



Environmental Report

Blazing Star Wind Farm

In the Matter of the Application of Blazing Star Wind Farm, LLC for a Certificate of Need for the Blazing Star Wind Farm in Lincoln County, Minnesota

Docket No. IP-6961/CN-16-215



Prepared by
Minnesota Department of Commerce
Energy Environmental Review and Analysis
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Responsible Governmental Unit

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Abstract

On July 20, 2016, Blazing Star Wind Farm, LLC (Applicant) filed a Certificate of Need (CN) application with the Minnesota Public Utilities Commission (Commission) for the Blazing Star Wind Farm (Project). The Applicant is proposing to construct an up to 200 megawatt (MW) large wind energy conversion system (LWECS) in Lincoln County, Minnesota.

The proposed Project is a large energy facility as defined by Minn. Statute 216B.2421. Such a facility requires a CN from the Commission (Minn. Statute 216B.243). As part of the application review, the Department of Commerce (DOC) must prepare an Environmental Report (ER) for the Project (Minn. Rules 7849.1200).

The Department's Energy Environmental Review and Analysis (EERA) staff is responsible for preparing the ER. This ER has been prepared per Minnesota Rule 7849.1100-2100, and is part of the record which the Commission will consider in making a decision on issuance of a CN for the Project.

Information about the Commission's CN process can be obtained by contacting Kevin George, Public Advisor, Minnesota Public Utilities Commission, 121 7th Place E., Suite 350, Saint Paul, MN 55101, (651) 221-2251, consumer.puc@state.mn.us.

Information about this Project can be found on the Department's energy facilities website: <http://mn.gov/commerce/energyfacilities/Docket.html?Id=34561>, or obtained by contacting Richard Davis, Department of Commerce, Energy Environmental Review and Analysis, 85 7th Place East, Suite 280, St. Paul, Minnesota 55101, (651) 539-1846, richard.davis@state.mn.us.

The record for the CN for this Project can be found on the eDockets system at: <https://www.eDockets.state.mn.us/EFiling/search.jsp>; search on the year "16" and number "215".

Preparer: Richard Davis

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Appendix A. Environmental Report Scoping Decision

1 Introduction

On July 20, 2016, Blazing Star Wind Farm, LLC (Applicant), filed a Certificate of Need (CN) application with the Minnesota Public Utilities Commission (Commission) for the Blazing Star Wind Farm (Project). Geronimo Energy, LLC is the parent company of the Applicant. The Applicant is proposing to construct a 200 megawatt (MW) large wind energy conversion system (LWECS) in Lincoln County, Minnesota.

Project Overview

The Project consists of wind turbines and associated structures, which include access roads, communication lines, meteorological towers, sonic detection and ranging (SoDAR) or light range detection and ranging (LiDAR) unit, temporary batch plant, staging area, construction laydown area, operation and maintenance (O&M) facility, and electrical collector and feeder lines connecting to the proposed Project substation within the Project site.¹ Blazing Star currently anticipates that the Project would consist of 57 to 100 turbines yielding a total nameplate capacity of 200 MW.² Turbine models with nameplate capacities ranging from 2.0 MW to 3.5 MW are currently being considered.³

The Project is located in southwest Minnesota, adjacent to the Minnesota-South Dakota border, around the community of Hendricks (See **Figure 1**). The Project is within Hansonville, Marble, and Hendricks townships in Lincoln County.⁴

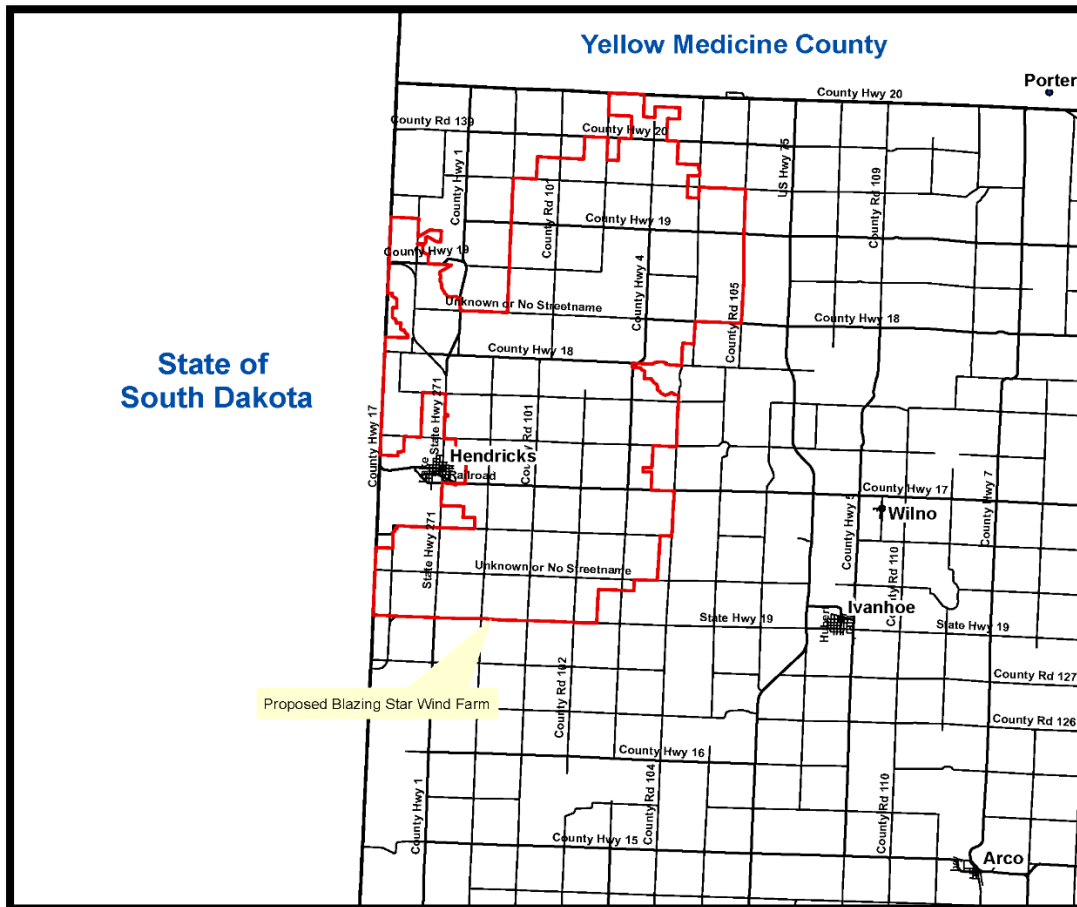
¹ Site Permit Application, pg. 3 – Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

² Site Permit Application, pg. 3 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

³ Site Permit Application, pg. 3 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁴ Site Permit Application, pg.3 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Figure 1. General Project Vicinity



Within the approximately 37,200 acre Project area, Blazing Star has secured wind rights for approximately 30,250 acres of private land.⁵ The Project intends to commence commercial operation in the fourth quarter of 2018, dependent upon completion of the interconnection process.⁶

Blazing Star intends to offer wind-generated electricity through a Power Purchase Agreement (PPA), or possibly sell the Project to a utility.⁷ Production is intended to help utilities satisfy renewable energy objectives in Minnesota, under Minnesota Statute 216B.1691, and in the surrounding area. Accordingly, alternatives examined in this Environmental Report (ER) are limited to technologies that support renewable energy objectives. These alternatives include: (1) a generic 200 MW LWECs sited elsewhere in Minnesota, (2) a 38.5 MW biomass plant, and (3) the “no build” option.

⁵ Site Permit Application, pg. 3 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁶ Site Permit Application, pg. 101 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁷ Site Permit Application, pg. 100 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Organization and Content of this Document

This Environmental Report is organized into eight sections:

Section 1: Introduction

Section 2: Regulatory Framework

Section 3: Description of the Proposed Project

Section 4: Description of Project Alternatives

Section 5: The No Build Alternative

Section 6: Human and Environmental Impacts

Section 7: Availability and Feasibility of Alternatives

Section 8: Permits

Sections three through seven discuss the Project, alternatives, associated impacts and mitigation.

Sources of Information

Information for this report is drawn from multiple sources and cited throughout. The primary source documents used are the Site Permit and CN applications submitted by Blazing Star Wind Farm, LLC.^{8,9} Additionally, Project information was drawn from Project updates and addendums that have been filed in eDockets.

Information from other reports issued by the Minnesota Environmental Quality Board and Minnesota Department of Commerce has been incorporated as applicable.

2 Regulatory Framework

The Project is a LWECs as defined in the Wind Siting Act (Minnesota Statute 216F). Upon completion, the Project would produce up to 200 MW of power, meeting the definition of a large energy facility per Minnesota Statutes section 216B.2421.

In accordance with Minnesota Statutes section 216B.243, no large energy facility may be sited or constructed in Minnesota without issuance of a CN by the Commission. Accordingly, on July 20, 2016, the applicant submitted a CN application to the Commission.¹⁰ On September 19, 2016, the Commission issued an order accepting the application as substantially complete and authorizing an informal review process.¹¹

The informal review process is designed to develop a record upon which a CN decision is made, including: (1) a notice and comment period, (2) analysis by the DOC - Energy Regulation and Planning staff, (3) environmental review by DOC EERA staff and (4) a public hearing conducted by an administrative law judge (ALJ). Based on the ALJ's hearing report and the entire record, Commission staff will make a recommendation to the Commission on issuance of the CN. The Commission is the final decision-making body.

⁸ Application for a Certificate of Need - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket #[20167-123462-01](#)

⁹ Site Permit Application - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁰ Application for Certificate of Need - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket #[20167-123462-01](#)

¹¹ Order - Commission, September 19, 2016, eDocket #[20169-124994-01](#)

2.1 Environmental Report

Pursuant to Minnesota Rule 7849.1200, the analysis provided by EERA staff takes the form of an Environmental Report. The ER provides an analysis of potential human and environmental impacts of the Project, as well as alternatives to the Project. To develop the ER, EERA staff is required to conduct at least one public meeting in the proposed Project area. The purpose of the meeting is to advise the public of the Project and to solicit public input into the scope of the ER. A scoping decision is a determination of what needs to be assessed in the ER to fully inform decision-makers and the public about the possible impacts and potential alternatives of the Project.

EERA staff held a public information and scoping meeting on December 6, 2016, in Hendricks to receive comments on the scope of the ER. Approximately 40 persons attended the meeting, with four people commenting. A public comment period followed the meeting, closing on December 27, 2016. Eight verbal comments/questions were received during the Public Information and Scoping Meeting, and five public individuals provided written comments during the comment period. Additionally, comment letters were received from federal, state, and county agencies.

The verbal comments and questions provided at the Public Information and Scoping Meeting included a broad range of topics including; how the process proceeds and what are potential things that would stop the project from moving forward, where the generated power will be utilized, electromagnetic field (EMF) risk and evaluation, property value loss concerns, turbine placement, setbacks from non-participating landowners, questions regarding project maps provided at the meeting, how does the project developer work with the local public utilities, project related transmission and collector lines, switchyard placement, and survey work and gravel road repair.¹² DOC-EERA staff, Commission staff, and Geronimo Energy staff provided responses and clarifications to the majority of verbal comments and questions.¹³ Additional clarification and analysis of issues brought up at the Public Information and Scoping Meeting has been provided in this ER document.

Written public comments were received from five individuals through the DOC-EERA webpage, email, and provided after the Public Information and Scoping meeting.^{14,15} Written public comments received included the following requests: improved communication between the developer and the local road authorities, increasing setbacks from non-participating landowners to one mile from the property line, and a one year moratorium to suspend project development. Public comments also raised concerns regarding inefficiency of wind energy production, intimidation and divisive practices by Geronimo Energy staff, test borings in the local roads, and local bald eagles. Comments were also submitted requesting analysis of potential wildlife impacts, impacts on property values, creation of permanent local jobs, human health impacts, potential impacts to local tourism, potential impacts to farming, turbine visual and noise impacts, turbine lighting impacts, potential weather pattern changes due to turbine operation, electrical line impacts on animals and humans.^{16,17}

¹² Public Information and Scoping Meeting Notes, December 6, 2016, eDocket # [20171-127757-01](#)

¹³ Public Information and Scoping Meeting Notes, December 6, 2016, eDocket # [20171-127757-01](#)

¹⁴ Public Comment – Draft Site Permit and ER Scope, January 3, 2017, eDocket # [20171-127758-01](#)

¹⁵ Public Comment, Blazing Star Wind Farm, January 6, 2017, eDocket # [20171-127896-01](#)

¹⁶ Public Comments – Draft Site Permit and ER Scope, January 3, 2017, eDocket # [20171-127758-01](#)

¹⁷ Public Comment, Blazing Star Wind Farm, January 6, 2017, eDocket # [20171-127896-01](#)

Agency comment letters were provided by the U.S. Army Corps of Engineers (USACOE), Lincoln County Highway Department, Minnesota Pollution Control Agency (MPCA), Minnesota Department of Transportation (MnDOT), and the Minnesota Department of Natural Resources (MN DNR).¹⁸ The USACOE provided comments regarding potential project impacts to streams or wetlands that would require permits under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.¹⁹ Lincoln County Highway Department provided comments regarding the project's potential to impact county roads during the construction and operation phases of the project.²⁰ Lincoln County also requested that a Development Agreement between the County and the Blazing Star Wind Farm be initiated once project design has been finalized.²¹ MPCA indicated that they did not have any comments to provide regarding the project at this time.²² MnDOT indicated that there are a number of future road projects in close proximity to the proposed Blazing Star Wind Farm, and this should be taken into consideration during delivery of project equipment.²³ Additionally, MnDOT recommended that the proposed project's draft site permit include language specifically requiring the Permittee to obtain all other necessary permits and approvals.²⁴

The MN DNR recommended that two of the proposed turbines be located further from a large wetland complex to reduce the potential risk of those turbines to birds and bats.²⁵ The MN DNR recommended the draft site permit include specific language that the wind turbine blades be feathered below the operational cut-in speed, and if necessary to further reduce bat fatalities the operational cut-in speed may need to be raised.²⁶ The MN DNR also recommended a minimum of two years of post-construction fatality monitoring be conducted, and monitoring of an existing blue heron rookery along the Lac Qui Parle River be conducted prior to construction and three years post-construction.²⁷ Additional recommendations were provided on the use of crane paths near the rookery, and other potential impacts to the rookery and individual great blue herons during the operation of the project.²⁸ MN DNR recommended that all planned monitoring be detailed in the project's Avian and Bat Protection Plan (ABPP).²⁹

Based on the scoping comments received and the rules governing the scope of an ER (Minnesota Rule 7849.1500), the Department of Commerce Deputy Commissioner issued a scoping decision on January 12, 2017 (Appendix A). This ER has been developed in accordance with the scoping decision.

A public hearing conducted by an ALJ will be held in the Project area to further develop the record for a Commission decision. This ER will be introduced into the record by EERA staff.

¹⁸ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

¹⁹ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

²⁰ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

²¹ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

²² Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

²³ MnDOT Comment Letter, December 21, 2016, eDockets # [201612-127522-01](#)

²⁴ MnDOT Comment Letter, December 21, 2016, eDockets # [201612-127522-01](#)

²⁵ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

²⁶ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

²⁷ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

²⁸ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

²⁹ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

2.2 Permitting Authority and Additional Permits

Site Permit

In addition to the Certificate of Need, the proposed Project requires a Site Permit (Minn. Statute 216F.04). The Site Permit is issued by the Commission and is being considered in a separate docket (WS-16-686). A Site Permit authorizes the siting and construction of the Project and cannot be issued before a certificate of need has been issued for the Project (Minn. Statute 216B.243).

Additional Permits

In addition to approvals issued by the Commission, the Project will require permits and approvals from federal agencies, additional state agencies and local governments. These permits are discussed in Section 8.

2.3 Public Participation

The Commission relies on public participation for the development of a thorough record for the Project for both the CN and Site Permit processes. People are assured state-issued notices for Project events by placing their name on the appropriate EERA Project contact list. Interested persons can sign up for the Blazing Star Wind Farm project mailing list online at:

<http://mn.gov/commerce/energyfacilities/Docket.html?id=34561>.

People may also join the Project mailing list by contacting Environmental Review Manager Richard Davis, phone: (651) 539-1846, email: richard.davis@state.mn.us; or Public Advisor Kevin George at phone: (651) 201-2251, email: consumer.puc@state.mn.us.

Public participation and state and federal agency input have been sought throughout the CN process. Technical representatives from the state and federal agencies were provided with hard copies and electronic copies of the Site Permit Application for the Blazing Star Wind Farm, and requested to provide comments and information to be considered in the development of the scope for this ER and items to consider in the development of a preliminary Draft Site Permit. Additionally, a Public Information and Scoping Meeting was held in Hendricks, Minnesota on December 6, 2016 to provide information to those in attendance, and to hear public comments with respect to the proposed Blazing Star Wind Farm. A public comment period was also conducted from November 21, 2016 to December 27, 2016, which allowed for the submittal of written comments from public citizens and state and federal agency staff.³⁰ All comments received at the Public Information and Scoping Meeting and all comments received during the comment period were taken into consideration during the development of the ER Scoping Decision³¹ and the development of the preliminary Draft Site Permit³².

³⁰ Notice of Public Information and Scoping Meeting – DOC-EERA, November 21, 2016, eDocket # [201611-126662-01](#)

³¹ Environmental Report Scoping Decision - DOC-EERA, January 12, 2017, eDocket # [20171-128021-01](#)

³² Comments and Recommendations, Draft Site Permit - DOC-EERA, January 17, 2017, eDocket # [20171-128197-01](#)

A Public Hearing will be conducted by an Administrative Law Judge (ALJ) from the Office of Administrative Hearings (OAH). The Public Hearing is scheduled for March 15, 2017 at the Hendricks Public School, 200 Lincoln Street, Hendricks, Minnesota 56136. During the Public Hearing the public is invited to attend and provide comments on this ER document, the Draft Site Permit, and whether the Commission should approve the CN and Site Permit for the proposed Project. A public comment period is associated with the Public Hearing, and comments can be submitted until March 30, 2017.³³

3 Description of the Proposed Project

The Applicant is proposing to build a 200 MW LWECS. Blazing Star Wind Farm, LLC is responsible for the oversight and management of the Project, along with construction, operations and maintenance. Blazing Star Wind Farm, LLC is a wholly-owned subsidiary of Geronimo Energy (Geronimo).

3.1 Project Description

The Project consists of wind turbines and associated structures, which includes access roads, communication lines, meteorological towers, sonic detection and ranging (SoDAR) or light range detection and ranging (LiDAR) unit, temporary batch plant, staging area, construction laydown area, operation and maintenance (O&M) facility, and electrical collector and feeder lines connecting to the proposed Project substation within the Project site.³⁴ The Applicant currently anticipates that the Project will consist of 57 to 100 turbines yielding a total nameplate capacity of up to 200 MW. The final number and size of the turbines will be dictated by current market conditions, turbine availability and the terms of the final Site Permit for the Project. Four wind turbines are currently under consideration and described in the Blazing Star Wind Farm Site Permit Application and the CN Application; the Gamesa G126 – 2.625 MW, Vestas V110 - 2.0 MW, Acciona 3.0-132 – 3.0 MW and GE 2.5-116 – 2.5 MW. The specifications for each are described below in **Table 1**.

³³ Notice of Public Hearing and Draft Site Permit Availability – Commission, February 27, 2017 eDocket # [20172-129429-02](#)

³⁴ Site Permit Application, pg. 3 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket # [20169-124610-02](#)

Table 1. Turbine Specifications³⁵

Characteristics	Turbines			
	Gamesa G126	Vestas V110-2.0	Acciona 3.0-132	GE 2.5-116
Nameplate Capacity (MW)	2.625	2.00	3.00	2.50
Hub Height (meters)	84	90 to 95	84	80 to 94
Rotor Diameter (meters)	126	110	132	116
Total Height (meters)	147	135 to 150	150	138 to 150
Wind Swept Area (square meters)	12,469	9,503	13,685	10,568
Cut-in Wind Speed (meters/second)	3	3	3	3
Rated Capacity Wind Speed (meters/second)	10	11	10	11
Cut-out Wind Speed (meters/second)	25	20	25	20
Maximum Sustained Wind Speed (meters/second)	52.5	52.5	52.5	52.5
Rotor Speed (revolutions per minutes)	6.0 to 11.6	6.6 to 12.5	8.0 to 15.7	6.0 to 17.0

The wind turbines under consideration are three-blade, upwind, and horizontal axis. Hub heights range from 84 meters to 95 meters, and the rotor diameters range from 110 meters to 132 meters. A smooth tubular steel tower will be used to support the nacelle and rotor. All modern turbine models contain emergency and backup power systems to allow shutdown of the turbine if power to the grid is lost.

The Project would require additional facilities beyond the turbines. Those facilities include:

- gravel access roads (Approximately 27 miles)
- step-up transformers installed at the turbines
 - Gamesa G126 AND Vestas V110 turbine models use transformers located inside the nacelle
 - Acciona 132 and GE 116 turbine models utilize external transformers, which will be placed on concrete slabs located at the base of the turbines
- 34.5 kV collector lines installed between turbine strings, generally trenched underground to a depth of 36" or greater (Approximately 65 miles)

³⁵ Site Permit Application, pg. 9 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

- If conflicts arise from existing underground utilities, other infrastructure, shallow bedrock, or sensitive environmental conditions the collector lines may be run above ground
- installation of a Site Control And Data Acquisition (SCADA) system
- construction of a Project substation (Approximately 10 acres)
- construction of an Operation and Maintenance (O&M) facility (building approximately 5,000 s.f., parking lot 3,000 s.f.)
 - O&M facility will be located adjacent to the proposed Project substation
- up to four permanent meteorological towers
- SODAR and/or a LiDAR unit(s)
- temporary laydown area (Approximately 10 acres)
- construction staging area (Approximately 10 acres)

The SCADA system would be installed to monitor turbine availability and conditions. This system remotely monitors the conditions of the wind farm and will alert technicians to any irregularities with the wind turbines, circuit breakers, meters, meteorological equipment, etc.

The Project will require the construction of a substation, as noted previously, and the Project substation will be connected to an interconnection switchyard to deliver the generated power on to the grid. The Project substation and the interconnecting switchyard will be connected by an approximately 1,000 foot 345 kV transmission line. The interconnection switchyard will be constructed by the interconnecting utility.

3.2 Project Location

The Project is on the western edge of Lincoln County, near the community of Hendricks. The Project is within Hansonville, Marble, and Hendricks Townships in Lincoln County. **Table 2** identifies the townships and sections within the Project boundary.

Table 2. Project Location

County	Township Name	Township (N)	Range (W)	Sections
Lincoln	Hansonville	113	46	1, 10-15, 19, 20, 22-27, 29-36
Lincoln	Marble	113	45	6, 7, 17-20, 29-31
Lincoln	Hendricks	112	46	1-18, 20-36
Lincoln	Hendricks	112	47	1, 12, 13, 25, 26

The total Project area being considered for turbine and associated infrastructure placement is 37,200 acres. Blazing Star Wind Farm, LLC currently has various agreements with land owners for approximately 30,250 acres of private land within the Project area.

3.3 Project Cost and Schedule

The total Project installed capital costs are estimated to be approximately \$330 million, including wind turbines, associated electrical and communication systems, and roads. Final costs will be dependent on site conditions and final turbine selection and layout. Ongoing operations and maintenance costs and administrative costs are estimated to be approximately \$6.5 to 7.5 million per year, including royalties to landowners for wind easement rights and property taxes.

Depending on interconnection process completion, permitting, and other development activities the Project is expected to achieve commercial operation by the fourth quarter 2018.

4 Description of Project Alternatives

Minn. Rule 7849.1200 requires the Commission to consider alternatives to the proposed Project. In addition to evaluating alternatives and their impacts, a no build option must also be evaluated. This section provides a discussion of alternate power sources to the Blazing Star Wind Farm Project.

The alternatives considered would generate energy equivalent to that of the proposed Project and provide renewable, low, or zero carbon emission energy. Typically, alternatives to the Project would include generation facilities of all types, including plants that use coal, natural gas, fuel oil, or similar non-renewable fuels. Alternatives would also include constructing transmission facilities (to import energy) in lieu of generation. However, the proposed Project would be producing renewable energy for use in Minnesota and the surrounding area. Accordingly, alternatives considered here were selected as they are technologies eligible to be counted toward renewable energy objectives.³⁶

Alternatives evaluated include: (1) a 200 MW wind generation plant sited elsewhere in Minnesota, (2) a 38.5 MW biomass plant, and (3) a “no build” alternative.

4.1 200 MW LWECs

An alternative to the proposed Project that would utilize an eligible renewable energy (wind) is a large wind energy conversion system sited elsewhere in Minnesota. Such a Project could, theoretically, be an approximately 200 MW Project or a combination of smaller dispersed Projects. The analysis in this ER will attempt to describe differences in the impacts associated with a generic 200 MW wind project sited in Minnesota and the Blazing Star Wind Farm, sited in Lincoln County.

4.2 38.5 MW Biomass Plant

One alternative renewable energy source to the proposed Project would be a biomass plant of similar electricity generation as the proposed Project. Biomass is any organic matter that is available on a renewable or recurring basis. It includes all plants and plant derived materials, including agricultural crops and trees, wood and wood residues, grasses, aquatic plants, animal manure, municipal residues, and other residue materials. Plants (on land or in water) use the light energy from the sun to convert

³⁶ Minn. Statute 216B.1691, Subd. 1. Eligible energy technologies include technologies that generate electricity from solar, wind, hydroelectric, hydrogen, or biomass.

water and carbon dioxide to carbohydrates, fats, and proteins along with small amounts of minerals. Combustible gases from landfills or anaerobic digestion of waste material is referred to as biogas.

Solid biomass can be burned like coal to produce steam. It can also be gasified and burned like natural gas. Various forms of biomass are utilized in Minnesota. The St. Paul District Energy, a combined heat and power facility in downtown St. Paul, is fueled primarily by woody biomass and has an electric generation capacity of 25 MW. Other biomass plants in Minnesota, such as Fibrominn, utilize turkey litter or combinations of woody biomass and agricultural biomass, as with the Laurentian Energy Authority in Hibbing and Virginia.

The 38.5 MW NGPP Minnesota Biomass, LLC, electric generation facility underwent environmental review in Minnesota (2003).³⁷ Given today's technological improvements in turbine design, the net capacity factor for Blazing Star Wind Farm is anticipated to be between 45 to 50 percent,³⁸ so 38.5 MW is not an exact equivalency for a modern 200 MW wind farm. However, this biomass project has been chosen for review as it provides reliable data on potential impacts for fairly comparable production. This biomass alternative would likely burn a combination of woody and agricultural biomass, such as corn stover, with natural gas as a backup fuel.

4.3 No Build Alternative

The no build alternative means that no wind Project is constructed. The analysis for this alternative will consider the potential benefits and drawbacks of not constructing the proposed Project.

5 The No Build Alternative

Analysis of the no build alternative involves a discussion of the environmental impacts of continuing the status quo. For example, with a proposed highway project, the no build alternative would take into account the impacts associated with continuing to have traffic increase along existing roads and highways and the potential impacts on development occurring along these existing arteries. Potential impacts and benefits of the no build alternative for the Blazing Star Wind Farm are discussed here.

5.1 Impacts

At least three categories of impacts can be identified if the Blazing Star Wind Farm is not built: (1) a hampering of the state's ability to meet its renewable energy objective, (2) the loss of economic benefits in the Project area, and (3) the possible negative impact of providing replacement electricity from a non-renewable energy source.

³⁷ NGPP Minnesota Biomass Project, EQB Docket No. 03-67-EAW-NGP Biomass [hereafter NGPP Minnesota Biomass EAW]; <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

³⁸ Application for Certificate of Need, pg. 15 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

Renewable Energy Objectives

Minnesota has committed to a renewable energy objective of generating 25 percent of its electricity from eligible renewable sources by the year 2025.³⁹ Minnesota utilities forecast the need for 5,841 MW of renewable generation by the year 2025 to meet this objective.⁴⁰ If the Blazing Star Wind Farm is not built, it could hinder the ability of the state to meet its renewable energy objective. There are wind resources in other parts of the state and wind farms could be placed in these areas (see **Figure 2**). However, the wind resources of the state are finite. The wind resource in the Project area is very good, and, if untapped, could hinder the state's ability to meet its renewable energy objective.

Loss of Economic Benefits

If the Blazing Star Wind Farm is not built, there would be a loss of economic benefits in the Project area. Landowners would lose lease payments over the operational life of the Project. Local governments would lose wind energy production tax revenues estimated at \$900,000 annually.⁴¹ The Blazing Star Wind Farm will utilize the services of local contractors and suppliers, which will contribute to the local personal income in the area.⁴² The proposed Project is expected to generate approximately 250 temporary construction jobs and 10 to 14 permanent operation and maintenance jobs.⁴³ These employment opportunities and their associated income would be lost if the Project is not built.

Replacement with a Non-Renewable Resource

If the Blazing Star Wind Farm is not built, the electrical power it would have produced may need to be replaced, possibly with a non-renewable energy resource. The Blazing Star Wind Farm would produce approximately 788,400 and 876,000 megawatt-hours annually (MWh/yr).⁴⁴

Though the impacts associated with non-renewable sources vary, it is possible to estimate, as an example, the impact of replacing the Blazing Star Wind Farm MWh/yr output with natural gas or, less likely, coal energy. However, since no non-renewable proposals are being considered in this case, that comparative analysis is not pursued in this Environmental Review.

5.2 Benefits

Benefits of not building the Blazing Star Wind Farm would include avoidance of potential human and environmental impacts associated with the Project. These impacts are discussed in Section 6 of this ER.

³⁹ Minn. Statute 216B.1691

⁴⁰ "Minnesota Renewable Energy Integration and Transmission Study," (Presentation) on September 13, 2013, <http://mn.gov/commerce/energy/topics/resources/energy-legislation-initiatives/studies-and-reports/minnesota-renewable-energy-integration-transmission-study.jsp>

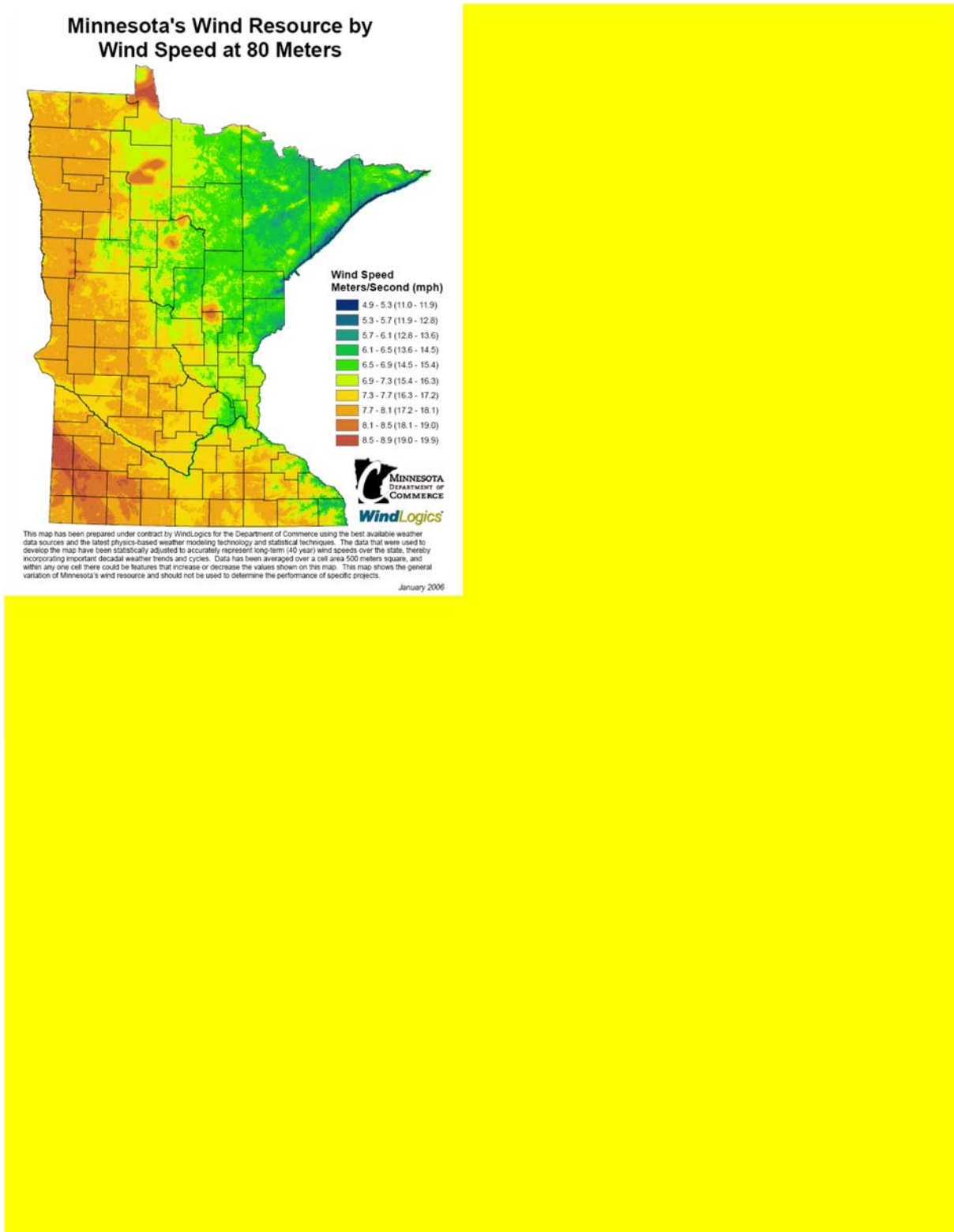
⁴¹ Site Permit Application, pg 53 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket # [20169-124610-02](#)

⁴² Site Permit Application, pg 53 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket # [20169-124610-02](#)

⁴³ Application for Certificate of Need, pg. 5 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

⁴⁴ Application for Certificate of Need, pg. 15 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

Figure 2. Wind Resources



6 Human and Environmental Impacts

The Blazing Star Wind Farm and the Project alternatives have the potential for human and environmental impacts, which are discussed below. The alternatives include: (1) a 200 MW wind energy conversion system sited elsewhere in Minnesota and (2) a 38.5 MW biomass plant. The potential impacts of the no build alternative are discussed in Section 5. Additionally, this section provides mitigation strategies for potential impacts.

6.1 Air Quality

Electric generation facilities may emit air pollutants during construction and operation. This ER examines air emissions as required by Minnesota Rule 7849.1500, subp. 2.

6.1.1 Criteria Pollutants

Minnesota Rule 7849.1500 requires this ER to examine emissions of the following pollutants: sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon dioxide (CO₂), mercury (Hg), and particulate matter (PM). These common pollutants (other than mercury) are known as criteria pollutants.⁴⁵

Blazing Star Wind Farm

The Blazing Star Wind Farm would emit no criteria pollutants during operation. Impacts from construction will be minimal and localized and would include dust due to earth moving and emissions from diesel-powered construction equipment. Transmission lines, under certain conditions, produce limited amounts of ozone and nitrogen oxide emissions. Emissions of these pollutants would be minimal.

Dust and emissions associated with the construction of the project would be similar to large scale outdoor construction activities such as road work and residential areas. The project area includes multiple construction “sites” in the form of individual turbines and a network of access roads. Dust from construction traffic can be controlled using standard construction practices such as watering of exposed surfaces, covering of disturbed areas, and reduced speed limits on site. Once project construction is completed, air and dust emissions related to vehicular traffic would be reduced. Limited emissions would be associated with routine maintenance and repairs.

Generic 200 MW LWECS

A generic 200 MW LWECS would emit no criteria pollutants during operation, and would have ancillary emissions (construction, transmission line) similar to those from the Blazing Star Wind Farm.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would emit criteria pollutants (**Table 3**). These pollutants are based on a plant similar to the NGPP Minnesota Biomass plant (see Section 4.2). Each of these pollutants is known to cause environmental health impacts. Sulfur oxides (SO_x) causes acid rain and human respiratory illness.⁴⁶

⁴⁵ Criteria Air Pollutants, EPA, <https://www.epa.gov/criteria-air-pollutants>

⁴⁶ Sulfur Dioxide Basics, EPA, <https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects>

Nitrous oxides (NO_x) are greenhouse gases that react with other chemicals to form ozone and particulate matter, and are known to cause respiratory illnesses.⁴⁷ Carbon dioxide (CO₂) is a greenhouse gas that contributes to climate change and associated impacts.⁴⁸ Mercury can cause impaired neurological development in children.⁴⁹ Inhalation of particulate matter causes and contributes to human respiratory illness.⁵⁰ **Table 3** provides potential emission rates and annual emissions of criteria pollutants associated with a 38.5 MW biomass plant.

Table 3. Criteria Pollutants from a 38.5 MW Biomass Plant⁵¹

Pollutant	Emissions Rate (lbs/kWh)	Annual Emissions (tons/year)
Sulfur Dioxide (SO ₂)	3.46 E-04	58.3
Nitrogen Oxides (NO _x)	1.98 E-03	333.9
Carbon Dioxide (CO ₂)	0.66 ⁵²	1.11 E-05 ⁵³
Mercury (Hg)	1.19 E-08	2.00 E-03
Particulate Matter (PM)	7.18 E-04	121.1

lbs/kWh = pounds per kilowatt-hour

Because these pollutants are diffused into the global atmosphere, regional impacts are difficult to quantify. However, impacts due to particulate matter and ground-level ozone can be localized. Particulate matter and ozone are the pollutants of most concern in Minnesota and are tracked regionally by the Minnesota Pollution Control Agency (MPCA). Because the plant would primarily utilize biomass for generation, net impacts from carbon dioxide would be minimal. Carbon dioxide released by the biomass plant would be utilized by living plants, which in time, would serve as fuel. The plant would operate as a largely closed carbon dioxide loop. However, fuels used to collect and transport biomass would likely not be carbon neutral and would create carbon dioxide emissions.

Mercury exists throughout the environment; however, the primary source of mercury in air emission is coal, i.e., the burning of coal in a coal-fired power plant. The biomass plant considered here would use

⁴⁷ Basic Information about NO₂, EPA, <https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects>

⁴⁸ Climate Change 2007: Synthesis Report, Summary for Policymakers, An Assessment of the Intergovernmental Panel on Climate Change (IPCC), <http://www.ipcc.ch/>

⁴⁹ Health Effects of Exposure to Mercury, EPA, <https://www.epa.gov/mercury/health-effects-exposures-mercury>

⁵⁰ Particulate Matter (PM) Basics, EPA, <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#effects>

⁵¹ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

⁵² AP-42, Fifth Edition, Volume 1, Chapter 1 External Combustion Sources, Section 1.6 Wood Residue Combustion in Boilers, <http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s06.pdf>.

⁵³ Because the plant is fired with biomass (excepting natural gas backup) net carbon dioxide emissions from the plant would be minimal. Carbon dioxide released from the plant would be integrated into new biomass materials which, in time, would be harvested and used to fire the plant. There would be carbon dioxide emissions related to transport of biomass and plant operations.

biomass as a primary fuel and natural gas as a backup fuel. Thus, emissions of mercury, and related impacts, would be minimal.

Mitigation

Emissions of some criteria air pollutants can be mitigated through control technologies. Nitrous oxides emissions could be reduced by approximately 75 percent through use of a selective non-catalytic reduction system on the biomass boiler.⁵⁴ Particulate matter emissions could be reduced by 90 percent with add-on devices such as a multi-cyclone and dust collector.⁵⁵

In addition to the use of control equipment to mitigate pollutant impacts, a best available control technology (BACT) analysis could be conducted. The BACT analysis is a requirement of new facilities under federal new source review prevention of significant deterioration (PSD). A BACT analysis and implementation could limit emissions from the plant to less than those presented in **Table 3**.

6.1.2 Hazardous Air Pollutants and Volatile Organic Compounds

Electric generation facilities have the potential to emit air pollutants during construction and operation. Minnesota Rule 7849.1500 requires this ER to examine emissions of hazardous air pollutants (HAP) and volatile organic compounds (VOC). These classes of pollutants are known or suspected of causing cancer and other serious health effects.⁵⁶

Blazing Star Wind Farm

The Blazing Star Wind Farm would emit minimal HAPs or VOCs during operation. Petroleum-based fluids used in the operation of wind turbines, such as gear box oil, hydraulic fluid and gear grease, have a low vapor pressure and any release of VOCs would be minimal.

Generic 200 MW LWECs

A generic 200 MW LWECs would have HAP and VOC emissions similar to the Blazing Star Wind Farm, as the generic 200 MW LWECs would utilize the petroleum-based fluids during wind turbine operation.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would emit HAPs and VOCs. The amounts of these pollutants are based on a plant similar to the NGPP Minnesota Biomass plant. Because these pollutants are diffused into the global atmosphere, regional impacts are difficult to quantify. Generally, the more densely populated parts of Minnesota have the highest cancer risk due to HAPs, the Minneapolis-St. Paul, Rochester, and Duluth areas have some of the highest risk levels in the State.⁵⁷ The emissions from the biomass plant would be relatively small compared with other sources. **Table 4** lists the potential emission rate and annual emissions of hazardous air pollutants and volatile organic compounds associated with a 38.5 MW biomass plant.

⁵⁴ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

⁵⁵ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

⁵⁶ Hazardous Air Pollutants, EPA, <https://www.epa.gov/haps>

⁵⁷ 2011 National Air Toxics Assessment (NATA) App, <https://gispub.epa.gov/NATA/>

Table 4. HAP and VOC Emissions from a 38.5 MW Biomass Plant⁵⁸

Pollutant	Emission Rate (lbs/kWh)	Annual Emissions (tons/year)
Hazardous Air Pollutants (HAPs)	1.80 E-04	30.4
Volatile Organic Compounds (VOCs)	5.55 E-04	93.6

lbs/kWh = pounds per kilowatt-hour

Mitigation

It is possible to mitigate HAP and VOC emissions with control technologies. However, given the relatively small amounts of HAP and VOC emissions compared with the costs of control equipment, it is likely that control technologies would not be employed.

6.1.3 Ozone

Large electric power generating facilities, such as biomass facilities, have the potential to produce reactive organic gases, which can lead to ground-level ozone formation. Wind turbines do not produce ozone or ozone precursors. Minnesota Rule 7849.1500, subpart 2 requires that this ER address anticipated ozone formation. Ozone can cause human health risks and can also damage crops, trees and other vegetation.⁵⁹

Blazing Star Wind Farm

The Blazing Star Wind Farm would not produce ozone or ozone precursors at the operating wind turbines. Ozone production can occur adjacent to transmission line under specific conditions. The proposed 345 kV transmission line associated with the Blazing Star Wind Farm will likely experience some ozone production. The proposed 345 kV transmission line will be approximately 1,000 feet in length, connecting the project substation with the switchyard to deliver the power to the grid. This short of a transmission line is likely to only produce minimal ozone. As an additional consideration, ozone is not continuously produced by transmission lines, but only under specific conditions as outlined previously. Thus, there will be minimal or no human or environmental impacts, and thus no mitigation related to ozone formation.

Generic 200 MW LWECS

A generic 200 MW LWECS would not produce ozone or ozone precursors at the operating wind turbines. The ozone production at the generic 200 MW LWECS would depend on the use of associated transmission lines to deliver power to the grid. The generic 200 MW LWECS would have minimal or no impacts related to ozone formation, similar to the Blazing Star Wind Farm.

⁵⁸ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

⁵⁹ Ozone Pollution, EPA, <https://www.epa.gov/ozone-pollution>

38.5 MW Biomass Plant

A 38.5 MW biomass plant would produce ozone precursors (e.g., NO_x, VOC) that would lead to ozone formation. Impacts from ozone are localized. Ground level ozone formation and associated impacts are anticipated to be minimal.

Mitigation

Ozone formation could be mitigated by minimizing ozone precursors. See discussion in Sections 6.1.1 and 6.1.2 regarding nitrous oxides (NO_x) and volatile organic compounds (VOC) respectively.

6.2 Water Resources

Different generation options have different water usage and effects on the water quality.

6.2.1 Water Appropriations

Large electric power generating facilities may require water for operations. This section discusses potential water appropriation impacts from such facilities.

Blazing Star Wind Farm

The proposed Project would require water appropriations for potable and sanitary water for the operations and maintenance (O&M) facility. Water would be supplied through the existing rural water supply or a single domestic-sized well.⁶⁰ This amount of water used would be roughly equivalent to the amount consumed by a residence or farmstead in the area, and would likely not require mitigation.

The proposed Project may also need a temporary batch plant to supply concrete during construction. The temporary batch plant will likely require the use of well water, versus rural water supply, to produce concrete.⁶¹ Once a contractor has been selected for the Project, the source of water for the batch plant will be selected.⁶² If a groundwater well is utilized a water appropriations permit from the Minnesota Department of Natural Resources (DNR) will be acquired and any necessary drawdown capacities and impact mitigation measures will be addressed in the needed permits.⁶³

Generic 200 MW LWECS

A generic 200 MW LWECS would have water appropriations similar to the Blazing Star Wind Farm.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would require water appropriations for energy production (process water) and sanitation. Process water could come from a well; however, a municipal water source may also be required. For some aspects of the process, such as in the cooling tower, effluent water from a wastewater treatment facility could be used. The sources of water would depend on the type and availability of water sources near the facility location.

⁶⁰ Site Permit Application pg 57 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁶¹ Site Permit Application pg 57 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁶² Site Permit Application pg 57 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁶³ Site Permit Application pg 57 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

The required quantity of water would be dependent on plant design and water quality. Functions within the plant that require water include cooling, sanitation, washing and separations. The average anticipated water use would be approximately 57 gallons per minute (GPM), with an estimated potential max flow at 592 GPM.⁶⁴ If a source of effluent wastewater were available, the appropriation of well or municipal water would be lower. If the plant used only well or municipal water, the water appropriation would be higher. Based on anticipated water use, the plant would require a water appropriations permit from the DNR if using well water.⁶⁵

Mitigation

Mitigation of well water and municipal water use by the plant could be achieved through plant equipment choices and through the use of effluent water (water that has already been appropriated). If municipal water were used for the plant, modifications or an expansion of the municipal water treatment plant may be required to accommodate the increase in demand.

6.2.2 Wastewater

Large electric generation facilities have the potential to generate significant amounts of wastewater. This section discusses potential impacts from wastewater generation.

Blazing Star Wind Farm

The proposed Project does not create wastewater during the generation of electricity. However, wastewater would be created by the operation and maintenance (O&M) building. This wastewater would likely be discharged into a septic system associated with the building. The potential impacts of this wastewater and septic system are anticipated to be minimal. Mitigation of the impacts, beyond a properly functioning septic system, is not anticipated.

Generic 200 MW LWECS

A generic 200 MW LWECS would have wastewater impacts similar to the Blazing Star Wind Farm.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would have process and sanitary wastewater discharges. The amount of wastewater discharge would depend on the water sources used for the plant. If well/city water is used, anticipated average wastewater discharge would be approximately 226.2 million gallons per year. If effluent water is also utilized, wastewater discharge could decrease to approximately 81.7 million gallons per year.⁶⁶

⁶⁴ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

⁶⁵ Water Use Permits, MN DNR
http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

⁶⁶ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

Mitigation

Wastewater impacts could be mitigated by processing. The most likely scenario is transference of the wastewater to a municipal sewage system for treatment and release. Wastewater could be held or pre-treated at the biomass plant. Holding could reduce discharges through evaporation. However, holding introduces risks related to keeping wastewater stored away from surface and ground waters.

6.2.3 Groundwater

The groundwater in the project area is supplied by the Cretaceous aquifer, which is a combination of thick to thin discontinuous beds of sandstone confined in some places by overlying limestone and shale beds. Where the aquifer is not confined by overlying limestone and shale, glacial deposits make up the overlying material.⁶⁷ The depth to bedrock throughout the Project site varies from 400 feet to nearly 900 feet, with the bedrock in the north and western portions of the Project tending to be closer to surface.⁶⁸ The highest yielding aquifers in this region are the Sioux Quartzite aquifer, and a few surficial sand and gravel aquifers.⁶⁹ Many residents of this region are now served by rural water supply systems.

Blazing Star Wind Farm

Impacts to groundwater resources are anticipated to be minimal. Water supply needs during Project operation is anticipated to be limited to the O&M facility requirements, which will be satisfied with either a well or rural water service. As discussed in Section 6.2.1, the temporary concrete batch plant will likely need a water well to provide water for concrete production during the construction phase of the Project. Necessary water appropriations permits will be acquired from the DNR.

Mitigation

Large excavations in the Project are limited to the turbine pads and the few other support buildings. Groundwater resources should not be impacted. Wind turbine locations will not impact the use of existing water wells. To comply with residential and noise setbacks, turbines would be located at least 1,000 feet from homes, where most of the residential wells would be located. Measures would be taken to identify any nearby wells prior to construction of turbine foundations. Agencies such as the DNR, Minnesota Pollution Control Agency (PCA) and Minnesota Department of Health (MDH) should also be contacted as necessary to determine appropriate actions to protect local groundwater resources.

Necessary water appropriations permits will be acquired from the DNR to utilize groundwater for the water source for the O&M facility and for concrete production. The O&M facility would likely utilize about as much water as a rural residence, and concrete production will be temporary in nature. The Project's groundwater use is anticipated to be minimal, and supply and drawdown impacts will be further addressed in necessary appropriations permits.

⁶⁷ Site Permit Application pg. 56 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁶⁸ Site Permit Application, Appendix A, Figure 14a – Blazing Star Wind Farm, LLC, December 2, 2016, eDocket #[201612-127039-18](#)

⁶⁹ The Condition of Minnesota's Groundwater 2007-2011, MPCA 2013, <https://www.pca.state.mn.us/sites/default/files/wq-am1-06.pdf>

Generic 200 MW Wind Project

Impacts to groundwater from a generic 200 MW wind project would be similar or higher depending on site location and geological material of the project. The potential for groundwater contamination resulting from construction may be higher in areas with karst topography.

38.5 MW Biomass Plant

As discussed in Section 6.2.1, during operation a biomass plant would be expected to require approximately 57 gallons per minute (GPM), with an estimated potential max flow at 592 GPM of water for cooling, sanitation, washing and separations.⁷⁰ Construction of a biomass plant would be expected to have similar impacts on resources as the proposed project depending on resources on and near the project site. Siting of the biomass plant utilizing construction practices that minimize impacts to surface water would likely mitigate impacts.

6.2.4 Surface Water

Potential impacts to surface waters from electric generation projects are largely related to construction activities. In the case of a biomass facility, where fuel may be stored onsite, fuel supplies need to be properly stored to prevent potential impacts to surface waters from runoff.

Blazing Star Wind Farm

The Project area is located in the Minnesota River Basin, and is within the La Qui Parle and Minnesota River watersheds. There are numerous watercourses in the Project area, including the La Qui Parle River, North Branch of the Yellow Medicine River, and several unnamed intermittent and perennial stream. The watercourses within the Project area include eight county designated drainage ditches.⁷¹ Watercourses generally flow to the north and northeast as they move across the Project area. DNR data indicates there is approximately 10 miles of intermittent watercourses, including intermittent streams and large intermittent drainage ditches, and approximately 29 miles of perennial watercourses, including rivers and streams, which occur within the Project area. Additionally, approximately a half mile of small watercourses are present within the Project area that provide connectivity between lakes and wetlands.⁷² There are numerous wetlands and small lakes scattered throughout the Project area. Lake Hendricks is the largest lake in the general area, and it is located outside of the Project area, adjacent to the southwest boundary of the Project area on the Minnesota-South Dakota border.⁷³

During construction of the project, there is the potential for sediment to reach surface waters due to ground disturbances from vegetation clearing, excavation, grading and construction traffic.

Mitigation

Because construction of the Project requires disturbance of more than one acre of soil, the Applicant will need to submit a National Pollutant Discharge Elimination System (NPDES) permit application to the

⁷⁰ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

⁷¹ Site Permit Application, pg. 57 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁷² Calculated using ArcGIS software and publicly available Protected Waters Inventory (PWI) – Watercourse Shapefile

⁷³ Site Permit Application, Appendix A, Figure 15a – Blazing Star Wind Farm, LLC, December 2, 2016, eDockets #[201612-127039-18](#)

PCA for construction activities. The application will identify Best Management Practices (BMP) to be employed during construction of the project. A Stormwater Protection Plan (SWPPP) will be developed prior to construction to identify BMPs such as silt fencing, management of exposed soils and revegetation plans to prevent erosion. In addition to erosion control measures, fueling and lubricating construction equipment away from waterways will ensure that fuel and lubricants do not enter waterways.

LWECS Site Permits issued by the Commission require permits and approvals from the DNR, U.S. Fish and Wildlife Service (USFWS) and/or Army Corps of Engineers (USACE) for any access roads constructed across streams or drainage ways. If access roads are constructed across streams or drainage ways, roads must be designed to ensure that runoff from the upper portions of the watershed can readily flow to the lower portions of the watershed.

Generic 200 MW Wind Project

The primary source of impacts to surface water from a generic 200 MW wind project would be erosion and runoff during construction. Generally mitigation strategies would be similar to those of the Blazing Star Wind Farm. In areas where a surface water body is identified as impaired, the SWPPP would provide detailed mitigation on how impacts to the impaired water body would be avoided.

38.5 MW Biomass Plant

Construction of a 38.5 MW biomass plant would also increase the potential for soil erosion. As such a project would require disturbance of an area larger than one acre, the developer would be required to apply for an NPDES permit and develop a SWPP for both the construction and operation components of the project. Fuel stocks stored onsite would need to be properly contained and covered to minimize the potential for runoff.

6.3 Solid and Hazardous Wastes

Large electric generation facilities have the potential to generate solid and hazardous wastes. Solid and hazardous wastes, if not properly handled, can contaminate surface and ground waters. This contamination can cause human health impacts, e.g., cancer.⁷⁴

Blazing Star Wind Farm

The proposed Project would create solid wastes during construction including scrap wood, plastics, cardboard and wire to name a few. Small amounts of solid and hazardous wastes would be generated during operation, such as oils, grease, hydraulic fluids and solvents⁷⁵ Small quantities of hydraulic oil, lube oil, grease, and cleaning solvent will be maintained and stored at the O&M building, and as these fluids are replaced the waste products will be handled and disposed of through an approved disposal firm as required by regulations.⁷⁶

⁷⁴ Volatile Organic Compounds (VOCs) in Minnesota's Ground Water, MPCA, <https://www.pca.state.mn.us/sites/default/files/voc-fs.pdf>

⁷⁵ Site Permit Application, pg 48 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁷⁶ Site Permit Application, pg 49 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Additionally, an ASTM E 1527-05 conforming Phase I environmental site assessment (Phase I ESA) will be conducted on the entire Project area, which will identify potential hazardous materials that may affect the Project area.⁷⁷

Mitigation

Hazardous wastes would need to be handled appropriately; hydraulic fluid, lubrication oil and grease would be disposed of through an approved waste disposal firm. Leaks or spills could be mitigated using appropriate clean up techniques. A listing of all potentially hazardous materials related to the Project will be maintained at the O&M facility for the Project.

It is not anticipated that the Project would require a hazardous waste license. Hazardous waste generation would likely fall below the quantity required for a very small quantity generator license (220 pounds per month).⁷⁸

The Phase I ESA will be used to identify and avoid potential hazardous waste sites within the Project area.⁷⁹

Generic 200 MW LWECS

A generic 200 MW LWECS would have solid and hazardous waste impacts similar to the Blazing Star Wind Farm.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would create solid and hazardous wastes. Solid wastes would be generated during construction, e.g., scrap wood, plastics, cardboard and wire. Solid waste generated from operations would consist primarily of ash from the biomass boiler. Small amounts of hazardous wastes would be generated during operation, e.g., oils, grease, hydraulic fluids and solvents. Hazardous materials would likely be stored on site, e.g., diesel fuel.

Mitigation

Ash generated by the plant would be held on-site in an ash holding facility or removed to an off-site disposal facility. Storage tanks would be registered and maintained in accordance with PCA guidelines.

6.4 Natural Resources

Large electric generation facilities have the potential to impact natural resources, including flora, fauna, habitat, soils and water. This section discusses potential impacts to natural resources from the operation of a generation facility in the Project area.

⁷⁷ Site Permit Application, pg 48 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁷⁸ Very Small Quantity Generator Collection Programs, MPCA, <https://www.pca.state.mn.us/sites/default/files/hw2-51.pdf>

⁷⁹ Site Permit Application, pg 49 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

6.4.1 Ecological Setting

The Minnesota Department of Natural Resources and the U.S. Forest Service have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota⁸⁰ (see **Figure 3**). Ecological land classifications are used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features.

The Blazing Star Wind Farm sits in the Coteau Moraines Subsection of the Prairie Parkland and Tallgrass Aspen Provinces, a large province extending from Manitoba and covering much of the Midwest.⁸¹ The Coteau Moraines Subsection is located in the southwest corner of Minnesota and includes parts of southeastern South Dakota and northwestern Iowa.⁸² Shallow lakes and prairie wetlands are numerous in this Subsection, and are important for waterfowl foraging, resting, and nesting.⁸³ Today, agriculture is the predominant land use and its expansion and intensification have resulted in water quality and water quantity concerns.⁸⁴ Gravel and boulder mining occur in this Subsection, and large-scale wind-power production has expanded dramatically.⁸⁵ Many of the remaining prairie-grassland complexes are in private ownership and have been used for grazing, and wetland protection and restoration are important conservation issues.⁸⁶

⁸⁰ See MN DNR Ecological Classification System, <http://www.dnr.state.mn.us/ecs/index.html>

⁸¹ See MN DNR Coteau Moraines Subsection Profile, http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/coteau_moraines.pdf

⁸² See MN DNR Coteau Moraines Subsection Profile, http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/coteau_moraines.pdf

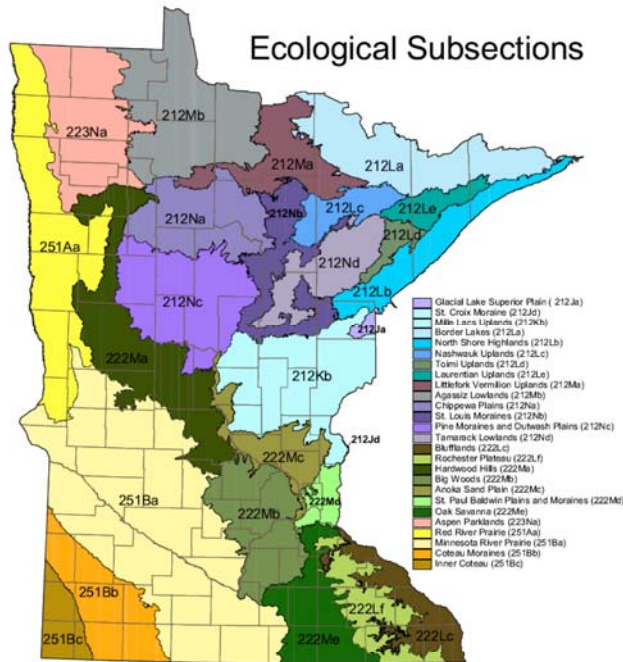
⁸³ See MN DNR Coteau Moraines Subsection Profile, http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/coteau_moraines.pdf

⁸⁴ See MN DNR Coteau Moraines Subsection Profile, http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/coteau_moraines.pdf

⁸⁵ See MN DNR Coteau Moraines Subsection Profile, http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/coteau_moraines.pdf

⁸⁶ See MN DNR Coteau Moraines Subsection Profile, http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/profiles/coteau_moraines.pdf

Figure 3. Ecological Subsections



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Land use within the project area is primarily agricultural, with cultivated lands making up approximately 67 percent of the total land cover, and grassland/herbaceous lands and hay/pasture lands making up approximately 13 percent and 11 percent, respectively. All other cover types, excluding developed lands, make up approximately five (5) percent of the Project area. Approximately four (4) percent of the total land cover is developed.⁸⁷

6.4.2 Soils

Most of the soils in the Project area consist of glacial till deposited dominated by calcareous loamy sediments. Flom-Barnes and Singaas-Flom are the two soil associations found throughout the Project area. Flom soils are poorly to very poorly drained silty clay loams found on level to nearly slopes, due to relatively shallow slope Flom soils tend to have slow surface runoff. Barnes soils are well drained loams found on level to hilly till plains and moraines, depending on the landscape slope Barnes soils can have negligible to high surface runoff. Singaas soils are well drained silty clay loams found on nearly level to gently undulating ground moraines, with low to high surface runoff depending on slope.⁸⁸

6.4.3 Wetlands

Wetlands provide direct benefits to the environment and vary according to the type or class of wetland and the season. Wetlands serve as floodwater detentions, provide nutrient assimilation and sediment entrapment (water quality), and provide wildlife habitat. Wetlands may be protected federally under Section 404 of the Clean Water Act, and also by the State of Minnesota under the Wetland Conservation Act. The National Wetland Inventory (NWI) developed by the USFWS identifies wetlands based on imaging from aerial photography or digital aerial imagery. Minnesota Protected Waters Inventory (PWI) Maps were also utilized to identify PWI wetlands and lakes within the Project area.

Analysis of NWI data within the Project area indicates a total of 5,049.9 acres of wetlands, which can further be reduced to broad wetland types; palustrine emergent (PEM) 4,371.0 acres, palustrine shrub-scrub (PSS) 49.1 acres, palustrine forested (PFO) 100.4 acres, freshwater pond (PA or PU) 166.7 acres, freshwater lakes (L2U) 297.7 acres, and riverine (R2U) 65.0 acres.⁸⁹ Analysis of PWI data indicates that 601.5 acres of wetlands and lakes are present within the Project area.⁹⁰ Large wetlands, ponds, and lakes are likely to be present in both NWI and PWI data, which means there will be some overlap between the data sources. The desktop analysis of the NWI wetlands within the Project area is outlined in **Table 5** below.

⁸⁷ Site Permit Application, pg 63 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁸⁸ Site Permit Application, pg 55 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁸⁹ Site Permit Application, pg 60 and 61 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁹⁰ Site Permit Application, pg 61 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Table 5. NWI Wetland Type and Acreage⁹¹

Wetlands Estimates from Databases	Acreage
Palustrine Emergent Wetland (PEM)	4,371.0
Palustrine Forested/Shrub Wetland (PSS)	49.1
Palustrine Forested Wetland (PFO)	100.4
Palustrine Pond (PUB, PAB, PUS)	166.7
Lacustrine System (L)	297.7
Riverine System (R)	65.0

Mitigation

Wind permits issued by the Commission prohibit placement of wind turbines or associated facilities such as roads, transformers, foundations, or underground cables within public water wetlands. Electric collector or feeder lines may cross or be placed in public waters or public waters wetlands subject to permits and approvals from the DNR, the USACE, and local units of government as implementers of the Minnesota Wetland Conservation Act (WCA).

Turbines, access roads, O&M facility, and substations will design and constructed in a manner that will avoid direct and indirect wetlands to the greatest extent practicable. Temporary impacts to wetlands may occur at crane walk crosses and at locations where underground utilities may need to be trenched in through a wetland.⁹²

Currently, all four of the wind turbine models being considered are anticipated to result in an impact to a wetland identified on the NWI, and the GE 2.3-116 and Vestas V110 turbine model layouts have posse the greatest potential impact of 0.44 acres of wetland.⁹³

A formal wetland delineation will be completed prior final layout design and construction.⁹⁴ Final layout design will be completed in a manner that will avoid and minimize wetland impacts to the greatest extent practicable. For wetland impacts that cannot be avoided, the Applicant will secure all necessary permits required under Section 404 of the CWA, Section 401 of the CWA, and the Minnesota WCA.

Generic 200 MW Wind Project

Because wind projects are designed to avoid wetlands to the extent possible, impacts and mitigation would be expected to be similar for a generic 200 MW wind project.

⁹¹ Site Permit Application, pg. 60-61 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁹² Site Permit Application, pg. 62 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁹³ Site Permit Application, pg. 62 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

⁹⁴ Site Permit Application, pg. 62 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

38.5 MW Biomass Facility

It is likely that a biomass facility could be designed and located to avoid wetland impacts. If the project could not avoid wetlands, permits from the USACE, DNR, and the local county or implementer of the WCA would be required depending upon jurisdiction.

6.4.4 Wildlife

Wildlife in the Project area consists of birds, mammals, fish, reptiles, amphibians and insects, both resident and migratory, which utilize the habitat in the project area for forage, breeding and shelter. The resident species are representative of game and non-game fauna in southwestern Minnesota. There are wetlands, lakes, and riverine habitats in the Project area. Small forested areas are present on the landscape; however, small groves of trees and wooded shelterbelts are common features of farmsteads in the area. The majority of migratory wildlife species are birds, including waterfowl, raptors and songbirds and migratory bat species.

Local species use the grasslands, farm woodlots, wetlands and other areas for food and cover. Mammals common to this landscape include opossum, skunk, squirrels, rodents, rabbits, deer, fox, coyotes, and raccoons. Reptiles and amphibians are associated with wetlands, waterways and forested areas within the Project area. Reptiles and amphibians include snakes, turtles and frogs. Several species of birds and bats are also known to occur in this landscape, including grassland birds, migratory birds, raptors and waterfowl. Birds and bats are discussed below.

Studies have shown that placement of turbines and auxiliary structures can result in decreased densities of songbirds and other species. Species of grassland birds, such as various grouse species, are particularly susceptible to displacement due to their high site fidelity.⁹⁵ The potential for habitat avoidance by wildlife in response to wind turbines and associated infrastructure is highly variable depending on the species under consideration, seasonal and annual variation in weather, migration patterns, and local and individual behavior patterns.

State-managed, federally owned, and private lands under permanent conservation easement provide wildlife habitat that has long-term protections from development and encroachment. The Project area has a mixture of state-managed Wildlife Management Areas (WMAs), federally owned Waterfowl Protection Areas (WPAs), and private land enrolled in the Reinvest In Minnesota (RIM) permanent easement program (see **Table 6**). These conservation lands are considered to be non-participating, and will be treated as such with respect to Project facility siting and placement. At a minimum, Project wind turbines will be placed at least five rotor diameters or three rotor diameters, depending on wind direction and property location, from identified conservation lands within and adjacent to the Project area. The five rotor diameter and three rotor diameter setbacks are indicated in Section 4.1 Wind Access Buffer of the DSP.

⁹⁵ Wind Turbine Interactions with Birds, Bats, and their Habitats, National Wind Coordinating Committee, Spring 2010, https://www1.eere.energy.gov/wind/pdfs/birds_and_bats_fact_sheet.pdf

Table 6. Conservation Lands within or Directly Adjacent to the Project⁹⁶

Type of Land	Managed by	Total Areas	Total Acreage
Wildlife Management Areas (WMA)	State	11	1,619
Waterfowl Production Areas (WPA)	Federal	10	1,251
Reinvest in Minnesota (RIM)	Private	6	5,484

Birds

The impact of wind facilities on avian species has been relatively well documented in Minnesota and South Dakota, in the general vicinity of the Project area. When using publicly available data from five (5) wind farms operating in Minnesota, and the four (4) wind farms operating in South Dakota, adjusted bird fatalities per MW per study period ranged from 0.44 to 5.59 and adjusted raptor fatalities per MW.⁹⁷

In summary, studies of bird fatalities near wind farms indicate that fatalities will occur and that they will vary with bird type (e.g., raptor, waterfowl, passerine), habitat availability, and other resources available within the Project area. At this time it is unclear how these fatalities will impact avian populations on a broader scale. Studies looking at avian fatalities caused by wind turbines throughout the United States estimated a fatality range of between 134,000 to 327,000 birds per year.⁹⁸

Bald eagle collisions with wind turbines are of additional concern as bald eagles populations continues to grow and expand throughout Minnesota. Bald eagles are afforded additional protections under the Bald and Golden Eagle Protection Act (BGEPA), which is administered by the USFWS. Due to the bald eagles protections under BGEPA, refer to Section 6.4.5. Rare and Unique Natural Resources, for further discussion of potential impacts and mitigation.

Bats

Bat fatality studies indicate a broad range of fatalities across the United States as a result of wind development. Fatality rates are highest for migrating-tree roosting bat species, with the majority of fatalities occurring during the late summer and early fall migration (roughly July-October). Documented bat fatalities are highest in the eastern United States, while those in the Midwest represent a wide range of fatality rates. Post-construction fatality studies completed in Iowa, Minnesota and Wisconsin

⁹⁶ Calculated using ArcGIS software and publicly available shapefiles on WMAs, USFWS Lands of Interest, and RIM Easements

⁹⁷ Site Permit Application, Appendix G – Avian and Bat Protection Plan, pg 28-29, Table 4 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124611-09](#)

⁹⁸ Wind Turbines, USFWS – Migratory Birds Program, <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/wind-turbines.php>

show bat fatality estimates ranging from 1 to 24 bats/MW/year.⁹⁹ Bat studies conducted in Minnesota, eight (8) wind facilities, and South Dakota, four (4) wind facilities, indicated an adjusted bat fatality rate of 0.16 to 20.19 fatalities per turbine per study period.¹⁰⁰

It is presumed that projects in areas with similar habitat and cover types would have similar fatality rates, depending on migration patterns, known roosting and foraging areas, and hibernacula. However, bat migration routes and behavioral patterns are poorly understood and there is a lack of comparative studies of bat fatalities from wind facilities, making it difficult to determine fatality rates at regional levels much less at broader scales.

There are seven species of bats that occur in Minnesota, all of which have the potential to occur throughout the state.¹⁰¹ Four bat species are state-listed as special concern in Minnesota; tri-colored bat (*Perimyotis subflavus*), northern myotis / northern long-eared bat (*Myotis septentrionalis*), big brown bat (*Eptesicus fuscus*), and little brown bat (*Myotis lucifugus*). The northern long-eared bat is currently listed as threatened by the USFWS and protected under the Endangered Species Act (ESA).¹⁰² With a current ESA status of threatened and an issued Final 4(d) Ruling, specified otherwise lawful activities are exempt from requiring further action to pursue an Incidental Take Permit for the taking of northern long-eared bats.¹⁰³ The issued Final 4 (d) Ruling for the northern long-eared bat has identified wind energy facilities as an activity exempt from needing an Incidental Take Permit, so long as the project does not result in tree removal, and the project does not result in the incidental take of northern long-eared bats in hibernacula or impair essential behavioral patterns around known hibernacula.¹⁰⁴

Bats primarily roost in trees, and some of the cave-dwelling species will also utilize human structures for roosting during the day. Bats commute to a variety of habitats for foraging, including riparian corridors, open grasslands, forests, wetlands, and agricultural fields, beginning shortly before sunset and continuing throughout the night until shortly after sunrise.¹⁰⁵ The various bat species found in Minnesota differ in the distance traveled, timing, weather conditions, prey species, and habitat utilization for foraging activities.

Bat activity is greatest in late July through mid-August. Fatality rates of migrating bats (tree-roosting species) peak during late summer and early fall.¹⁰⁶ The cumulative impacts of the wind industry to bat populations are unknown at this time.

⁹⁹ Wind Turbine Interactions with Birds, Bats, and their Habitats, National Wind Coordinating Committee, Spring 2010, https://www1.eere.energy.gov/wind/pdfs/birds_and_bats_fact_sheet.pdf

¹⁰⁰ Site Permit Application, Appendix G – Avian and Bat Protection Plan, pg 28-29, Table 4 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #20169-124611-09

¹⁰¹ DNR <http://www.dnr.state.mn.us/mammals/bats.html>

¹⁰² USFWS, Endangered Species – Northern Long-Eared Bat, <https://www.fws.gov/midwest/endangered/mammals/nleb/>

¹⁰³ Federal Register, Vol. 81, No. 9, Thursday, January 14, 2016, Rules and Regulations, <https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf>

¹⁰⁴ Federal Register, Vol. 81, No. 9, Thursday, January 14, 2016, Rules and Regulations, <https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf>

¹⁰⁵ Kunz et al. 2011. *Ecosystem Services Provided by Bats*, *Annals of the New York Academy of Sciences*: 1223 (2011) 1–38. <http://www.caves.org/WNS/WNS%20Kunz%20April%205%20%202011.pdf>

¹⁰⁶ Wind Turbine Interactions with Birds, Bats, and their Habitats, National Wind Coordinating Committee, Spring 2010, https://www1.eere.energy.gov/wind/pdfs/birds_and_bats_fact_sheet.pdf

Blazing Star Wind Farm

The Project area is dominated by row crop production, approximately 24,963 acres, approximately 67 percent of the Project area.¹⁰⁷ Other portions of the Project area include approximately 4,747 acres of grasslands, 3,964 acres of pasture/hay, 1,552 acres of developed/open space, 1,735 acres of wetlands/open water, 8 acres of shrub/scrub, and 221 acres of forest.¹⁰⁸ MN DNR has identified approximately 32 acres of dry sand-gravel prairie (southern) and approximately 225 acres of dry hill prairie (southern) within the Project area.¹⁰⁹

The Minnesota Biological Survey (MBS) has identified 50 areas, totally approximately 6,995 acres, as sites of biodiversity significance. Of those identified areas, 36 are below the minimum biodiversity threshold, 11 have moderate biodiversity significance, and three have high biodiversity significance. The areas with high biodiversity significance are located in close proximity of the northern Project boundary, and the moderate biodiversity significance areas are located along the eastern Project boundary and through the center of the Project area. The below and moderate biodiversity significance areas in the center of the Project area are likely at the greatest risk of being impacts by the proposed Project.

There appear to be no Federal Wildlife Refuge Lands, DNR Designated Wildlife Lakes, DNR Migratory Waterfowl Feeding and Resting Areas (MWFRA), State Game Refuges, DNR Scientific and Natural Areas (SNAs), or State Wild, Scenic, and Recreational Rivers (WSRs) within the Project boundary. There are no designated Important Bird Areas (IBA) present within the Project boundary, the Prairie Coteau Complex IBA is located directly south of the Project boundary.

Natural Heritage Information Systems (NHIS) data does not indicate any records of known bat maternity roost sites or known hibernacula within the Project area, or within five miles of the Project boundary.¹¹⁰ NHIS data does not indicate any records of federally listed species within the Project area, and there are four records of state listed species, one bird species and two plant species, within the Project area (see **Table 7**).¹¹¹ There are five species of special concern (State listing) within one mile of the Project boundary, one bird species and four plant species.¹¹² State listed species are further discussed in Section 6.4.5. Rare and Unique Natural Resources.

MN DNR staff has identified a blue heron rookery along the Lac Qui Parle River, which could potentially be impacted by the proposed Project. Additional surveys of the rookery have been recommended by the DNR, and are discussed in the mitigation section.

Impacts to most wildlife species during construction are expected to be minimal. Avian and bat fatalities will occur during Project operation, and have the potential to be moderate to high. While the extent of such fatalities is not known at this time, the range of adjusted fatalities seen at other large wind facilities in Minnesota and South Dakota is 0.44 to 5.59 birds fatalities/MW/study period and 0.16 to

¹⁰⁷ Site Permit Application, pg 63 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁰⁸ Site Permit Application, pg 63 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁰⁹ Calculated using ArcGIS software and publicly available Minnesota DNR Native Prairie Shapefile

¹¹⁰ Site Permit Application, pg 69 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹¹¹ Site Permit Application, pg 85 and 86, Table 8.32 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹¹² Site Permit Application, pg 68 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

20.19 bats/MW/ per study period.¹¹³ The majority of Project related fatalities will likely be migratory tree roosting bats, as has been typical of other wind energy facilities in Minnesota.

Impacts to other terrestrial and aquatic animals are expected to be minimal during construction and operation of the Project and no specific mitigation has been proposed.

Mitigation

Blazing Star Wind submitted a draft Avian and Bat Protection Plan (ABPP) on September 1, 2016 with the Project's Site Permit Application. The final ABPP will be required to include information on formal and informal monitoring, construction and operation training and reporting protocol. Applicants propose to minimize impacts to birds and bats through siting, timing of construction and avoidance of habitat. Siting turbines away from bird habitat (grasslands, riparian areas and wetlands), identified flyways and bat feeding areas (forests, riparian corridors and wetlands) reduces impacts to avian and bat species. The project will maintain a 3 x 5 RD setback from all public conservation lands within the Project area and adjacent to the Project boundary.

High wind conditions reduce bird and bat flight activity. Wind turbines require a minimum wind speed ("cut-in" speed) for operation. Impacts to birds and bats could be mitigated by "feathering" or locking the turbine blades up to the manufacture's designated cut-in speed, or by increasing the cut-in speed during periods of high activity.¹¹⁴ Curtailment of turbines has been found to effectively reduce bat fatalities by a minimum of 50% by raising operational cut-in speeds.¹¹⁵

The DSP currently identifies the following Special Conditions to monitor and mitigate the Blazing Star Wind Farm's potential impacts on wildlife resources;

- Special Condition 6.1 – The Permittee shall consult with the USFWS to determine if an Eagle Incidental Take Permit under BGEPA is appropriate for the Project.
- Special Condition 6.2 – The existing blue heron rookery along the Lac Qui Parle River shall be monitored prior to construction, and if active, will be monitored for an additional three years following the completion of construction.
- Special Condition 6.3 – The Permittee shall utilize a qualified third party to conduct two full years fatality monitoring following the commencement of commercial operation.
- Special Condition 7.5 – Includes requirements to maintain an updated ABPP in coordination with MN DNR, USFWS, and the Commission, quarterly and immediate incident reporting, feathering of turbine blades below operational cut-in speeds, and utilizing operational software that can adjust turbine cut-in speeds.

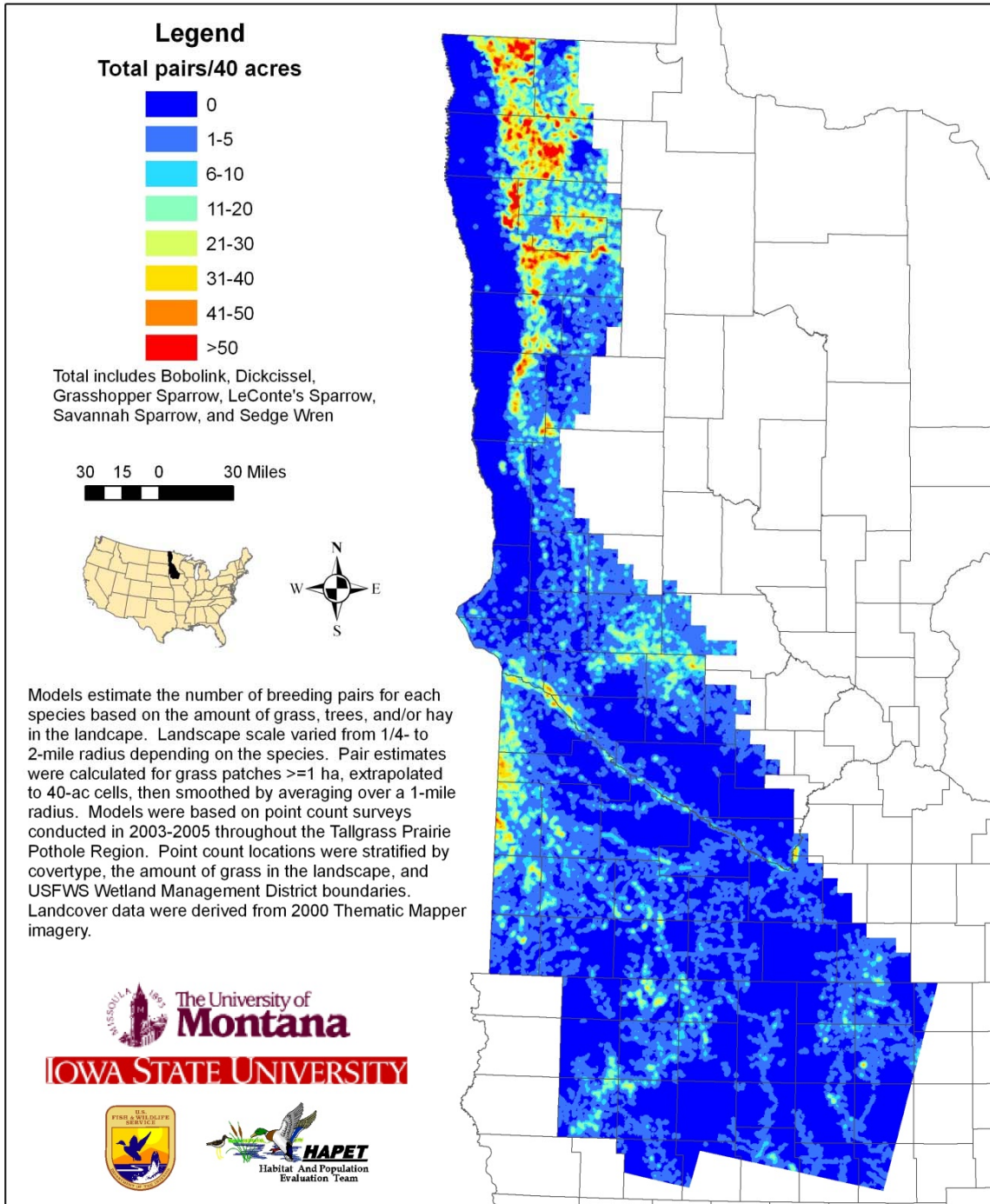
¹¹³ Site Permit Application, Appendix G – Avian and Bat Protection Plan, pg 28-29, Table 4 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124611-09](#)

¹¹⁴ Arnett et al. April 2009. *Effectiveness of Changing Wind Turbine Cut-In Speeds to Reduce Bat Fatalities at Wind Facilities*, http://www.batsandwind.org/pdf/Curtailment_2008_Final_Report.pdf

¹¹⁵ Arnett et al. April 2009. *Effectiveness of Changing Wind Turbine Cut-In Speeds to Reduce Bat Fatalities at Wind Facilities*, http://www.batsandwind.org/pdf/Curtailment_2008_Final_Report.pdf

Figure 4. Predicted Nesting Grassland Bird Pairs

Predicted Number of Grassland Nesting Bird Pairs in the Prairie Pothole Region of Minnesota and Iowa



Generic 200 MW LWECs

Because impacts to wildlife would depend upon specific site characteristics, it is difficult to assess wildlife impacts for a generic 200 MW LWECs located elsewhere in Minnesota. As discussed above, impacts to birds and bats are the primary concern with wind projects. Information about local bird and bat populations within Minnesota is incomplete and different sites provide varying habitat and foraging areas for different species of birds and bats. As shown in **Figure 4**, compared to the rest of the Prairie Pothole region in Minnesota and Iowa, the Project area shows a moderate population density of grassland nesting birds (including Bobolink, Dickcissel, Grasshopper Sparrow, LeConte's Sparrow, Savannah Sparrow, and Sedgewren). USFWS Tstorm Maps, which show the predicted accessibility of upland nest habitat for duck pairs in the Prairie Pothole Region of Minnesota and Iowa, indicate that the Blazing Star Wind Farm is located in an area of moderate accessibility to habitat, and a large portion of the Prairie Pothole Region outside of the Project area ranges from low to moderate accessibility of habitat.¹¹⁶

38.5 MW Biomass Plant

A 38.5 MW biomass plant would likely have fewer impacts on avian and bat species than the Blazing Star Wind Farm. The biomass plant would be constructed on an approximately 60 acre site. This acreage would be removed from use as wildlife habitat. However, the land used for the project would likely be agricultural land; such land is relatively poor habitat for wildlife. Impacts from operation of the plant are anticipated to be minimal. Emissions from the plant (e.g., hazardous air pollutants) could, through impacts to the environment, impact wildlife. The extent of this impact is uncertain.

6.4.5 Rare and Unique Natural Resources

The Minnesota Biological Survey (MBS) and the Minnesota Natural Heritage Information System (NHIS) provide information on federal and state listed species, Species of Greatest Conservation Need and unique or rare habitat types in Minnesota. The MBS systematically collects, interprets and delivers baseline data on the distribution and ecology of rare plants, rare animals and native plant communities.¹¹⁷ The NHIS database provides information on Minnesota's rare plants, animals, native plant communities and other rare features. The NHIS is continually updated and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities and other natural features.¹¹⁸

Bald eagle collisions with wind turbines are of additional concern as bald eagles populations continues to grow and expand throughout Minnesota. Wind energy facilities are eligible to apply for Incidental Take Permits and Nest Removal Permits issued by the USFWS, which will allow for the non-intentional take of bald eagles and the removal of bald eagle nests, respectively. Bald eagle incidental take permits and nest removal permits are considered to be voluntary permits, meaning a project proposer must make the determination to pursue a permit based on the respective risk of their project's potential to take a bald eagle.

¹¹⁶ USFWS, Habitat and Population Evaluation Team, Thunderstorm Maps

<https://www.fws.gov/midwest/hapet/thunderstormmaps.html>

¹¹⁷ Minnesota County Biological Surveys, <http://www.dnr.state.mn.us/eco/mcbs/index.html>

¹¹⁸ Minnesota Natural Heritage Information System Database, <http://www.dnr.state.mn.us/eco/nhnrp/nhis.html>

Blazing Star Wind Farm

A review of NHIS data indicates there is one record of a loggerhead shrike (State Endangered), one record of slender milk vetch (State Special Concern), and two records of Western white prairie-clover (State Special Concern) within the Project area, as noted in **Table 7**. NHIS data does not indicate any records of Native Plant Communities within the Project area. The most recent NHIS data record of loggerhead shrike nesting within the Project area was documented in 1995, and there have been no additional sightings of the species within the Project area during any of the avian surveys conducted for the Blazing Star Wind Farm.

Table 7. State Protected Species within the Project Area¹¹⁹

Species	Federal Status	State Status	Occurrences
Loggerhead Shrike	None	Endangered	1
Slender Milkvetch	None	Special Concern	1
Western White Prairie-clover	None	Special Concern	2

Six species that are known to occur in Lincoln County are listed and protected under the Federal ESA, northern long-eared bat (threatened), Dakota skipper (threatened), Poweshiek skipperling (endangered), Topeka shiner (endangered), prairie bush clover (threatened), and western prairie fringed orchid (threatened).¹²⁰ NHIS data does not have any records of the above listed, federally protected species, within the Project site. There is no designed Critical Habitat for any of the federally listed species within the Project boundary.¹²¹ Additionally, acoustic survey efforts by the Applicant's consultant, have not identified any acoustic calls of the northern long-eared bats within the Project area.

Bald eagle nest surveys conducted by the Applicant's consultant in March 2016 identified six occupied and active bald eagle nests within 10 miles of the Project boundary, including two nest that are within two miles of the Project boundary.¹²² Bald eagles have been observed flying through the Project area, during avian use surveys conducted by the Applicant's consultant in April, May, and June of 2016.¹²³

Since the Project's initial Application was filed, EERA, MN DNR, and USFWS staff have been notified by a public citizen of an active bald eagle nest that appears to be located within the Project area.

¹¹⁹ Site Permit Application, pg 85 and 86, Table 8.32 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket [#20169-124610-02](#)

¹²⁰ Site Permit Application, pg 83, Table 8.31 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket [#20169-124610-02](#)

¹²¹ Site Permit Application, pg 87 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket [#20169-124610-02](#)

¹²² Site Permit Application, Appendix G – Avian and Bat Protection Plan, pg. 18 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket [#20169-124611-09](#)

¹²³ Site Permit Application, Appendix G – Avian and Bat Protection Plan, pg. 18 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket [#20169-124611-09](#)

Mitigation

The following measures would help prevent potential impacts to rare and unique natural resources in the Project area.

- Conduct a pre-construction inventory of existing biological resources, native prairie and wetlands in the Project area to inform micro-siting;
- Avoid or minimize disturbance of individual wetlands or drainage systems during construction of the Project; and
- Avoid or minimize placement of turbines in high quality native prairie and MBS “Sites of Biodiversity Significance” ranked as “Outstanding,” “High” or “Medium.”

The DSP currently identifies the following Conditions and Special Conditions to monitor and mitigate the Blazing Star Wind Farm’s potential impacts on rare and unique natural resources;

- Condition 4.7 – The Permittee shall prepare a Prairie Protection and Management Plan in consultation with MN DNR.
- Special Condition 6.1 – The Permittee shall consult with the USFWS to determine if an Eagle Incidental Take Permit under BGEPA is appropriate for the Project.
- Special Condition 6.3 – The Permittee shall utilize a qualified third party to conduct two full years fatality monitoring following the commencement of commercial operation.
- Special Condition 7.5 – Includes requirements to maintain an updated ABPP in coordination with MN DNR, USFWS, and the Commission, quarterly and immediate incident reporting, and utilizing operational software that can adjust turbine cut-in speeds.

Specific to the bald eagle nests that has been identified within the Project area and near the Project area; the Applicant, EERA staff, and USFWS staff will be engaged in further consultation, prior to the Commission’s final decision on the Project’s Certificate of Need and Site Permit Applications, to determine the Project’s potential to take a bald eagle. From this consultation, it will also be determined if additional mitigation measures are necessary.

Generic 200 MW LWECs

A generic 200 MW LWECs sited elsewhere in Minnesota could have potentially very different unique and rare natural resources depending on location. Mitigation techniques would be site specific and would likely include avoidance as the primary mitigation technique.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would likely have fewer impacts to rare and unique natural resources. By occupying a single location rather than being dispersed across thousands of acres, opportunities for conflict with rare and natural resources would be reduced. Additionally, a biomass plant could also be sited to avoid unique habitats and would utilize construction practices that would avoid or minimize disturbances to wetlands or drainage systems.

6.5 Human and Social Environment

LWECS have the potential for effects real or perceived on a local area, including impacts to human, community and social environments. The human setting into which this wind project is being proposed to be set is rural and predominately agricultural. From a larger landscape perspective there are already a number of commercial wind turbines operating to the south and southwest of the Project area.

Table 8. Demographic and Economic Characteristics of the Project Area

Description	Lincoln County	Minnesota
Population, 2015 ¹²⁴	5,771	5,489,594
Population, 2010 ¹²⁵	5,896	5,303,925
Percent Population Change, 2010-2015	-2.1	3.5
Persons per Square Mile, 2010 ¹²⁶	11.0	66.6
Land Area in Square Miles, 2010 ¹²⁷	536.76	79,626.74
Median Household Income ¹²⁸ (in 2015 dollars)	49,575	61,492
Persons below Poverty ¹²⁹ (2015 percent)	9.3	10.2

The Project area is within a county that has been experiencing declines in population over the last five years, and even greater population declines have been seen over the past few decades. Lincoln County had a population of approximately 9,651 back in 1960, and by 1990 the population had decreased to 6,890.¹³⁰ Even though the population decline has continued into the new millennium, household

¹²⁴ U.S. Census Bureau Website, <https://www.census.gov/quickfacts/table/PST045216/27081>

¹²⁵ U.S. Census Bureau Website, <https://www.census.gov/quickfacts/table/PST045216/27081>

¹²⁶ U.S. Census Bureau Website, <https://www.census.gov/quickfacts/table/PST045216/27081>

¹²⁷ U.S. Census Bureau Website, <https://www.census.gov/quickfacts/table/PST045216/27081>

¹²⁸ U.S. Census Bureau Website, <https://www.census.gov/quickfacts/table/PST045216/27081>

¹²⁹ U.S. Census Bureau Website, <https://www.census.gov/quickfacts/table/PST045216/27081>

¹³⁰ U.S. Census Bureau, <https://www.census.gov/population/cencounts/mn190090.txt>

incomes in Lincoln County remain relatively competitive with state average, and percentage of the Lincoln County population below the poverty line is below the state average (see **Table 8**).

The Applicant has identified 96 homes/residences within the Project area.¹³¹ The population density within the Project area ranges from 3.4 to 6.1 people per square mile, depending on Township, which appears to be typical and in line with neighboring Townships in Yellow Medicine County (see **Table 9**).¹³²

Table 9. Population and Residences in Project Area¹³³

County	Township	Population Density (people per square mile)
Within 5 Miles of the Project Boundary		
Yellow Medicine	Fortier	3.2
Yellow Medicine	Norman	8.1
Within the Project Boundary		
Lincoln	Hansonville	3.4
Lincoln	Hendricks	6.1
Lincoln	Marble	5.4

6.5.1 Aesthetic Impact and Visibility Impairment

The large size and appearance of wind turbines causes them to stand out against the backdrop of the open, rural landscapes in which they are often sited. Additionally, due to their height, ranging from 433 to 499 feet, they can be seen from long distances. Visual impairment would not be an issue with this Project because wind turbines do not generate or emit by-products as a result of generation activities. This section discusses visual changes, shadow flicker, and perceptions of aesthetics of the proposed Project.

Blazing Star Wind Farm

The Blazing Star Wind Farm would alter the current landscape through the introduction of large wind turbines. Many factors influence how a wind energy facility is perceived. Factors may include levels of visual sensitivity of individuals, viewing conditions, visual settings, and individual ideas and experiences. Distance from a turbine(s) and activities within and near the Project area, landscape features such as hills and tree cover, as well as an individual's personal feelings about wind energy technology can all contribute to how a wind energy facility is perceived. Blazing Star Wind Farm would be located in a predominantly rural, agricultural area characterized by flat to gently rolling topography. From a larger landscape perspective there are already a number of commercial wind turbines operating to the south and southwest of the Project area.

¹³¹ Site Permit Application, pg 14 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹³² Site Permit Application, pg 14 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹³³ Site Permit Application, pg 14 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Developing a method to assess the impacts to aesthetics of wind projects is difficult. Current methods of assessing visual impacts include viewshed mapping, photographic simulations, and video animation.¹³⁴ All of these methods depend, to some extent, on assessing the current aesthetic resources of the project area, i.e., the aesthetics of the area before construction of a wind farm. Such assessments can be subjective; however, state and federal agencies often perform such assessments in the development of parks that have valuable aesthetic resources.

There are state-managed WMAs and federally owned WPAs within and adjacent to the Project area (see **Table 6**). WMAs, SNAs, WPAs, and wildlife refuges provide recreational opportunities in a passively managed, natural landscape. Public lands provide numerous benefits, including aesthetic and visual. Recreational users would likely see turbines from these areas, potentially diminishing qualities of perceived remoteness and scenic value. A portion of the Lincoln County Snowmobile Trail travels south out of the City of Hendricks, running adjacent to State Highway 271 for approximately 3 miles, and then the Trail turns and travels east along State Highway 19 adjacent to the southern edge of the Project area.

Mitigation

Mitigation of impacts to aesthetic and visual resources is best accomplished through micro-siting of wind turbines and maintaining designated setbacks from participating and non-participating landowners. In general, siting wind projects in rural areas minimizes human impacts. Aesthetic impacts to public lands can be mitigated by siting wind Projects outside of these areas, and utilizing natural features such as topography and vegetation to reduce visual intrusions.

Setbacks for individual turbines, as embodied by the DSP assist in mitigating visibility impacts. Wind turbines must be set back from non-participating property lines a minimum distance of 5 rotor diameters (RD) on the prevailing wind direction and 3 RD on the non-prevailing wind direction. The potential rotor diameters for the turbines proposed for the Blazing Star Wind Farm are shown in **Table 1**. Turbines are designed to be a uniform off-white color to blend in with the horizon and reduce visibility impacts.

Generic 200 MW LWECS

A generic 200 MW LWECS located elsewhere in Minnesota would have similar visual impacts and mitigation strategies. The number of people experiencing the visual impacts could potentially be greater if locating the Project in a less rural area of Minnesota.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would likely impact visual aesthetics in the immediate area of the facility and in the surrounding area depending on the height of the stack plume.

A biomass plant would be industrial in nature with many buildings, conveyors, biomass piles, and a boiler stack. The building housing the boiler is likely to be at least 100 feet tall. The conveyors and biomass piles could range from 30 to 50 feet in height. Buildings, conveyors, and biomass piles would

¹³⁴ A Visual Impact Assessment Process for Wind Energy Projects, Clean Energy States Alliance, March 2011, http://www.cbuilding.org/sites/cbi.drupalconnect.com/files/CESA_Visual%20Impacts_Methodology_032111.pdf

likely be lighted to allow for nighttime operation. Lighting would also be necessary for wood fuel loading/unloading points, truck scales, and vehicle parking areas.

The estimated height for the boiler stack is approximately 150 feet. Particulate matter control devices would capture most of the particulates from the boiler exhaust gas steam. Thus, the majority of the plume from the boiler stack would be water vapor. This plume may be seen during cold weather conditions, but would likely be virtually clear in warm weather. In cold weather, the plume may impair visibility. If taller than 200 feet, the boiler stack may require FAA lighting, similar to wind turbines.

Mitigation

Mitigation of visual impacts could be accomplished through siting of the biomass plant. The plant could be located in an industrial location allowing it to blend in with other industry and be located away from aesthetically valuable resources. However, the biomass plant would need to be located in an area where biomass is readily available in large quantities. Vegetative screening (trees, shrubs) could be used to partially block views of industrial buildings, silos, conveyors and boiler stack.

6.5.2 Shadow Flicker

Wind turbines are known to create shadow flicker. Shadow flicker is the intermittent change in light intensity due to rotating wind turbine blades casting shadows on the ground. Three conditions must be present for shadow flicker to occur: the sun must be shining with no clouds to obscure it; the rotor blades must be spinning and located between the receptor and the source; and the receptor must be close enough to the turbine to be able to distinguish the shadow created by the turbine. Shadow intensity, or how “light” or “dark” a shadow appears at a specific receptor, will vary with distance from the turbine. The closer a receptor is to a turbine, the more turbine blades block out the sun’s rays, and shadows will be wider and darker. Receptors located farther away from a turbine experience thinner and less distinct shadows since the blades block out less sunlight. Shadow flicker is reduced or eliminated when buildings, trees, blinds, or curtains are located between the turbine and receptor.

There is not a Minnesota “light standard” that addresses potential impacts of shadow flicker, i.e. there is not a descriptive or numeric standard that would categorize a certain amount of flicker as acceptable or unacceptable. No other states have adopted such a standard. However, other countries have examined the issue and have adopted standards. Standards depend on assumptions about how flicker impacts are to be calculated:

- Germany has established a "norm" for shadow flicker that does not exceed 30 hours/yr. or 30 minutes/day at a receptor.¹³⁵ It is unclear whether this is a worst-case scenario (e.g., clear skies every day) or an real-case scenario (e.g., weather representative of the Project area).
- Belgium has adopted the German norm, adding a requirement for modeling in an EIA.¹³⁶

¹³⁵ Spatial Planning of Wind Turbines, European Actions for Renewable Energy (PREDAC), <http://www.oddzialywaniawiatrakow.pl/upload/file/302.pdf>

¹³⁶ Spatial Planning of Wind Turbines, European Actions for Renewable Energy (PREDAC), <http://www.oddzialywaniawiatrakow.pl/upload/file/302.pdf>

- Denmark recommends a maximum of 10 hours/yr. assuming average cloud cover in the Project area.¹³⁷
- France has adopted no standard but requires shadow flicker modeling.¹³⁸
- The Netherlands have adopted a yearly maximum of 5 hours and 40 minutes assuming clear skies.¹³⁹
- The State of Victoria, Australia, has adopted a shadow flicker standard of 30 hours/yr.¹⁴⁰

Blazing Star Wind Farm

Shadow flicker would occur as a result of the proposed Project. Areas most likely to experience shadow flicker would occur to the east and west of turbines. The number of shadow flicker hours per year experienced by a receptor is dependent on sun angle and path, cloud cover, distance from turbine(s), wind direction and speed, topography, presence of visual obstacles (i.e. trees or buildings), and the light intensity within the home.

Potential shadow flicker impacts on the local residences has been modeled by the Applicant, which has looked at worst case and real case scenarios for both participating and non-participating residences.¹⁴¹ The modeling also takes the various turbine models into account, as the various turbine heights and blade lengths will influence the shadows cast by the Project.

The maximum worst case scenario for a participating residences would result if the proposed Acciona turbine was used for the Project, which would expose a receptor to 192.9 hours of shadow flicker per year.¹⁴² The proposed Acciona turbine would also result in the maximum real case scenario for a participating residences, which would expose a receptor to 56.1 hours of shadow flicker per year.¹⁴³ With respect to non-participating residences, the maximum worst case scenario would occur by using the proposed GE turbine (89.6 hours of shadow flicker per year) and the maximum real case scenario would occur with the proposed Vestas turbine (30.3 hours of shadow flicker per year).¹⁴⁴ **Table 10** provides a summary of the Applicant's initial modeling results.

¹³⁷ Spatial Planning of Wind Turbines, European Actions for Renewable Energy (PREDAC), <http://www.oddzialywaniawiatrakow.pl/upload/file/302.pdf>

¹³⁸ Spatial Planning of Wind Turbines, European Actions for Renewable Energy (PREDAC), <http://www.oddzialywaniawiatrakow.pl/upload/file/302.pdf>

¹³⁹ Spatial Planning of Wind Turbines, European Actions for Renewable Energy (PREDAC), <http://www.oddzialywaniawiatrakow.pl/upload/file/302.pdf>

¹⁴⁰ Policy and planning guidelines for development of wind energy facilities in Victoria, p. 47, January 2016, https://www.planning.vic.gov.au/data/assets/pdf_file/0030/9696/Policy-and-Planning-Guidelines-for-Development-of-Wind-Energy-Facilities-in-Victoria-January-2016.pdf

¹⁴¹ Site Permit Application, pgs. 23-27 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁴² Site Permit Application, pg. 25, Table 8.8 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁴³ Site Permit Application, pg. 25, Table 8.8 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁴⁴ Site Permit Application, pg. 25, Table 8.9 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Table 10. Potential Shadow Flicker Exposure on Homes over the Course of a Year

Model Statistic	Shadow Flicker Hours/Year by Turbine Model			
	Acciona	Vestas	GE	Gamesa
Max - Worst Case (Participating)	192.9	179.7	188.7	177.8
Max – Real Case (Participating)	56.1	51.2	54.2	51.6
Max – Worst Case (Non-Participating)	87.1	88.3	89.6	82.7
Max Real Case (Non-Participating)	19.3	30.3	20.0	18.3

The Applicant's consultant conducted additional shadow flicker modeling based upon turbine siting modifications, and determined that none of the turbine models currently under consideration will produce more than 20 hours per year of shadow flicker (real case scenario) for any non-participants.¹⁴⁵

Mitigation

The Applicant's computer modeling of the proposed Project can be used to minimize shadow flicker at receptors within and adjacent the Project area by using micrositing of wind turbines and maintaining designated setbacks from participating and non-participating landowners. The Applicant is currently required to maintain a minimum 1,000 foot setback from all residences, which should be effective in reducing shadow flicker.

A number of mitigation options are available and have been proposed by the Applicant, to help reduce the potential for shadow flicker impacts. The Applicant will provide educational materials to residents in the area, which will describe ways to minimize the effects of shadow flicker.¹⁴⁶ Additionally, the Applicant has indicated that providing indoor screening (i.e. window curtains or blinds), exterior screening (i.e. vegetation buffers or awnings), or operational software adjustments (brief, temporary shutdown of specific turbines) will be considered and utilized where appropriate and reasonable.¹⁴⁷

It is important to note that all of the proposed turbine models being considered for the Project do not pose a health risk to photosensitive individuals, including those with epilepsy.¹⁴⁸ The frequency of shadow flicker anticipated to be generated by the proposed turbine models is expected to be no greater than 1.5 flashes per second.¹⁴⁹

¹⁴⁵ Final Report Blazing Star Wind Farm – Shadow Flicker Study, EAPC Wind Energy, December 1, 2016, eDocket# [201612-127379-01](#)

¹⁴⁶ Site Permit Application, pg. 27 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁴⁷ Site Permit Application, pg. 27 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁴⁸ Site Permit Application, pg. 26 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁴⁹ Site Permit Application, pg. 26 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

According to the Epilepsy Foundation it is generally thought that a flashing light must have a frequency of between 5 and 30 flashes per second to trigger seizures.¹⁵⁰

Generic 200 MW LWECS

Depending on surrounding landscape and topography, a generic 200 MW LWECS would have similar shadow flicker impacts and mitigation. Shadow flicker could be reduced in an area with greater variation in topography and vegetation, such as a landscape with hills and greater tree cover.

38.5 MW Biomass Plant

A biomass plant would not cause shadow flicker due to the lack of exterior moving parts that could cast alternating shadows.

6.5.3 Facility and Turbine lighting

Large electric generating facilities would generally have some type of lighting at the facility to ensure safe operation of the facility. The Federal Aviation Administration (FAA) requires that all structures more than 200 feet above the ground have proper lighting or marking to allow for safe air navigation.¹⁵¹ Generally, to meet this requirement wind turbines are lighted with red flashing lights, which can create an undesirable nighttime view in a rural setting for some individuals.

Blazing Star Wind Farm

The Project will have some non-turbine facilities, which must be lit at times to allow for worker safety. Lighting of the wind turbines will be consistent with FAA guidelines and is similar to that for other tall structures in rural areas, such as communication towers.

Mitigation

All non-turbine facilities will only be lit when workers are present, or at other times when lighting is absolutely necessary. Downward facing lights will be used at non-turbine facilities.

The Applicant must submit and get FAA approval of lighting plan, and they hope to minimize the visual impacts of the nighttime turbine lighting. The Applicant is anticipating that only 50% of the turbines will need to be lit and the turbine lighting will have a maximum off phase. Use of the proposed Acciona turbine model may also reduce potential visual impacts of turbine lighting, as only 66 turbines would be utilized versus up to having up 100 turbines for some of the other proposed turbine models.

Generic 200 MW LWECS

A generic 200 MW LWECS located elsewhere in Minnesota would have lighting impacts similar to the proposed Project.

¹⁵⁰ Site Permit Application, pg. 26 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁵¹ FAA Advisory Circular AC 70/7460-2K,

[http://rgl.faa.gov/REGULATORY_AND_GUIDANCE_LIBRARY/REGADVISORYCIRCULAR.NSF/0/22990146db0931f186256c2a00721867/\\$FILE/ac70-7460-2K.pdf](http://rgl.faa.gov/REGULATORY_AND_GUIDANCE_LIBRARY/REGADVISORYCIRCULAR.NSF/0/22990146db0931f186256c2a00721867/$FILE/ac70-7460-2K.pdf)

38.5 MW Biomass Plant

If taller than 200 feet, the boiler stack for a 38.5 MW Biomass plant would require FAA lighting similar to wind turbines.

6.5.4 Noise

Large electric generation facilities generate noise. Potential human impacts due to noise include hearing loss, stress, annoyance, and sleep disturbance.¹⁵² Noise can be defined as unwanted or inappropriate sound. Sound has multiple characteristics which determine whether a sound is too loud or otherwise inappropriate. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels (dB). Sounds also consists of frequencies, e.g., the high frequency (or pitch) of a whistle. Most sounds are not a single frequency but a mixture of frequencies. Finally, sounds can be constant or intermittent. The perceived loudness of a sound depends on all of these characteristics.

A sound meter is used to measure loudness. The meter sums up the sound pressure levels for all frequencies of a sound and calculates a single loudness reading. This loudness reading is reported in decibels, with a suffix indicating the type of calculation used. For example, "dB(A)" indicates a loudness reading using an A-weighted calculation (or "scale").

Table 11. Minnesota Noise Standards by Area Classification (expressed in dB A)¹⁵³

Noise Area Classification ¹⁵⁴	Daytime		Nighttime	
	L ₅₀ ¹⁵⁵	L ₁₀	L ₅₀	L ₁₀
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

The State of Minnesota has promulgated noise standards designed to ensure public health and minimize citizen exposure to inappropriate sounds. The rules for permissible noise vary according to land use, i.e., according to their noise area classification (NAC).

In a residential setting, for example, noise restrictions are more stringent than in an industrial setting. Rural residential homes are considered NAC 1 (residential), while agricultural land and agricultural activities are classified as NAC 3 (industrial). The rules also distinguish between nighttime and daytime noise; less noise is permitted at night. Sound levels are not to be exceeded for 10 percent and 50

¹⁵² Guidelines for Community Noise, World Health Organization, 1999

¹⁵³ Minnesota Rule 7030.0040, <https://www.revisor.leg.state.mn.us/rules/?id=7030.0040>

¹⁵⁴ Minnesota Rule 7030.0050, <https://www.revisor.leg.state.mn.us/rules/?id=7030.0050>

¹⁵⁵ Minnesota Rule 7030.0020, <https://www.revisor.leg.state.mn.us/rules/?id=7030.0020>

percent of the time in a one-hour survey (L_{10} and L_{50}) for each noise area classification. **Table 11** lists Minnesota's noise standards by area classification.

Blazing Star Wind Farm

The operation of wind turbines will produce noise. Turbines produce mechanical noise (noise due to the gearbox and generator in the nacelle) and aerodynamic noise (noise due to wind passing over the turbine blades).¹⁵⁶ Perceived sound characteristics would depend on the type/size of turbine, the speed of the turbine (if turning), and the distance of the listener from the turbine.

Wind turbines produce audible, low frequency sound and sub-audible sound (infrasound). These sounds can have a rhythmic modulation due to the spinning of the turbine blades.¹⁵⁷ Impacts due to these sound characteristics are subjective, i.e., human sensitivity, especially to low frequency sound, is variable. However, low frequency sounds may cause annoyance and sleep disturbance for more sensitive individuals.¹⁵⁸

The Applicant conducted a preliminary noise assessment of the proposed Project, which models the anticipated sound levels that will be experienced at the 138 noise-sensitive receptors throughout the Project area (see **Table 12**).¹⁵⁹ The noise assessment looked at all turbine models being considered for the Project, assumed wind speeds are at the maximum sound power level, and the wind speeds are constant for one entire hour.¹⁶⁰ The maximum calculated noise level at any noise-sensitive receptor was 49 dBA, so it is anticipated that under real-world conditions there would be no exceedances of the MPCA rules at any of the residential receivers for any of the wind turbine options.¹⁶¹

Table 12. Noise Modeling Results at Receiver¹⁶²

Turbine Model	Maximum Modeled L_{50} Sound Level (dB(A))
Acciona 3.0-132	48
GE 2.5-116	49
Gamesa 126	48
Vestas V110	48

¹⁵⁶ Public Health Impacts of Wind Turbines, Minnesota Department of Health, May 22, 2009, <http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>

¹⁵⁷ Public Health Impacts of Wind Turbines, Minnesota Department of Health, May 22, 2009, <http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>

¹⁵⁸ Public Health Impacts of Wind Turbines, Minnesota Department of Health, May 22, 2009, <http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>

¹⁵⁹ Site Permit Application, pg. 20 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁶⁰ Site Permit Application, pg. 19 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁶¹ Site Permit Application, pg. 20 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁶² Site Permit Application, pg. 20 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Mitigation

The primary means of mitigating sound (noise) produced by wind turbines is siting. Turbines must be sited to comply with noise standards in Minnesota Rule 7030.¹⁶³ For rural residential areas in Lincoln County, this means sound levels must meet an L₅₀ standard of 50 dB(A). The distance that turbines are setback from residences would depend on the type and size of turbine. As required in the DSP, and proposed by the Applicant, no turbines will be built within 1,000 feet of any residence. Cumulative noise impacts must also be considered. That is, if there are multiple turbines in the vicinity of a residence, the standards set by Minnesota Rule 7030 must still be met. This may require additional setbacks.

Setback requirements are enforced by the Site Permit issued by the Commission. The Commission continuously reviews public health setbacks related to wind farms to determine if they remain appropriate and reasonable.¹⁶⁴

Generic 200 MW LWECS

A generic 200 MW LWECS would have noise impacts and mitigation similar to the Blazing Star Wind Farm. Depending on location, surrounding vegetation, topography, and turbine selection, impacts from noise could be more or less than those expected of the proposed Project.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would create noise during operation from a variety of sources including the turbine/boiler building, conveyor system, hammer mill and bale choppers, front end loaders, and idling trucks. Based on noise studies, the plant would need to be located approximately 2,100 feet from a residence to meet the daytime L₅₀ standard of 60 dB(A), and approximately 6,200 feet from a residence to meet the nighttime L₅₀ standard of 50 dB(A). These are conservative estimates – they are based on maximum equipment operation and have not been adjusted for possible noise shielding.

Mitigation

Sound (noise) from the biomass plant could be mitigated by siting. A study would likely be required to ensure that noise standards are met for all local residents. Enclosure of heavy equipment would reduce noise impacts. Vegetative screening, planted to lessen visual impacts, would also reduce potential noise levels. Fuel windrows could provide noise attenuation. Hours of operation, e.g., for fuel delivery or heavy equipment operation, could be managed to reduce noise impacts and help meet the standards.

6.5.5 Property values

Large electric generation facilities have the potential to impact property values. Because property values are influenced by a complex interaction between factors specific to each individual piece of real estate as well as local and national market conditions, the effect of one particular project on the value of one particular property is difficult to determine.

¹⁶³ Minn. Rules 7030.0040, Noise Standards, <https://www.revisor.leg.state.mn.us/rules/?id=7030.0040>

¹⁶⁴ Commission Investigation into Large Wind Energy Conversion Systems Permit Conditions on Setbacks and the Minnesota Department of Health Environmental Health Division's White Paper on Public Health Impacts of Wind Turbines, CI-09-845, found on eDockets, <https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&userType=public>, enter "09" for year and "845" for number

Blazing Star Wind Farm

The proposed Project would be located in Lincoln County in southwest Minnesota. The population in Lincoln County has dropped between 2010-2015, continuing a decades long trend, which could be expected to depress residential values. Additionally, average household incomes in Lincoln County are below the average household income throughout the State of Minnesota (see **Table 8**). However, southern and southwestern Minnesota have experienced the greatest development of wind energy facilities, which could make the addition of another large wind facility in the area to be less influential on property values than it may be if the facility was placed in an area where wind energy facilities are less common on the landscape.

The impacts on property values due to the Project is difficult to quantify. Numerous factors influence a property's market value, including acreage, schools, parks, neighborhood characteristics and improvements. A direct influence on property value is often the status of the housing/land market at the time of sale.

In December 2009, The Department of Energy (DOE) Lawrence Berkeley National Laboratory released a technical analysis of wind energy facilities' impacts on the property values of nearby residences:

Using a combination of different analytic approaches, the investigation finds no evidence that prices of homes surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities. Though the analysis cannot dismiss the possibility that individual homes or small numbers of homes have been or could be negatively impacted, it finds that if these impacts do exist, their frequency is too small to result in any widespread, statistically observable impact.¹⁶⁵

Six counties in southern Minnesota (Dodge, Jackson, Lincoln, Martin, Mower and Murray counties) with large wind energy conversion systems responded to a Stearns County survey asking about impacts on property values as a result of wind farms.¹⁶⁶ That survey showed that neither properties hosting turbines nor those adjacent to those properties in the counties listed, have been negatively impacted by the presence of wind farms.¹⁶⁷

Mitigation

Negative impacts to property value due to the proposed Project are not anticipated. In unique situations it is possible that specific, individual property values may be negatively impacted. Such impacts can be mitigated by siting turbines away from residences.

¹⁶⁵ The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis, Hoen et al. December 2009, <https://eetd.lbl.gov/sites/all/files/publications/report-lbnl-2829e.pdf>

¹⁶⁶ Stearns County Board of Commissioners Meeting, June 8, 2010, Stearns County Resolution #10-46, <https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7B84D17419-28C1-4D3F-AAE0-5D4DE117F9E4%7D&documentTitle=20106-52067-01>

¹⁶⁷ Stearns County Board of Commissioners Meeting, June 8, 2010, Stearns County Resolution #10-46, <https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7B84D17419-28C1-4D3F-AAE0-5D4DE117F9E4%7D&documentTitle=20106-52067-01>

Generic 200 MW LWECS

A generic 200 MW LWECS would have property value impacts similar to the Blazing Star Wind Farm. If a generic 200 MW LWECS were constructed and operated in an area of the State with minimal or no wind energy facilities present on the landscape there could be more noticeable impacts on property values, but this impact is difficult to quantify or estimate for comparison purposes.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would potentially negatively impact property values near the plant site and possibly along roads used to transport biomass. However, as with other alternatives, impacts on property values are difficult to quantify because of the many factors that influence a property's market value. For example, if biomass for the plant were supplied by neighboring land parcels, these parcels might experience an increase in property value.

Mitigation

Because the plant would be sited at a single location, compared to multiple turbine locations, property value impacts could be mitigated by siting, such as in an area zoned to accommodate industrial use.

6.5.6 Local Economy

Short-term and long-term economic benefits would result from the construction of the Blazing Star Wind Farm. Short-term economic benefits would occur as a result of construction jobs generated by the Project and additional expenditures in the local economy. Once the project becomes operational, local economies may benefit from more long-term benefits, such as jobs to operate and maintain the facility. Landowners with turbines or other Project facilities on their land would receive an annual lease payment for the life of the Project. Long-term benefits would occur through the Wind Energy Production Tax paid to local units of government.

Blazing Star Wind Farm

Local contractors and material suppliers will be used for portions of Project construction.¹⁶⁸ The Applicant estimate that construction of the Project will require approximately 250 short-term construction jobs. During the operations phase of the project, Applicants anticipate that approximately 10-14 permanent positions will be created to operate and maintain the Project.¹⁶⁹

Based on a production tax of \$0.0012 per kWh produced, wind energy production taxes would provide an estimated \$900,000 annually to the county and to townships within the Project.¹⁷⁰ Additionally, payments to landowners would provide income that could add to the local economy.

Generic 200 MW LWECS

Economic benefits of a generic 200 MW LWECS would be similar to those of the Blazing Star Wind Farm.

¹⁶⁸ Site Permit Application, pg. 53 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁶⁹ Application for Certificate of Need, pg. 5 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket #[20167-123462-01](#)

¹⁷⁰ Site Permit Application, pg. 53 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

38.5 MW Biomass Plant

A biomass plant would likely pay property tax, which would benefit local government revenues, but would not pay the Wind Energy Production Tax. A 38.5 MW biomass plant would also provide temporary contractor jobs and benefits to local material suppliers during the construction phase. Additionally, approximately 20 permanent jobs would be created to maintain operations of the biomass plant.¹⁷¹ Local landowners may also receive additional income for the sale of biomass materials from agricultural production, which may otherwise remain in the field and decompose.

6.6 Infrastructure

A generation Project of this size has to consider potential impacts to existing infrastructure, such as transportation and communication. Wind farms, and their associated transmission facilities, need to add to the overall infrastructure without disrupting the existing system.

6.6.1 Associated Electrical Facilities, Electromagnetic Fields, and Stray Voltage

Wind generation facilities typically require construction of electrical facilities such as collector and feeder lines and a substation to connect to the transmission grid. The required facilities are lower voltage electric infrastructure (typically 34.5 kV). These lines, covered in the Site Permit, collect power generated by the wind turbines and supply the Project substation which connects to the grid.

Electromagnetic fields (EMF) are invisible regions of force resulting from the presence of electricity. EMF is often raised as a concern with electric transmission facilities. Naturally occurring EMF are caused by the earth's weather and geomagnetic field. Man-made EMF are caused by any electrical device and found wherever people use electricity.

- Electric fields are created by the electric charge (i.e., voltage) on a transmission line. Electric fields are solely dependent upon the voltage of a line (volts), not the current (amps). Electric field strength is measured in kilovolts per meter (kV/m). The strength of an electric field decreases rapidly as the distance from the source increases. Electric fields are easily shielded or weakened by most objects and materials, such as trees and buildings.
- Magnetic fields are created by the electrical current moving through a transmission line. The magnetic field strength is proportional to the electrical current (amps). Magnetic field strength is typically measured in milliGauss (mG). Similar to electric fields, the strength of a magnetic field decreases rapidly as the distance from the source increases. However, unlike electric fields, magnetic fields are not easily shielded or weakened by objects or materials.

Although EMF is often raised as a concern with electrical transmission projects, the Commission has consistently found that there is insufficient evidence to demonstrate a causal relationship between EMF exposure and human health effects.

¹⁷¹ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

Stray voltage is sometimes raised as an issue associated with electric transmission. Stray voltage is an extraneous voltage that appears on metal surfaces in buildings, barns and other structures, which are grounded to earth. This voltage is also called a neutral-to-earth voltage (NEV). Stray voltage is typically experienced by livestock who simultaneously come into contact with two metal objects (i.e. feeders, waterers, stalls). If there is a voltage between these objects, a small current will flow through the livestock. The fact that both objects are grounded to the same place (earth) would seem to prevent any voltage from existing between the objects. However, this is not the case – a number of factors determine whether an object is, in fact, grounded. These include wire size and length, the quality of connections, the number and resistance of ground rods, and the current being grounded.¹⁷² Thus, stray voltage can exist at any house or farm which uses electricity, independent of whether there is a transmission line nearby. Stray voltage is more commonly associated with small electrical distribution lines, which connect homes to larger transmission lines, and provide electricity to individual residences, farms, businesses, etc. Data analysis has determined that there does not appear to be any link between the distance between a farm (residence) and substation, or the electrical magnitude of the primary power line, leading to increased risk of stray voltage impacts.¹⁷³

Blazing Star Wind Farm

The Blazing Star Wind Farm would construct a Project substation, which will utilize approximately 10 acres of land within the Project area.¹⁷⁴ The Project substation will receive power from all the wind turbines through the collector line system, and the power will be converted to 345 kV at the substation.¹⁷⁵ An approximately 1,000 foot long 345 kV transmission line will deliver the Project generated power from the Project substation to the interconnection switchyard, which will deliver the power to the electrical grid system.¹⁷⁶ The location of the Project substation would be in Section 2 of Hendricks Township in Lincoln, County.¹⁷⁷ The interconnection switchyard construction will be the responsibility of the utility interconnecting into the grid.¹⁷⁸

The Blazing Star Wind Farm collector line system will be approximately 65 miles of 34.5 kV underground lines, which will be installed by trenching, plowing, or through directional boring, where necessary.¹⁷⁹ Underground collection lines may occasionally require an above-ground junction box where lines need to be spliced together.¹⁸⁰ Collector lines would generally continue underground when they reach public roads or the edge of farm fields. In certain cases, such as bedrock conditions, conflict with existing underground utilities or infrastructure, permits provide for overhead collector lines to be constructed along public rights of way.

The project is not expected to impact existing transmission or distribution facilities in or near the project. Construction impacts would include impacts related to land clearing and materials transport.

¹⁷² Stray Voltage, NDSU Extension Publication #108, <http://www.ag.ndsu.edu/extension-aben/epq/files/epq108.pdf>.

¹⁷³ Answers to Your Stray Voltage Questions: Backed by Research, Wisconsin Public Services,

http://www.wisconsinpublicservice.com/business/pdf/farm_voltage.pdf

¹⁷⁴ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁷⁵ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁷⁶ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁷⁷ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁷⁸ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁷⁹ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁸⁰ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

The 345 kV interconnection transmission line, electrical collector and feeder lines, and the turbine transformers associated with the project will create some EMF. The 345 kV transmission line will create EMF, which will be greatest directly below the line and will dissipate as you move further from the line in either direction. Exact electrical field and magnetic field measurements associated with the proposed 345 kV transmission line are currently not available, as the final location of the switchyard and transmission line length are still being studied by MISO.¹⁸¹ Blazing Star Wind Farm, LLC has indicated that upon final design the electrical field and magnetic field measurements for the 345 kV transmission line will be within normal utility parameters.¹⁸² EMF produced by the collector lines would be relatively small, and is anticipated to dissipate within 20 feet on either side of the collector line.¹⁸³ Because most of the collector lines would be buried, the ground provides additional shielding from electric fields. Although the ground does not provide the same shield for magnetic fields, the current passing through the collector is relatively small. EMF generated by the turbine transformers is expected to completely dissipate within 500 feet of the turbine.¹⁸⁴

The project would not create stray voltage because the project does not connect directly to residences or farms in the area and does not change on-farm electrical service.

Mitigation

Siting the Project substation close to the point of interconnection to the power grid reduces the number of new electric transmission poles and lines and associated impacts. Construction impacts could be mitigated by minimizing the amount of land cleared for the substation. Visual impacts will be mitigated by placing collector lines underground, while aesthetic impacts from overhead feeder lines can be mitigated through design and pole placement.

Impacts associated with EMF production by Project components will be mitigated by providing setbacks from residences, which will allow for dissipation of EMF.

Generic 200 MW LWECS

A generic 200 MW LWECS will generally require transmission facilities to an interconnection point, similar to those indicated for Blazing Star Wind Farm. Impacts from the associated transmission lines and substation of the generic 200 MW LWECS will have impacts and mitigations similar to those identified for the Blazing Star Wind Farm.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would have transmission facilities similar to the generic LWECS; however, an electrical collection system and Project substation would not be required. The plant would include a transformer at the plant to transform the voltage to transmission levels and a transmission line between the plant and a substation where the power would enter the grid.

Potential impacts and mitigation strategies would be similar to those for any energy project. Again, the primary impact would be the length and voltage of the transmission line required to connect the

¹⁸¹ Email communication with Patrick Smith, Blazing Star Wind Farm, LLC, March 10, 2017

¹⁸² Email communication with Patrick Smith, Blazing Star Wind Farm, LLC, March 10, 2017

¹⁸³ Site Permit Application, pg. 44 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁸⁴ Site Permit Application, pg. 44 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

biomass plant to the transmission grid. A relatively longer line or higher voltage would increase construction and operation impacts.

6.6.2 Roads

An established transportation network of state, county and township roads exists in the Project area. County and township roads generally follow section lines. Private roads, mostly used for agricultural purposes, are also common. There are two primary traffic routes through the Project area: Minnesota Highway 271 is a two-lane paved highway running north-south along the western edge of the Project area, and Minnesota Highway 19 is a two lane paved highway running east-west along the southern edge of the Project area.¹⁸⁵ Within the Project area road surfaces vary, and gravel roads are common. Traffic volumes in the area are fairly light. The Annual Average Daily Traffic (AADT) counts in 2014 were highest on Minnesota Highway 271 between Minnesota Highway 19 and County State-Aid Highway (CSAH) 17, which was 1,050 vehicles per day.¹⁸⁶ Along other county roads in the area, AADTs are generally below 570 vehicles per day.¹⁸⁷

Blazing Star Wind Farm

Construction traffic would use the existing county and state roadway system to access the Project area and deliver construction materials and personnel. During construction peak, the Applicant has estimated there will be an additional 375 large truck trips per day and up to an additional 875 small vehicle trips per day.¹⁸⁸ Since current traffic levels on the roadways in the Project area are below roadway capacities, typically in excess of 5,000 vehicles per day for two-lane paved rural highways, construction traffic would be perceptible but similar to seasonal variations in traffic, such as autumn harvest. Construction is not anticipated to result in adverse traffic impacts. Operation and maintenance activities would not noticeably increase traffic in the area.

There would be impacts to local roads. Depending on final turbine location and established haul routes, intersections may be temporarily widened to accommodate oversize loads. Any improvements to existing roads would consist of re-grading and filling of gravel surfaces. No additional asphalt or other paving is anticipated. Any temporary modifications to the existing road system would need to be restored following construction.

Constructing the Project will require the construction of approximately 27 miles of gravel access roads, the final mileage will depend on the wind turbine model selected and final design.¹⁸⁹ Access roads would be used by operation and maintenance crews while inspecting and servicing the wind turbines throughout the life of the Project. The access roads would be between towers and one road would be required for each turbine string. The roads will be primarily gravel with varying thickness and may contain a geofabric layer, depending on specific soil conditions. The roads will initially be wide enough for construction traffic, but the permanent access road will be 16 - 18 feet wide with a low profile to allow cross travel by farm equipment.¹⁹⁰

¹⁸⁵ Site Permit Application, pg. 29 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁸⁶ Site Permit Application, pg. 29 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁸⁷ Site Permit Application, pg. 29 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁸⁸ Site Permit Application, pg. 30 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁸⁹ Site Permit Application, pg. 13 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁹⁰ Site Permit Application, pg. 13 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Mitigation

Construction is not anticipated to result in adverse traffic impacts. Operation and maintenance activities would not noticeably increase traffic in the area. Permits issued by the Commission require permittees to notify local and state authorities of the roads to be used for project construction. Permits also require permittees to make arrangements with state or local governments having jurisdiction over roads for any build-up or repair of roads subject to extra wear and tear. The Applicant has committed to developing a transportation plan and road restoration agreement with Lincoln County and/or any other local governments and road authorities.

Generic 200 MW LWECs

Impacts of a generic 200 MW LWECs would be similar to those of the proposed Blazing Star Wind Farm. Depending on project location, impacts on road systems could be greater, particularly on roads with higher daily use. Mitigation would be similar, and permittees would be required to make arrangements with state and local road authorities for repair of roads used during project construction.

38.5 MW Biomass Plant

A 38.5 MW Biomass plant would also impact road systems. Impacts during construction would include increased traffic and an increase in use by heavy equipment. For the lifetime of the Project, fuel (biomass) would be delivered to the facility. The fuel handling and receiving operations are expected to be truck-traffic (typically multi-axle or semi-combination vehicles) operating on a 24-hour per day, 7-day per week basis. The frequency of trucks is dependent on the demand of materials and the available payload of each specific vehicle. An average flow of three to five semi-combination vehicles per hour is anticipated. Peak fuel receiving is anticipated to occur between the hours of 6:00 AM and 5:00 PM.¹⁹¹ The origin of loaded trucks and destination of empty trucks depends upon the location of the fuel source.

6.6.3 Communication Systems

Large electric generation facilities have the potential to impact electronic communications (radio, television, internet, cell phone, and microwave). This section discusses potential impacts on communications systems due to the operation of a large electric generation facility in the Project area.

Blazing Star Wind Farm

Wind turbines can cause interference with electronic communications by obstructing the reception of communication signals. Wind turbines do not impact digital signals (e.g., digital television, internet, cell phones), unless the turbines directly obstruct the signal, such as being located in the line-of-sight.¹⁹² Analog signals (e.g., AM and FM radio, microwaves) can be interfered with by direct obstruction and by indirect signal interference, resulting in ghosting of television pictures or signal fading.

¹⁹¹ NGPP Minnesota Biomass EAW, <http://mn.gov/commerce/energyfacilities/documents/EQBFileRegister/03-67-EAW-NGPP-Biomass/EAWbiomassfinal.pdf>

¹⁹² Post Digital Television Transition - The Evaluation and Mitigation Methods for Off-Air Digital Television Reception in-and-around Wind Energy Facilities; Comsearch, 2009, <http://acvmoonqa.comsearch.com/newsletter/archiveWP/WirelessPulseDec09.html>

Radio

Land mobile and radio facilities are wireless communication systems intended for use by users in vehicles, such as those used by emergency first responder organizations, public works organizations or companies with large vehicle fleets or numerous field staff. FM radio is not impacted by wind turbines or transmission facilities; AM radio can be impacted near transmission facilities, e.g., signal fading underneath a transmission line. Potential communications impacts due to the Blazing Star Wind Farm are anticipated to be minimal.

Microwave Beam Paths

Wind turbines can interfere with microwave paths by blocking or partially blocking the line-of-sight path between microwave transmitters and receivers. To prevent disruption of the microwave beam path, turbines should not be sited the centerline of a beam path. Appropriate turbine siting would mitigate potential impacts. One unique microwave beam path crosses the southern portion of the Project area.¹⁹³

Radar

The federal government has a large number of departments and agencies that operate a set of communication systems that are not part of any public databases. The United States Department of Commerce National Telecommunications and Information Administration (NTIA) coordinates government communication systems for all departments and agencies.¹⁹⁴ The Applicant requested a review by NTIA to determine if there would be any concerns with radio frequency transmission blockage, and the NTIA responded with a review finding that No Harmful Interference Anticipated.¹⁹⁵

The FAA identified the potential for Project impacts to the Tyler radar facility.¹⁹⁶ The Applicant is currently working with the Department of Defense (DoD) to better understand what is needed to minimize and avoid impacts to the Tyler radar facility. The Applicant will continue to work with DoD on a final mitigation and voluntary contribution agreement with respect to the Tyler radar facility.¹⁹⁷

Telephone Service

Construction and operation of the proposed Blazing Star Wind Farm will not impact the telephone service in the Project area.¹⁹⁸ Generally, construction, operation, and maintenance of a wind project does not impact cellular towers. Gopher One Call will be contacted prior to construction to locate and avoid all underground facilities.¹⁹⁹ To the extent Project facilities cross or otherwise affect existing telephone lines or equipment, the Applicant will have to enter into agreements with service providers to avoid interference with their facilities.²⁰⁰

¹⁹³ Site Permit Application, pg. 31 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁹⁴ For more information on the National Telecommunications and Information Administration, <http://www.ntia.doc.gov/about.html>

¹⁹⁵ Site Permit Application, pg. 32 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁹⁶ Site Permit Application, pg.45 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁹⁷ Site Permit Application, pg.46 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁹⁸ Site Permit Application, pg. 31 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

¹⁹⁹ Site Permit Application, pg. 31 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²⁰⁰ Site Permit Application, pg. 31 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Broadcast Facilities

There is a possibility that broadcast facilities (HDTV and digital television) would be impacted by the proposed Project. Outdoor antennas pointed through the turbine area, "rabbit ear" antennas or older HDTV receivers would be more likely to experience signal disruption (in the form of pixilation or "freezing" of a picture). Interference would be more likely to occur where there is direct interference with digital broadcast paths of local television stations. Occasionally, multipath interference from one or more turbines can cause video failure in HDTV receivers, especially if the receiver location is in a valley or other place of low elevation. The Applicant has indicated that the Project may negatively affect television reception at homes within the Project area.²⁰¹

Local television stations generally originate from Sioux Falls, SD. The nine stations that place a predicted FCC primary service signal over the Project area are listed in **Table 13**.

Table 13. Digital Television Stations Serving the Project Area²⁰²

Call Sign	Network Affiliate	City of License	Signal Strength
KWCM	PBS	Appleton, MN	Moderate
KESD	PBS	Arlington, SD	Weak
KDLO	CBS	Garden City, SD	Weak
KSMN	PBS	Chandler, MN	Weak
KDLT	NBC	Sioux Falls, SD	Weak
KELO	CBS	Sioux Falls, SD	Weak
KSFY	ABC	Sioux Falls, SD	Weak
KRWF	ABC	Vesta, MN	No Signal
KABY	ABC	Crandall, SD	No Signal

GPS

Global positioning systems (GPS) use satellite signals to determine locations on the earth's surface and are commonly used to guide agricultural operations.²⁰³ Because GPS uses multiple digital satellite signals, interference with the signals or subsequent uses is not anticipated. Obstruction of any one satellite signal would require direct line-of-sight obstruction due to a wind turbine. Such an obstruction would be temporary (i.e., there is concurrent GPS receiver movement, satellite movement, and wind turbine blade movement such that the obstruction should be resolved).

Mitigation

The Applicant, and their consultant, have conducted a microwave beam path analysis, an off-air television analysis, and requested a radio blockage review from NTIA for the Blazing Star Wind Farm project area. The Applicant has indicated that, where possible, turbines and associated facilities will be

²⁰¹ Site Permit Application, pg. 33 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²⁰² Site Permit Application, pg. 32, Table 8.13 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²⁰³ Precision Farming Tools: Global Positioning Systems (GPS), Virginia Cooperative Extension; <http://www.pubs.ext.vt.edu/442/442-503/442-503.html>

sited in manner that does not interfere with microwave beam paths, radio transmissions, or television reception. If the turbines or associated facility infrastructure are the cause of disruption or interference with television reception or microwave patterns the Applicant will work with the affected residents to establish a comparable alternative to the previously existing service.

Radio

No impacts or disruptions are anticipated.

Microwave Beam Paths

To prevent disruption of the microwave beam path, turbines will not be sited in the centerline of a beam path. Appropriate turbine siting would mitigate potential impacts.

Radar

The Applicant is currently working with the Department of Defense (DoD) to better understand what is needed to minimize and avoid impacts to the Tyler radar facility. The Applicant will continue to work with DoD on a final mitigation and voluntary contribution agreement with respect to the Tyler radar facility.²⁰⁴

Telephone Services

The Blazing Star Wind Farm is not anticipated to impact telephone services within the Project area. If the Project does negatively impact telephone services, the Applicant will provide a mitigation plan and work with the service provider to promptly restore the impacted services.²⁰⁵

Broadcast Facilities

The Applicant has committed to providing satellite, cable service or receiver upgrades to mitigate negative impacts on broadcast facilities if impacts cannot be avoided through turbine placement. Impacts on broadcast facilities as a result of the Project will be handled on a case-by-case basis, and these impacts will be better understood after the Project has been constructed.²⁰⁶ Blazing Star will establish a complaint database system, which will log complaints received and track the resolution efforts.²⁰⁷

GPS

No impacts or disruptions are anticipated.

Generic 200 MW LWECS

A generic 200 MW LWECS would have communications impacts similar to the Blazing Star Wind Farm depending on a variety of factors such as the proximity of homes in relation to the Project, number of turbines and the number of communication facilities and types in the area. Mitigation efforts at a generic 200 MW LWECS for impacts to communication services would also be similar to the mitigation efforts at Blazing Star Wind Farm.

²⁰⁴ Site Permit Application, pg.46 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²⁰⁵ Site Permit Application, pg. 31 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²⁰⁶ Site Permit Application, pg. 33 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²⁰⁷ Site Permit Application, pg. 33 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

38.5 MW Biomass Plant

A 38.5 MW biomass plant would have fewer or no impacts on communications than the proposed Project. A biomass plant would be shorter than the Project's wind turbines and sited in one location.

6.6.4 Wireless Broadband Internet

It is unknown if there are impacts to wireless broadband internet signals due to operation of a wind project. No literature exists that shows effects of wind turbines on broadband internet signals. In an earlier project,²⁰⁸ EERA contacted engineers at the local wireless broadband internet service provider (StarCom/StarNet) for further information. StarCom representatives stated that it is possible that a wind turbine operating along the "line of sight" between a broadband signal tower and residential antenna can cause intermittent signal loss, but that such cases were rare.

Blazing Star Wind Farm

The Applicant has been in contact with the ITC, the wireless broadband internet provider in the Project area, and has begun discussions with respect to potential Project impacts. Blazing Star Wind Farm, LLC will work with ITC, and any other providers should they be identified, to establish an acceptable agreement, including options to mitigate any unexpected impacts resulting from construction or operation of the Project.²⁰⁹

Generic 200 MW LWECS

A generic 200 MW LWECS would have impacts similar to the Blazing Star Wind Farm.

38.5 MW Biomass Plant

It is unlikely a 38.5 MW biomass plant would cause interference with wireless broadband internet signals. However, if building components (e.g. a 150-foot tall boiler stack) were constructed within the "line of sight" between a broadband signal tower and residential antenna, it is possible the broadband customer could experience intermittent signal loss. Potential mitigation could be relocating biomass plant building components to ensure no interference with wireless broadband internet signals or relocating the residential antenna.

6.7 Fuel Availability

Large electric power generating facilities require some type of fuel. Depending upon the amount and type of fuel required and the location of the fuel relative to the proposed project, the project can create impacts related to harvesting and delivery of the fuel. LWECS rely on wind, a renewable energy source, to generate electricity. Wind turbine blades extract kinetic energy as the wind passes through the blades

²⁰⁸ Elm Creek II Wind Project, Environmental Report, pg. 30,
http://mn.gov/commerce/energyfacilities/documents/20051/ECII%20Final%20ER_112309.pdf

²⁰⁹ Email communication with Patrick Smith, Blazing Star Wind Farm, LLC, March 10, 2017

and creates turbulence downstream. To operate effectively, turbines must be setback from other turbines to compensate for this turbulence known as wake loss.²¹⁰

Blazing Star Wind Farm

Wind capacity varies across Minnesota. Extensive wind measurements have been taken and analyzed by the Minnesota Department of Commerce.²¹¹ Local data collection suggests the mean annual wind speeds at 80 meters is approximately 8.2 to 8.5 m/s.²¹² Power generation by the Project depends not only on wind speed (how much energy it contains), but also the frequency of attaining optimal wind speeds. Wind turbines generate power only when the wind is blowing, and the Applicant anticipates that the turbines in the Blazing Star Wind Farm will be available for production at least 97% of the year, which is the industry standard.²¹³ The frequency of attaining optimal wind speed is expressed as capacity factor, which is expressed as how much power the turbine generates compared to how much it could generate if it was operating all the time. Capacity factors of 35 to 40 percent are common in Minnesota for large wind energy conversion systems. The Blazing Star Wind Farm is estimated to have a capacity factor ranging from 45 to 50 percent.²¹⁴

Generic 200 MW LWECs

To be economically feasible, a 200 MW LWECs sited elsewhere in Minnesota would need to be sited in an area with sufficient wind resources to meet generation projections. Few areas of the State have wind resources that are equal to the southwestern portion of the State where the Blazing Star Wind Farm. As shown in **Map 2**, the highest areas of good wind resources are located in southwestern Minnesota. Because of transmission constraints, as well as advances in turbine technology, wind projects have become operational, and more have been proposed throughout the State. The availability of productive, undeveloped wind resources in Minnesota still remains available.

38.5 MW Biomass Plant

A combination of wood chips and agricultural biomass would be the primary fuel sources for a 38.5 MW biomass plant. A 38.5 MW biomass plant would use approximately 40,000 tons of wood, wood wastes, and agricultural biomass materials per month.

It is possible that rail could be used for delivery of fuel to the plant, depending on its location. However, the most likely method of delivery for woody and agricultural biomass fuel would be semi-trailer trucks. Trucks would likely deliver wood and agricultural biomass by loads of 20 tons or greater. The biomass facility would operate 24 hours a day, but fuel delivery would be between the hours of 6 and 6. The total number of daily truck trips is estimated to be approximately 100. The origin of the biomass trucks and

²¹⁰ Commission Order Establishing General Permit Standards, January 11, 2008
<https://mn.gov/commerce/energyfacilities/documents/19302/PUC%20Order%20Standards%20and%20Setbacks.pdf>

²¹¹ Designing a Clean Energy Future: A Resource Manual, Chapter 4 – Wind, Clean Energy Resource Teams,
<http://www.cleanenergyresourceteams.org/files/CERTsManualCh4.pdf>

²¹² Site Permit Application, pg. 88 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²¹³ Application for Certificate of Need, pg. 21 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

²¹⁴ Application for Certificate of Need, pg. 15 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

the total trip length required for delivery would depend on the location of the biomass source relative to the biomass plant.

A back-up fuel source would be required for the biomass plant, to assist with plant start-up and to sustain the plant temporarily when the biomass fuel supplies are low. Natural gas would likely be used as the backup fuel. The construction of a natural gas pipeline would be required to deliver the natural gas to the biomass plant. Potential impacts to the environment related to fuel for a biomass plant include possible degradation of the environment due to biomass removal (increased soil erosion and productivity due to removal of agricultural biomass and loss of wildlife habitat), air pollution due to biomass transport and the impacts associated with building a natural gas pipeline.

Mitigation

Impacts related to harvesting for a biomass plant could be mitigated by using guidelines for biomass harvesting.²¹⁵ These guidelines minimize impacts to natural resources. Siting the plant in a location that reduces biomass transportation would reduce the impacts to air quality associated with ground transportation. The Minnesota Forest Resource Council has developed woody biomass harvest guidelines that reduce impacts to wildlife habitat.²¹⁶ If harvesting guidelines are used to mitigate impacts to natural resources and wildlife, suppliers of biomass fuels would need to follow biomass harvest guidelines.

6.8 Agriculture

Large generation facilities in agricultural areas will have impacts on cropland and possibly on livestock operations.

6.8.1 Cropland

Wind farms placed in cultivated areas do take a limited amount of acreage out of production for turbine placement, access roads, substation, and the O&M facility. However, crop and wind farming are generally compatible uses.

Blazing Star Wind Farm

Approximately 78 percent of the Project area is classified as cultivated land, and approximately 16 percent of the Project area is classified as hay/pasture.²¹⁷ Up to approximately 100 acres of farmland will be removed from agricultural production for turbine pads and access roads.²¹⁸ An additional 20 acres of farmland may be utilized for construction of the Project substation and the O&M facility.²¹⁹ Farmland preservation programs such as the federal Conservation Reserve Program and Minnesota's RIM provide land preservation and provide a small income for participating landowners. Wind development is allowed on these lands with adequate consultation with state and federal agencies. The

²¹⁵ See Minnesota DNR Guidelines for Woody Biomass, 2007

<http://www.dnr.state.mn.us/forestry/biomass/resources.html>

²¹⁶ Forest Biomass and Biofuels Harvest, http://www.frc.state.mn.us/initiatives_policy_biofuels.html

²¹⁷ Site Permit Application, pg. 49 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²¹⁸ Site Permit Application, pg.49 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²¹⁹ Site Permit Application, pg. 11 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

Applicant will make every effort to minimize impacts to CRP lands, and avoid all impacts to lands under RIM easements.²²⁰

Corn and soybeans are the major crops, with some small grains and forage crops grown as well.²²¹

Mitigation

Farming activities will continue on the land surrounding turbines and access roads. Impacts to drain tile in the Project area are not anticipated, however, any damages sustained as a result of Project construction would be repaired according to agreement with the landowner. Areas temporarily removed from agricultural crops production during Project construction will be restored back to farmable conditions after construction is complete. Additionally, landowners will be reimbursed, by the Applicant, for any crop damages and losses that occur during Project construction or O&M activities throughout the life of Project operation.

Generic 200 MW LWECS

Impacts to farming at a generic 200 MW LWECS would be similar to those of the proposed Project, if placed in a predominantly agricultural area.

38.5 Biomass Plant

Impacts to farming from a biomass plant would be minimal. It is likely that such a facility would not remove land from agricultural production and no mitigation would be necessary.

6.8.2 Livestock

Large electric generation facilities have the potential to impact domesticated animals and livestock indirectly through environmental impacts. Potential impacts to wildlife are discussed in Section 6.4.

Livestock health depends on ecosystem health (clean water, fresh air, healthy soils and crops). Generation facilities that impair ecosystem functions can also negatively impact livestock health, such as through emissions of hazardous air pollutants or through the contamination of water systems. Potential ecosystem impacts due to generation facilities are discussed elsewhere in this report (Sections 6.1 discussing air pollutants).

Other potential impacts to livestock health include annoyance or stress. Stress may result from a variety of impacts related to generation facility operations, such as lights, noise, and stray voltage.

The primary concern with stray voltage has been its potential effect on farm animals that are confined in areas where electrical distribution systems supply the farm. A great deal of research on the effects of

²²⁰ Site Permit Application, pg. 51 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

²²¹ Site Permit Application, pg. 49 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #[20169-124610-02](#)

stray voltage (Neutral to Earth Voltage or NEV) on dairy cows has been conducted over the past 40 years.²²²

Blazing Star Wind Farm

Livestock operations in the Project area consist of beef cattle, hogs, dairy cattle and sheep. Livestock in and adjacent to the Project area would be exposed to noise and shadow flicker created by wind turbines. Exposure levels would depend on factors such as grazing, housing, and the distance between livestock and the turbines. Health impacts from turbine noise and shadow flicker are uncertain. Information about impacts to livestock is anecdotal and indicates that livestock are not impacted by turbine operations. Animals do graze near, under and up to turbine towers.

The electrical collection system proposed for the Blazing Star Wind Farm is designed to be a separately derived system as defined in the National Electrical Safety Code. The system would have no direct electrical connection (including grounded circuit conductors) to conductors originating in another system. The wind farm collection system would have its own substation and transformers.

Because of the type of transformers used at each turbine and the design of the collection system, there are no ground currents in the collection system, whether the system is operating at zero generation or maximum generation. Therefore, under normal operating conditions, the grounding for the wind farm collection system has no current with which to create stray voltage.

Potential impacts to livestock can arise during project construction, or during O&M activities. Gates restricting livestock can inadvertently be left open, and livestock fences can be damaged. Cattle, in particular, can be put at risk of walking on to a public roadway and being struck by a vehicle if gates are left open or fences are damaged.

Mitigation

Mitigation of potential stray voltage impacts would include that all safety requirements are met during the construction and operation of the project. There are a number of strategies for mitigating stray voltage, including improved grounding.²²³ Making good electrical connections and choosing proper wiring materials for wet and corrosive locations will improve grounding and reduce stray voltage levels.

The DSP has specific conditions requiring the protection of livestock during all phases of the proposed Project, and also the immediate repair of any fences or gates damaged during Project construction or O&M activities.

Generic 200 MW LWECS

A generic 200 MW LWECS located elsewhere in Minnesota would have impacts to livestock similar to the Blazing Star Wind Farm.

²²² Literature Review and Synthesis of Research Findings on the Impact of Stray Voltage on Farm Operations, March 31, 2008, Douglas J. Reinemann, Ph.D.,

http://www.uwex.edu/uwmril/pdf/08%20OEB%20SV%20Research%20Report_Reinemann_20080530.pdf

²²³ Stray Voltage, Public Service Commission of Wisconsin, <http://psc.wi.gov/utilityinfo/electric/strayvoltage.htm>

38.5 MW Biomass Plant

A 38.5 MW biomass plant would have fewer impacts to livestock than those of the proposed Project. Biomass plant operations would create noise and lighting that could impact livestock health. The biomass plant would also have an associated transmission line that produces induced voltage. However, the plant could be sited away from livestock operations to minimize health impacts. The biomass plant would be a concentrated impact that can be sited away from livestock. Wind turbines represent a diffuse impact that exists within landscapes utilized by livestock.

6.9 Aviation

Large electric generation facilities have the potential to impact aviation. This section discusses potential impacts to aviation from the operation of a generation facility.

Blazing Star Wind Farm

Due to their height, wind turbines have the potential to impact aviation. Wind turbines in the Blazing Star Wind Farm will require notice to and evaluation by the FAA and the Minnesota Department of Transportation (MnDOT).²²⁴

There are no public airports within the Project boundary. The Myers Field in Canby, Minnesota is the closest airport to the Project located approximately 8 miles northeast of the Project; the Tyler Municipal Airport is located approximately 15.6 miles from the Project, and the Clear Lake Municipal Airport is located approximately 16.7 miles from the Project area.²²⁵

Wind turbines could impact some local aviation operations, such as aerial crop dusting. Pilots making such applications would have their attention divided between aircraft systems, spraying requirements, weather conditions, and obstructions. Additionally, when operating, wind turbines can create turbulence wakes which would make aircraft operation difficult or can effect drifting of the product while spraying.

However, MET towers could offer a significantly more dangerous obstacle to agricultural aviation. They are very difficult to see in different lighting conditions and from a distance. Many times they bypass FAA regulation because many are less than 200 feet tall (FAA lighting regulations would apply to taller MET towers). Additionally, temporary MET towers may be guyed structures with wires extended out from the base upwards of 150 feet.

Concerns have been raised about the impacts of wind farms on emergency air transport. Officials at the Mayo Clinic in Rochester, Minnesota, have noted that impacts on helicopter operations due to wind projects in the area have been insignificant.²²⁶

²²⁴ FAA Advisory Circular AC 70/7460-2K,

[HTTP://RGL.FAA.GOV/REGULATORY_AND_GUIDANCE_LIBRARY/REGADVISORYCIRCULAR.NSF/0/22990146DB0931F186256C2A00721867/\\$FILE/AC70-7460-2K.PDF](http://rgl.faa.gov/regulatory_and_guidance_library/rgadvisorycircular.nsf/0/22990146db0931f186256c2a00721867/$file/ac70-7460-2k.pdf)

²²⁵ Site Permit Application, pg 45, Table 8.19 - Blazing Star Wind Farm, LLC, September 2, 2016, eDocket #20169-124610-02

²²⁶ Mayo: Turbines do not hamper medical helicopters, Rochester Post-Bulletin, May 18, 2010

Mitigation

Potential impacts to aviation can be mitigated by proper siting of the Project and adherence to FAA and MnDOT regulations. The existence of all wind towers is registered, and they are highly visible objects. As a condition in the DSP, the wind turbines in the Project must be lit to meet the minimum FAA requirements. Siting turbines in a linear pattern could improve safety; but siting needs to accommodate a large number of factors, such as wind rights, property setbacks and environmental avoidance. However, aerial crop applications are typically made during low wind conditions. In these conditions, wind turbines may not be turning or creating turbulence wakes.

As a condition of the DSP, all permanent MET towers must be free-standing structures (not guyed) and marked as required by the FAA.

Generic 200 MW LWECS

A generic 200 MW LWECS located elsewhere in Minnesota would very likely have aviation impacts similar to the Blazing Star Wind Farm or any other project located in an agricultural setting. The impacts on aviation could be greater if the generic 200 MW LWECS was built close to a larger city, which may have a larger and more active airport.

38.5 MW Biomass Plant

A 38.5 MW biomass plant would have less aviation impacts than the Blazing Star Wind Farm. A biomass plant would be significantly shorter and located on a single site. Thus, its potential to disrupt aviation would be minimal.

7 Availability and Feasibility of Alternatives

Having analyzed comparative impacts of alternatives, an Environmental Report is required to offer an assessment of the availability and feasibility of those alternatives (Minn. Rule 7849.1500 subp. 1F). This section describes the feasibility and availability of alternatives in the Blazing Star Wind Farm, LLC Application for Certificate of Need.

7.1 Blazing Star Wind Farm

The Project is located in a rural area with a primarily farm-based economy. Wind projects have typically been well integrated into similar settings. Wind resources are among some of the best in the State of Minnesota. In addition, convenient access to the grid is available within the Project area, with the need to construct only minimal new transmission facilities, a Project substation and a 1,000 foot 345 kV transmission line. Blazing Star Wind Farm, LLC currently has a MISO Large Generator Interconnection Agreement, and additional studies are being conducted to determine interconnection details and engineering designs.²²⁷

The proposed Project is feasible and available to be implemented once interconnection details and designs have been completed.

7.2 Generic 200 MW LWECS

An alternative to the proposed Blazing Star Wind Farm in Lincoln County is a large energy conversion system sited elsewhere in Minnesota. There are good wind resources in other parts of the state, and wind farms could be placed in these areas (see **Figure 2**). Such a Project could be a 200 MW Project or a combination of smaller dispersed Projects. Several feasible Projects are being evaluated in Minnesota. At the time this report was prepared, 63 LWECS are operating in Minnesota and have a total nameplate capacity of 3,208 MW. One other project with a nameplate capacity of 105 MW has a valid LWECS site permit, but has not been constructed at this time. One additional LWECS with a proposed nameplate capacity of 200 MW is also currently going through the State permitting process at this time. In addition to wind resource availability, access to transmission interconnection is also important for a project to be viable; in the past transmission access has been a constraint for the development of wind energy in Minnesota.

7.3 38.5 MW Biomass Plant

A 38.5 MW biomass plant is feasible but not likely available. Currently there is a 55 MW biomass plant in Benson, Minnesota. Many factors could limit the availability of a 38.5 MW biomass plant, including equipment, financing, and consistently available biomass fuels.

²²⁷ Email Communication with Patrick Smith, Blazing Star Wind Farm, LLC

7.4 No-build Alternative

The no build alternative is feasible and available.

The Project has been proposed to meet growing electric demand in Minnesota and growing demand for additional renewable resources in Minnesota and neighboring states. Minnesota has committed to a renewable energy objective of generating 25 percent of its electricity from eligible renewable sources by the year 2025.²²⁸ Minnesota utilities had approximately 3,177 MW of wind generation in their portfolios in 2013. 5,307 MW of wind generation will be required by the year 2025 to meet the new objective.²²⁹ In addition to Minnesota's renewable energy objective, there is a regional need and desire for wind energy. It is not clear what the effect of a no-build alternative would be on meeting Minnesota and regional demand for electric power and for renewable generation in particular.

7.5 Additional Renewable Alternatives

Blazing Star Wind Farm, LLC also considered other renewable energy alternatives in their Application for a Certificate of Need; including solar power, hydropower, and emerging technologies. Solar power is a legitimate renewable energy source in Minnesota, but to meet the energy output of the 200 MW nameplate capacity of the proposed Blazing Star Wind Farm a solar facility would be prohibitively expensive and require 4,725 acres of contiguous land.²³⁰ Hydropower production has decreased by 20 percent over the past 10 years, and hydropower facilities are considered to be prohibitively expensive to maintain and pose significant negative effects to Minnesota's river ecosystem.²³¹ A number of emerging technologies for renewable energy production, compressed air, superconducting magnets, and fuel cells, were considered as alternatives. However, these technologies are currently not available on a commercial scale, so they cannot be utilized as alternatives for the proposed Project.²³²

²²⁸ Minn. Statute 216B.1691

²²⁹ Presentation (RE Integration and Transmission Study)

²³⁰ Application for Certificate of Need, pg. 17 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

²³¹ Application for Certificate of Need, pg. 17 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

²³² Application for Certificate of Need, pg. 18 - Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

8 Permits

The Blazing Star Wind Farm would require permits and approvals from entities other than the Commission. Potential federal, state, and local permits or approvals that have been identified for construction and operation of the proposed Project are listed below in **Table 14**.

Table 14. Potential and Required Permits and Approvals²³³

Agency	Permit/ Approval	Need for Permit/ Approval
Federal		
U.S. Army Corps of Engineers (USACE)	Review and Approval of Wetland Delineations	Required to determine extent of USACE jurisdiction, quantify impacts, or document avoidance.
	Federal Clean Water Act Section 404 and Section 10 Permit(s)	Project may require a USACE Regional General Permit or an Individual Permit depending on amount and type of wetland impact proposed. Permit from USACE required if wetlands are jurisdictional and not avoidable.
Environmental Protection Agency (Region 5) in coordination with MPCA	Spill Prevention Control and Countermeasure (SPCC) Plan	May be required if turbine commissioning or construction activities will require oil storage in excess of 1320 gallons. May be required for O&M facility or if an oil storage tank is planned for this Project.
Lead Federal Agency	Federal Section 106 Review	Section 106 of the National Historic Preservation Act (NHPA) may be invoked by a Federal Agency if the Project requires federal land, funding, or permits.
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)	Determination of No Hazard to Air Navigation needed for each structure over 200 feet tall via form 7460-1.
	Notice of Actual Construction or Alteration (7460-2)	Notify FAA of construction via Form 7460-2.

²³³ Application for a Certificate of Need, pg. 38-40 – Blazing Star Wind Farm, LLC, July 20, 2016, eDocket # [20167-123462-01](#)

Agency	Permit/ Approval	Need for Permit/ Approval
Department of Defense	Voluntary Contribution Agreement	Agreement related to impact mitigation for the Tyler Rada Facility.
Federal Land Manager (BLM, USBR, Forest Service)	Federal Lands Right-of-way Grant	Required to cross, or place any project facilities on any federally owned and managed lands.
National Historic Preservation Act	Class I Literature Review/Class III Cultural Field Survey	Protection of archeological and cultural resources.
U.S. Department of Agriculture	Form AD-1006	Conversion of farmland to non-agricultural use.
	Conservation/Grassland/Wetland Easements and Reserve Program releases and consents	Required to remove lands from federal conservation easement or reserve programs.
	Farm Services Agency Mortgage Subordination & Associated Environmental Review	Farm loan and securities program.
Federal Communications Commission	Non-Federally Licensed Microwave Study	Assists with the identification of license-exempt radio frequency transmitter users.
	NTIA Communication Study	Federal agency review of potential blockage of radio frequency transmissions.
Federal Energy Regulatory Commission	Exempt Wholesale Generator Self Certification (EWG)	Effects the obligations of entities that hold ownership in the generating facility.
	Market-based Rate Authorization	Allows an entity to make whole electricity sales at market based rates.
Federal Emergency Management Agency	Flood Plain Designation	Needed to insure that no new structures are being constructed within a designated floodplain.
USFWS	Bald Eagle Incidental Take Permit	Necessary for the Project to take a bald eagle.
	Bald Eagle Nest Removal Take Permit	Necessary for the Project to remove a bald eagle nest.

Agency	Permit/ Approval	Need for Permit/ Approval
State		
Minnesota Public Utilities Commission	Large Wind Energy Conversion System (LWECS) Site Permit	Required under Minnesota Statute Section 216F.03 for a LWECS that generates 5 MW or more of electricity.
	Certificate of Need (CN)	A CN is required under Minnesota Statute Section 216B.243 for a LWECS unless the project meets exemption criteria set forth within Minnesota Statutes.
Minnesota State Historic Preservation Office (SHPO)	Class I Literature Review / Class III Cultural Field Survey. Cultural and Historic Resources Review and Review of State and National Register of Historic Sites and Archeological Survey	May be required for MN LWECS Site Permit compliance. Consultation with SHPO is recommended. Should Section 106 of the National Historic Preservation Act (NHPA) be triggered, consultation will be mandatory.
Minnesota Pollution Control Agency	Section 401 Water Quality Certification	Individual Section 401 Water Quality Certification or Waiver is required under the Federal Clean Water Act (CWA) for projects that require an Individual Section 404 Permit from the USACE to ensure that authorized activities do not violate state water quality standards.
	National Pollutant Discharge Elimination System Permit (NPDES) — PCA General Storm water Permit for Construction Activity (MN) R100001)	Coverage under the PCA General Storm water Permit for Construction Activity is required for projects that disturb more than one acre of land.
Minnesota Department of Transportation	Utility Agreements and Permits	Minnesota Statute Section 161 requires a permit to place utility facilities on trunk highway rights-of-way.
	Oversize/Overweight Permit for State Highways	Under Minnesota Statute Section 169, a permit is required for hauling construction equipment and materials that exceed height and weight limits on U.S., Interstate, and state highways through Minnesota.

Agency	Permit/ Approval	Need for Permit/ Approval
	Access Driveway Permits for Mn/DOT Roads (TP-1721)	Permit for temporary or permanent accesses and temporary widening of access points.
Minnesota Department of Natural Resources	License for crossing Public Lands and Waters (Minn. Stats. 84.415)	Required for wind farm facilities that cross or locate on State administered Public Lands or Waters.
	Public Waters Work Permit (Minn. Stats. 103G)	Any construction activities that impact waterways, including wetlands, applies to public waters that are identified on DNR public waters maps.
Minnesota Board of Water and Soil Resources	Wetland Conservation Act Approval	For wetland impacts. Ranges from an exemption for small or temporary impacts to a permit and mitigation for greater impacts.
Minnesota Department of Labor and Industry	Electrical Plan Review, Permits, and Inspection	Approval of electrical plans and inspections at turbines, O&M facility, and the substation.
Minnesota Department of Health	Environmental Bore Hole (EBH)	Drill samples to analyze geologic materials.
	Water Supply Well Notification	Required to establish a water supply well for the O&M facility.
	Plumbing Plan Review	Required for the O&M facility.
Local		
Counties	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with townships)
	Access Road Permits	Required to start construction
	Approval of Wetland Delineations	Onsite review of wetlands delineation in compliance with Wetland Conservation Act
	Construction Site Permit	Required to start construction of operations and maintenance facility
Townships	Access Road Permits	Required to start construction
	Road Agreements	Oversize/overweight permits and road repair agreement (may combine with County)

Agency	Permit/ Approval	Need for Permit/ Approval
Other		
MISO	Turbine Change Study	Analysis of the facilities electrical generation capabilities.
	Generator Interconnection Agreement	Necessary for the facility to deliver generated electricity on to the power grid.

Appendix A. Environmental Scoping Decision



**In the Matter of the Application of
Blazing Star Wind Farm, LLC for a
Certificate of Need for a 200 MW Wind
Project in Lincoln County PUC Docket No.
IP-6961/CN-16-215**

**ENVIRONMENTAL
REPORT SCOPING
DECISION**

The above matter has come before the Department of Commerce for a decision on the content of the Environmental Report (ER) to be prepared in consideration of the Blazing Star Wind Farm, LLC Application for a Certificate of Need for the proposed 200 Megawatt (MW) Blazing Star Wind Farm (Project) in Lincoln County. Blazing Star Wind Farm, LLC, is a subsidiary of Geronimo Energy.

A final decision on turbine selection and design has not been made, but the Project will consist of turbines with a rated capacity between 2.0 and 3.5 MW in such number and combination as to yield up to 200 MW. The ER will analyze the potential impacts of the various turbine sizes on the human and environmental resources within and adjacent to the proposed project area. Facilities associated with the project include a project substation, collector and feeder lines, access roads, meteorological towers and an operations and maintenance building.

The Project is located around the community of Hendricks, and the project site is located in Hansonville, Hendricks, and Marble townships in Lincoln County. There are currently 37,200 acres of land within the project boundary, with approximately 30,250 acres under site control. Electricity from the Project would be delivered into the newly constructed project substation and distributed into the grid using an interconnection with existing 345 kV Brookings to Lyon County line.

The project requires a Certificate of Need (CN) and a Site Permit for the wind farm from the Minnesota Public Utilities Commission (Commission). The CN (CN-16-215) and the site permit (WS-16-686) are being considered by the Commission in separate dockets.

On July 20, 2016, Blazing Star Wind Farm, LLC filed a Certificate of Need Application with the Commission for the Blazing Star Wind Farm. On September 19, 2016, the Commission issued an order accepting the Application as substantially complete and authorizing an informal review process. The Proposed Project is a large energy facility under Minnesota Statute 216B.2421. As such, it requires the Minnesota Department of Commerce to prepare an Environmental Report for the project pursuant to Minnesota Rule 7849.1200.

A public meeting was held on December 6, 2016, in Hendricks to receive comments on the scope of the environmental report. Approximately 40 people attended the meeting. A public comment period followed the meeting; the comment period closed on December 27, 2016. Eight verbal comments/questions were received during the Public Information and Scoping Meeting, and five public individuals provided written comments during the comment period. Additionally, comment letters were received from federal, state, and county agencies.

The verbal comments and questions provided at the Public Information and Scoping Meeting included a broad range of topics including; how the process proceeds and what are potential things that would stop the project from moving forward, where the generated power will be utilized, electromagnetic field (EMF) risk and evaluation, property value loss concerns, turbine placement, setbacks from non-participating landowners, questions regarding project maps provided at the meeting, how does the project developer work with the local public utilities, project related transmission and collector lines, switchyard placement, and survey work and gravel road repair.¹ DOC-EERA staff, Commission staff, and Geronimo Energy staff provided responses and clarifications to the majority of verbal comments and questions.² Additional clarification and analysis of issues brought up at the Public Information and Scoping Meeting will be provided in the ER document completed by DOC-EERA.

Written public comments were received from five individuals through the DOC-EERA webpage, email, and provided after the Public Information and Scoping meeting.^{3,4} Written public comments received included the following requests: improved communication between the developer and the local road authorities, increasing setbacks from non-participating landowners to one mile from the property line, and a one year moratorium to suspend project development. Public comments also raised concerns regarding inefficiency of wind energy production, intimidation and divisive practices by Geronimo Energy staff, test borings in the local roads, and local bald eagles. Comments were also submitted requesting analysis of potential wildlife impacts, impacts on property values, creation of permanent local jobs, human health impacts, potential impacts to local tourism, potential impacts to farming, turbine visual and noise impacts, turbine lighting impacts, potential weather pattern changes due to turbine operation, electrical line impacts on animals and humans.^{5,6}

Agency comment letters were provided by the U.S. Army Corps of Engineers (USACOE), Lincoln County Highway Department, Minnesota Pollution Control Agency (MPCA), Minnesota Department of Transportation (MnDOT), and the Minnesota Department of Natural Resources (MN DNR).⁷ The USACOE provided comments regarding potential project impacts to streams or wetlands that would require permits under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.⁸ Lincoln County Highway Department provided comments regarding the project's potential to impact county roads during the construction

¹ Public Information and Scoping Meeting Notes, December 6, 2016, eDocket # [20171-127757-01](#)

² Public Information and Scoping Meeting Notes, December 6, 2016, eDocket # [20171-127757-01](#)

³ Public Comment – Draft Site Permit and ER Scope, January 3, 2017, eDocket # [20171-127758-01](#)

⁴ Public Comment, Blazing Star Wind Farm, January 6, 2017, eDocket # [20171-127896-01](#)

⁵ Public Comments – Draft Site Permit and ER Scope, January 3, 2017, eDocket # [20171-127758-01](#)

⁶ Public Comment, Blazing Star Wind Farm, January 6, 2017, eDocket # [20171-127896-01](#)

⁷ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

⁸ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

and operation phases of the project.⁹ Lincoln County also requested that a Development Agreement between the County and the Blazing Star Wind Farm be initiated once project design has been finalized.¹⁰ MPCA indicated that they did not have any comments to provide regarding the project at this time.¹¹ MnDOT indicated that there are a number of future road projects in close proximity to the proposed Blazing Star Wind Farm, and this should be taken into consideration during delivery of project equipment.¹² Additionally, MnDOT recommended that the proposed project's draft site permit include language specifically requiring the Permittee to obtain all other necessary permits and approvals.¹³

The MN DNR recommended that two of the proposed turbines be located further from a large wetland complex to reduce the potential risk of those turbines to birds and bats.¹⁴ The MN DNR recommended the draft site permit include specific language that the wind turbine blades be feathered below the operational cut-in speed, and if necessary to further reduce bat fatalities the operational cut-in speed may need to be raised.¹⁵ The MN DNR also recommended a minimum of two years of post-construction fatality monitoring be conducted, and monitoring of an existing blue heron rookery along the Lac Qui Parle River be conducted prior to construction and three years post-construction.¹⁶ Additional recommendations were provided on the use of crane paths near the rookery, and other potential impacts to the rookery and individual great blue herons during the operation of the project.¹⁷ MN DNR recommended that all planned monitoring be detailed in the project's Avian and Bat Protection Plan (ABPP).¹⁸

The proposed project is intended to produce renewable energy in furtherance of Minnesota's renewable energy objectives. Accordingly, alternatives examined in the ER will be limited to "eligible energy technologies" that support these objectives (Minnesota Statute 216B.1691). These alternatives include: (1) a generic 200 MW wind generation project sited elsewhere in Minnesota, (2) a 38.5 MW biomass plant, and (3) a "no-build" option. An ER provides a high level environmental analysis of the proposed Project and system alternatives, and reviews environmental impacts associated with named and alternative projects. It is a part of a larger Public Utilities Commission investigation of the Certificate of Need Application. The Commission in its overall review will address all the issues and alternatives required by rule.

⁹ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

¹⁰ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

¹¹ Agency Comments on Draft Site Permit and ER Scope, January 3, 2017, eDockets # [20171-127760-02](#)

¹² MnDOT Comment Letter, December 21, 2016, eDockets # [201612-127522-01](#)

¹³ MnDOT Comment Letter, December 21, 2016, eDockets # [201612-127522-01](#)

¹⁴ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

¹⁵ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

¹⁶ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

¹⁷ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

¹⁸ MN DNR Comment Letter, December 27, 2016, eDockets # [201612-127610-01](#)

Having reviewed the matter and consulted with the Department of Commerce Energy Environmental Review and Analysis staff, and in accordance with Minnesota Rules 7849.1400 and 7849.1500, I hereby make the following scoping decision:

MATTERS TO BE ADDRESSED

Blazing Star Wind Farm

- 1.0 Project Description [Minn. Rule 7849.1500, subp. 1, A]**
- 2.0 Alternatives to be Evaluated [Minn. Rule 7849.1500, subp. 1, B]**
 - 2.1 No-build Alternative
 - 2.1 A Generic 200 MW Wind Project
 - 2.2 A 38.5 MW Biomass Plant
 - 2.3 Other Renewable Energy Sources
- 3.0 Human and Environmental Impacts and Mitigation of Project and Evaluated Alternatives [Minn. Rule 7849.1500, subp. 1, C, D,E]**
 - 3.1 Emissions [Minn. Rule 7849.1500, subp. 2, A]
 - 3.2 Hazardous air pollutants and VOCs [Minn. Rule 7849.1500, subp. 2, B]
 - 3.3 Aesthetic Impacts and Visibility impairment [Minn. Rule 7849.1500, subp. 2, C]
 - 3.4 Ozone formation [Minn. Rule 7849.1500, subp. 2, D]
 - 3.5 Fuel availability and delivery [Minn. Rule 7849.1500, subp. 2, E]
 - 3.6 Associated transmission facilities [Minn. Rule 7849.1500, subp. 2, F]
 - 3.7 Water appropriations [Minn. Rule 7849.1500, subp. 2, G]
 - 3.8 Wastewater [Minn. Rule 7849.1500, subp. 2, H]
 - 3.9 Solid and hazardous wastes [Minn. Rule 7849.1500, subp. 2, I]
 - 3.10 Noise [Minn. Rule 7849.1500, subp. 2, J]
 - 3.11 Property Values
 - 3.12 Communication Signals
 - 3.13 Wildlife

- 3.14 Natural Environment
- 3.15 Agriculture
- 4.0 Feasibility and availability of alternatives [Minn. Rule 7849.1500, subp. 1, F]
 - 4.1 No-build alternative
 - 4.2 200 MW wind project
 - 4.3 38.5 MW biomass plant
 - 4.4 Blazing Star Wind Farm
- 5.1 Required Permits [Minn. Rule 7849.1500, subp. 1, G]

ISSUES OUTSIDE OF THE ENVIRONMENTAL REPORT

The Environmental Report will not consider the following matters:

1. Impacts or mitigative measures associated with specific sites, including specific tower or road locations for the proposed project and alternatives.
2. The negotiation and content of easement agreements by which land owners are paid for property rights, including wind rights.
3. Any alternatives not specifically described in this scoping decision.

SCHEDULE

The Environmental Report will be completed no later than March 2017. A public hearing will be held in the Project Area before an Administrative Law Judge after the Environmental Report has been issued and notice served.

Signed this 11th day of January 2017

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE
DIVISION OF ENERGY
RESOURCES



William Grant, Deputy Commissioner