SITE PERMIT APPLICATION FOR LARGE WIND ENERGY CONVERSION SYSTEM

ECOHARMONY WEST WIND PROJECT

FILLMORE COUNTY, MINNESOTA

MPUC DOCKET NO. IP6688/WS-08-973

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Minnesota PUC Docket No. IP6688 /WS-08-973

Project Name:	EcoHarmony West Wind
Applicant:	EcoHarmony West Wind LLC P.O. Box 95 725 Main Ave. North Harmony, MN 55939 Phone: 507-886-6570
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Preparer of Application:	Donald Miller, P.E. Project Manager EcoHarmony West Wind , LLC Signature: _____
Project Location: ***Includes all or part of the listed sections. See Figure 1, Project Location Map for detailed boundary delineation.***	• Fillmore County • Harmony Township (T101N, R10W) All Sections, except 1,2,3,4,9,10,11,12, 31,32,33 • Bristol Township (T101N, R11W) All Sections • York Township (T101N R12W); Sections 1, 2, 11, 12, 13, 14, 23, 24, 25, 26, and 36 • Preston Township (T102N R10W); Sections 31and 32 • Carimona Township (T102N R11W); Sections 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36 • Forestville Township (T102N R12W); Sections 35 and 36

1.0 Introduction

EcoHarmony West Wind, LLC ("EcoHarmony" or "Applicant"), a limited liability company, is proposing to construct a 200 MW wind project in Fillmore County, Minnesota, called the EcoHarmony West Wind Project, and is pleased to submit this application for a Site Permit for a Large Wind Energy Conversion System (LWECS) to the Minnesota Public Utilities Commission (the "Commission"). EcoHarmony submitted an application for a Certificate of Need for the Project on October 22, 2008. PUC Docket No. IP6688/CN-08-961.

EcoHarmony West Wind, LLC is a wholly-owned subsidiary of EcoEnergy Wind, LLC. EcoEnergy Wind is a wholly-owned subsidiary of The Morse Group, Inc., a national commercial electrical, energy and construction firm. EcoEnergy Wind intends to develop the Project and manage its overall construction. During development, EcoEnergy Wind will explore opportunities to joint venture with established renewable energy companies and/or utilities to secure turbine supply and finalize financing. EcoEnergy Wind recently opened a regional office in Harmony, Minnesota. This office serves three full-time and two part-time employees.

The Project will have a nameplate capacity of approximately 200 MW. A final decision on turbine selection and design has not been made, but will involve constructing either 134 turbines with a rating of 1.5 MW, or up to 87 turbines with an output of 2.3 MW, or some other combination that yields 200 MW. A final decision on turbine type and size will be made prior to the start of construction. The estimated energy production for each 1.5 MW turbine, accounting for both net capacity factor and array efficiency, is 4.5 GWh annually. The total energy to be generated by the Project is estimated to be over 600 GWh/yr.

The Project will be located in southeastern Minnesota, in the townships of Harmony, Bristol, York, Carimona, Forestville, and Preston, all in Fillmore County. The locations are summarized in the table below. The Project Location Map presented in Figure 1 presents the detailed project boundary delineation for setback and landowner notification purposes. The actual boundary divides some of the land sections listed such that not all of the listed sections are wholly included in the project boundary.

Table 1.1 Project Location

	Township	Range	Section
Harmony	T101N	R10W	All Sections except 1,2, 3, 4, 9, 10, 11, 12, 31, 32, 33
Bristol	T101N	R11W	All Sections
York	T101N	R12W	1, 2, 11, 12, 13, 14, 23, 24, 25, 26, 36
Preston	T102N	R10W	31 and 32
Carimona	T102N	R11W	27, 28, 29, 30, 31, 32, 33, 34, 35, 36
Forestville	T102N	R12W	35 and 36

EcoEnergy Wind began development of this site in 2006 and already has over 20,000 acres of the site area under control through wind option agreements. EcoEnergy Wind has been continuously collecting wind data in the area since May 2007 from a 197 foot (60 meter) wind measurement tower, and the data collected shows a robust wind resource with an annual average wind speed of 17.0 to 17.9 miles per hour (7.6 to 8.0 meters per second) throughout the Project area.

Associated facilities include gravel access roads, an operations and maintenance ("O&M") building, permanent meteorological towers, an electrical sub-transmission collection system, a new collection substation, an overhead 161 kilovolt transmission line about eight miles long, and a Line Tap Substation. The area of direct land use will be between 40 and 67 acres for turbines and access roads (approximately ½ acre per turbine), depending on the turbine size chosen, plus up to 10 acres combined for the new substations and the O&M building.

A new collection substation will be built in the geographic center of the Project at a site to be determined where the power from the turbines will be collected. A new 161 kV above-ground transmission line will run from the collection substation approximately eight miles to a new Line-Tap (Switching) Substation located approximately one mile east of the City of Harmony, Minnesota. This Line-Tap (Switching) Substation will be in close proximity to an existing substation owned by Dairyland Power Company and immediately adjacent to an interconnect transmission line owned by ITC Midwest and operated by the Midwest Independent Transmission System Operator (MISO). The new Line-Tap (Switching) Substation will deliver power from the project into the transmission grid at 161 kV.

In early 2007, the EcoHarmony West Wind Project entered an interconnect queue position with MISO for 200 MW on the ITC Midwest 161 kV line. This represents the first renewable generation connection request to MISO for this particular 161 kV line. The EcoHarmony queue

position is well ahead of the log jam of requests that MISO has subsequently received from other wind energy developers for this area.

MISO has completed an Interconnection Feasibility Study and initial indications are that the system can accommodate the additional generation. MISO is scheduled to begin a System Impact Study in regard to the EcoHarmony request later this year. This study will determine the probable constraints to delivering energy into the system and identify measures necessary to enable the interconnection.

The Project is intended to provide Minnesota and the region with additional clean, renewable wind energy in furtherance of Minnesota's and neighboring states' renewable energy objectives.

As an independent power producer, EcoHarmony intends to enter into negotiations with utilities, including Minnesota electric utilities that continue to show a need for additional renewable energy, and offer the energy generated by the Project for sale to wholesale customers. Like previous wind projects that have secured certificates of need, the energy may be sold through a long-term Power Purchase Agreement ("PPA"), or sold on a merchant basis directly into MISO's daily energy markets.

Consistent with the Commission's objectives, EcoEnergy Wind is committed to optimizing the wind resource for the EcoHarmony West Wind Project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. EcoEnergy Wind has and will continue to evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.

The Commission has approved a number of Site Permit requests for wind projects in the state, including ones in southeastern Minnesota. *See, e.g.*, the *Wapsipinicon Project* (hereafter "*Wapsipinicon*").[1] Another project in southeastern Minnesota, the *Bent Tree Project*, is presently under review.[2] Other wind projects in other parts of the state have also been approved.[3] The EcoHarmony West Wind Project is similar to these other projects, and much of the information relating to those projects is also applicable here. The Applicant has taken into account and referred to the information in these other applications, including related Environmental Reports, and Commission findings.

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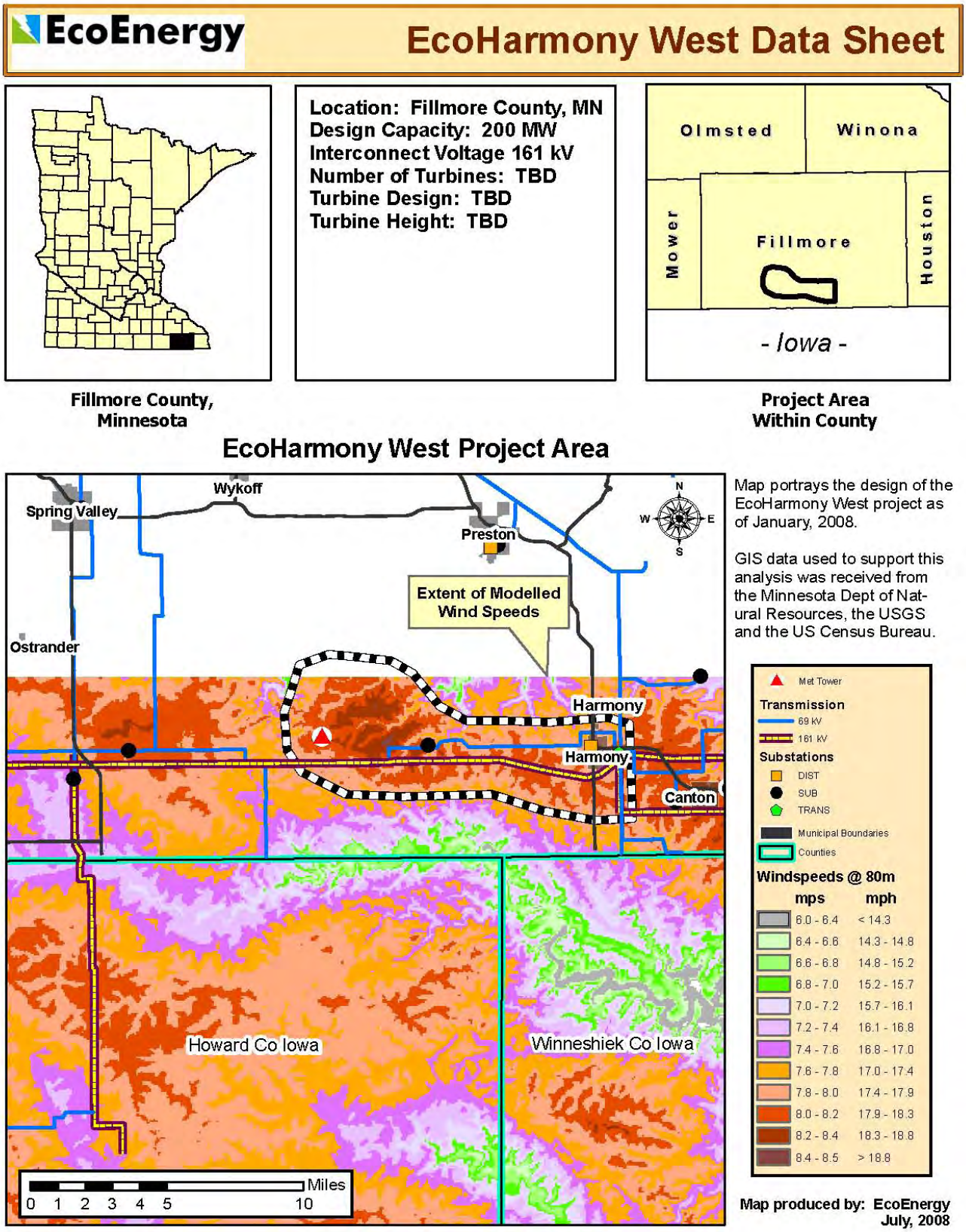
[1] *Wapsipinicon Project*, MPUC Docket Nos. CN-08-334 and WS-07-839 (a 100 MW project in Mower County approved in August 2008).

[2] *Bent Tree Project*, MPUC Docket Nos. CN-07-1425 and WS-08-573 (a 400 MW project in Freeborn County still under review to be built in two phases).

[3] See *Elm Creek Project*, MPUC Docket Nos. CN-07-789 and WS-07-338 (100 MW project in Martin and Jackson Counties, approved in January 2008) and *Trimont Project*, MPUC Docket Nos. CN-03-1841 and 03-72-LWECS (a 100 MW project in Jackson and Martin Counties approved in 2004).

The diagram below presents some summary information about the EcoHarmony West Wind Project in graphic form.



2.0 Applicant Information

2.1 Project Ownership

EcoHarmony West Wind is a project-specific, special-purpose Limited Liability Company. It is wholly owned and being developed by EcoEnergy Wind LLC, a member of The Morse Group.

EcoEnergy Wind LLC will develop the EcoHarmony West Wind project and manage the overall construction of the project. After initial development and engineering, it will seek Joint Venture partners to obtain project financing, secure a turbine supply, and contract for project construction. Upon commissioning of the project, the operation and maintenance of the LWECS facility will be managed by a qualified third party operator.

Role	Participant
Project Developer	EcoEnergy Wind LLC
Project Finance	To Be Decided
Transmission & Engineering	EcoEnergy Engineering (Morse Group)
Construction & Balance of Plant	EcoEnergy Construction (Morse Group)
Operation & Maintenance	To Be Decided

2.2 The Morse Group & EcoEnergy

The Morse Group of Companies, with over $100 million in annual revenue, serves many facets of the renewable energy industry. Services offered by the Morse Group include specialty engineering and design of facilities and industrial products, complete construction and construction management services, as well as design and installation of facility control and automation systems. The Morse Group of Companies serves commercial, industrial and utility markets throughout North America with electrical and energy solutions. Incorporated in Freeport, Illinois in 1944, the Morse Group has offices in Illinois, Iowa, Wisconsin, Minnesota and Nevada.

EcoEnergy Wind, LLC has current projects in wind energy and biofuels (biomass and biomethane) and has participated in projects with an overall construction value in excess of $2.5 billion. The company specializes in all aspects of alternative energy, from development (site evaluation, specialized engineering services, permitting, etc.) through operations and maintenance. EcoEnergy Wind strives to hold an ownership share in projects to ensure a local presence, as well as to follow through on its commitment to be an active community partner. EcoEnergy Wind

personnel have constructed facilities providing more than 1,400 MW of power and have extensive experience in utility interconnection, a critical element in all projects.

2.3 Construction, Operation and Maintenance

EcoEnergy Wind, LLC will develop the EcoHarmony West Wind project and manage the overall construction of the project. Upon completion of the project, the operation of the LWECS facility will be managed by a qualified third party operator. At this point in time, the third party operator has not yet been selected.

As part of the overall development process, EcoEnergy Wind, LLC will negotiate with parties interested in forming a Joint Venture for ownership and operation and maintenance (O&M) of the LWECS facility. EcoEnergy Wind, LLC will be part of the Joint Venture ownership group and will maintain a long-term interest in the success of the project.

A final decision on the selection of the O&M service provider will be made in conjunction with other members of the Joint Venture. The Minnesota Public Utilities Commission will be notified when the Joint Venture agreements are signed and all parties thereto will then be identified.

2.4 Interests in other LWECS Projects in Minnesota

EcoEnergy Wind, LLC currently is developing and intends to retain an ownership position in two other wind projects planned in the State of Minnesota: EcoHarmony East Wind and EcoMin.

2.4.1 EcoHarmony East Wind

EcoHarmony West Wind is the first phase of a two-phase project. EcoHarmony East Wind is the second phase of the overall EcoHarmony Project. The East Wind project plans to extend in a southeasterly direction from the West Wind project and stretch into northern Iowa.

EcoHarmony East Wind is a proposed 200 MW wind project under development in southeastern Minnesota and northeastern Iowa. The configuration of turbines would be either 134 turbines with a nameplate output of 1.5 MW, or 100 turbines with an output of 2 MW.

EcoEnergy is currently signing up landowners within the East Wind project boundary. The overall boundary line encompasses approximately 50,000 acres of land. The East Wind project is tentatively scheduled for permitting and construction in the 2011 to 2013 timeframe.

The EcoHarmony East Wind project will interconnect to the same ITC Midwest 161 kV powerline that the West Wind project will connect to. The energy will be sold through a long-term Power Purchase Agreement

(PPA) with either a MISO footprint utility, such as Dairyland Power, or "as merchant" facility.

EcoEnergy Wind LLC will develop the EcoHarmony East project and manage the overall construction of the project. After initial development and engineering, it will seek Joint Venture partners to obtain project financing, secure a turbine supply, and contract for construction. Upon completion of the project, the operation of the East Wind facility will be managed by a qualified third party operator. EcoEnergy Wind will be part of the Joint Venture ownership group and will maintain a long-term interest in the success of the project.

2.4.2 EcoMin Wind

EcoMin Wind is a proposed 300 MW wind project under development that stretches along I-90 from east of Rochester in Olmsted County to Ridgeway in Winona County, Minnesota. This project area was chosen for a number of attributes, including high elevations, ground above 1,350 feet above mean sea level (AMSL), the rural and agricultural character of the area, and easy access to the Interstate highway.

The estimated wind speeds are 17.2 to 17.9 miles per hour (7.7 to 8.0 meters per second) at hub height. This project area is sufficiently large to host 300 MW of wind energy,

2.4.3 Midwest Footprint

EcoEnergy Wind is developing numerous wind energy projects in the Midwest (Minnesota, Wisconsin, Illinois, and Iowa) totaling over 1,400 MW. EcoEnergy Wind and The Morse Group of Companies are currently constructing the 100 MW EcoGrove Wind Farm in Stephenson County, Illinois. EcoEnergy Wind provided complete development services for the project, while The Morse Group served as the general contractor for the project. EcoEnergy Wind, LLC was also an engineering consultant serving an instrumental role in the development of the 180 MW Tatanka Wind Farm (North and South Dakota), which came online in 2007.

3.0 Certificate of Need

A Certificate of Need is required for a large wind project over 50 MW under Minnesota Statutes §§ 216B.2421 and 216B.243. EcoHarmony West Wind has applied to the Minnesota Public Utilities Commission for a Certificate of Need for this project. PUC Docket No. IP6688/CN-08-961.

The Applicant requests that the Commission combine the Site Permit proceeding and the Certificate of Need proceeding and conduct a joint proceeding to consider both.[4] The Department of Commerce will prepare an Environmental Report as part of the Certificate of Need proceeding. The Applicant hopes that the Commission can make a final decision on both the Certificate of Need and the Site Permit before August 2009 to allow construction to begin in the fourth quarter of 2009.

[4] Minnesota Statutes § 216B.243, subd. 4 contemplates that a joint hearing on siting and need will be held to the extent practicable.

4.0 State Policy

The EcoHarmony West Wind Project is being developed in full compliance with the requirements of Minnesota Rules Chapter 7836 and Minnesota Statutes §§ 216E.03, subd. 7, and 216F.02(a), in an orderly and professional manner to help ensure a final project that meets or exceeds the expectations of the project stakeholders, the community at-large, and the State of Minnesota. Consistent with the Commission's objectives, EcoEnergy Wind is committed to optimizing the wind resource for the Project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. EcoEnergy Wind has and will continue to evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.

Further, the Project will be constructed and operated in a manner that is entirely consistent with state policy expressed in Minnesota Statutes § 216F.03 that Large Wind Energy Conversion Systems (LWECS) be sited in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources. EcoEnergy Wind LLC will expend considerable resources in the planning and design phases to facilitate a smooth construction process and successful project.

As more fully explained herein, the EcoHarmony West Wind Project will promote all three of these legislative goals set forth in section 216F.03. The project is entirely consistent with environmental protection. It will have little impact on the environment, including agricultural land in the area. It is sustainable, relying on the wind to generate electricity. It will be efficient, employing state-of-the-art turbines, allowing adequate spacing, and accommodating nearby wind projects and future developments.

In addition to all this, the EcoHarmony West Wind Project will promote state policies regarding promotion of renewable energy. Minnesota has established a preference for renewable energy. Minnesota Statutes §§ 216C.051, subd. 7, 216B.2422, subd. 4, and 216B.243, subd. 3.

Also, the Minnesota Legislature established in the 2007 Renewable Energy Act (Minnesota Law 2007, ch. 3) certain renewable energy milestones that Minnesota utilities must meet, so that by the year 2025, electric utilities serving retail customers in the state must obtain 25% of their retail electric sales from eligible renewable resources, including wind. For Minnesota's largest utility – Xcel Energy – the goal is 30% renewable resources by the year 2020. Minnesota Statutes § 216B.1691, subd. 2a.

The EcoHarmony West Wind project is intended to help utilities meet these upcoming Minnesota Renewable Standards. Upon completion, this 200 MW nameplate capacity project will annually generate more than 600 gigawatt hours (GWh) of power that can contribute to the Minnesota renewable energy commitment. A gigawatt hour is a thousand megawatt hours. An average homeowner uses less than 1000 kilowatt hours per month, so this project can serve 50,000 or more homeowners.

5.0 Proposed Site and Wind Characteristics

5.1 Site Boundary

The EcoHarmony West Wind Project is located in Fillmore County, mainly within Harmony, Bristol, and Carimona Townships, and extending slightly west into York Township and north into Forestville Township and Preston Township. The Project boundary encompasses approximately 50,000 acres.

Figure 1, Project Location Map, presents the boundary delineation for the project. This area in Minnesota is conducive to wind development with a good wind resource, low population density, and an agricultural-based land use.

The project's topography is dominated by a series of wide ridges with an east/west orientation that traverse the length of the project. These ridges reach an elevation of 1,350 feet and often drop vertically 150 to 200 feet at their edges; they are common features over large areas of south central and southeastern Minnesota.

5.2 Wind Characteristics

The topography in Fillmore County promotes a good wind resource. Data analysis at one met tower site in the project area indicates an average annual wind speed at 60 meters above ground level of 15.2 miles per hour (6.8 meters per second).

Using data from this 60m met tower, in addition to two met towers in Howard County, Iowa, wind resource consultant AWS Truewind created a wind model for the project area.

This model predicts that wind speed at the 80 meter hub height will average 17.0 to 17.9 miles per hour (7.6 to 8.0 meters per second). This average range is consistent with reported hub height wind speeds for projects permitted and constructed in the adjacent Mower County.

The table below presents the monthly 80 meter wind speed distribution as modeled for the project area.

Table 5.1. Wind Speed Distribution

Month	80m Mean Speed (m/s)
Jan	7.79
Feb	7.96
Mar	7.87
Apr	7.83
May	6.67
Jun	6.01
Jul	5.76
Aug	5.60
Sep	6.14
Oct	7.08
Nov	6.56
Dec	7.55

Wind modeling from AWS Truewind, for a representative site in the project area, estimates a very similar wind rose pattern at 80 meters above ground level; the energy coming from north-northwest is slightly less, and from the south-southwest the energy is slightly more.

Additional information regarding specific characteristics of the wind resource at the project site is provided below.

- **Interannual Variation:** The average annual wind speeds measured at the long term reference station at Rochester, MN varied by approximately 5% during calendar years 1997 through 2006.

- **Seasonal Variation:** Typical to northern climes, the highest speeds are found in the colder winter months due to recurring storm systems and large temperature gradients. Lower average wind speeds occur in the warmer summer months. Average wind speed generally increases through the fall and decreases through the spring. This variation is borne out in the previous 80m Mean Speed graph.

- **Diurnal Conditions:** The highest average wind speed observed on site occurs during the afternoon and late night. The lowest wind speeds are in mid-morning and in the early evening.

- **Atmospheric Stability (to the extent available):** The studies engaged to determine wind speed and energy production for LWEC systems do not include this information.

- **Turbulence (to the extent available):** Turbulence intensity is 0.10 or less at the existing 60-meter met tower, as shown in the wind rose on the following page. Even lower turbulence intensity is expected at and above the proposed hub height of 80 meters. For one of the proposed wind turbines, certified to IEC Class IIIb, power curves are calculated using turbulence intensity equal to 0.10. (The Iowa Energy Center (IEC) classifies multiple aspects of both wind analysis and a turbine's structural, mechanical, and electrical integrity and performance. Class IIIb reflects the moderate wind conditions experienced at the site.)

- **Extreme Conditions:** Extreme wind conditions, while possible, are rare in southeastern Minnesota. Wind conditions monitored at the site were well within the design parameters of commercial wind turbines. A wind farm that EcoEnergy consulted on, the Tatanka Wind Farm, sited 120 turbines on the border of North and South Dakota, which performs very well under conditions similar to those found in southeastern Minnesota.

- **Speed Frequency Distribution:** Wind speed frequency distribution is shown on the map on page 15.

- **Variation with Height:** Wind speed variation with height was calculated using the power law. In the interval between 32 and 60 meters, wind shear is approximately 0.20. In the 50 to 60-meter interval, wind shear was 0.27. Wind shear is a comparison of how wind speed changes with height. While wind shear may be expected to be relatively consistent across intervals, in practice shear can vary considerably. The National Renewable Energy Laboratory (NREL), a research arm in the U.S. Department of Energy, found in a wind shear study using a site in the Upper Midwest that wind shear varied as follows:

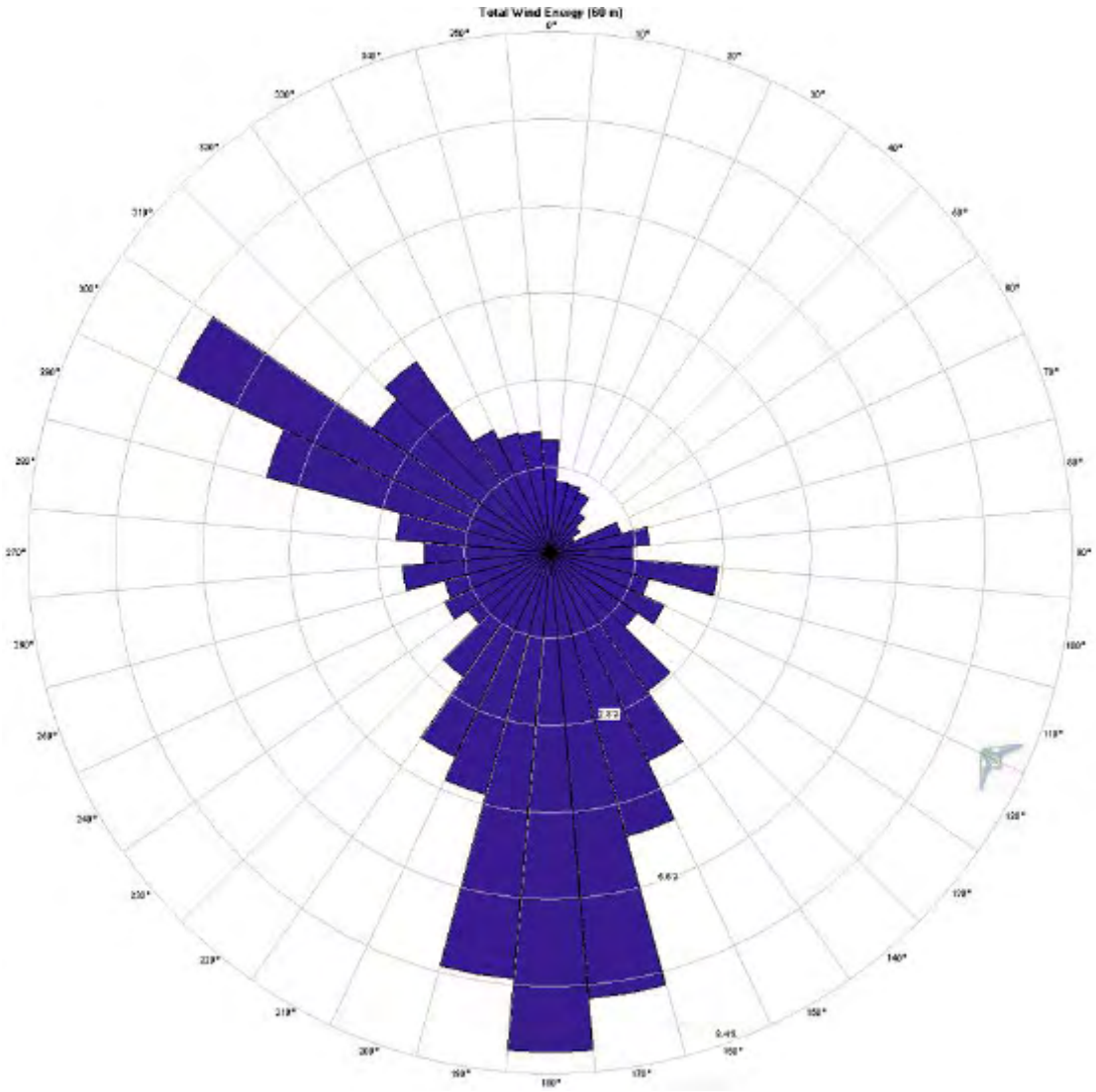
Table 5.2. Wind Shear Coefficient

37-60 m	0.27
60-83 m	0.31
83-103 m	0.18
103-123 m	0.21

NREL's study of wind shear is entitled "Evaluation of Wind Shear Patterns at Midwest Wind Energy Facilities" and can be downloaded from http://www.nrel.gov/docs/fy02osti/32492.pdf.

- **Spatial Variations:** Due to the relatively uncomplicated terrain of the project area significant variation in wind speed is not anticipated within the project area.

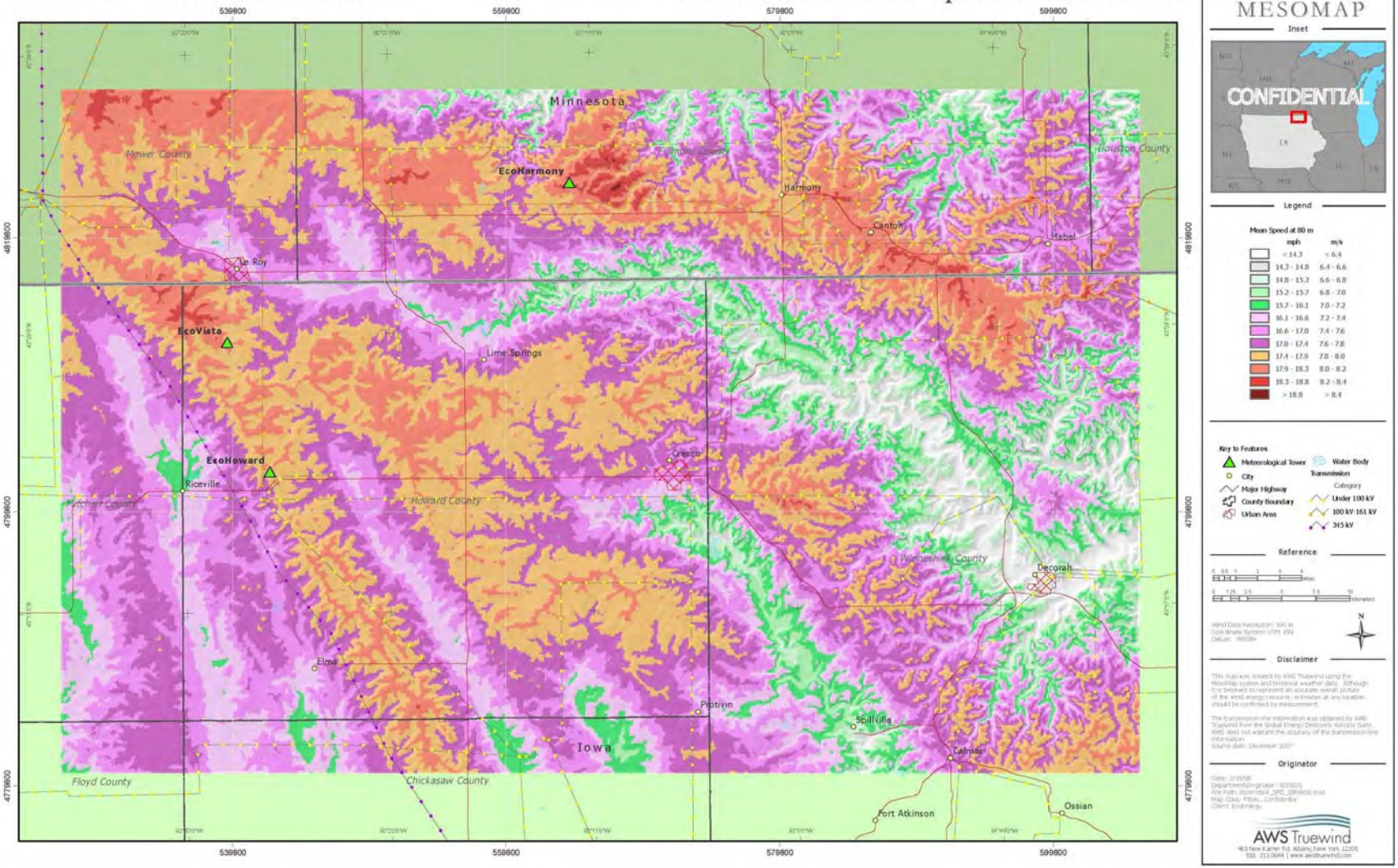
- **Wind Rose:** A wind rose for the period of 6/1/07 to 5/31/08 (one year) from a 60-meter met tower in the project area is shown below. The north direction is represented at 0 degrees and east is represented at 90 degrees on the wind rose. The concentric circles represent the percentage of total wind energy coming from any particular 'slice of the pie'. For example, the percentage of the wind energy coming in from 140 degrees, is about 2.8% of the total.



- **Map**. A map of the EcoHarmony West Wind Project Area showing the wind resource is included on the following page.

WIND RESOURCE

Mean Annual Wind Speed at 80 Meters



5.3 General Meteorological Conditions

Meteorological conditions at the project site are typical to southeastern Minnesota. Data accumulated over the past few years at the meteorological towers in the area correlate well with the historical records for the area. The nearest National Weather Service stations are in Rochester, MN and Decorah, IA, each more than 20 miles from the project area. Records from Rochester are presented in the table below

Table 5.3. Rochester Minnesota, Historical Meteorological Data

Month	Mean Daily Maximum (°F)	Mean Extreme Maximum (°F)	Mean Daily Minimum (°F)	Mean Extreme Minimum (°F)	Normal Precipitation (inches)	Max Precip (inches)	Min Precip (inches)	Normal Snowfall (inches)	Normal wind speeds (mph)
January	21.2	40.2	3.7	-20.1	0.94	2.53	0.07	11.9	13.0
February	27.0	44.2	9.5	-14.4	0.75	2.21	0.04	7.8	12.6
March	37.8	60.6	20.7	-1.9	1.88	3.58	0.32	9.0	13.2
April	55.3	78.2	34.5	18.5	3.01	7.30	0.94	4.3	13.7
May	68.1	85.7	46.0	30.8	3.53	8.41	1.17	0	12.4
June	77.5	90.9	55.8	42.0	4.00	12.51	0.94	0	11.4
July	81.3	92.1	60.0	48.4	4.61	12.33	1.02	0	10.0
August	79.0	90.4	57.8	45.4	4.33	9.52	0.34	0	9.8
September	70.7	86.4	48.7	32.6	3.12	10.50	0.38	0	10.9
October	58.8	78.8	37.9	21.8	2.20	6.08	0.27	1.0	12.0
November	40.8	62.1	24.4	4.3	2.01	5.90	0.06	7.1	13.0
December	26.5	45.4	11.0	-13.3	1.02	2.83	0.22	11.6	12.8
Year	53.7	71.2	34.2	16.2	31.40				12.1

Source: Normals, means, and extremes from Rochester Airport (1971-2000), State Climatology Office.

The project site is no more vulnerable to extreme weather events then the surrounding areas. Potential problems with high winds or tornadic activity will be addressed by turbine operational parameters and tower foundation design.

As to the durability of turbines operating in weather conditions similar to those expected for the proposed site, hundreds of wind turbines are in place in Minnesota that have been and are operating during severe winter conditions. The Tatanka Project, spread over 12,000 acres along the North Dakota/South Dakota border and installed in 2007, has turbines that contain a cold weather package allowing operation down to -30°C. Turbines operating in Europe are installed in areas similar in climate and wind speed to that of southern Minnesota – cold winters, moderate to hot summers, and wind speed averages of 14.5 to 17.9 mph (6.5-8.0 m/s) at hub height.

5.4 Nearby LWECS Projects

A number of other LWECS projects are permitted or constructed in Mower County, which is immediately west of Fillmore County. These include the 99 MW High Prairie Project (Florida Power & Light), the 100 MW Prairie Star Project (Horizon Wind Energy), and the 200 MW Wapsipinicon Wind Project (enXco Development Corporation).

6.0 Wind Rights

EcoEnergy Wind LLC identified the EcoHarmony West Wind Project site in 2006 and is securing easement and wind rights with private property owners within the project area to site 200 MW of nameplate turbine capacity. Of the approximately 23,000 acres needed for the project, more than 20,000 have already been signed under lease.

Project land and wind rights are secured through lease agreements entered into with EcoHarmony's partner landowners. EcoEnergy Wind is using a combined Option/Lease document with a 5-year Option period, an option for a 20 year initial lease period, and two 5-year lease extension options. The lease agreements transfer entitlement to all wind rights in the vertical space above the leased lands to the EcoHarmony project. In addition to these wind rights, the lease agreements also provide EcoHarmony with the following entitlements:

1. Construction and maintenance of wind turbines

2. Construction and maintenance of project access roads

3. Construction and maintenance of electrical collection and transmission lines.

The agreements allow for up to 30 years of project operation. Lease payments of approximately $23 million over the initial twenty (20) year lease period will be paid to landowners who host turbines. Additional lease payments will made if the 5-year option extension periods are exercised and the project is extended to the optional 30 year lease period.

The lease agreements clearly dedicate the wind rights to the EcoHarmony West Wind Project. They also protect individual turbine sites from future wind resource interference by restricting growth or construction of any features that could dampen the wind resource. The lease agreements run for the full expected life of the project, and include clauses and contractual language to protect the project in the event of divorce or land disputes among land owners, or between land owners and mortgage holders.

The EcoHarmony lease agreements do not impact the wind rights of any lands or landowners that have not entered into agreements with the project. Any such lands that fall within the overall boundary of the EcoHarmony West Wind Project will maintain full control of their associated wind rights.

7.0 Project Design

7.1 Project Layout

Figure 1, Project Location Map, at the end of this document, presents the EcoHarmony West Wind Project site boundary. A preliminary turbine layout is indicated in *Figure 2, Proposed Turbine Locations*. The turbines will be laid out in linear alignment to the greatest extent possible. A linear layout provides the greatest efficiencies for construction staging, access road construction, electrical line construction, and electricity generation. Turbine siting and spacing will be done in accordance with all applicable laws, rules, and permit conditions. The turbine siting will also reflect spacing requirements to ensure optimum performance of the turbines to maximize electricity production.

7.2 Turbine Description and Spacing

The type and size of turbine to be installed is still under deliberation by the Applicant. A final decision is expected in the spring of 2009. Data about three of the turbine models under consideration is presented in the table on the following page.

Table 7.1. Turbine Specifications

Characteristic	GE 1.5 MW	Acciona 1.5 MW	Suzlon 2.1 MW	Vestas 3.0 MW
Nameplate Capacity	1,500 kW	1,500 kW	2,100 kW	3,000 kW
Hub Height	80m (262 ft)	80m (262 ft)	80m (262 ft)	80 m (262 ft)
Rotor Diameter	77m (253)	82m (269)	88m (289)	90 m (295 ft)
Total Height[1]	119m (390)	122m (400 ft)	124m (407 ft)	125 m (410 ft)
Cut-In Wind Speed[2]	3 m/s (6.7 mph)	3 m/s (6.7 mph)	4 m/s (8.9 mph)	4 m/s (8.9 mph)
Rated Capacity Wind Speed[3]	11.8 m/s (26.4 mph)	10.5 m/s (23.5 mph)	14 m/s (31.3 mph)	15 m/s (33.6 mph)
Cut-Out Wind Speed[4]	25 m/s (55.9 mph)	20 m/s (44.7 mph)	25 m/s (55.9 mph)	Not Available
Maximum Sustained Wind Speed[5]	Over 45 m/s (100.7 mph)	Over 45 m/s (100.7 mph)	Over 45 m/s (100.7 mph)	Over 59.5 m/s (133 mph)
Rotor Speed	10.1 to 20.4 rpm	16.7 rpm	15.1 to 17.7 rpm	16.1 rpm
Distance to 50 dBA Noise Level	623 ft	650 ft	850 ft	Not Available

[1]Total Height = The total turbine height from the ground to the tip of the blade in an upright position.
[2]Cut-In Wind Speed = Wind speed at which turbine begins operation.
[3]Rated Capacity Wind Speed = Wind speed at which turbine reaches its rated capacity.
[4]Cut-Out Wind Speed = Wind speed above which turbine shuts down operation.
[5]Maximum sustained wind speed = Wind speed up to which turbine is designed to withstand.

The wind turbines will have a rotor diameter (RD) of 77 to 90 meters (252.6 to 295 feet) depending on the turbine selected. The minimum turbine spacing internally within the project area would range from 3 RD east-west spacing to 5 RD north-south spacing with up to 20% of the turbines having closer spacing.

The table below depicts the range of setback distances based on several possible turbine rotor diameters.

Table 7.2. Minimum Setback Distances

Rotor Diameter*	Internal East-West Spacing 3 RD	Internal North-South Spacing 5 RD	N-S Perimeter Setback 5 RD	E-W Perimeter Setback 3 RD
77 m RD	231 m (758 ft)	385m (1,263 ft)	385m (1,263 ft)	231m (758 ft)
82 m RD	246 m (807 ft)	410m (1,345 ft)	410m (1,345 ft)	246m (807 ft)
88 m RD	264 m (866 ft)	440m (1,444 ft)	440m (1,444 ft)	264m (866 ft)
90 m RD	270 m (886 ft)	450m (1,476 ft)	450m (1,476 ft)	270m (886 ft)

*The listed RDs provide the range of rotor sizes; depending on the final turbine selection, the RD could vary slightly from the listed values, but would remain between 77 and 88 m.

The setback from the site boundary and unleased lands would be 5 RD on the north-south axis and 3 RD on the east-west axis. This separation translates to a separation of 385m (1,265 feet) on the north-south axis and 231m (758 ft) on the east-west axis respectively. Previous LWECS Site Permit requirements identify minimum setbacks from occupied residences of 500 feet and setbacks from public and developed roads of 250 feet. EcoHarmony West Wind expects that all turbines will be 1000 feet or more from the nearest residence.

Minimum setback requirements for the EcoHarmony West Wind Project are summarized below.

Table 7.3. Minimum Setback Requirements

Turbine Description	N-S Perimeter Setback 5 RD	E-W Perimeter Setback 3 RD	Public Roads	Trans-mission Lines	Natural Gas Pipelines
77m RD	1,263 ft	758 ft	250 ft	400 ft	100 ft
82m RD	1,345 ft	807 ft	250 ft	400 ft	100 ft
88m RD	1,444 ft	866 ft	250 ft	400 ft	100 ft

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

7.3 LWECS Electrical System

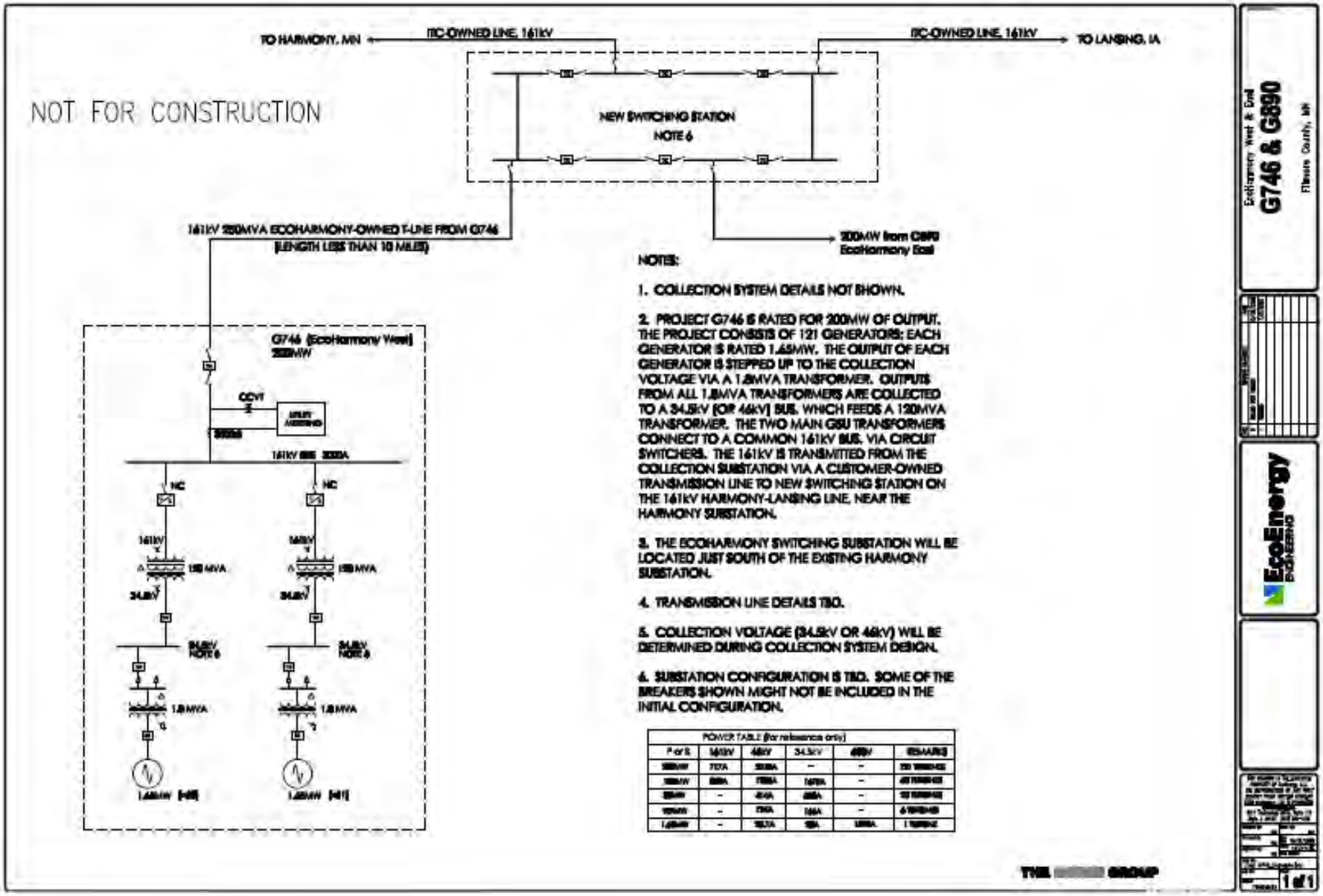
In early 2007, EcoEnergy Wind, LLC entered an interconnect queue position for 200 MW on an ITC Midwest 161 kV powerline controlled by MISO. The study request's queue position is G746. This represents the first renewable generation connection request to MISO for this particular 161 kV line. The EcoHarmony queue position is well ahead of the log jam of requests that MISO has subsequently received from other wind energy developers for this area.

The Interconnection Feasibility Study is complete; initial indications are that the lines can accommodate the additional generation. MISO is scheduled to complete a System Impact Study in regard to the EcoHarmony request in 2009. This study will determine the probable constraints to delivering energy into the system and identify measures necessary to enable the interconnection.

For this MISO connection, it will be necessary to construct a new collection substation as part of the overall EcoHarmony West Wind facility. This new substation will be constructed somewhere near the center of the project. A 161 kV transmission line will then be constructed from the collection substation to a new LineTap substation about a mile east of the City of Harmony. The power will then be delivered to the existing ITC Midwest 161 kV line.

The electrical design for the EcoHarmony West Wind Project will be performed by EcoEnergy Engineering, a member of The Morse Group of Companies and sister company to EcoEnergy Wind LLC. This team structure will provide beneficial channels of communication between the electrical system designers, the turbine siting professionals, and the overall project management staff. EcoEnergy Engineering is among the most experienced regional firms in utility interconnections. The firm recently completed the first ever 345 kV interconnection project for Commonwealth Edison Power Company and PJM Interconnection in Illinois. The close working relationship between EcoEnergy Wind and EcoEnergy Engineering will contribute to the overall efficiency and success of the project design phase.

A preliminary one-line diagram of the electrical system is shown on the following page.



Preliminary EcoHarmony One-Line Diagram, from EcoEnergy Engineering

7.4 Associated Facilities

The individual turbines and electrical substations represent the major structural features of the project. Associated facilities include the electric collection and feeder line system, an electric sub-transmission line, an overhead transmission line, and the service road network.

7.4.1 Electric Collection and Feeder System

The electricity generated by each turbine is stepped up by a pad-mounted transformer at the base of each turbine to a power collection line voltage of 34.5 or 69 kV. The buried electric collection and feeder line system will consist of collection lines connecting turbines, or groups of turbines, to the electric feeder lines. These electric lines will be trenched into the ground to a depth of approximately four feet. These lines will be buried above any drain tile that is encountered, although drain tile will be avoided as much as possible. The trenches will be backfilled and covered with topsoil such that the surface over the trenches can be utilized for agricultural production. In segments where the collector or feeder lines run with service roads, they will be located just off the road edge. The lease agreements with the landowners will provide for the location, construction, and maintenance of the electric collection and feeder lines as necessary for operation of the LWECS.

7.4.2 Collection Substation

The collection and feeder lines will convey the power from the turbines to a new Collection Substation that will be sited near the geographic center of the Project. The power will come in to the Collection Substation at 34.5 kV and be transformed to a transmission voltage of 161 kV. The Collection Substation will require approximately five acres and will be a fenced area to prevent access by unauthorized individuals. All necessary permits for the substation will be obtained and the substation will be designed and constructed in accordance with all applicable standards.

7.4.3 Transmission Line

An overhead 161 kV transmission line will be necessary to transmit power from the Collection Substation to the MISO Interconnect point about one mile east of the City of Harmony. It is expected that this transmission line will run along the right-of-way of County State Aid Highway 44. This is an east-west road that starts near the proposed substation site and runs across the project boundary. The transmission line will be approximately eight miles long and will be constructed above ground.

A Certificate of Need from the Minnesota Public Utilities Commission will not be required for the transmission line, because a 161 kV line must be over ten miles long (or cross the state border) before a CON is required. Minnesota Statutes § 216B.2421, subd. 2(3). A Route Permit will be

required for the line under Minnesota Statutes § 216E.01, subd. 4, because any 161 kV line over 1500 feet in length requires a permit, although EcoEnergy Wind has the option of applying to the local government for that permit. Minnesota Statutes § 216E.05, subd. 2(3).

7.4.4 Line Tap (Switching)Substation

A second Line-Tap (Switching) Substation will be constructed at the MISO Interconnect point to deliver power to the transmission grid at a voltage of 161 kV. The proposed site for the Line-Tap (Switching) Substation is located approximately one mile east of the City of Harmony, Minnesota as shown on *Figure 1, Project Location Map.* This site is in close proximity to an existing substation owned by Dairyland Power Company and immediately adjacent to the MISO Interconnect lined owned by ITC Midwest. All substations and transmission lines will be permitted, designed, routed, and constructed in accordance with all applicable standards and codes.

7.4.5 MISO Coordination

EcoHarmony entered a MISO study request in early 2007, and now holds queue position G746 for 200 MW. This project represents the first generation request for this particular 161 kV line. This position is ahead of the queue log jam that MISO currently faces from interconnect requests by several other companies in southern Minnesota. MISO completed an Interconnect Feasibility Study for the project in 2007 and initial indications are that their line can accommodate the additional generation.

The System Impact Study for this MISO Group will be completed in 2009. The System Impact Study will determine probable constraints and necessary mitigations required to deliver the energy into the system. Since EcoHarmony is the first project on this line, EcoEnergy Wind, LLC believes it is one of the better opportunities within this area of MISO.

7.4.6 Service Road Network

The project's service road network will provide access to the turbine sites for future maintenance and decommissioning. The turbine layout will be designed to help minimize the length and extent of the access roads required. Input from the project landowners will be critical in siting both the turbines and access roads in order to help minimize the project's impact on their future operation of the land. The access roads will be constructed with crushed limestone aggregate base over a woven geotextile fabric. During construction, it will be necessary to temporarily maintain access road at widths of up to 40 feet to allow heavy equipment to access the turbine site, but after construction is complete, the roads will typically be maintained at 17 feet wide. Landowners will also be able to use the access roads in their day-to-day operations as they like. The EcoHarmony project will provide maintenance of the access road network

over the course of the project's life as necessary to keep them in good working condition.

7.4.7 Operations & Maintenance Building

An operations and maintenance facility is expected to be constructed in conjunction with the project. The size and final location of this facility have not yet been determined.

When constructed, the O&M facility will be sized adequately for a staff of 8 to 12 full time employees, with work space suitable for maintaining turbine components and storage of equipment and supplies.

8.0 Environmental Analysis

8.1 Environmental Overview

As the project developer, EcoEnergy Wind, LLC strongly believes that careful consideration of the environmental impacts that could result from the construction and operation of this LWECS is of the utmost importance. It is critical that a thoughtful and thorough review of potential impacts be completed, that specific concerns be identified and discussed with stakeholders, and that measures be implemented to address and, where necessary, mitigate environmental concerns related to the project. EcoEnergy Wind is committed to a thorough review, analysis, and action plan regarding environmental impacts to assure that the concerns of stakeholders, the local community, and the State of Minnesota are adequately satisfied in the development of this LWECS.

8.2 Demographic Impact

8.2.1 Description of Resources

The project area in Fillmore County presents a good location for a wind farm development. The land is predominately agricultural with a relatively low population density.

According to the U.S. Census Bureau, the 2000 Census reflects that there were 21,122 people, 8,228 households, and 5,718 families residing in the county. The population density was 24 people per square mile (9/km²). There were 8,908 housing units at an average density of 10 per square mile (4/km²).

There are two population centers within or adjacent to the project boundary:

The unincorporated village of Greenleafton, with a population of less than 200, is located in the northwest part of the project area. The City of Harmony, with a population of 1080 (year 2000), is immediately adjacent to the boundary on the easterly side of the project. In addition to these population centers there are homesteads and rental housing properties spread throughout the project area.

There are currently 120 different landowners (Aug. 1, 2008) who have signed agreements to enter their land into the project. This voluntary participation of local landowners signifies the general acceptance of LWECS facilities in this rural agricultural area.

The Census Bureau also reported the economic situation of Fillmore County: median income for a household was $36,651, and the median

income for a family was $44,883. The per capita income for the county was $17,067. About 6.80% of families and 10.10% of the population were below the poverty level, including 14.40% of those under age 18 and 11.20% of those aged 65 or over. The job activity associated with the project's construction phase and the long-term turbine land-lease payments will have a positive impact on the local economy.

8.2.2 Impacts

Short-term impacts to socioeconomic resources will be relatively minor. The vast majority of the project area is comprised of agricultural lands. Roughly 50 to 77 acres of agricultural land will be permanently removed from production. Landowner compensation will be established by the lease, and the areas surrounding each turbine may still be farmed. Project construction will not cause additional impacts to any industries within the Project area. There is no indication that any minority or low-income population is concentrated in any one area of the Project, or that the wind turbines will be placed in an area occupied primarily by any minority group.

EcoHarmony estimates that at least 100 temporary jobs will be created during the construction phase and 8 to 12 permanent technical and professional jobs will follow after the project is built. Local contractors and suppliers will be used for portions of the construction. Total wages and salaries paid to contractors and workers in Fillmore County will contribute to the total personal income of the region. Expenditures made for equipment, fuel, operating supplies, and other products and services benefit businesses in the county and the state. Additional personal income will be generated for residents in the county and state by circulation and recirculation of dollars paid out by the Applicant for business expenditures and for state and local taxes. All these payments diversify and strengthen the local economy.

Also, any new jobs created are in addition to the annual operating fees paid to landowners and to production tax fees paid to the State of Minnesota. Landowners having a turbine or other Project facilities on their land will receive a royalty or lease payment annually for the life of the Project. In addition, the Project will pay a Wind Energy Production Tax of $0.0012 per kWh of electricity produced, resulting in an annual Wind Energy Production tax ranging from approximately $700,000 to $800,000. This tax will be collected by the State of Minnesota and redistributed to Fillmore County and will result in benefits to the local economy in the area.

The development of wind energy has been found to be important in diversifying and strengthening the local economic base in other areas of the state. Northwest Economic Associates prepared a report, "Assessing the Economic Development Impacts of Wind Power," that included a case study of the Lake Benton I wind project in Lincoln County, Minnesota.

NEA found that wind development had positive ramifications on the local economy.

Meetings with city, village, township officials and residents have been held, as listed in *Exhibit 1, Public Meetings and Awareness Activities*, at the end of this document. During each meeting, the officials were asked if they expected the construction and operation of the LWECS facilities to impact the demographics of the area. Generally speaking, the officials were supportive of the project and felt it would bring positive economic impacts without any corresponding negative impacts to the local demographics.

8.2.3 Mitigative Measures

Socioeconomic impacts associated with the Project will be primarily positive with an influx of wages and expenditures made at local businesses during Project construction and an increase in the county's tax base from the construction and operation of the wind turbines. No mitigative measures are deemed necessary.

8.3 Sound Level Concerns

8.3.1 Description of Resources

Concerns about noise related to the operation of wind turbines have been well studied and documented. As a result, turbine manufacturers have instituted improved design and production measures to reduce the amount of sound generated by the turbines in operation. The primary source of noise is created by the rotation of the turbine blades. This sound is often described as a "swooshing sound" created by the blades cutting through the wind.

The American Wind Energy Association (AWEA) notes that, "Some wind turbines (usually older ones) can also produce tonal sounds (a "hum" or "whine" at a steady pitch). This can be caused by mechanical components or, less commonly, by unusual wind currents interacting with turbine parts. This problem has been nearly eliminated in modern turbine design."[5]

AWEA also acknowledges that, "Noise used to be a very serious problem for the wind energy industry. Some early, primitive types of turbines built in the early 1980s were extremely noisy, to the point that it was annoying to hear them from as much as a mile away. The industry quickly realized that this problem needed to be dealt with, particularly in Europe, where

[5] American Wind Energy Association, *Facts About Wind Energy and Noise*, at p. 2, available at http://www.awea.org/pubs/factsheets/WE_Noise.pdf

turbines are often located in or near residential areas, and manufacturers went to work on making their machines quieter."[6]

Re-engineering of wind turbines for the past 25 years has resulted in dramatic reductions of sound. Today, an entire wind farm at a distance of 750 to 1,000 feet is no noisier than a kitchen refrigerator or a moderately quiet room, and less than a car moving at 40 mph at 100 meters, as shown in the following table:

Table 8.1. Comparative Sound Levels

Source/Activity	Indicative noise level dB (A)
Threshold of hearing	0
Rural night-time background	20-40
Quiet bedroom	35
Wind farm at 350m	35-45
Car at 40mph at 100m	55
Busy general office	60
Truck at 30mph at 100m	65
Pneumatic drill at 7m	95
Jet aircraft at 250m	105
Threshold of pain	140

Source: The Scottish Office, Environment Department, Planning Advice Note, PAN 45, Annex A: Wind Power, A.27. Renewable Energy Technologies, August 1994. Cited in "Noise from Wind Turbines," British Wind Energy Association, http://www.britishwindenergy.co.uk/ref/noise.html .

Background noise levels in the Project area are typical of those in rural settings, where existing nighttime noise levels are commonly in the low to mid-30 dBA. The dBA scale is A-weighted decibels based on the range of human hearing. Low to mid-30 dBA are relatively low background levels and are generally representative of the site. Higher levels exist near roads and other areas of human activity. The windy conditions in this region tend to increase ambient noise levels compared to other rural areas.

8.3.2 Impacts

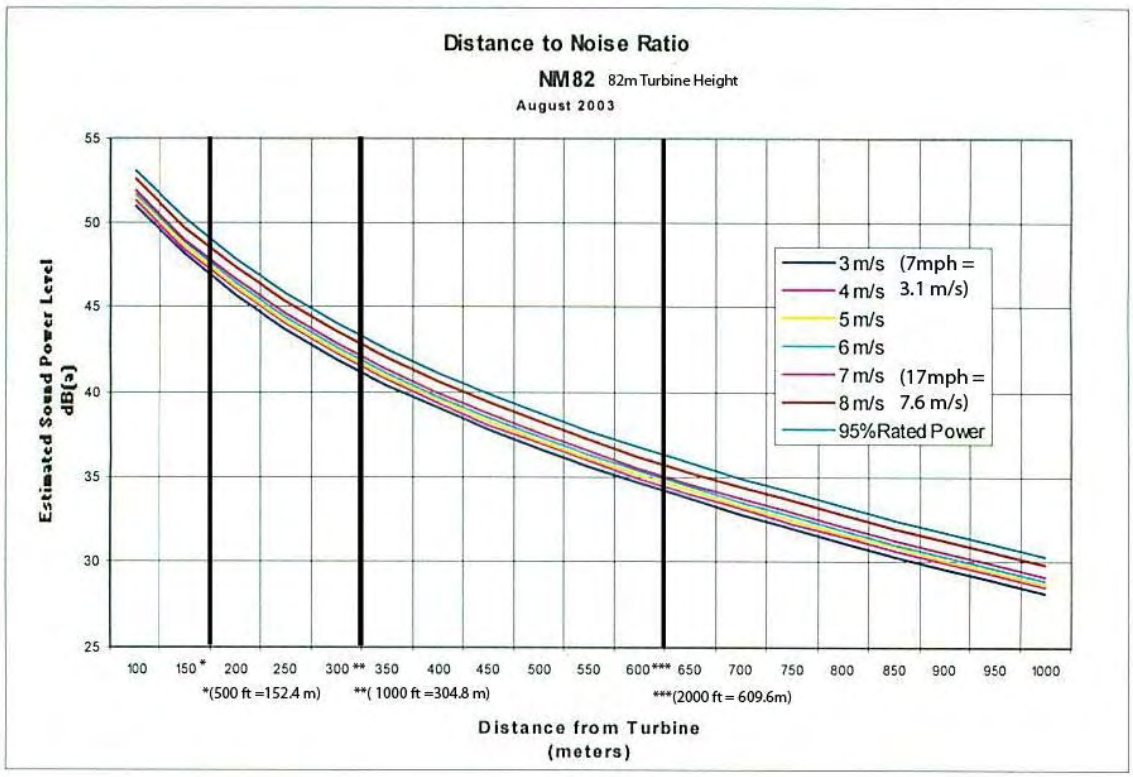
When in motion, the wind turbines emit a perceptible sound. The level of this noise varies with the speed of the turbine and the distance of the listener from the turbine. On relatively windy days, the turbines create more noise; however, the ambient or natural wind noise level tends to override the turbine noise as distance from the turbines increases.

Each model of turbine has different noise characteristics. EcoEnergy Wind has not yet selected the turbines to site for the EcoHarmony West Wind Project. The larger the turbine the greater the distance from the nearest residence to ensure compliance with the 50 dBa state noise standard. With a 77 m RD turbine, the estimated minimum distance is 623 feet. That distance goes up to 650 feet with a 82 m RD and to 850 feet with an 88 m RD turbine.

[6] *Id.*

The following graph provides a "Distance to Noise" ratio for a 1.5 MW turbine with an 82m rotor that the Applicant has sited on other projects. The graph illustrates that at speeds greater than 17.9 miles per hour (8 m/s), the sound power level drops below 50 dBA before 500 feet (152.4 meters), and drops well below 45 dBA before 1,000 feet (304.8 meters).

Table 8.2. Distance to Noise Ratio



8.3.3 Mitigative Measures

Some of the mitigating factors that have made recent wind turbines so much quieter include:

- Placing rotors in an upwind design (to prevent the impulsive noise when the blade passes behind the shadow of the tower)
- Streamlining nacelles (making it more aerodynamic to reduce vibration)
- Soundproofing nacelles (adding soundproofing and placing the equipment inside on sound-dampening buffer pads)
- Improving the blade efficiency (to convert the wind into rotational energy instead of aerodynamic noise)
- Designing quiet-operation gearboxes (such as "flex" gearwheels and use of sound-dampening buffer pads)

Anecdotal evidence suggests that the level of sound created by a wind turbine, as detected in a home at the setback distance of 1,000 feet, is no louder than normal conversation. It is also often noted that the winds that are rotating the blades also effectively dissipate the sound as it travels the setback distance to a house. Higher velocity winds tend to mask any sound made by the wind turbines.

Creating setbacks is a principle means of reducing sound to surrounding residents. EcoEnergy Wind, LLC will site turbines a minimum of 1,000 feet away from adjacent homes or inhabited structures so there will be no violations of state noise standards at residences.

Computer modeling of sound levels will be completed as the turbines are sited. Further studies may be conducted if the turbine micrositing changes. Since the project is in a rural and agricultural area (i.e., not a bedroom community), no significant issues are anticipated. EcoEnergy Wind will not exceed 50 dBA for non-participatory residences.

Noise generated during construction of the turbines will not exceed noise levels generally produced by other types of heavy construction activities such as road construction or farm equipment during harvesting. Therefore, sound levels during construction will not reach excessive or nuisance levels.

8.4 Visual Impacts

8.4.1 Description of Resources

The topography of the projected EcoHarmony West Wind site is in an area of over 60 square miles of concentrated ridges with elevations above 1,350 feet AMSL. Surrounding elevations are lower by 150 to 200 feet. The primary ridge is a prominent feature in southeastern Minnesota, with several wind projects under construction or operating just to the west in Mower County. The Project area is a crop farm region with few homesteads and a low population density. Agricultural soils of 3 to 20 feet overlay a limestone/sandstone substrate. The photographs below illustrate the low uniform cover of crop (primarily corn and forage) and pasturelands.

View to the North of the EcoHarmony Met Tower

View to the South of the Met Tower

A mix of deciduous and coniferous trees planted for windbreaks typically surround the farmsteads. Generally, these forested patches are isolated groves or windrows established by the inhabitants to prevent wind erosion and to shelter dwellings. Typically, the farmsteads and residences are located at lower elevations to avoid winds common to the area.

8.4.2 Impacts

The installation of the Project will have a visual impact in the area. The topography in the vicinity is generally flat and the vegetation cover is uniformly low, making the ridgelines of the landform in the vicinity vulnerable to visual changes. Wind turbines already existing near the Project have altered the viewshed in the area.

The visual difference between the 1.5 MW and the larger turbines is primarily in the rotor diameter (RD). The 1.5 MW turbine design will have a maximum of a 82 m (269 feet) RD, whereas the largest sized turbines under consideration (3.0 MW) will have an RD of 100 m (328 feet). The difference in visual impacts between the 1.5 and 3 MW turbines' RD will be difficult to ascertain. The major difference will be in the number of turbines associated with the wind farm; there will be 50% fewer turbines if the Project is built using 3.0 MW versus 1.5 MW turbines (134 versus 67 turbines).

EcoEnergy Wind, LLC is not aware of any formal studies or surveys regarding the public's perception of the visual impact of wind turbines in our area. Certainly there are people who appreciate the turbines as symbols of clean and renewable energy just as others see them as an unwelcome feature on the landscape.

For some viewers, wind turbines could be perceived as a visual intrusion, characterized as "industrial" metal structures, 80 to 122 meters (262 to 400 feet) high at hub height for the range of turbines considered, intruding on

the natural aesthetic value of the landscape. Wind farms have their own aesthetic quality and appeal, however. Although "industrial" in form and purpose, turbines are essentially "farming" the wind for energy and are compatible with the rural, agricultural heritage in the area.

The fact that the Minnesota Legislature passed the Renewable Energy Standards, with a recognition that a lot of wind turbines would be required to achieve the requisite level of renewable energy, is compelling affirmation that wind turbines will dot the windy areas of Minnesota. With the existence of several wind farms in nearby Mower County, Fillmore County officials and landowners are experienced in understanding what the visual impact will be of a wind farm in their own communities

The proposed Project will cumulatively contribute to the visual character imposed by the existing wind turbines. Because the site is immediately to the east of other wind farms in Mower County, the combined projects will have a larger overall visual impact. The Project will increase both the "industrial" appearance of the wind farms in the vicinity and the areas from which they will be seen. Since wind generation development is likely to continue in southern Minnesota, this visual impact is inevitable.

The FAA requires obstruction lighting or marking of structures over 200 feet above ground surface because they are considered obstructions to air navigation (U.S. Department of Transportation (DOT) FAA Advisory Circular 70/7460-IJ dated 11/29/95). The FAA recently released guidance (DOT/FAA/AC 70/7460-1K Chg2 dated 02/07) on standards for obstruction lighting for wind turbine farms. The Applicant will use this guidance when applying to the FAA for approval of a lighting plan that will light the Project as one large obstruction versus every structure over 200 feet in height. This will potentially reduce the number of lights on turbines in the Project, compared with what FAA required in the past. In addition, the FAA now requires synchronized red strobe lights (compared to their earlier typical requirements for both red strobes at night and white strobes in the day).

The presence of turbines within the viewshed of wildlife management areas (WMAs) or other natural areas may diminish the natural quality of those areas and the experience of the persons utilizing those areas. Forestville State Park is the nearest State recreational land to the project boundary. Staff from EcoEnergy Wind LLC have met with the MnDNR and will review turbine siting with the DNR in regards to the park. The turbines associated with the EcoHarmony West Wind Project, however, are not located in close proximity to wildlife and natural areas and should not intrude upon persons seeking such experiences in this part of the state.

8.4.3 Mitigative Measures

The turbines will become a significant feature of the local landscape. Project landowners will be consulted in regard to turbine placement in general and asked about any concerns for visual impacts in particular. EcoEnergy Wind is resolved to work with project landowners and public officials in siting turbines where significant and legitimate visual concerns are raised.

While working with the project landowners on turbine siting, EcoEnergy Wind will also be sensitive to potential concerns from the general public. This issue of public acceptance is a common interest for the entire wind industry. EcoEnergy Wind will implement the following measures to minimize the visual impact of the turbines in the area:

- The gray/white color of the turbines is designed to blend into the skyline.
- The turbines will not be placed in park areas or sensitive habitat areas.
- Turbines will lit to the minimum extent required by the FAA.
- Collector lines and transmission lines will be buried underground to the greatest extent feasible.
- Areas not used for crop production which are temporarily disturbed to create the turbine sites and access roads will be re-seeded with the same surrounding vegetation.
- Turbines will be placed at least 1,000 feet away from nearby residences.

8.5 Public Services and Infrastructure

8.5.1 Description of Resources

As part of the project planning process, EcoEnergy Wind will meet with local, state, and federal agencies in regard to potential impacts the project may have on the surrounding environment. It is expected that impacts to public services and infrastructure will be mostly related to local and state agencies. Anticipated issues include:

- impacts to existing roads and bridges
- impacts to existing storm water features
- impacts to the operation of emergency vehicles during construction
- potential impacts to microwave beam paths

- other impacts as may be identified

The potential impacts to public services and infrastructure will be considered for both the construction phase and operational phase of the project.

8.5.2 Impacts

Construction Traffic (Physical): The construction phase of the project will create a significant impact to the regional road network. The size and weight of the equipment and materials needed for construction will overload some of the county and township roads in the project area.
Construction Traffic (Logistical): The construction phase of the project could also impact the movement and dispatch of emergency vehicles, postal carriers, and school bus routes as large equipment and vehicles maneuver through the area. A primary focus of the traffic management will be the many large trucks delivering aggregate base and concrete to the project during construction.
Stormwater and Drainage: Information in regard to storm water and drainage features is included under item *Surface Water and Floodplain Resources*, within this subpart 7 of the application document.
Microwave Beam Paths: Previous construction of LWECS projects has established the possibility of turbine locations interfering with microwave beam paths as used in emergency services communication systems. *Figure 3, Microwave Beam Path Study*, shows the location of known microwave beam paths within the project area.

8.5.3 Mitigative Measures

Construction Traffic (Physical): EcoEnergy Wind, LLC has already met with the Fillmore County Engineer and some of the Township road authorities to initiate discussion of the project's impact on their roads. EcoEnergy Wind, LLC will develop a formal Transportation Plan for the project's construction. This plan will identify the roads proposed for use in constructing the project, the number, size, and weight of vehicles and loads proposed to access these roads, and the road improvements that are necessary both before and after the project construction is complete.

In addition, this Transportation Plan will include a schedule of the delivery of materials and equipment for the project and provide contact information for individuals involved with the overall logistics of the project's construction. This Transportation Plan will be reviewed with County, Township, and State road officials and revised as necessary in response to any comments that are received. EcoEnergy Wind is committed to working with County, Township, and State officials to ensure that any impacts of the project on the road systems are addressed and resolved to their satisfaction.

Construction Traffic (Logistical): EcoEnergy Wind, LLC will coordinate closely with the owners and users of local roads to minimize the impact on the roadway network during the project's construction. Construction project managers will notify appropriate officials prior to the arrival of oversize loads and prior to expected road delays that may affect select routes. Careful preparation, review, and follow-up with the Transportation Plan and open communication with road officials and users will allow the project's construction to proceed without negative impact to the road networks or their users. Regarding the large trucks delivering aggregate base and concrete, EcoEnergy Wind will implement a plan to stress safety and caution with the drivers of these vehicles. These trucks will be sharing the local roads with the general public, and most importantly, with school buses and young drivers. Management staff will continuously reinforce the need for driver safety to the truck operators for the duration of the project construction. Upon completion of the construction, the project will not present any additional or unusual safety concerns related to traffic.

Stormwater and Drainage: During the project's planning process, local and regional storm water drainage ways and drainage features will be identified. These features will be reviewed and analyzed in regard to the potential impacts the project may have on them. Please see *Surface Water and Floodplain Resources*, in subsection 8.14.

Microwave Beam Paths: The identified beam path locations have been reviewed by the Fillmore County Sheriff and Fillmore County Administrator. There is no documented evidence that turbines impact or interfere with cell phone towers or other communication towers. Therefore, no action is required in regard to nearby cell phone or other communication towers. However, a turbine setback equal to two times the rotor diameter (i.e., greater than 550 feet) will be maintained along these microwave beam paths.

8.6 Cultural and Archaeological Impacts

8.6.1 Description of Resources

EcoEnergy Wind has engaged Pathfinder CRM of Spring Grove Minnesota, to prepare an archival report for the project area to include cultural and archaeological considerations.

8.6.2 Impacts

Pathfinder has performed a desktop survey of the known cultural and archaeological resources within the project boundaries. A listing of these identified resources is included as *Exhibit 2, Cultural and Archaeological Resources*, at the end of this document.

8.6.3 Mitigative Measures

The final project layout and design will be set to avoid impact to these known resources. In addition, upon final siting of the individual turbines and related facilities, Pathfinder will perform individual Phase 1 Archaeological Reviews to ensure that the construction does not compromise any known or unknown cultural or archaeological resources.

If archaeological sites are found during the Phase I survey or during construction, their integrity and significance should be addressed in terms of the site's potential eligibility for designation on the National Register of Historic Places (NRHP). If such sites are found to be eligible for the NRHP, appropriate mitigative measures will need to be developed in consultation with Minnesota SHPO and the State Archaeologist.

8.7 Recreational Resources

8.7.1 Description of Resources

All of the project elements will be constructed on private property with the possible exception of some portions of the transmission line, which may be constructed within public road right-of-way. A review of public lands within the region was completed by Natural Resources Consulting, Inc. out of Cottage Grove, Wisconsin, (NRC Consulting), and their findings are presented in *Figure 4, Recreational and Wildlife Areas*. The following three recreational facilities are outside the boundary of the project but within a short distance of the project.

Forestville State Park: The southern border of Forestville State Park abuts the northwest corner of the project boundary as presented in *Figure 4, Recreational and Wildlife Areas*. EcoEnergy Wind, LLC staff has met with the Minnesota Department of Natural Resources to discuss issues related to the park as described in the following paragraph 8.7.2.

DNR Bike Trail: A DNR bike trail lies between the cities of Harmony and Preston. This trail alignment is located no closer than ½ mile from the Project's signed parcels and will not be physically impacted by the Project.

Cherry Grove Blind Valley Scientific and Natural Area: This natural area and its adjacent Cherry Grove Wildlife Management Area, are approximately four miles to the west of the Project's western boundary and will not be physically impacted by the Project.

8.7.2 Impacts

Since the vast majority of the project elements will be constructed on private property, the potential impact of the project on recreational resources is limited. To discuss this and other natural resource related issues, a meeting was held with the Minnesota Department of Natural Resources (DNR) on October 27, 2008 in Rochester, Minnesota. The primary concern of the DNR was the project's proximity to Forestville State Park located just off the northwest corner of the project boundary. The DNR was concerned with preserving the viewshed and minimizing the impact of the turbines on migratory and local bird populations around Forestville State Park. EcoEnergy Wind, LLC and its environmental consultant, NRC Consulting will continue to study the matter and discuss final design of the project with the Minnesota DNR.

8.7.3 Mitigative Measures

Biologists from NRC Consulting will examine the project area and report any navigable waterways or trout streams. Neither turbines nor access roads will be sited in proximity to navigable waterways or trout streams; these features will not be impacted by the project.

8.8 Public Health and Safety

8.8.1 Description of Resources

This information reflects the analysis of how this project may affect air traffic, electromagnetic fields, security, and traffic.

The planning and development of this LWECS project will be conducted in a responsible manner such that it does not increase any risk to public health or safety. Specific health and safety related items to be addressed in the planning and development process include:

Air Traffic: The FAA and Fillmore County have both advised that the only airport in the region is the Preston/Fillmore County airport. This airport is approximately 3.5 miles north of the project boundary and approximately 4 miles north of the closest potential turbine location. The Hammervold Landing Strip in Section 34 of Harmony Township is a small and seldom used airstrip approximately 0.5 miles from the project boundary and approximately 2 miles from the nearest draft turbine location. EcoEnergy Wind, LLC will continue to review the potential impacts of the project on regional air facilities with the Federal Aviation Administration and the Minnesota Department of Transportation, Office of Aeronautics.

Electromagnetic Fields: The electricity generated by each turbine is stepped up by a pad-mounted transformer at the base of each turbine to a power collection line voltage of 34.5 or 69 kV. This collection and feeder

line system, as with any line carrying electric current will result in the formation of electromagnetic fields (EMF).

Security: Up to 134 individual turbine towers and pad-mounted transformers will be visible and externally accessible, even though they are sited on private land.

Traffic: The construction phase of the project will increase the number and size of vehicles traveling the local roads.

8.8.2 Impacts

Air Traffic: The Preston/Fillmore County airport is located four miles to the north of the project, which will not cause any impacts to this airport or to flight patterns. The owners of the small private airstrip outside the project boundary will be contacted to determine if the project will have any impact on their operation.

Electromagnetic Fields: The potential impact of electromagnetic fields (EMF) on public health has been well studied and documented. The Minnesota Department of Public Health has stated that "the current body of evidence is insufficient to establish a cause and effect relationship between EMF and health."[7] There are no federal standards limiting residential or occupational EMF exposure. The primary sources of potential exposure to EMF on this project are the overhead electrical lines. The fields are strongest immediately under the lines and the strength drops dramatically with distance from the lines.

Security: The individual turbines and related facilities will not introduce any additional safety concerns to the local environment. Unauthorized persons will not be able to access the interior of the turbine towers or substation facilities. Claims involving thrown ice have been debunked. Equipment and structures erected in conjunction with the project will not present any special security concerns.

Traffic: The physical and logistical effects of increased heavy traffic during the construction phase are described previously in the *Public Services and Infrastructure* section. A primary focus of the traffic management will be the many large trucks delivering aggregate base and concrete to the project during construction.

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[7] "A White Paper On Electric and Magnetic Field (EMF) Policy and Mitigation Options," Prepared by the Minnesota State Interagency Working Group on EMF Issues (page 38).
Note: the Working Group consists of:
MN Department of Health
MN Department of Commerce
MN Public Utilities Commission
MN Pollution Control Agency
MN Environmental Quality Board

8.8.3 Mitigative Measures

Air Traffic: EcoEnergy Wind, LLC will coordinate the siting of wind turbines with the FAA. The turbines will be lit to comply with FAA regulations and will be visible in the area. Each turbine will receive a Determination of No Hazard to Air Navigation from the FAA and the associated Mn/DOT Aeronautics Office concurrence will be obtained prior to construction.

Electromagnetic Fields: The rural location of this project and the electrical lines minimizes the potential of any significant exposure to EMF in the area. To the extent that the presence of a cable system may be perceived as a source of public health, the collection system consists of buried electric cable (to the depth of four feet) running between turbines (and thus is removed from common public access), or is transmitted via overhead lines in the manner of existing telephone and electrical distribution.

Security: Locking out unauthorized persons from the interior of the turbine towers and substation facilities will prevent substantially all unauthorized access. The extremely rare incidents of turbine fire due to lightning or tower collapse are usually mitigated by the isolated location of the tower. Equipment and structures erected with the project will not present any special security concerns.

Traffic: Safety concerns attributable to this additional traffic will be managed by a construction management staff on-site. All material deliveries and equipment movements will be made on designated routes. Appropriate local road authorities will be advised of traffic related issues in accordance with the project Transportation Plan as described in the *Public Services and Infrastructure* section. EcoEnergy Wind will implement a plan to stress safety and caution with the drivers of these vehicles. These trucks will be sharing the local roads with the general public, and most importantly, with school buses and young drivers. Management staff will continuously reinforce the need for driver safety to the truck operators for the duration of the project construction. Upon completion of the construction, the project will not present any additional or unusual safety concerns related to traffic.

8.9 Hazardous Materials

8.9.1 Description of Resources

The process of constructing and operating a LWECS does not introduce any special toxic or hazardous materials into the local environment. The materials and equipment required to construct and operate this facility are no different than used in conventional heavy highway or similar construction.

8.9.2 Impacts

During construction and operation of the turbines, vehicles involved in the construction and maintenance of the turbines will contain gasoline and other petroleum products. The turbines themselves will contain relatively small amounts of petroleum products such as oil, hydraulic fluid and gear grease. EcoEnergy Wind has not found any record of hazardous material disposal or dumping in this area and as such does not anticipate encountering any hazardous wastes at the turbine sites.

8.9.3 Mitigative Measures

The materials within the turbines are not anticipated to create a hazardous condition. If any wastes are generated or identified during this project, it will be addressed in conformance with local, State, and Federal requirements.

As part of the construction management requirements, a listing of the potential hazardous materials related to the construction or construction equipment will be filed in a construction field office. Material Safety Data Sheets will be maintained for any known hazardous material that any contractor or transportation company may bring to the site.

8.10 Land-Based Economics

8.10.1 Description of Resources

This project is located in rural Fillmore County. The vast majority of the project area comprises agricultural land. There is no active forestry operation within the project boundaries. There are some active limestone quarries in the project area.

8.10.2 Impacts

The turbine sites and access roads comprising the permanent facility will remove approximately 0.5 acres of agricultural land out of production per turbine for the length of the lease term, approximately 50-77 acres for the entire Project.

The construction phase of the project will temporarily disrupt and occupy the agricultural lands that are to receive turbines, access roads, or electric lines in excess of the 50 – 77 acres that will be part of the completed facility.

The limestone quarries will supply significant amounts of crushed limestone aggregate base required for access roads and equipment pad construction. It is anticipated that this material can be supplied from existing quarries and not require development of new quarries.

8.10.3 Mitigative Measures

The total project area includes over 23,000 acres of signed land. With project build out of a maximum of 134 turbines, and including roughly 10 acres for a new substation and O&M building, approximately 50-77 acres of the total signed land will be removed from production. This represents less than 0.3% of the total signed land acres. The financial impact of the lost production acres on landowners is more than offset by the revenue streaming to them per the lease agreements.

The project's lease agreements provide just compensation to the landowners for the disruption associated with the construction phase of the project. Construction is scheduled to begin after crop-out in the fall of 2009, thus minimizing crop loss for that season. Upon completion of construction, the project's impact on agricultural lands will be minimal.

The limestone quarries expect to benefit during construction of the project by the significant increase in their business. Again, it is anticipated that this material can be supplied from existing quarries and not require development of new quarries.

The Project will not diminish or remove any existing business operations. Instead, it will create short term jobs during construction, long term jobs for operation and maintenance of the facility, long term revenue streams to project landowners, and additional tax revenue to the State of Minnesota, Fillmore County, the townships, and the local school districts.

8.11 Tourism and Community Benefits

8.11.1 Description of Resources

The primary tourist related activities in proximity to the project were previously discussed in "Recreational Resources" of this section. The Forestville State Park and the Preston to Harmony Bike Trail draw recreational tourists to the area.

Another draw of tourists to the area is the local Amish population located throughout this part of southeastern Minnesota. A local store in the City of Harmony displays Amish crafts for sale.

8.11.2 Impacts

The EcoHarmony West Wind Project will not directly impact either Forestville State Park or the Preston to Harmony Bike Trail. Staff from EcoEnergy Wind LLC has met with the Minnesota Department of Natural Resources to review the project in relation to these two recreational resources. The DNR expressed concern in regards to viewshed impacts of the turbines in regard to these recreational resources.

The project will not directly impact the Amish community or the tourism that it draws to the area. EcoEnergy Wind, LLC land agents met with several Amish landowners to discuss participation in the project. Although none of the Amish landowners was interested in participating in the project, they did not express any opposition or concern for the project.

8.11.3 Mitigative Measures

No mitigation is necessary. Community benefits related to the project are predominantly economic benefits from jobs and revenues paid to project landowners as discussed under the "Demographic Impact" section

8.12 Topography

8.12.1 Description of Resources

The EcoHarmony West Wind site is in an area of over 60 square miles that includes a number of broad ridges with elevations above 1,350 feet Above Mean Sea Level. Surrounding elevations are lower by as much as 150 to 200 feet. The primary ridge within the project boundary lies in an easterly to westerly orientation and is a prominent landscape feature in the region. Several wind projects under construction or operating just to the west in Mower County are sited on or along ridge features of similar character and wind resource.[8]

The general topography is gentle rolling hills with long low ridges and intermittent drainage ways and minor streams.

The significant topographical feature in the area is the karst topography, which is further discussed under the section *Geologic and Groundwater Resources*.

8.12.2 Impacts

The project construction will include minor grading to level turbine site pads and for construction of project access roads. The level of surface grading required for this work will not significantly impact the local topography.

8.12.3 Mitigative Measures

No mitigation related to impacts to the local topography is required for this project.

[8] *See Id.*

8.13 Soils

8.13.1 Description of Resources

The Fillmore County Soil Survey manual was reviewed for general descriptions and summaries of the soils in the project area. A Soils Association map of the project area is presented as *Figure 4*. Project soil borings will be drilled prior to final design of the project to collect and analyze additional site specific soil information. The Soil Survey reports that the primary soil association for the project area is the Fayette – Dubuque - Whalan association. These soil groups are characterized by lightly colored soils formed chiefly over silty material. Within the project boundary, the Whalan type soil group is the most common. The soils in the project area have generally formed on top of a thin layer of glacial till that overlays the regional bedrock. These types of soils are typically found to be moderately well draining and susceptible to erosion.

8.13.2 Impacts

The primary impact to the area soils will be during the construction of the project. The construction will include disturbing the existing soils for preparation of the turbine sites and for construction of the access road network. It is during this period that the disturbed soils will be most susceptible to loss by erosion.

8.13.3 Mitigative Measures

Protection of the existing topsoil will be an important element of the construction management for the project. Existing topsoil will be stripped from land areas designated for turbine site and road construction. The topsoil will be stockpiled and re-spread over the sites upon completion of the construction. In addition, susceptible areas to be disturbed by the construction will be protected from soil erosion by installation of silt fence and other erosion control measures.

The project will secure a National Pollutant Discharge Elimination System (NPDES) permit from the Minnesota Pollution Control Agency (MPCA) prior to the start of construction. This permit will establish the site specific Best Management Practices (BMPs) to be utilized during construction to protect the soil resource on the sites. The project's construction management team will be responsible to ensure the permit requirements are properly implemented.

8.14 Geologic and Ground Water Resources

8.14.1 Description of Resources

The geology of Fillmore County is defined as gently rolling or upland rolling plain. The eastern half of the county contains a series of gently rolling divides which are remnants of an old geologic plain. The soil

survey of Fillmore County identifies a relatively flat area covering the townships of Harmony, Bristol, and Carimona. These townships, which represent the heart of the EcoHarmony West Wind Project, lie on a broad flat divide that separates the Root River and Upper Iowa River watersheds.

A significant feature of the regional geology is the existence of karst landscapes. Karst landscapes develop where mildly acidic groundwater contacts soluble limestone bedrock. Over long periods of time, this water to bedrock contact can slowly dissolve susceptible faces of carbonate bedrock and create cavities and voids in the bedrock. Such cavities and voids can potentially develop into sinkholes.

The groundwater resource in the project area is well documented in the Fillmore County soil survey. Within the project area, the town of Harmony derives its municipal water supply from groundwater resources. The karst landscape and soluble bedrock present pathways for surface waters to enter underlying aquifers.

8.14.2 Impacts

The evaluation of specific turbine sites in regard to the susceptibility of sinkhole development will be a major consideration during turbine layout design. Evaluation criteria will include the existence of sinkholes in close proximity, the depth of overburden to bedrock, and local site drainage. With soluble bedrock present, contaminants at the ground surface could quickly drain to aquifers through karst geology.

8.14.3 Mitigative Measures

EcoEnergy Wind has contracted with a geotechnical consulting firm, American Engineering Testing, to analyze, evaluate, and plan mitigation for potential issues with the karst topography. A summary document describing the methodology of investigating karst-related issues is attached to this application document as *Exhibit 3: American Engineering Testing (AET) Subsurface and Geotechnical Analysis Plan*. A minimum of one soil/rock boring is planned at each wind turbine site, even if the electrical resistivity survey shows competent bedrock. The groundwater level will also be measured in the boreholes since groundwater is an important factor in assessing the probability of internal erosion of soil overburden into the karst limestone.

The evaluation process will eliminate the selection of potential turbine sites that may be susceptible to sinkhole formation. In addition to the site evaluation, a system to monitor potential ground subsidence at turbine sites will be incorporated into the project construction.

Regarding the groundwater and concerns raised by contaminants draining into the aquifers, it is important first to limit exposure of contaminants at the ground surface. The construction and operation of the EcoHarmony West Wind Project will not introduce any new contaminant exposure risk

to the landscape. Also, siting turbines away from sinkhole areas will minimize any potential impact to the karst geology and groundwater resource. No additional mitigation is required in regard to protection of the groundwater resource.

8.15 Surface Water, and Floodplain Resources

8.15.1 Description of Resources

Most of the project boundary is located in a high plain area between the Root River and Upper Iowa River watersheds. *Exhibit 4, NRC Report on Wetlands, Waterways, Vegetation, and Wildlife*, presents the existing creeks and streams within the project boundary. The project area also includes a number of judicial ditches and drainage ways. Spring thaw melt water and storm water enters these waterways via overland drainage and also via drain tile lines. Many of the judicial ditches and water ways only run during the snow pack melt and after large storm events. A review of the Federal Emergency Management Agency (FEMA) floodplain maps for the project area found there are no documented floodplains within the project area. The following quote from the NRC Consulting report states that there are neither identifiable lakes nor designated state or national wild, scenic, or recreational rivers within the project boundary:

> *The Minnesota Department of Natural Resources and/or the U.S. Army Corps of Engineers maintain jurisdiction over navigable water bodies such as streams, rivers, lakes, ponds and, in some circumstances certain ditches. There are no identifiable lakes within the project boundary.*[9]

According to the most current (2006) Minnesota Impaired Waters List there are no impaired waters within or adjacent to the project area. In addition, there are no designated state or national wild, scenic or recreation rivers within the project area. [10]

8.15.2 Impacts

The greatest exposure for impact to surface water will be during the project's construction phase. As discussed in the *Geologic and Ground Water Resources* section, disturbing soils and equipment movements during construction will require protective measures to control soil erosion from entering the surface water ways. The construction phase will also include trenching of electric cable and potential damage to agricultural tile lines.

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[9] *NRC Report on Wetlands, Waterways, Vegetation, and Wildlife*, Fillmore County, MN, NRC Project # 007-0230-01-008," page 1 (Exhibit 4 attached).

[10] *Id*. at p. 2.

Upon completion of construction, the project will result in a small net increase of impermeable surface in the project boundary in the way of turbines and access roads. This increase will amount to approximately 0.5 acres per turbine for a total of approximately 50 to 77 acres (to include 10 acres for the new substation and O&M building).

8.15.3 Mitigative Measures

Creating 50 to 77 acres of impermeable surface over a total project area of 23,000 acres represents less than a 0.3% increase in impermeable surface and will not have a significant impact on the regional surface waters. As summarized by the NRC Report, "Therefore, cumulative impacts of increased stormwater runoff volume will be widely distributed and isolated and is expected to have minimal impacts to surface water resources."[11]

During final design of the project, all underground cable locations will be identified. These locations will be reviewed with each affected property owner. Part of this review will be to determine the location of agricultural tile lines. Identifying and locating agricultural tile lines will be carefully monitored to ensure that any damaged lines are repaired during the project's construction. EcoEnergy Wind, LLC will be fully responsible for tile repairs and to insure tile lines are open and operable upon completion of the project construction.

Generally, turbine locations will be selected that have a minimum impact on drainage and surface waters. Typically, turbines will be located on the highest ground available for any particular site and setback from any surface waters. These siting criteria will serve to minimize the turbine impacts to surface waters. Access roads constructed for the project will also be located to avoid surface waters to the extent possible. At locations where access roads must cross waterways, permanent culverts will be properly installed such that use of the road will not impair the water resource. Culverts will be sized so as not to create major backwater events or localized flooding during spring thaws or typical rain events.

The overall project will have very little impact on surface waters or floodplains. Turbines and access roads will be located so as to minimize their potential impacts on surface waters. Protective measures will control soil erosion from entering the surface water ways. Properly sized culverts will be constructed at any location where access roads must cross waterways.

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[11] *Id.*

8.16 Wetlands

8.16.1 Description of Resources

Natural Resources Consulting of Cottage Grove, Wisconsin, has been engaged to identify the wetland, surface water, and floodplain resources that may be affected; these will be communicated to the Minnesota PCA, Army Corps of Engineers, and Minnesota DNR through the Public Utilities Commission application process.

Initial wetland desktop studies show few wetland areas within the project that would be disturbed by the project.

See Exhibit 4: NRC Report on Wetlands, Waterways, Vegetation, and Wildlife.

8.16.2 Impacts

As summarized by the NRC Report, "Because less than 0.75% of the project area is comprised of wetlands and wind turbines are typically located on the higher elevation portions of the landscape, wetland impacts are expected to be minimal if any."[12]

8.16.3 Mitigative Measures

Temporary construction activities such as burying cable and constructing, equipment access and permanent access roads will be planned to avoid wetlands to the greatest extent practicable. No other mitigation is necessary.

8.17 Vegetation

8.17.1 Description of Resources

The existing vegetation within the project area was assessed by review of aerial photographs, Light Data and Ranging information (LiDAR), and field inspections. This review process found the vast majority of the project area to consist of row crop agricultural land. There are also small areas of pasture lands and wooded parcels within the project boundaries. Most of the wooded parcels are around building sites or drainage ways. Turbines will not be sited in wooded areas such that the project will not result in loss of wooded acres. A summary of the existing vegetative cover is provided below from *Exhibit 4: NRC Report on Wetlands, Waterways, Vegetation, and Wildlife (map included with that report)*:[13]

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12 *Id*. at p. 3.

13 *Id.*

Table 8.3. Vegetative Cover

GAP Land Cover	Acreage	Percent
Aquatic	8.023	0.014
Aspen/White Birch	3.336	0.006
Cropland	39078.29	69.213
Developed	745.435	1.32
Grassland	14212.64	25.173
Lowland Deciduous	472.345	0.837
Lowland Shrub	34.026	0.06
Maple/Basswood	187.92	0.333
Marsh	33.137	0.059
Oak	1578.106	2.795
Silver Maple	6.246	0.011
Upland Deciduous	61.157	0.108
Upland Shrub	40.294	0.071

8.17.2 Impacts

The most significant impact to existing vegetation will be during construction of the project. The primary impact will be the temporary loss of row crop acreage due to construction activities. During construction it is estimated that approximately one acre of land will be disturbed for each turbine for a possible maximum total of 134 disturbed acres. The vast majority of this disturbed area will be row crop lands that will be taken out of production during the project construction for turbines and access roads. The exact length of the access roads required for the project are unknown at this time since final turbine layout is not yet set. Upon completion of the project, it is estimated that about 0.5 acres of land will be utilized for the actual turbine footprint and access roads. For 134 turbines, this will amount to approximately 67 acres permanently removed from production. These 67 acres (plus approximately 10 more for the new substation and O&M building for a total of up to 77) represent less than 0.3% of the total 25,000 acres included in the total project area.

As summarized by in the NRC Consulting Report, "Because row crops are planted on an annual basis and forage crops such as hay, alfalfa, etc. are easily restored following construction activities, such impacts are expected to be relatively small and temporary." [14]

8.17.3 Mitigative Measures

Actions to minimize the loss of vegetation will be implemented during the project planning and construction phases. It is the interest of EcoEnergy Wind, LLC to minimize the length of access roads required for the project

[14] *Id.* at p. 4.

through efficient siting of the turbines. During the planning phase, turbine and access road locations will be selected to avoid established woodlands, grass lands, and waterways such that these types of natural areas will not be disturbed. During the construction phase, site managers will be responsible to ensure that only those areas necessary for construction are allowed to be disturbed. Upon completion of the construction phase, all disturbed areas to be re-vegetated will be restored to their pre-existing conditions and stabilized with seed and mulch as appropriate to control potential soil erosion.

8.18 Wildlife

8.18.1 Description of Resources

The majority of the project area and surrounding landscape is used for agricultural purposes with crop land comprising a significant portion of the vegetative cover. Scattered patches of grassland, forested hillsides and wetlands make up the remaining wildlife habitat within the project boundary. Based on the geographic range and the habitat available within the project boundary and surrounding area, there is a host of wildlife species that will occupy this area on a seasonal or year round basis.

Avian and bat species are of particular interest in the vicinity of wind energy projects. There have been a number of pre-construction and post-operation studies conducted throughout the United States, including Minnesota and surrounding states, to document bird and bat use and subsequent fatality impacts to these species. In general, results of these studies indicate that the degree of such impacts may be correlated with historic migratory corridors and/or the habitat composition within and adjacent to the project area. Project specific pre-construction avian surveys are currently being conducted to identify the seasonal bird use within the project area. This survey effort will document the species composition and relative abundance of birds using or passing through the project area throughout the year. Also, a desktop avian and bat screening analysis will be conducted as part of the overall environmental analysis for the proposed project.

A number of mammal species have adapted to and thrive in agricultural landscapes that contain a mosaic of habitat types including crop land. The row crops provide seasonal cover and food for some species during the summer and fall months prior to harvesting, and waste grain remaining on the ground after harvest can provide migrating waterfowl and other wildlife with food leading into winter. The scattered forests, grasslands and wetlands provide the limited long-term cover and food. Species typical of this landscape include a variety of rodents such as squirrels, rabbits and mice, white-tailed deer, red fox, coyote, raccoon, woodchuck and striped skunk.

A number of reptile and amphibian species are likely to be found in the project area. However, most of these will be associated with the wetlands, waterways and forest habitats. For example, most turtle and frog species will be associated with streams, ponds and wetlands. Depending on the species, snakes can be found in a variety of habitats including wetlands, forests and grasslands. However, agricultural crops are not a preferred habitat type.

8.18.2 Impacts

Regarding impacts to general wildlife, wind turbines and associated infrastructure have a relatively small footprint on the landscape and will typically be located in existing agricultural fields thereby minimizing impacts to the most suitable wildlife habitat. The disturbance resulting from construction-related activities will be temporary and is expected to have minimal affects to the local wildlife.

Regarding impacts to birds and bats, upon completion of a desktop avian and bat screening analysis and the year-long bird survey currently underway, an assessment of potential impacts to birds and bat can be determined for this project location. Based on similar studies that have been conducted in Minnesota and Iowa, results indicate that when properly located, bird and bat fatalities are minimal and do not significantly impact the overall population of these species.

8.18.3 Mitigative Measures

The location of the proposed wind energy facility was selected due to the favorable wind resource in this area and the open landscape that maximizes free flow of the wind. As a result of this landscape and the agricultural land use practices, there is a lack of habitat that would typically attract large numbers of birds and bats. Also, the wind turbine and associated infrastructure layout will be designed to avoid the wetland and woodland habitat that has the highest likelihood of attracting birds and bats. Based on these considerations, impacts to these species are expected to be minimal, and thus, pending study results that indicate otherwise, mitigative measures are expected to be unnecessary. *See Exhibit 4: NRC Report on Wetlands, Waterways, Vegetation, and Wildlife and Exhibit 5: NRC Avian Study Plan, Preliminary Results*.

8.19 Rare and Unique Natural Resources

8.19.1 Description of Resources

As part of the overall project review process, the Minnesota Department of Natural Resources performed a search of their Natural Heritage Database for the project area. This database contains information regarding known occurrences of rare and unique natural resources including wildlife and vegetation. The Natural Heritage Database is included as part of *the NRC*

Report on Wetlands, Waterways, Vegetation, and Wildlife, Exhibit 4. Exhibit 6 contains the letter from the DNR transmitting the Database.

8.19.2 Impacts

The database search identified rare and unique plants and animals that could occur within the project boundary. The Minnesota DNR has advised EcoEnergy Wind, LLC of their concerns in the project area, which include potential visual impacts to Forestville State Park, potential impact to regional bat and avian populations, and potential impact to specific mussel species in area waterways.

8.19.3 Mitigative Measures

As discussed in Section 8.7.2, staff from EcoEnergy Wind, LLC and the project environmental consultant, Natural Resources Consulting, met with the Minnesota DNR to discuss the project in October 2008. DNR staff included local regional staff from the Rochester office as well as a staff Ecologist from St. Paul. The Applicant will continue to work with the DNR to ensure that all rare and unique resources in the area are protected.

During the project planning phase, information gathered by the Natural Heritage Database inventory and DNR will be used to avoid locating turbines or access roads in the immediate vicinity of critical or sensitive resources. The Heritage Database information will also be used in the field, prior to construction, to ascertain whether or not any of the listed resources are present in areas designated for construction activities so that appropriate protective measures can be implemented prior to construction as needed.

In addition to the database results, EcoEnergy Wind, LLC is committed to minimizing potential impacts to any existing wetlands or native grass prairie areas that might be located within the project boundary. Field surveys will be conducted of all areas designated for construction activities to determine if any wetlands or native grass prairies would be impacted by the project. When such resources are found, protective measures will be implemented to minimize any impact the project may have. These measures would include maintaining protective setbacks from wetlands or prairie areas to provide a protective buffer between the resource and the construction activity.

9.0 Construction of the Project

9.1 Construction Overview

EcoEnergy Wind, LLC and its parent company, The Morse Group of Companies, will directly manage and be responsible for all aspects of the project planning, design, and construction. By maintaining control of all phases of the project, EcoEnergy Wind can ensure that the work is completed to the highest industry standards of care and quality. This commitment to quality will result in the completion of EcoHarmony West Wind as a model LWCS project for the industry.

EcoEnergy Wind, LLC and The Morse Group of Companies have the resources, experience, and commitment to quality to ensure successful completion of the EcoHarmony West Wind Project. They have participated in a number of wind development projects and have developed the resources, relationships, and expertise required for the planning, design, and construction of a LWECS project. A brief summary of the work involved in these three stages of a project's development are provided below.

9.2 Construction Planning Phase

The planning phase includes a number of critical activities that are either completed or underway for the EcoHarmony West Wind Project.

9.2.1 Interconnection

Most importantly, the project has a MISO queue position, G746 for 200 MW, which is part of the Group 7 study. The Interconnection Feasibility Study is complete; initial indications are that the lines can accommodate the additional generation. This group System Impact Study will commence later this year; it will be necessary to construct a new substation as part of the overall EcoHarmony West Wind facility.

9.2.2 Landowner Easements

The planning phase also includes securing easements with project landowners for placement of turbines, access roads, electrical cable trenches, transmission lines, substation, and related facilities. EcoEnergy Wind, LLC has total control over this effort and considers positive relationships with the landowners to be of critical importance. There is no project without the landowner agreements and EcoEnergy Wind is committed to establishing and maintaining positive relationships with the landowners and treating them with the utmost fairness and respect. As of August 1, 2008, EcoEnergy Wind had acquired access to over 20,000

acres for the project (of the 23,000 sought) through more than 120 land agreements.

9.2.3 Permits

A final part of the planning process is securing the necessary review documents and permits required to move the project forward. EcoEnergy Wind, LLC possesses the experience and the means to successfully acquire all local, state, and federal permits and requirements necessary for development and operation of the facility. EcoEnergy Wind will work closely with all state and federal agencies to ensure that issues are addressed and mitigative measures are implemented. In addition, EcoEnergy Wind has contracted with highly qualified professionals to ensure that all the work and reviews are completed to a high standard of excellence. These include:

- American Engineering Testing (AET), St. Paul, for the Subsurface and Geotechnical Analysis. (See *Exhibit 3*.)

- Natural Resources Consulting of Cottage Grove, Wisconsin, for both the Surface Water and Floodplain Study, and the year-long Avian(Bird & Bat) Survey and Analysis. (See *Exhibit 5*.)

- Pathfinder CRM, Spring Grove Minnesota, to prepare an Archival Cultural and Archaeological report. (See *Exhibit 2*.)

- Ayres and Associates of Madison, Wisconsin, for Aerial Photogrammetry and LiDAR Topographical Surveys.

EcoEnergy Wind will adhere to all regulatory approvals and environmental compliance needed for the EcoHarmony West Wind Project.

9.3 Design Phase

The design phase of the project includes siting the turbines and access roads, layout of the electric cable and transmission lines, and design of the substation and associated facilities. EcoEnergy Wind, LLC is committed to completing a thorough and rigorous design to ensure a high quality project and smooth construction process. The most important part of the design is the location of the individual turbines. A preliminary layout of the project turbines has already been completed based on the signed parcels, project topography, and available wind resource. These factors establish the optimum layout array that will result in the maximum power production. However, EcoEnergy Wind also realizes that the final turbine and access road layout must accommodate the needs and operations of the project landowners. Careful coordination and review of turbine and access road locations with the landowners will result in an overall layout

that is acceptable to the landowners while producing the energy needed to make the project financially viable.

After establishing the preliminary turbine and access road layout, the final detailed design effort will commence. The final detailed technical design will be generally divided between the Civil Site Design and the Electrical Facilities Design.

9.3.1 Civil Site Design

The Civil Site Design will include the detailed construction documents needed for the individual turbine sites and for the project access roads. Project plan sheets will be developed to show the location and construction information for the turbine sites and access roads. These plan sheets will also show the additional temporary easements that will be required during the project construction to allow for movement of material and equipment both on the project site and over the local road network. The materials and equipment needed to construct a LWECS project are very large and heavy and can result in excessive wear of the local road system. An important part of the Civil Site Design effort is to identify the local roads that will be used for the construction of the project and to determine the potential for damaging these roads. This evaluation process will consider a number of factors including: the strength and condition of the existing roads; the size, weight, and number of construction related loads to use the roads; the condition of any bridges or culverts on designated haul routes; the local traffic use of the roads; and the season of construction. This evaluation process will result in a Project Transportation Plan as previously discussed in the *Public Services and Infrastructure* section of this application. This plan will be reviewed with local, township, county, and state road authorities to ensure that everyone is informed and in agreement regarding the project's use and repair of the existing road system.

9.3.2 Electrical Facilities Design

The Electrical Facilities Design will include the detailed design of the project substation, layout of the electric collection system within the project, and design of a transmission line to the interconnect location.

- Electrical design of turbine components and the turbine/collection system interface will be completed by the turbine manufacturers.

- Design of the project's SCADA system to allow remote monitoring of the project's performance will be completed by an outside vendor.

- The layout of the electric collection system will generally follow the project access roads to the greatest extent possible. The collection system consists of buried electric cable (to the depth of four feet) running between turbines and forming a network to deliver the electricity from the turbines to the project substation. Segments of

this network will be located on properties not receiving turbines or access roads. The coordination with landowners to site these collection cables will follow the same process used to site turbines and access roads. The interests and desires of the project landowners will be highly respected at every stage of the project.

The design of the electrical facilities will be completed by EcoEnergy Engineering LLC, a member of The Morse Group of Companies. The close relationship between EcoEnergy Wind LLC and EcoEnergy Engineering LLC will provide excellent channels of communication to help ensure that the needs and desires of all project stakeholders are shared and incorporated into the final design.

9.4 Construction Phase

Construction of the project will be managed by professional staff from both EcoEnergy Wind, LLC and EcoEnergy Construction, LLC. The Morse Group of Companies may serve as the project's general contractor. They have extensive experience on large, high-voltage electric and power generation projects of similar complexity and size. They also have experience specific to LWECS projects in Illinois and Wisconsin.

EcoEnergy Wind will continue to serve as an active project developer throughout the project's construction. EcoEnergy Wind will provide general oversight and perform quality assurance functions for the project construction. EcoEnergy Wind will also continue as a point of contact for various agencies and officials with interest in the project. This continued presence of EcoEnergy Wind, LLC staff will provide continuity to the project from planning to design and through construction. This continuity will prove especially useful in maintaining contact with local agencies and road authorities, keeping them abreast of the project schedule and status. It will also provide those agencies and road authorities with a familiar and reliable contact to approach with any issues that may arise.

The combination of EcoEnergy Wind as project developer and EcoEnergy Construction working under Morse as the general contractor would prove beneficial to the overall project by providing open communication. EcoEnergy Wind staff will be intimately knowledgeable about all the discussions and interests of the project landowners and local authorities. The close relationship among The Morse Group of Companies would also encourage cooperation and mutual problem solving during construction to keep the project moving forward. Their mutual interests in completing a successful project would result in a true team effort to the benefit of all parties and stakeholders involved.

9.5 Commissioning Phase

The Development will be commissioned after completion of the construction phase. Acceptance of the five major subsystems that comprise a wind power plant and the wind power plant as a whole is achieved through detailed inspection and testing procedures.

The manufacturer's inspection criteria applicable to wind power plant components augment this process as the wind power plant acceptance is dependent upon the cooperation of each component within the major wind power plant subsystems (e.g., turbines, communication system, meteorological system, high voltage collection and distribution system, and wind power plant SCADA System).

10.0 Operation of the Project

10.1 Operations

EcoEnergy Wind, LLC will develop the EcoHarmony West Wind Project and manage the overall construction of the project. Upon completion of the project, the operation of the LWECS facility will be managed by a third party operator. At this point in time, the third party operator has not been selected. As part of the overall development process, EcoEnergy Wind will negotiate with parties interested in forming a Joint Venture for ownership and operation and maintenance (O&M) of the LWECS facility. EcoEnergy Wind will be part of the Joint Venture ownership group and will maintain a long term interest in the success of the project. A final decision on the selection of the O&M service provider will be made in conjunction with other members of the Joint Venture. The Minnesota Public Utilities Commission will be notified when the Joint Venture agreements are signed and all parties thereto will then be identified.

As a member of the Joint Venture group, EcoEnergy Wind LLC will only select highly reputable firms who will share its commitment to project excellence. EcoEnergy Wind will ensure that the Joint Venture ownership group places a high value on the relationships with project landowners and on owning, operating, and maintaining the LWECS facility in accordance with the industry's highest standards of quality.

10.1.1 Turbine Manufacturer

A major consideration in selecting the O&M service provider will be the turbine manufacturer that is selected for the project. The turbine manufacturer may want to participate in the facilities operation and maintenance. If the turbine manufacturer is not interested in O&M for EcoHarmony West Wind, then a reputable service provider with demonstrable experience, competence, and resources for operating such a facility will be selected.

10.1.2 Maintenance

Operation and maintenance of the facility will include the presence of permanent, full-time, on-site technicians and support staff working a typical Monday – Friday schedule. At all other times, operations and maintenance personnel will be on-call, and equipped with remote monitoring and control capabilities.

This staff will be responsible for daily inspection of the operations and for routine maintenance of the equipment. Routine maintenance will follow a schedule as recommended by the turbine manufacturer. In addition to performing routine maintenance and inspections, the on-site staff will be

able to troubleshoot and service the turbines and related equipment to maintain a high level of power generation capacity.

Staff members will also create, schedule, and update individual turbine maintenance records. The turbine manufacturer will provide a recommended maintenance and service schedule for the various turbine components. Routine maintenance will also be required for the project substation, the electrical collection and transmission system, and the project access roads. The on-site O&M staff will be responsible to monitor the condition of all the different components of the facility, and to schedule maintenance and service work as necessary.

The specific maintenance checklist and timetables will be established once the final components are selected. Typically, scheduled maintenance is conducted on each turbine in two separate inspections, at approximately six-month intervals for such things as switch cupboards, control cabinets, wind tracking components, pitch adjustment, and braking and hydraulics. Large assembly items with few moving parts (tower, nose cone, rotor blades, cables) are typically inspected on an annual basis.

10.2 SCADA

The EcoHarmony West Wind Project will include a Supervisory Control and Data Acquisition System (SCADA) to help monitor and control the facility. The SCADA system will run over fiber optic cable connecting the turbines to the project's operation and maintenance facility. The fiber optic cable will be run in the same trenching that hosts the electric collection cable. The SCADA system will monitor the turbine performance, the meteorological gauges, and related system equipment on a continuous basis. The system will alert site staff upon recognizing any turbine or system irregularities. The SCADA system will provide a log of system operation and performance such that any trending in operational inefficiency can be identified and resolved. The SCADA system can also be accessed from remote locations to allow monitoring of the facility outside the normal working hours of the on-site service staff.

11.0 Costs

11.1 Project Development and Construction Costs

Costs associated with the project development include, among others:

- Land and land lease acquisition costs
- Wind resource evaluation costs
- Permit and environmental review costs
- Project engineering and design costs
- Civil construction (grading, electrical lines, foundations)
- Procurement, transport and installation of the turbines and related equipment and material
- Management of the project work

For the EcoHarmony West Wind Project, these combined costs of project development and construction are estimated at $475 million for the 200 MW facility (or $2,375,000 per MW), pending final interconnection costs. The largest component in the total cost of the Project will be the wind turbines; however, infrastructure costs for access road construction and electrical collection systems also are factors.

11.2 Project Operating Costs, Life of Project Costs

Project operating costs include those costs to be incurred after construction is completed. These costs include:

- Project debt service
- Facility operation and maintenance costs
- Land lease payments to project landowners
- Minnesota Production Tax on energy generation

The most variable of these costs will be the facility operation and maintenance costs. O&M costs are predicted to be relatively flat for the first years of the project and then to increase each year to approximately year 22 of the project's 30 year life expectancy. After year 22, the annual O&M costs are expected to decrease on an annual basis as only critically essential maintenance is performed on equipment in the last stage of the project life.

Lease: The land lease payments during the operating life of the project are generally fixed amounts with annual adjustments indexed to inflation.

Production Tax: The Minnesota Production Tax is also a fixed rate based on the energy production of the facility. The lease payments and production tax are generally fixed costs and not expected to vary greatly over the life of the project.

Maintenance: Variable maintenance costs will likely be approximately $5.5 million over the thirty year life of the project. An advantage of wind energy facilities is that they typically do not require going offline for maintenance. Individual turbines within the project can be serviced while the rest of the facility continues to deliver energy.

Total Costs: EcoEnergy Wind has estimated capital costs and on-going operating costs to be approximately $475 million.

12.0 Schedule

12.1

The overall completion date for the EcoHarmony West Wind Project is scheduled for the fourth quarter of 2010. By this date the project will be fully constructed and in commercial operation. The following project milestones have been set in order to achieve this final project completion date.

Table 12.1. Anticipated Project Schedule

Milestone Event	Date
Submit Permit Application to PUC	January 2009
Finish Recording Land Easement Documents	February 2009
Execute Project Financing Agreement	March 2009
Formalize Power Purchase Agreement	April 2009
Finalize Equipment Procurement Contracts	April 2009
Receive PUC Permit	August 2009
Project Groundbreaking	October 2009
Complete Construction	October 2010
Commence Commercial Operation	November 2010

EcoEnergy Wind, LLC is developing the project and currently negotiating with potential joint venture partners to provide turbines and necessary additional project financing.

As explained earlier, EcoEnergy Wind has nearly completed negotiations with landowners for rights to place turbines on their property.

13.0 Energy Projections

13.1 WindFarmer Analysis / Energy Production

Energy projections for the facility are based on the turbine size and reliability and availability of the wind resource. EcoEnergy Wind, LLC is internally analyzing the project data using WindFarmer software. The anticipated energy production for each turbine, accounting for both Net Capacity Factor (NCF) of 38% and array efficiency losses of 3.75%, is 4.5 GWh annually. The total energy generated by 134 turbines is estimated to be 603 GWh/yr.

This energy estimate was created using data from an EcoEnergy Wind met tower and wind data collected between May 2007 and June 2008. It assumes the power curve of a 1.5 MW turbine with a 77m rotor at a tower hub height of 80m. Meteorological data collected to date establish that the average annual wind speed at the site will range from 7.6 to 8.0 meters per second at the 80 meter hub height.

Actual energy production will vary based on the size of the turbines, the actual wind resource, and the facility's operating efficiency.

14.0 Decommissioning and Restoration

14.1 Overview

Decommissioning and restoration for the EcoHarmony West Wind Project include the removal of all structures, project improvements, and related infrastructure to a depth of 42 inches and de-compacting the soil to a depth of 36 inches to pre-project conditions. This includes removal of all access roads and de-compacting all improved areas to facilitate the return of the land to row crop agriculture production. The following items are addressed as specifically required for the permit application.

14.2 Anticipated Life

The anticipated life of the project is for a 30 year operational life to the year 2040. The land easement documents obtained for the project provide for this 30-year life. Decommissioning and restoration would be performed within 12 months of the end of the 30-year period.

14.3 Costs

The major costs involved in decommissioning the project will be removal of the turbine structures (all above-ground components and parts of the foundation to a depth of 42 inches) and the access roads, then de-compacting the soil to a depth of 36 inches to pre-project conditions. This will take place within 12 months after termination of the Lease or abandonment of the facility.

The actual costs will be determined by the cost of the removal minus a credit for the salvage value of the materials. The estimated decommissioning costs are approximately $25,000 per turbine in today's dollars for a total cost of $3,350.000.

14.4 Schedule for Updating Costs

The estimated cost of decommissioning the project will be updated every 5 years with the costs adjusted in accordance with the Engineering News Record annual construction cost index. Cost adjustments related to any significant changes in salvage value of the turbine components will be made as necessary.

14.5 Funds Acquisition

A decommissioning fund will be put in place starting in year seven with $25,000 per turbine put aside, and every three years this amount will be adjusted for inflation.

Funding for decommissioning the project will be made a part of the project budget and will transfer to any future entity that may purchase or otherwise come to own the project.

Decommissioning is required as part of the land easement agreements that will be recorded documents in Fillmore County. The owner of the project at the end of the 30 year life will have legal responsibility to decommission the project.

14.6 Manner of Decommissioning

As stated above, the decommissioning will include removal of all structures, components, access roads, and related facilities to a depth of 42 inches, and de-compacting the soil to a depth of 32 inches to pre-project conditions. De-compacting will include all areas that have been compacted; this procedure is followed up by stabilizing the sites to prevent excessive erosion.

Decommissioning will require mobilization of cranes to remove turbines and above-grade equipment and the use of grading equipment to remove access roads and de-compact the soils.

The decommissioning work will proceed with consideration to agricultural drain tile lines. Record drawings from the project construction and operational life will be referenced during the decommissioning to identify known drain tile locations. Current landowners will be consulted during decommissioning to identify known drain tile areas and to ensure the tiles remain operational upon completion of the decommissioning.

15.0 Identification of Other Permits

15.1 Table of Permits and Approvals Sought

There are a number of permits or approvals that are or may be required prior to construction of the EcoHarmony West Wind Project. These permits and approvals are outlined in the table below:

Table 15.1. Possible Permits and Approvals Required

Agency	Permits / Approval	Authority	Description
FAA	Notice of Proposed Construction or Alteration	14 CFR Chap 1 Subchapter E Part 77	Determination of No Hazard to Air Navigation
USFWS	Consultation and review of the proposed project regarding federally threatened and endangered species	Endangered Species Act of 1973	The Act requires all projects that are in areas designated to be habitat for endangered species to be reviewed by FWS
US Army Corps of Engineers	Section 404 Permit	Clean Water Act	Required for activities that involve dredging or filling wetlands and waters of the U.S.
Federal Energy Regulatory Commission (FERC)	Exempt Wholesale Generator Status	1992 Energy Policy Act	Self-Certification of exempt wholesale generator requires filing with FERC.
Minn. PUC	LEGF Certificate of Need	MN Rules 7849	For wind turbines and transmission interconnections and associated facilities
Minn. PUC	LWECS Site Permit	MN Rules 7836	For wind turbines; to meet threshold for LWECS requiring permit.
MN State Historical Preservation Office	Cultural and Historical Resources Review	National Historic Preservation Act; Historical Sites Act (Minn. Stat. 138.661-138.669); Field Archaeology Act (Minn. Stat. 138.31-138.42); Private Cemeteries Act (Minn. Stat. 307)	Cultural Resources Review and State and National Register of Historic Sites Review

Agency	Permits / Approval	Authority	Description
MN Pollution Control Agency	401 Certification	Clean Water Act	When a federal permit is required (i.e., Section 404 Permit with the Corps of Engineers) a State Water Quality Certification/Waiver is needed.
MPCA	NPDES Stormwater Permit for Construction	Clean Water Act	Program designed to reduce the amount of sediment and pollution entering surface and groundwater during and after construction projects.
MPCA	Small Quantity Generator	MN Rules 7045	Hazardous Waste rules regarding storage and disposal of turbine lubricating oil.
Minn. DNR	Works in Public Waters	Minn. Stat. §103G.005	Applies to activities conducted below the Ordinary High Water Level of public waters and public waters wetlands
Minn. DNR	License to Cross Public Lands and Waters	Minn. Stat. §84.415	Required for utilities passing over, under, or across state lands and public waters
MN Dept. of Natural Resources	Consultation and Review of the Proposed Project regarding State Threatened and Endangered Species	Minn. Stat. § 84.0895	Establishes Guidelines for the protection of Threatened and Endangered species in the State of Minnesota.
MN Dept. of Health	Water Well Permit	MN Well Code (Minn. Stat. § 103I); Safe Drinking Water Act	Ensures development and protection of groundwater in an ordinary, healthful, and reasonable manner.
MN Dept. of Health	Plumbing Plan Review	MN Rules 4715.3130	Ensures healthy and safe plumbing installation.

Agency	Permits / Approval	Authority	Description
MN Board of Water and Soil Resources	Wetland Conservation Act Approval	Minn. Stat. §103G.222-103G.2373; MN Rules 8420	Requires proposed impacts to wetlands be avoided and minimized
MN Dept. of Transportation (MnDOT)	Driveway Permit		If access road will connect a state road.
MnDOT	Utility Access Permit	Minn. Stat. § 161.45	Provides for placing utilities in R.O.W.
MnDOT	Highway Access Permit	Minn. Stat., Ch. 505	Permits access to State roads.
MnDOT	Work Within Right of Way Permit		Allows for construction activity in MnDOT R.O.W.
MnDOT	Oversize and Overweight Haulage Permit	Minn. Stat., § 169.862	Permits oversized and overweight loads to travel on State roads.
MnDOT	Aviation clearance from Office of Aeronautics		Review and approval of FAA 7460 permits.
Fillmore County	Building Permits	County Ordinances	
Fillmore County	Conditional Use Permits	County Ordinances	Approves the siting and construction of the substation and Transmission Line.
Fillmore County	Individual Septic Tank Systems (ISTS) Permit	County Ordinances	
Fillmore County	Driveway Permit	County Ordinances	If Turbine road will connect to a county road
Fillmore County	Utility Permit	County Right of Way	
Fillmore County	Moving Permit	County Ordinances	Need to permit oversized loads on county roads
Fillmore County	Sign Permit	County Ordinances	Permits erection or maintenance of signs.

16.0 Abbreviations

AET	American Engineering Testing
AMSL	Above Mean Sea Level
AWEA	American Wind Energy Association
BMP	Best Management Practices
CFR	Code of Federal Regulations
CON	Certificate of Need
dBA	A-Weighted Decibels
EMF	Electric and Magnetic Fields
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
ft	Feet
GWh	Gigawatt hours
km	Kilometer
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hours
LEGF	Large Electric Generating Facility
LiDAR	Light Data and Ranging Information
LWECS	Large Wind Energy Conversion System
m	Meter
MISO	Midwest Independent Transmission System Operator
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
mph	Miles per hour
m/s	Meters per second
MW	Megawatt
NCF	Net Capacity Factor
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
O&M	Operations and Maintenance
PCA	Pollution Control Agency
PPA	Power Purchase Agreement
PUC	Public Utilities Commission
RD	Rotor Diameter
SCADA	Supervisory Control and Data Acquisition System
SHPO	State Historic Preservation Office
USFWS	United States Fish and Wildlife Service
WMA	Wildlife Management Area