into Ecological Provinces, Sections, and Subsections. The Project is located within the North Central Glaciated Plains Section of the Prairie Parkland Province (251B). The Project is located in the Minnesota River Prairie ecological subsection.

The Minnesota River Prairie subsection coincides with large till plains flanking the Minnesota River. The subsection consists of a gently rolling ground moraine about 60 miles wide. The depth to bedrock in this subsection is typically 100 to 400 feet through glacial till; however, there are exposures of bedrock in Cottonwood County. Soils are loamy and well-drained with thick dark surface horizons. Annual precipitation in the Minnesota River Prairie subsection ranges from 25 inches in the west to 30 inches in the east and the average growing season lasts approximately 147 to 152 days in length. Prior to Euro-American settlement, vegetation in this subsection was predominantly tallgrass prairie, with many islands of wet prairies and forest restricted to the Minnesota River and other streams. Currently land used in this subsection is agricultural activity; there are few remnants of pre-settlement vegetation left (MNDNR, 2020a).

Most of the area crossed by the Proposed Route is between 1,210 and 1,280 feet above mean sea level, with elevation gradually increasing from east to west.

10.2.3 LAND USE AND HUMAN SETTLEMENT

Transmission lines have the potential to impact human settlements during construction and operation of the Project. Public health and safety issues during construction include injuries due to falls, equipment use, and electrocution. Health impact concerns related to the operation of the Project include health impacts from electric and magnetic fields, stray voltage, induced voltage, impaired air quality, and electrocution. Transmission lines and conductors also have the potential to displace homes or businesses, introduce new noise sources, affect the aesthetics and socioeconomics of the Project Study Area, be incompatible with local land use and zoning, interfere with electronic communications, and impact public services (i.e., transportation). Each of these resources related to human settlement and their potential impacts are discussed in more detail below.

Generally, the townships within the Project Study Area and crossed by the Proposed Route are sparsely populated rural areas with farmsteads located along roads, and away from population centers. The three counties in the Project Study Area, Cottonwood, Watonwan, and Martin, have very small populations compared to the State of Minnesota as a whole, collectively comprising about one percent of the state's total population (U.S. Census Bureau, 2019). The municipalities nearest to the Route are Mountain Lake and Odin. The municipal boundary of Mountain Lake is approximately 0.4 mile west of the Route and the municipal boundary of Odin is roughly 1.6 miles east of the Proposed Route.

Figure 2 depicts the rural landscape along the Proposed Route.

10.2.4 PUBLIC HEALTH AND SAFETY

Public emergency services within the Project Study Area are provided by local law enforcement and emergency response agencies located in nearby communities. The sheriff's offices of Cottonwood, Watonwan, and Martin Counties provide law enforcement to communities in the Project Study Area. Additionally, the Cities of Mountain Lake, Windom, St. James, and Trimont have local police departments. Fire services near the Project Study Area are provided by city and community fire departments, including Mountain Lake, Butterfield, Windom, St. James, and Trimont.

Ambulance response is provided by regional and local ambulance services. The Windom Ambulance Service provides response services to a 200-square-mile region surrounding Windom, Minnesota. The cities of Mountain Lake, St. James, and Trimont also provide ambulance services (Minnesota Emergency Medical Services Regulatory Board, 2020).

There are 10 towers that are a part of the Allied Radio Matrix for Emergency Response ("ARMER") in Cottonwood, Watonwan, and Martin Counties (MDPS, 2018). These ARMER towers are part of Minnesota's Statewide Communication Interoperability Plan, which aims to improve communication for emergency responders. There is one ARMER tower in the City of Mountain Lake; the municipal boundary of Mountain Lake is 0.5 mile from the Application Alignment. The remaining ARMER towers in Cottonwood, Watonwan, and Martin Counties are all greater than 10 miles from the Application Alignment (MDPS, 2018).

No impacts to emergency services are anticipated as a result of the Project. Any temporary road closures required during construction would be coordinated with local jurisdictions to provide safe access of police, fire, and other rescue vehicles. Local law enforcement resources may be utilized for traffic control and law enforcement during construction activities. In the event that emergency services are needed for local residents during the approximate seven months of construction, construction will stop, and any impeding equipment will be relocated so that emergency vehicles may access the emergency site. Any accidents that might occur during construction of the Project would be handled through local emergency services. The influx of approximately 45 workers to construct the Project would not be expected to influence emergency or public health services. Once construction is complete, the Project will not impede emergency services. As such, construction and operation of the Project will have minimal impacts on the emergency services.

The Project will meet local, state, and NESC safety standards. The proposed transmission line will be equipped with protective devices to prevent damage from transmission line or pole falls or other potential accidents. The Project will be equipped with protective devices (circuit breakers and relays located in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if a structure or conductor falls to the ground. The protective equipment will de-energize the transmission line should such an event occur. In addition, the Step-up Substation will be fenced and, accessible only by authorized personnel. Signage around the Project will warn the public of the safety risks associated with the energized equipment. The construction of the Project is not expected to have a negative impact on public health or safety.

Construction crews will comply with Occupational Safety and Health Administration measures to ensure their own safety.

While there are ARMER towers in the Project vicinity (i.e., within one mile of the Proposed Route), the Big Bend Wind transmission line will not impact this communication system as Project facilities are proposed well below the typical height of a tower and line-of-sight near the top of these towers (i.e., greater than 150 feet above ground). The Big Bend Wind transmission line structures will be up to 120 feet above ground. As such, no mitigation is proposed.

10.2.5 LAND-BASED ECONOMIES

Construction and operation of the Project has the potential to affect land-based economies in Cottonwood, Watonwan, and Martin Counties through introduction of a physical, long-term presence which could prevent or otherwise limit use of the land for other purposes. The placement of transmission line structures in cultivated cropland has the potential to interfere with farming operations, if co-location with field edges and roadways is not possible due to other routing constraints. Interference with farming operations can negatively affect farm income. Additionally, trees and structures are not allowed within transmission line rights-of-way due to safety concerns, a restriction that could affect forestry businesses along the right-of-way, if present. Impacts to tourism could result from an aesthetic change to the predominantly agrarian landscape and interruption of public access to nearby recreational and tourism opportunities. Placement of transmission line towers near mining operations could interfere with access to existing mines and could limit the expansion of the mines.

Most of the land crossed by the Proposed Route is classified as cultivated cropland. According to the U.S. Department of Agriculture's 2017 Census of Agriculture, the average farm size in Cottonwood County (498 acres), Watonwan County (508 acres), and Martin County (493 acres) are generally larger than the average size of all Minnesota farms (371 acres). Most of the soils crossed by the Proposed Route are classified as "Prime Farmland (all categories)" and "Farmland of Statewide Importance."

Crop sales account for a slightly larger percentage of the total market value of agricultural products sold in Cottonwood and Watonwan Counties, which is similar to the state level. In contrast, livestock sales account for about 58 percent of the total market value of agricultural products sold in Martin County. Corn, soybeans, and forage crops are the dominant agricultural crops by acreage in Cottonwood. In Watonwan and Martin Counties, corn and soybeans are still in the top three agricultural crops by acreage, but vegetables harvested for sale are more common that forage in these counties. Cattle, hogs and pigs, and poultry are the dominant livestock raised in Cottonwood County. In both Watonwan and Martin Counties, hogs and pigs make up a larger portion of the livestock inventory by farms, followed by cattle and sheep and lambs/poultry (layers) in Watonwan County and by sheep and lambs in Martin County.

Construction of the Project could cause minimal, temporary impacts to farmland from soil compaction and rutting, accelerated soil erosion, crop damage, temporary disruption to normal farming activities, and introduction of noxious weeds to the soil surface. Table 4 summarizes the impacts of the Project on existing farmland.

Table 4
Summary of Impacts of the Proposed Route Right-of-Way on Agricultural Land

Resource	Amount
Route Length (miles)	17.7
Right-of-Way (acres)	300.4
Cultivated Cropland in Right-of-Way (acres)[1]	247.6
Cultivated Cropland in Step-up Substation (acres)	3.4
Number of Structures in Cultivated Cropland (based on preliminary pole spacing)[1, 2]	163
Total Impact from Structures in Cultivated Cropland (acres)	0.1

[1] Agricultural land includes cultivated crops. Pasture and hay are not included as they are classified separately. The Proposed Route is co-located with roads for the majority of its length, which are classified as developed. Where structures are adjacent to roads (developed), the next closest land cover type was used to reflect that poles will not be placed on roadways.

[2] Pole spacing is representative and assumes the Project minimum of 600 feet where the right-of-way is 100 feet wide and 800 feet where the right-of-way is 150 feet wide; final pole spacing may vary from this estimate and would likely result in fewer poles overall as changes to final design are incorporated. Pole spacing will range from approximately 600-800 feet in the 100-foot right-of-way and 800-1,100 feet in the 150-foot right-of-way.

Big Bend Wind will implement measures to reduce compaction, soil erosion, and the introduction of noxious weeds. Construction impacts to farmland would be short term and minimal in nature and would be mitigated through the proper use and installation of BMPs, such as minimizing the number of vehicles and protection and maintenance of topsoil during right-of-way clearing and generation-tie-line construction. Big Bend Wind will further mitigate impacts on agricultural production by coordinating with landowners or farm operators regarding the timing of construction to avoid peak growing season by constructing the Project before spring planting or after harvest in the fall. If this is not possible, Big Bend Wind will compensate the landowner or farm operator for crop damage, including any compaction that results from construction.

The Proposed Route was developed with attention to minimizing impacts to agricultural land; however, permanent impacts to agricultural land will occur where structures are placed in cultivated fields. Structures in cultivated fields act as barriers and can hinder efficient operation of large machinery. The proposed Application Alignment predominately follows roads and property lines. Big Bend Wind proposes to minimize impacts to agricultural land by placing structures along field edges, as closely as feasible (within 15 feet) from the edge of road rights-of-way or parcel lines. Furthermore, Big Bend Wind will make reasonable efforts to work with landowners to finalize the structure locations. The final spacing and location of structures will be designed to accommodate the movement of farm equipment within agricultural fields while still maintaining safety and design standards. The estimated permanent impacts from each transmission structure foundation will be up to three feet in diameter at the surface. Refer to Table 4 for an estimate of total acres of permanent impact from structures in agricultural lands. In addition, Big Bend Wind estimates that the proposed Step-up Substation will result in up to approximately five acres of construction impact on agricultural land.

Big Bend Wind has designed the Proposed Route to avoid Conservation Reserve Enhancement Program ("CREP") and RIM parcels. If these easements are identified during the

easement and title clearance process and final Project design requires transmission line structures to be placed on parcels enrolled in the CREP or Reinvest in Minnesota ("RIM") programs, Big Bend Wind will work with landowners and the Board of Soil and Water Resources ("BWSR") to address potential impacts to these conservation easements and to fully compensate landowners for lost CREP revenue resulting from the placement of the line within a CREP easement.

Post-construction restoration efforts will include restoration of any temporary access modifications and deep plowing to remove compaction. Both crop and livestock activities will be able to continue around Project facilities after construction. While no impacts to agricultural land are anticipated during operation of the Project, if impacts to crops do occur during operation or maintenance of the transmission line, Big Bend Wind will compensate the landowner or farm operator for crop damages.

No forestry operations are present along the Proposed Route; therefore, no mitigation measures specific to forestry operations are proposed. The Project may result in the removal or trimming of trees within and/or adjacent to the transmission line right-of-way to ensure it is clear of obstructions. Vegetation management is necessary for the safe operation of the transmission line as tree branches can cause stress on transmission lines and increase the risk of outages, especially in areas with a strong wind resource, which is typical of this area of the state.

To the extent possible, Big Bend Wind will minimize the need for trimming and removal of trees during construction and operation of the transmission line. Where trimming of trees is necessary, it will be performed with best practices for tree trimming so as to minimize stress on the tree.

Construction and operation of the Project is not anticipated to affect public access to nearby tourism and recreational opportunities. Impacts on tourism would mostly be related to Project construction, which will be minimal, temporary, and isolated to specific areas throughout the Proposed Route.

No direct impacts to mining operations will occur as a result of the Project and no mitigation measures are proposed.

10.2.6 ARCHEOLOGICAL AND HISTORICAL RESOURCES

Transmission line projects have the potential to impact archaeological and historic resources. Archaeological resources could be impacted by the disruption or removal of subsurface archaeological materials, structural remains, or earthworks during transmission line construction. Historic architectural resources may be impacted by the placement of a transmission line within the established viewshed of an historic property, which could affect the integrity of the viewshed in a way that decreases the historic value of the resource.

Information regarding the location of previously documented cultural resource sites was taken into consideration during initial route design. Big Bend Wind designed the Route to avoid any direct physical impacts to all previously recorded NRHP listed, eligible, or unevaluated archaeological and historic architectural resources identified during the background literature review.

Big Bend Wind understands the area surrounding Proposed Route also has potential to contain additional, previously undocumented cultural resources. Archaeological resources would most likely be located on or near elevated landforms near permanent water sources. Historic architectural resources would most likely be located near existing municipalities, farmsteads, and infrastructure such as roads and bridges. After the final route is ordered by the Commission, and in consideration of the literature search results and coordination with SHPO, Big Bend Wind will conduct field surveys in high-potential areas that could host previously unrecorded cultural resources. The survey protocol for the Project was developed in consultation with SHPO and report will be submitted to SHPO after completion of the field surveys. If archaeological or historic architectural resources are identified as a result of field surveys, Big Bend Wind will work with SHPO to identify measures to avoid, minimize or mitigate any effects to these resources.

If archaeological resources are discovered during construction, measures will be implemented in accordance with the Project's Unanticipated Discoveries Plan and may include halting construction and/or notification of the SHPO and THPOs, if appropriate. Additionally, if unanticipated human remains or burial resources are discovered during construction, they will be reported to the State Archaeologist per Minn. Stat. § 307.08 and construction will cease in that area until adequate mitigation measures have been developed between Big Bend Wind and the State Archaeologist.

10.2.7 EFFECTS ON NATURAL ENVIRONMENT

Transmission lines have the potential to impact natural resources through temporary, construction-related impacts and long-term impacts to air quality, geology and groundwater, soils, water resources, flora, and fauna. Construction of the Project would temporarily impact air quality with vehicle emissions and dust, impact bedrock and groundwater resources with structure foundations, temporarily disturb soils and vegetative cover, which could affect water quality in adjacent water resources, and could affect habitat for flora and fauna. Avian species could also be impacted by operation of the Project through collisions with transmission line structures and conductors.

Potential impacts to natural resources as a result of the Project are anticipated to be minimal. This assessment is due to the fact that the Project Study Area is primarily agricultural land with limited natural resource diversity and that impacts to natural resources, to a great extent, can be avoided and mitigated.

10.2.8 RARE AND UNIQUE NATURAL RESOURCES

10.2.8.1.1 Natural Resource Sites

Intersections of the Proposed Route with natural resource sites are minimal. The Proposed Route crosses one SOBS ranked as moderate, Cedar 2-3, which indicates that the site has been characterized as having records of rare species, NPCs that are moderately disturbed, or strong potential for recovery of NPCs or ecological processes.

The Proposed Route is collocated with a road at this SOBS crossing. Big Bend Wind will maximize pole spacing in this area to span the sensitive area (approximately 1,100 feet).

Additionally, Big Bend Wind will install exclusion fencing and signage in this area to inform construction crews of the sensitive area and avoid access. Overall, given the small number of natural resource sites present along the Proposed Route and the quality of these sites, minimal adverse impacts to rare or sensitive resources are anticipated.

Big Bend Wind will implement a vegetation-management plan that includes minimizing chemical use in sensitive areas by avoiding broadcast applications of herbicide and employing spot treatments for control of invasive species.

10.2.8.1.2 Federally Listed Species

The proposed Project may impact individual NLEB if clearing or construction occurs when the species is roosting, foraging, or raising pups in its summer habitat in June and July. In addition, northern long-eared bats may be disturbed during clearing or construction activities due to human presence or noise.

The USFWS published a Final Endangered Species Act 4(d) rule for the NLEB on January 14, 2016. In the Final 4(d) rule, the agency limited prohibitions for the species to those that would protect the bat in white-nose syndrome ("WNS")-affected geographic areas during the most vulnerable stages in the species' life history—specifically, during hibernation, spring staging, fall swarming, and pup rearing (USFWS, 2016). The Project's Application Route is located within the USFWS-designated WNS Zone (USFWS, 2020b). Per the species' final 4(d) rule, within the WNS Zone, incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25 mile of a documented hibernaculum, or
- If it involves a documented maternity roost tree or other trees within 150 feet of the documented maternity roost tree during June or July.

In addition, all take within known hibernacula is prohibited (USFWS, 2016).

Records of documented hibernacula and roost trees are maintained in the MNDNR's NHIS. Based on a review of the NHIS data, Big Bend Wind determined that there are no documented NLEB maternity roost trees within 150 feet or hibernacula within 0.25 mile of the Application Alignment. Big Bend Wind will minimize tree removal to the greatest extent possible and focus any necessary tree removal to the winter months, as practicable.

Two NPCs are crossed by the Proposed Route; both are Dry Hill Prairie (Southern) Type, and may provide suitable habitat for the prairie bush clover. Big Bend Wind will span these NPCs to avoid impacts to these sensitive areas and potential suitable habitat for prairie bush clover.

10.2.8.1.3 State-Listed Species

Based on the Big Bend Wind's NHIS review, one record of a state-listed endangered species (Poweshiek skipperling), one record of a state-listed threatened species (Sullivant's milkweed), and three records of state species of special concern (abbreviated underwing, Great Plains toad, and phlox moth) are documented within one mile of the Application Alignment. The

state's designation as a species of special concern for the abbreviated underwing, phlox moth, and Great Plains toad does not afford protections under the Minnesota Endangered Species Statute (Minn. Stat., § 84.0895).

Two NPCs are crossed by the Application Alignment; both are Dry Hill Prairie (Southern) Type, and may provide suitable habitat for the poweshiek skipperling, abbreviated underwing, and phlox moth. As described above, Big Bend Wind will avoid pole placement in the SOBS/NPC community. Given the habitat requirements for the Great Plains toad, ample suitable habitat exists in the Proposed Route so no population impacts will occur. Suitable habitat for the Sullivant's milkweed is not present in the Proposed Route.

11.0 FACILITY INFORMATION FOR PROPOSED PROJECT AND ALTERNATIVES INVOLVING CONSTRUCTION OF A LEGF (MINN. R. 7849.0320)

11.1 LAND REQUIREMENTS (MINN. R. 7849.0320(A))

The Project is located on land that is zoned for agricultural use. The Project will remove a total of between approximately 50 to 60 acres from agricultural use. Typical wind farms require approximately one-half to one acre per turbine for the turbine pad, transformer, access road, and associated infrastructure. The land requirements for the Project are consistent with the requirements for wind projects of a similar size. No relocation of people or businesses will be necessary for the Project.

11.1.1 LAND REQUIREMENTS FOR WATER STORAGE

The Project will not require any land for water storage.

11.1.2 LAND REQUIREMENTS FOR COOLING SYSTEM

The Project will not require any land for a cooling system.

11.1.3 LAND REQUIREMENTS FOR SOLID WASTE STORAGE

The Project will require minimal space in the maintenance facility for the storage of used oil and other lubricants, as well as for spare parts and tools.

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

Big Bend Wind estimates the maximum construction workforce is expected to generate approximately 40 large truck (permit loads) trips per day, 200 non-permit concrete truck trips per day, 16 tractor trailer equipment delivery trips per day and up to 510 small-vehicle (pickups and automobiles) trips per day during peak construction periods. The functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day. Currently, the heaviest traffic is on Highway 60 at 5,400 Annual Average Daily Traffic ("AADT") (MNDOT, 2019). Since many of the area roadways have AADTs that are currently well below capacity, the addition of 716 vehicle trips during peak construction would be perceptible, but similar to seasonal variations such as spring planting or autumn harvest. Specific additional truck routes will be dictated by the location

required for delivery. Final delivery routes will be determined by the manufacturers of the Project components and equipment. Additional operating permits will be obtained from the relevant road authorities for oversized truck movements.

After construction is complete, traffic impacts during the operations phase of the Project will be minimal. Operation and maintenance activities will not noticeably increase traffic in the Project Area, as these activities tend to be sporadic and spread out within the Project Area. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and maintain the wind turbines as needed. There would be a slight increase in traffic for occasional turbine and substation repair, but traffic function will not be impacted as a result. Furthermore, the availability of existing roadways throughout the Project Area will allow access roads to turbines to extend from existing public roads directly to the turbines, thereby minimizing impacts on adjacent agricultural land.

The Project is not expected to impact rail or barge traffic.

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. The Project will be fueled by wind.

11.3.2 EMISSIONS

The Project is not a fossil-fueled facility and will not release any emissions from the power generation process.

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

Wind power plants do not utilize cooling systems. Water requirements are, therefore, minimal, and limited to potable water needs for Project personnel. The water requirements of the O&M building will be met through the local rural water service or the installation of a well in accordance with applicable regulations.

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, and the O&M building may require a septic system, which will be installed in accordance with applicable regulations.

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

The Project will not produce any radioactive releases.

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

The only solid waste generated during the operation of the Project will be domestic wastes and used lubricants and other maintenance materials. These wastes and their disposition are summarized in Table 5.

Table 5: Summary of Wastes and Disposition

Waste	Solid/Liquid	Description	Generation Rate	Disposition Method
Oil/Grease	L/S	Hydraulic fluid, lubrication oil, grease	~1.13 tons per turbine/yr	Used oil recycler, incinerator
Maintenance Materials	S	Oily and greasy rags, materials packaging, cleaning residues, fluorescent light bulbs	~5.63 tons/yr	Solid waste landfill or, as necessary, hazardous waste treatment/disposal facility

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

When in motion, the wind turbines emit a perceptible sound. The level of this noise varies with the speed of the turbine and the distance of the listener from the turbine. Sound is generated from the wind turbine at points near the hub or nacelle from the blade tips as they rotate. Noise standards are regulated by the MPCA under Minn. Rules Ch. 7030. The most stringent of these standards is a 50 dB(A) L_{50} limit for nighttime noise levels.

Big Bend Wind conducted a preliminary noise assessment to estimate levels of noise from the Project at nearby dwellings and potentially eliminate turbine locations which would result in exceeding Minnesota's noise standards. Big Bend Wind has incorporated the 2019 LWECS Application Guidance and sited turbines so that turbine-only noise is < 45 dB(A) at non-participating residences and < 47 dB(A) at participating residences. The layouts have been modeled to help ensure cumulative impacts from all wind turbines, and maximum calculated noise levels for all turbine models are below the MPCA's nighttime L_{50} noise limit of 50 dB(A) at residential receptors. As shown in Table 6 below, the Project will comply with MPCA noise regulations:

Table 6
Summary of Noise Assessment

Turbine Model	Noise Source	Statistic	Residence Classification		
			dB(A) Levels at All Residences	dB(A) Levels at Participating	dB(A) Levels at Non-Participating
Nordex N-163	Turbine-Only Noise	Avg L_{50} Modeled	32	38	32

Table 6
Summary of Noise Assessment

Turbine Model	Noise Source	Statistic	Residence Classification		
			dB(A) Levels at All Residences	dB(A) Levels at Participating	dB(A) Levels at Non-Participating
		Max L_{50} Modeled	46	46	43
		Min L_{50} Modeled	19	23	19
	Total Sound (Background + Turbine)[1]	Avg L_{50} Modeled	36	39	35
		Max L_{50} Modeled	46	46	44
		Min L_{50} Modeled	33	33	33
Vestas V162	Turbine-Only Noise	Avg L_{50} Modeled	32	39	32
		Max L_{50} Modeled	46	46	43
		Min L_{50} Modeled	19	24	19
	Total Sound (Background + Turbine)[1]	Avg L_{50} Modeled	36	40	35
		Max L_{50} Modeled	46	46	44
		Min L_{50} Modeled	33	34	33
GE-158[2]	Turbine-Only Noise	Avg L_{50} Modeled	31	37	32
		Max L_{50} Modeled	45	45	42
		Min L_{50} Modeled	18	23	18
	Total Sound (Background + Turbine)[1]	Avg L_{50} Modeled	35	39	35
		Max L_{50} Modeled	45	45	42
		Min L_{50} Modeled	33	33	33

[1] The average Project nighttime sound was monitored at 33 dB(A) (L_{50})
[2] The GE-158 turbine was modeled at the 108 m hub height, which is louder than the 118 m hub height

As shown in Table 6, the maximum calculated noise level is within the standards established by MPCA. Big Bend Wind will also continue to evaluate operational modifications that may be available to mitigate noise impacts and meet the MPCA noise standards.

11.9 WORK FORCE FOR CONSTRUCTION AND OPERATION (MINN. R. 7849.0320(J))

Onsite, physical construction of the Project is anticipated to be completed by the end of 2022. During this time, approximately 316 construction jobs will likely be created. Approximately 14 permanent positions will likely be created to operate the Project.

Big Bend Wind will issue a Request for Proposal ("RFP") to qualified Balance of Plant ("BOP") contractors to oversee and manage the construction of the Project. In this RFP, Big Bend Wind intends to include a strong preference for bids that utilize local, union construction craft employees to the greatest extent feasible in accordance with the Project's timeline and safety requirements. Big Bend Wind expects that the selected BOP contractor will collaborate with organized labor unions and other stakeholders to develop a workforce and hiring plan that maximizes the local economic benefits of the Project

Big Bend Wind will augment its O&M staff as needed with appropriate contractors to service and maintain the Project. The operations phase of the Project will require a two-person maintenance crew driving through the area to monitor and maintain the wind turbines.

11.10 NUMBER AND SIZE OF TRANSMISSION FACILITIES (MINN. R. 7849.0320(K))

At the base of each turbine a step-up transformer will be installed to raise the voltage to power collection line voltage of 34.5 kV. Power will be run through an underground and/or overhead collection system. Generally, the electrical lines will be buried in trenches and run to the edge of the farm field. At the public road at the edge of the farm field, the power collection lines will either rise from underground to overhead lines or continue as underground lines. The collection lines will occasionally require an aboveground junction box when the collection lines from separate spools need to be spliced together.

Power generated by the Project will reach the electric grid by traveling through 10 34.5 kV feeder lines to a new Project substation. From that location, the Project will interconnect at the Lakefield Junction Substation via the 161 kV Transmission Line.

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 utility or utilities 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 EXEMPTION REQUEST

On June 19, 2019, Big Bend Wind requested an exemption from several of the informational requirements in Minn. R. Ch. 7849. On September 24, 2019, the Commission granted Big Bend Wind's Exemption Request.[59]

12.2 ENVIRONMENTAL REPORT

Pursuant to Minn. R. 7849.1000 - .2100, the Department of Commerce is required to prepare an Environmental Report for any large energy facility for which a CN must be obtained.

12.3 SITE & ROUTE PERMIT

Concurrent with this Application, Big Bend Wind will also submit to the Commission a Site Permit Application for a Large Wind Energy Conversion System, as required by Minn. Stat. § 216F.04 and a Route Permit Application for a High-Voltage Transmission Line, as required by Minn. Stat. § 216E.03.

12.4 OTHER PROJECT PERMITS

Project permits and approvals that may be necessary to complete the Project are listed in Tables 7 and 8. Big Bend Wind will obtain these approvals, as necessary, prior to Project construction.

Table 7
Potential Permits and Approvals for Wind Farm

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
Federal		
U.S. Army Corps of Engineers	Wetland Delineation Approvals Jurisdictional Determination Federal Clean Water Act Section 404	Wetland delineations will be completed prior to construction; Big Bend Wind anticipates impacts will be within the either Nationwide Permit or Minnesota Regional General Permit thresholds.
U.S. Fish and Wildlife Service	Review for Threatened and Endangered Species	Based on coordination with USFWS, an incidental take permit is not anticipated for the Project.
Environmental Protection Agency (Region 5) in	Spill Prevention Control and Countermeasure Plan	Big Bend Wind will develop a Spill Prevention Control and Countermeasure Plan for use during

[59] Order Approving Exemptions to Certain Filing Requirements, *In the Matter of the Application of Big Bend Wind, LLC for a Certificate of Need for an up to 314-MW Wind Project and 161-kV High Voltage Transmission Line in Cottonwood, Martin, and Jackson Counties*, Docket No. IP-7013/CN-19-408 (Sept. 24, 2019) (eDockets No. 20199-156040-01).

Table 7
Potential Permits and Approvals for Wind Farm

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
coordination with the Minnesota Pollution Control Agency (MPCA)		construction and operation of the Project to minimize risk of site contamination.
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)	Big Bend Wind will submit Form 7460-1 for the turbine locations in Q2 2021 to initiate FAA review of the layout and ADLS.
	Notice of Actual Construction or Alteration (Form 7460-2)	After construction is complete, Big Bend Wind will submit Form 7460-2 for the turbine locations.
State of Minnesota Approvals		
Board of Water and Soil Resources (BWSR)	Wetland Conservation Act approvals	Big Bend Wind has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Big Bend Wind will conduct wetland delineations to confirm wetland boundaries and impacts based on final design.
Minnesota Public Utilities Commission	Certificate of Need	Submitted November 9, 2020
	Site Permit for Large Wind Energy Conversion System	Submitted concurrent with this CN Application.
	Route Permit for electric transmission line	Submitted concurrent with this CN Application.
Minnesota State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archeological Survey	Big Bend Wind has coordinated with SHPO, conducted a literature review of the Project Area, and Project Facilities avoid previously identified NRHP listed, eligible, or unevaluated archaeological and historic sites. Big Bend Wind will conduct surveys for previously unidentified cultural resources in fall 2020. Big Bend Wind will coordinate with SHPO and the THPOs on any potential mitigation.
MPCA	Section 401 Water Quality Certification	Concurrent with Section 404, Clean Water Act – Big Bend Wind will meet the Minnesota conditions

Table 7
Potential Permits and Approvals for Wind Farm

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
	National Pollutant Discharge Elimination System Permit – MPCA General Stormwater Permit for Construction Activity	After the Site Permit is Ordered by the Commission, Big Bend Wind will submit National Pollutant Discharge Elimination System ("NPDES") Permit application. The permit is required to be submitted within 30 days of the start of construction. The NPDES permit will cover the transmission line and wind project.
	Very Small Quantity Generator License – Hazardous Waste Collection Program	To be obtained prior to construction.
	Aboveground Storage Tank Notification Form	To be obtained prior to construction.
Minnesota Department of Health	Well Construction Permit	To be obtained prior to construction of low-volume well at O&M facility.
Minnesota Department of Natural Resources	License to Cross Public Waters	Big Bend Wind will submit its License to Cross Public Waters, if applicable based on a final Project design.
	General Permit for Water Appropriations (Dewatering)	To be obtained prior to construction, if applicable.
	Public Waters Work Permit	To be obtained prior to construction, if applicable.
Minnesota Department of Transportation (MNDOT)	Utility Permits on Trunk Highway Right-of-way (Long Form No. 2525)	To be obtained prior to construction.
	Oversize/Overweight Permit for State Highways	To be obtained prior to construction.
	Access Driveway Permits for MNDOT Roads	To be obtained prior to construction.
	Tall Structure Permit	To be obtained prior to construction.
Local Approvals		
Cottonwood and Watonwan Counties	Right-of-way permits, crossing permits, driveway permits for access roads, oversize/overweight permits for County Roads	Big Bend Wind will enter into a Development, Road Use, and Drainage Agreement prior to construction.
Townships	Right-of-way permits, crossing permits, driveway permits for access roads, oversize/overweight permits for township roads	Big Bend Wind will enter into a Development, Road Use, and Drainage Agreement prior to construction.

Table 8.
Status of Potential Permits, Approvals, and Consultations for Transmission Line

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
Federal		
U.S. Army Corps of Engineers (USACE), St. Paul District	Wetland Delineation Approvals	Wetland delineations will be completed prior to construction; Big Bend anticipates impacts will be within the either Nationwide Permit or Minnesota Regional General Permit thresholds.
	Jurisdictional Determination	
	Federal Clean Water Act Section 404	
U.S. Fish and Wildlife Service (USFWS)	Review for Threatened and Endangered Species	Based on coordination with USFWS, an incidental take permit is not anticipated for the Project.
State of Minnesota		
Minnesota Public Utilities Commission	Certificate of Need and Route Permit	Submitted concurrent with this CN Application.
Minnesota Pollution Control Agency (MPCA)	Section 401 CWA Water Quality Certification	Concurrent with Section 404, Clean Water Act–Big Bend Wind will meet the Minnesota conditions.
MPCA	National Pollutant Discharge Elimination System Stormwater Permit	After the Route Permit is Ordered by the Commission, Big Bend Wind will submit NPDES Permit application. The permit is required to be submitted within 30 days of the start of construction. The NPDES permit will cover the transmission line and wind project.
Board of Water and Soil Resources (BWSR)	Wetland Conservation Act approvals	Big Bend Wind has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Big Bend Wind will conduct wetland delineations to confirm wetland boundaries and impacts based on final design.
Minnesota Department of Natural Resources (MNDNR)	License to Cross Public Waters	After the Route Permit is issued by the Commission, Big Bend Wind will submit its License to Cross Public Waters.
MNDNR	State Protected Species Consultations	NHIS request submitted September 28, 2020. Big Bend Wind will continue coordinating with MNDNR.
Minnesota State Historic Preservation Office (SHPO)	Minnesota Statutes, Chapter 138 (Minnesota Field Archaeology Act and Minnesota Historic Sites Act)	Big Bend Wind has coordinated with SHPO, conducted a literature review of the route segments, and avoided and previously identified archaeological sites within the right-of-way. Once a route is designated by the Commission, Big Bend Wind will conduct surveys for previously unidentified cultural resources. Big Bend Wind will coordinate with SHPO on the protocol and any potential mitigation.

Table 8.
Status of Potential Permits, Approvals, and Consultations for Transmission Line

Administering Agency	Permit, Approval, or Consultation	Status and Applicability to the Project
Minnesota Department of Transportation (MNDOT)	Utility Permit on Trunk Highway Right-of-Way (Long Form No. 2525)	Big Bend Wind will coordinate with MNDOT on crossing MN-60.
MNDOT	Driveway Access	To be obtained prior to construction.
MNDOT	Oversize/overweight permits	To be obtained prior to construction.
Local		
Board of Water and Soil Resources	Minnesota Wetland Conservation Act approvals	Big Bend Wind has conducted a desktop review of wetlands and potential impacts with the MNDNR update to NWI data. Based on this desktop data, the Project will fall under the impact threshold for either a Nationwide Permit or Minnesota Regional General Permit. Prior to construction, Big Bend Wind will conduct wetland delineations to confirm wetland boundaries and impacts based on final design
Cottonwood County Watonwan County Martin County	Floodplain Development permit	Big Bend Wind will obtain a Floodplain Development Permit for structures placed within floodplains depending on the route/segments designated by the Commission
County, Township, City	Right-of-way/utility permits	Big Bend Wind is coordinating with Cottonwood, Watonwan, and Martin Counties.
County, Township, City	Overwidth/overweight loads permits	To be obtained prior to construction.
County, Township, City	Road crossing permits	To be obtained prior to construction.
County, Township, City	Driveway/access permits	To be obtained prior to construction.