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MPUC Docket Nos. IP6688/CN-08-961
IP6688/WS-08-973

STATE OF MINNESOTA
OFFICE OF ADMINISTRATIVE HEARINGS

FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Application of EcoHarmony West Wind, LLC, for a Certificate of Need and Site Permit for a Large Energy Facility, a 200 MW Wind Facility in Fillmore County

SUMMARY OF TESTIMONY AT PUBLIC HEARINGS

This matter was initiated with the Minnesota Public Utilities Commission (MPUC or the Commission) by EcoHarmony West Wind, LLC (EcoHarmony) on October 22, 2008.[1] On that date, EcoHarmony filed an Application for a Certificate of Need (CN) for a 200 megawatt (MW) wind conversion system ("the Project"). On January 15, 2009, the Commission referred the matter to the Office of Administrative Hearings for conducting public hearings under the alternate CN process under docket number CN-08-961.[2]

On January 26, 2009, EcoHarmony filed a Site Permit Application for the Project to be installed in Fillmore County.[3] On February 27, 2009, the Commission accepted EcoHarmony's application for Site Permit for the Project, authorized the Minnesota Office of Energy Security Energy Facilities Permitting (EFP) staff to name a public advisor for the Project, approved a proposed draft site permit for the Project for distribution and public comment, and authorized EFP staff to initiate the public participation process found in Minnesota Rule 7836.0900.[4] The Site Permit application was assigned docket number WS-08-973.

Administrative Law Judge (ALJ) Steve M. Mihalchick conducted a public hearing regarding these matters in the evening of November 9, 2009, at the Harmony Community Center, Harmony, Minnesota. An opportunity was provided for members of

[1] EcoHarmony Certificate of Need Application, (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=5586889).
[2] Commission Order, January 15, 2009 (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=5701317).
[3] EcoHarmony Site Permit Application (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=5717595).
[4] Commission Order, February 27, 2009 (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=5790375).

the public to air their views regarding the need for and proposed siting of the wind project. The period for written public comments closed on November 23, 2009.

Description of the Project

EcoHarmony proposed to install 134 1.5 MW wind turbines resulting in a nameplate capacity of 200 MW. The exact number will depend on the type of turbine chosen.[5] Characteristics of turbines that may be used for the project are shown in Table 1 of Exhibit 1. Turbines are typically placed on towers 80 meters (262 ft.) in height. Rotor diameters vary from 77 to 101 meters (253 to 331 ft.).[6] Each turbine tower will be secured by a steel-reinforced concrete foundation that varies in size and design depending on soil and substrate conditions. A control panel inside the base of each turbine tower houses communication and electronic circuitry. Each turbine will be connected to a supervisory control and data acquisition (SCADA) system via fiber optic cable. The SCADA system allows for real-time monitoring and control of turbine operation.[7]

The electricity generated by each turbine is stepped up to collection line voltage (34.5 or 69 kV) by a pad-mounted transformer at the base of each turbine. The SCADA fiber optic cable and each turbine's collection line will be buried to a depth of approximately 4 feet. The collection lines carry the generated electricity from the turbines to a collection substation, sited near the geographic center of the project. The proposed collection substation will be sited on approximately 5 acres and will be fenced to prevent unauthorized access. Electricity entering the collection substation is stepped up there to a voltage of 161 kV. Power from the collection substation will be transmitted via an overhead 161 kV transmission line to a switching station southeast of Harmony, Minnesota.[8]

Facilities associated with the Project include gravel access roads, a new substation, an operation and maintenance (O&M) building, meteorological towers, and an electrical collection system. The project is proposed to interconnect to the transmission grid through a 161 kilovolt (kV) transmission line, approximately 8.5 miles long, which will connect the new substation to a switching station and an existing 161 kV transmission line owned by ITC-Midwest.[9]

The Project site is located in Fillmore County approximately five miles south of Preston, Minnesota, and just north of the Iowa border. Harmony, Minnesota, abuts the Project boundary on the northeast side.[10] The Project boundary encompasses approximately 50,000 acres of land within Harmony, Bristol, York, Carimona, Forestville,

[5] Transcript, at 17 (Miller)(noting that the Project could meet the 200 MW nameplate capacity with as few as 87 2.3 MW turbines).
[6] Ex. 1, at 5.
[7] Ex. 1, at 5-6.
[8] Ex. 1, at 6.
[9] Ex. 1, at 1.
[10] Ex. 1, Figure 1.

and Preston Townships.[11] The actual acreage needed for the Project is approximately 23,000 acres.[12] The area of direct land use will be between 47 and 94 acres for turbines and access roads (approximately 0.5 acres per turbine), with an additional 10 acres required for the collection substation and O&M building.[13]

The Project area is predominantly in agricultural use with a relatively low population density. The general topography of the project site is rolling hills with long low ridges and intermittent drainage ways and minor streams. The site has a number of broad ridges with elevations approximately 1,350 feet above mean sea level. Elevations around the ridges are lower by as much as 150 to 200 feet. The primary ridge in the area lies in an easterly to westerly direction and is a prominent landscape feature. The project area includes karst topography – a landform shaped by the slow dissolution of limestone bedrock.[14]

EcoHarmony has negotiated with landowners for the easements covering approximately 20,000 acres needed to install and maintain the turbines and other facilities required for the Project.[15] The Project is anticipated to remove about 77 acres or 0.3% of the Project area from crop production (including the ten acres for a new substation and operations and management building).[16]

EcoHarmony noted that review documents and permits will be required before the Project can proceed. The Applicant committed to working closely with State and Federal agencies to obtain the required local, state, and federal approvals required to construct the Project. EcoHarmony committed to working closely with the appropriate State and Federal agencies to address issues and implement mitigative measures. To assist in this process, the Applicant has contracted with consultants who have experience in areas of expertise regarding siting requirements for wind turbines.[17]

Hearing Notices

Notice of the public hearing in this matter was made by publication in the Fillmore County *Journal* on October 26, 2009. The notice was mailed to landowners, public officials, media outlets, and persons who indicated an interest in CN matters.[18]

Approximately fifteen members of the public appeared at the public hearing in this matter. In addition, six persons were present at the hearing on behalf of the Applicant or a State agency. Several of the attendees offered testimony concerning the Project and related issues. The Administrative Law Judge established a deadline of November 23, 2009, for receipt of written comments from any interested person.

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[11] EcoHarmony Site Permit Application, at 1, 11; Ex. 1, at 5.
[12] Ex. 1, at 1.
[13] Ex. 1, at 6.
[14] Ex. 1, at 5.
[15] EcoHarmony Site Permit Application, at 1, 11.
[16] EcoHarmony Site Permit Application, Section 8.17.2
[17] EcoHarmony Site Permit Application, Section 9.2.3.
[18] Ex. 1.
(https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=3943819).

The Commission will issue an Order on EcoHarmony's applications for a Certification of Need and a Site Permit after examination of this Summary, the hearing transcripts, all written filings submitted by the public and all filings and arguments submitted by the Applicant, the Minnesota Department of Commerce and other persons and entities interested in this matter.

Summary of Testimony in Harmony

Larry Hartman, Project Manager with the Department of Commerce's Energy Facilities Permitting Group (EFP) made a very brief presentation regarding the Department's role in the Project. Mr. Hartman also entered the environmental review prepared by EFP for the Project into the record.[19]

The environmental review conducted by the Department is summarized in a document entitled *Environmental Report: EcoHarmony West Wind Project* (*Environmental Report*).[20] The *Environmental Report* is a general document discussing the potential human and environmental impacts the Project as well as any alternatives to the Project as proposed. The Department also assessed possible mitigation of potential adverse effects of the Project.

As part of the *Environmental Report* development process, a public meeting was held on April 15, 2009, to solicit input into the scope of the issues to be addressed in the study.[21] Written comments were solicited and several were received. On September 14, 2009, the *Environmental Report* Scoping Decision was issued by Commerce.[22]

The *Environmental Report* detailed the work needed to be performed for the Project, potential impacts, and mitigation measures. Particular impacts noted were to the viewshed from several parks, the presence of karst topography in the Project area, and the potential for noise and shadow flicker from turbine operation. No significant impacts requiring extraordinary mitigation measures were identified in the *Environmental Report*. Mitigation measures were detailed for the very limited impacts and potential impacts resulting from the installation and operation of the Project.[23]

The Department's review covered: need, preference for renewable and conservation alternatives, cost of alternatives, impacts to the socioeconomic and natural environments, and policy implications. A "no build" alternative, a generic 280 MW large wind energy conversion system, a 106 MW biomass facility, and the Project were compared for feasibility and availability. None of the alternatives were determined to offer a viable alternative to the benefits offered by Project. None of the alternatives had

[19] Tr. at 8-9 (Hartman); Ex. 1.
[20] Ex. 1.
[21] Scoping Notice (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=5831089 .
[22] Ex. 1, Appendix A (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=200910-42823-01).
[23] Ex. 1, Section 6.

lesser socioeconomic and natural environment impacts than the Project. There was no significant policy implication identified as affected by the Project.[24]

Energy Facilities Permitting has taken no position regarding whether the Commission should approve the Project. Attendees at the public hearing were invited to comment on the Project and on the Department's assessment.[25]

Don Miller, Project Manager for EcoHarmony, discussed the anticipated need for electricity generated from renewable energy sources (RES) to meet the state goal for renewable energy of 25 percent of retail sales by the year 2025.[26] Regarding the financial impact of the Project, he stated:

> But, you know, mainly there's an economic impact to the community. There's lease payments to the landowners that would exceed $20 million over the life of the project. There will be something on the order of 100 to 125 construction jobs that come in with the project for the construction. We'll have a -- the facility will include an operations and maintenance building. More than likely, it will be sited in the city of Harmony and will have a staff of, say, ten to 12 people, permanent full-time jobs. And then the project will generate tax revenues for Fillmore County. If it's built to 200 megawatts, the tax revenue annually to Fillmore County would be on the order of $600- to $700,000, 80 percent of which will stay with the county and 20 percent would be distributed to the townships that are hosting the turbines. So, you know, that's one part of the project, I guess, that we're proud of. We're bringing economic development to Fillmore County and it's an important part of what we're doing, I guess, too.[27]

Bret Eknes, Planning Director for the Public Utilities Commission, described the permit process and the PUC's role in the considering the applications of EcoHarmony.[28]

Dan Tieffenbacher questioned what impact on bird populations could be forecast when the size of the turbines to be used was not yet known.[29] Mr. Hartman noted that a recent study indicated that bird mortality increased by 1.5 birds per turbine.[30]

Gayln Simon expressed concern over the occurrence of sinkholes in the Project area, caused by the karst layer in the local geology. This layer is characterized by limestone formations and aquifers. The effect of water on the limestone results in underground caverns and the appearance of sinkholes at the surface.[31] Mr. Simon noted that each turbine requires a large concrete footing and he opined that such construction could detrimentally impact existing aquifers. Mr. Simon suggested that the

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[24] *See* Ex. 1.
[25] Tr. at 10 (Hartman).
[26] Tr. at 10 (Miller).
[27] Tr. at 16 (Miller).
[28] Tr. at 7-8 (Eknes).
[29] Tr. at 21 (Tieffenbacher).
[30] Tr. at 22-23 (Hartman).
[31] Tr. at 25-27 (Simon); Public Exhibit 2.

Minnesota Department of Natural Resources (DNR) and the Fillmore County Soil and Water Conservation District conduct a study to determine if the proposed turbine locations would result in environmental harm.[32]

Brian Huggenvik, a property owner bordering the Project area, noted that the lot behind his house has five sinkholes due to the karst layer in the area. He noted that EcoHarmony has prospectively located five turbines in that lot. He indicated that EcoHarmony's map of turbine locations shows 17 turbines in areas designated as critical or sensitive sinkhole zones.[33] Nanette Huggenvik provided a map of sinkholes that have appeared in the Project area, using information provided by the DNR.[34]

Mr. Simon noted that during periods of substantial rain, seeping would occur. Seeping is the process of groundwater rising out of karst layers. Mr. Simon indicated that just because an area is elevated, there is no assurance that a particular location is not a karst area subject to seeping. He suggested that any borings done to determine the nature of the ground for siting of individual turbines be overseen by an agency with experience in this topography.[35]

EcoHarmony responded that:

> In our site permit application, we have a geotechnical report prepared by American Engineering and Testing out of St. Paul, Minnesota, in regards to the karst topography -- local here, and they have quite a lot of experience nationally and locally with karst topography. And what the -- the strategy for dealing with the karst is that the turbines would be sited -- you know, the siting -- a micrositing of the turbines and then soil borings would be taken at the turbine locations to identify if there are any sinkholes or potential sinkholes at those particular turbine -- individual turbine locations.
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> And there are a series of other geophysical testings that can be done in the vicinity of the turbine locations to determine whether or not the limestone bedrock is found or maybe potentially have some karst features to it. So the company, American Engineering and Testing, was very confident that the karst issue could be designed around. And, also, I just wanted to add, I guess, that we actually won't be changing any of the drainage patterns with our access roads. If we need culverts or grading to accommodate the existing drainage patterns, we will maintain existing drainage patterns. So the turbines tend to be on the high ground. This isn't like across the board, but in the -- the karst tends to develop where there is water accumulating and infiltrating the soil. So we believe that, for

[32] Tr. at 28, 31-32 (Simon).
[33] Tr. at 43-44 (B. Huggenvik).
[34] Tr. at 29-30 (N. Huggenvik); Public Exhibit 2.
[35] Tr. at 35-36 (Simon).

> the most part, the turbines won't be in the areas where there's active karst development.[36]

Ms. Simon noted that each turbine would have an electrical line running underground to the collector substation. She questioned whether running these electrical lines through aquifers would ionize the water in the aquifers, thereby weakening calcium and limestone deposits in the karst layer.[37]

On the question regarding ionization, EcoHarmony responded that

> Well, when the atmosphere is humid, there's electricity flowing through those overhead transmission lines. And I don't know -- understand the chemistry or the mechanics behind it, but if you hear power lines crackling, it's more predominant -- it's more likely to occur when there's moisture in the air. And I've seen that reference to ionization of the air molecules around the high voltage transmission lines producing that crackling sound.
>
> But as far as ionized water actually getting into the ground and infiltrating and creating additional dissolving of the limestone, I'm not familiar with that process or if that is even -- I don't think that's part of, you know, what could happen here. I think ionization is a minor thing, but I may be wrong about that.[38]

Mr. Eknes noted that ionization was discussed in the routing permit, regarding the effects of ionization arising from atmospheric humidity around above-ground power lines.[39]

Mr. Huggenvik noted that erection of wind towers will have a visual impact on the Project area and neighboring land that he described as "corporate, commercial, industrial, and that clutter the rural landscape."[40] He expressed concern that mitigation of effects like shadow flicker and aircraft warning lights would be inadequate due to the height of the towers and their proximity to his home.[41]

The impact of the noise resulting from wind turbine operation was raised by Mr. Huggenvik as an additional concern. On this issue, he stated:

> The current PUC setbacks are based on a maximum 50 decibels, high-frequency level. That's 50 decibels of high frequency, not considering low frequency. The PUC does not consider the more important low-frequency sound. Wisconsin citizens living next to wind farms have a large quantity of reported low-frequency sound information. And in summary, when the wind turbines hit the max level of 50 decibels, high frequency, the low

[36] Tr. at 32-34 (Miller).
[37] Tr. at 32 (Simon).
[38] Tr. at 34-35 (Miller).
[39] Tr. at 41 (Eknes).
[40] Tr. at 45 (B. Huggenvik).
[41] *Id*.

> frequencies are much higher, between 65 and 68 dB, decibels. The low frequency from these large turbines is now the most serious health issue being addressed in Wisconsin wind farm areas, and it needs to be considered here in Harmony.
>
> EcoEnergy's environmental report acknowledges low-frequency problems, and I quote: Wind turbines produce audible low-frequency sound and subaudible sound, also known as infrasound. These sounds can have a rhythmic modulation due to the spinning of the turbine blades. EcoEnergy goes on to say, in general, low-frequency sounds can cause stress, annoyance, and sleep disturbance. So EcoEnergy admits there is a problem with the low-frequency sound, but will not consider measuring it as they do high-frequency. I will have to buy a decibel meter to monitor the turbines, so I would like to know how I would have to go about proceeding with documented sound violations and what the enforcement procedure would be.[42]

Mr. Huggenvik disputed the effectiveness of the minimum 1,000 foot setback distance and the proposed 1,200 foot setback distance, stating:

> The townships and counties in Wisconsin have learned through experience that noise problems and health issues associated with shadow flicker decreased dramatically starting at 2,000 feet. Updating the current 1,000-foot setback similar to the 2,000-foot setback in Wisconsin would be a start in the right direction. The visual intrusiveness is still there, but the noise and flicker are considerably decreased.[43]

Mr. Huggenvik inquired as to how the noise standard was enforced, analogizing the situation for noise enforcement to the need for a radar gun to enforce speed limits.[44] Mr. Hartman responded that the siting of individual turbines was accomplished using "worst case" scenarios for determination of where a turbine could be placed in the vicinity of a residence. He indicated that a noise study could be required to ensure compliance with the appropriate standard as had been done with the Bent Tree Wind Farm (MPUC Docket Nos. ET6657/WS-08-573 [site permit] and ET6657/CN-07-1425 [CN]). OES follows up noise complaints with monitoring.[45] Mr. Hartman also stated:

> Regarding if it is a turbine that does, say, exceed the noise standard, one, they can be shut down. That's one thing. Now, let's say if it occurs under certain situations, let's say when the wind is out of the northeast, or just pick a direction, and maybe it's between 14 and 16 miles per hour, they can set the SCADA system -- the supervisory control and data acquisition system, the SCADA system to limit the turbine's ability to function. Then those parameters, if they're identified, will establish that the turbine won't

[42] Tr. at 45-47 (B. Huggenvik).
[43] Tr. at 47 (B. Huggenvik).
[44] Tr. at 70 (B. Huggenvik).
[45] Tr. 70-71, 74 (Hartman).

> operate in those conditions. And the last course, there's always revocation or suspension or limiting their ability to operate that turbine if it is in violation of the permit standards.[46]

Mr. Eknes noted that historically there has not been any requirement for testing. The Commission has relied upon the modeling performed by applicants to ensure that the noise standards will be met. He noted that the Commission has not had noise complaints regarding wind turbines in the past, although if such a complaint were to be received, it would be investigated.[47]

The potential impact of the Project on property values was raised by Mr. Huggenvik, who questioned whether legal action would be needed to address any loss of value in his land resulting from the Project.[48]

Ms. Huggenvik noted that Ravine House, listed on the National Register of Historic Places, is in the Project Area.[49] Ravine House is also known as the Daniel Dayton House.[50] Mr. Mitchell noted that the cultural resources assessment in the Site Permit recognized the Daniel Dayton House.[51]

Ms. Huggenvik questioned whether any studies had been done on the effect of shadow flicker and possible electromagnetic interference, particularly for the larger 2.3 MW turbines.[52] EcoHarmony was not able to identify any specific studies, but did note that the 2.3 MW turbines were approved for use in Mower County.[53] Mr. Hartman noted that:

> With regard to shadow flicker, the only place that has any standards regarding that is Europe, and I believe in Germany they've allowed 30 hours per year of shadow flicker. And that assumes five different factors: One, the sun is always shining, the turbines are always running, you're in your house and the curtains or drapes are up, you're awake, and I forgot what the other factor is. So, given that, the worst-case scenario is they allow up to 30 hours. Shadow flicker can be calculated. It might be modeled with WindPRO. So if you know the latitude and longitude, turbine characteristics, it will tell you how many hours, minutes, and seconds per year you might have shadow flicker. Given the fact that your prevailing winds tend to be northerly in the winter and southerly in the summer, your shadow flicker will probably be worst on the east/west diagonal and tends to be worst either in the early morning or late in the day.

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[46] Tr. at 71 (Hartman).
[47] Tr. at 73 (Eknes).
[48] Tr. at 47 (B. Huggenvik).
[49] Tr. at 51-53 (N. Huggenvik); Public Ex. 7.
[50] Tr. at 51-53 (N. Huggenvik); See National Register of Historic Places database (http://nationalhistoricregister.com/MN/Fillmore/state.html).
[51] Ex. 2; Tr. at 69 (Mitchell).
[52] Tr. at 53 (N. Huggenvik).
[53] Tr. at 53-54 (Miller)

> Shadow flicker can extend up to ten rotor diameters. However, it's probably the most noticeable within two to three rotor diameters, again depending on the time of day. It's going to be more pronounced the closer the turbine is. It will be thicker, fatter, darker, kind of, and as you catch more of the tips, they tend to taper down. The fact that it's more, kind of, maybe -- I don't know the proper word for it, wispy or whatever, that being at the outer edges. But, for the most part, shadow flicker has dissipated within the first several hundred feet. Now, again, that doesn't mean it can't go beyond that. But, again, a number of situations have to be in play for that to occur, given the maximum exposure of 30 hours. I'm not aware of any standards regarding shadow flicker in the United States. I know that companies can calculate that, the cumulative noise given the turbine arrays or the spacing of the turbines. So that's something that can be calculated.[54]

EcoHarmony performed a shadow flicker and noise analysis for the recently-commissioned Stephenson County, Illinois wind farm that resulted in turbines being moved from their proposed locations. EcoHarmony noted that the closest turbine to a house at Stephenson County was 1,371 feet and at that distance there was "absolutely no shadow flicker."[55] EcoHarmony committed to performing a similar study for shadow flicker and noise for the proposed Project.[56]

Don Schoepski noted that wind often changed direction and questioned why the setback standards were based on five rotational diameters (RDs) from one direction and only three RDs from another direction.[57]

Mr. Hartman indicated that the 5 RD setback was established to minimize "wake loss," the reduction in the velocity of the wind caused by the resistance of the wind turbine rotors. The wake of a wind turbine reduces the electricity able to be generated by a downwind turbine and increases the wear and tear on that downwind turbine. The 3 RD setback runs perpendicular to the prevailing winds, thereby allowing more efficient use of the land within the Project area without the problems caused by wake loss.[58] The 5 RD and 3 RD setbacks run from the property line of nonparticipating landowners, because to site them closer would impinge on those landowners' wind rights.[59]

Summary of Written Comments

James Vagts, a participating landowner within the Project area expressed his support for the Project as a good use of agricultural land, beneficial to the environment, and helpful in reducing dependence on foreign oil. Mr. Vagts indicated that, based on his experience with wind farms in Mower County and Northern Iowa, the 1,000 foot

[54] Tr. 58-59 (Hartman).
[55] Tr. at 60 (Rigas).
[56] *Id*. at 61.
[57] Tr. at 62 (Schoepski).
[58] Tr. at 63-64 (Hartman).
[59] Tr. at 65-67, 69 (Hartman); Tr. 67-68 (Mitchell).

setback proposed between his house and the nearest turbine would be "very adequate to prevent any noise or shadow flicker problems at my residence."[60]

Regarding the Daniel Dayton/Ravine House, Carol Engen noted that the Ravine House "is privately owned and there is not even a public road that goes there at this time."[61]

Dale Hensinkveld recounted the variety of species of plants and animals that lived in the Project area at the time of settlement. Mr. Hensinkveld described the changes that have occurred in the Project area during his lifetime, particularly as a result of farming practices. He expressed a preference for generating electricity through wind turbines over expansion of the Prairie Island Nuclear Generating Plant. Mr. Hensinkveld urged that "true values" be adopted that emulate our ecosystem.[62]

Mr. Schoepski continued to question why the 5 RD setback standard is not used in all directions. Mr. Schoepski noted that the wind can blow from any direction, and maintained that the same standard should be applied for neighboring homeowners. He urged that "an absolute minimum" 5 RD setback be established in the non-prevailing wind directions.[63]

The Minnesota Department of Health study, *Public Health Impacts of Wind Turbines*, was cited by Mr. Schoepski regarding the potential for noise impact from wind turbines. He noted that the study concluded that, "low frequency noise from a wind turbine is generally not perceived beyond ½ mile. However……. may be heard at greater distances." From this conclusion, Mr. Schoepski asserted that a one-half mile setback should be established as the standard to provide nonparticipating property owners "24 hours a day, 365 days a year … relief" from "noise, shadow flicker, and reduced property values …."[64]

Regarding the karst geology in the area, Mr. Schoepski passed on his personal observation that an area of land large enough to hold a garage collapsed and sank several feet below the surrounding ground level in a field. He noted that the location could potentially have a wind tower sited on it. Mr. Schoepski indicated that he had not been able to find any studies regarding erecting wind towers erected on lands that are subject to sink holes. He maintained that the geology of the area could result in a wind tower collapsing. He maintained that Applicant is taking this possibility too lightly.[65]

The construction of the wind towers will require significant amount of concrete for the foundation of each turbine. Mr. Schoepski expressed concern that:

[60] Public Ex. 16.
[61] Public Ex. 8.
[62] Public Ex. 9.
[63] Public Ex. 15.
[64] Public Ex. 15.
[65] Public Ex. 15.

> Families with young children that will be subjected to the dangers of 30 – 40 cement trucks per pad and numerous other construction vehicles as well as the long term effects of living very close to a large scale wind farm. The construction phase will go away, but there have not been enough in-depth studies done to determine if there are any long term affects on people that live near these towers day in and day out for years on end.[66]

Mr. Huggenvik submitted a picture of a sink hole that has begun to appear in his field. He noted that the adjacent field is slated for erection of six wind turbines.[67] This concern over the possibly catastrophic impact of sinkholes on wind turbines was echoed in a written comment from both the Huggenviks and the Simons. In that written comment, karst features, including the Forestville/Mystery Cave State Park, the Niagara Cave, the Harmony Sinkhole, and the Holy Grail Cave were identified as needing to be protected. The commentators maintained that the pervasive nature of karst features in the Project area would result in a hazardous situation if wind turbines were to be installed.[68]

The DNR expressed a concern regarding the alteration of a historically significant view from the Forestville State Park. EcoHarmony provided a leashed analysis that was subsequently discussed with the DNR. The preliminary results indicated that between 10 and 15 proposed turbines would be visible from the Forestville State Park outlook site. The Forestville State Park outlook site is frequently visited overlook that represents a presettlement vista of the unique landscape of southeastern Minnesota. The DNR subsequently determined that turbines located north of County Route 44 and west of Kodiac Road may alter the viewshed from this outlook. To minimize visual impacts from the Project, the DNR recommended avoiding the placement of turbines In the northwest corner of the Project area (north of County Route 44 and west of Kodiac Road), or coordinating turbine placement with the DNR to avoid visual impacts. The DNR also suggested that, to the extent that fewer turbines are ultimately installed, installation of turbines for the Project be commenced in areas other than the northwest corner of the project area.[69]

The DNR also discussed the bird and bat surveys conducted by EcoHarmony. The DNR recommended that EcoHarmony's final bird and bat survey reports, expected in early 2010, be considered when micrositing each turbine. The DNR further recommended that EcoHarmony's micrositing be coordinated with the DNR utilizing information from these reports to avoid impacting local and migratory bird and bat populations.[70]

The potential impact of the Project on avian populations, particularly that of bald eagles, was raised by Christian Frank and Noel Frank, farm owners in Fillmore County. The Franks noted that an active bald eagle nesting site was located in the southwestern

[66] Public Ex. 15.
[67] Public Ex. 10.
[68] Public Ex. 11.
[69] Public Ex. 12.
[70] Public Ex. 12.

portion of section 1 in Bristol Township. The Franks also related observations of eagles using the valley encompassing their family farm for winter habitat. To protect this population, the Franks recommended adoption of a 1-mile setback requirement for all wind turbines from the areas used by the bald eagles. The Franks expressed their belief that this setback requirement would affect five proposed wind turbine locations. The commentators also recommended that any micrositing by done in consultation with the DNR and a wildlife biology specialist from the U.S. Fish and Wildlife Service.[71]

EcoHarmony responded to issues raised by commentators in its own written comment. This comment addressed the practice of micrositing, noise standard compliance, measures to avoid sinkholes, the viewshed from Forestville State Park, addressing impacts on bald eagles, questions regarding property values, mitigating the impact on the Daniel Dayton/Ravine House, and the overall need for the Project.[72]

The general sentiment that assessing the impact of a project was difficult without the precise locations proposed for wind turbines was acknowledged by EcoHarmony. The Applicant noted that the normal procedure with wind projects is to provide a more complete analysis after micrositing is completed, thereby addressing the impacts arising from the precise locations of the turbines. EcoHarmony noted that, through the micrositing process, the Applicant, the Commission, and OES will be able to "ensure that setback limitations are met, that flicker impact is not unacceptable, that karst sinkholes are avoided, and that all other regulatory requirements will be met."[73]

Regarding noise generated by turbines, EcoHarmony noted the Minnesota Department of Health study and the open Commission docket on health impacts from low frequency sounds (MPUC Docket No. M-09-845). EcoHarmony indicated that, in the absence of any new standard having been adopted, the existing standard of 50 dB is the measure that must be met by this Project. EcoHarmony provided the manufacturer's specifications on the Siemens 2.3 MW turbine and noted that this turbine model meets Minnesota noise standards with a setback of 902 feet. That model has been in use in Mower County for three years.[74]

The existence of karst topography in Fillmore County was described by EcoHarmony as "well known." EcoHarmony described its approach to ensuring proper micrositing of each wind turbine to avoid problems with this topography as follows:

> EcoHarmony is well aware of the karst situation in Fillmore County and has developed a comprehensive plan for avoiding problems with sinkholes. EcoHarmony addressed this issue in its Site Permit application at pages 44-45. EcoHarmony engaged the environmental consulting firm American Engineering Testing, Inc., to investigate the karst terrain and develop a method for studying each turbine site. AET developed a *Work Plan for Geotechnical Investigation*. The *Work Plan* is included with the

[71] Public Ex. 13.
[72] Ex. 14 (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=200911-44380-04).
[73] Ex. 14, at 1-2.
[74] *Id*. at 2-3.

Site Permit application as Exhibit 3. The geotechnical investigation developed by AET is summarized on the first page of its report:

> At each of the wind turbine sites, the geotechnical investigation will consist of three phases – (1) a geophysical investigation (electrical resistivity) to explore for voids in the bedrock; (2) followed by soil/bedrock borings to check the results of the electrical resistivity survey; (3) followed by a series of electronic cone penetrometer (CPT) soundings if the potential for loose zones in the soil overburden are suspected.

AET also describes methods for ensuring that each wind turbine foundation is properly constructed depending on the soil conditions.[75]

In addition to the investigation described in the *Work Plan*, EcoHarmony committed incorporation of a system to monitor potential ground subsidence at the turbine sites.[76]

As to the DNR concerns regarding the Forestville State Park overlook, EcoHarmony indicated that the nearest turbine will be approximately three miles away. At that distance, EcoHarmony estimates that "between ten and twenty of the wind turbines will be partially visible above the tree line from an observation deck facing the southeast." As to the other proposals by the DNR, EcoHarmony responded:

> EcoHarmony has met with the DNR to discuss its concern and will continue to meet with the DNR during the micrositing process as the precise locations for turbines are selected. However, it is simply not going to be possible to avoid having some turbines be visible from certain locations in the Park. Significantly, the turbines will not be visible from most locations in the Park and not in directions other than southeast.
>
> There are other countervailing factors that must be taken into account besides DNR's desire that its Park visitors not see wind turbines while looking over the parkland. Private landowners have the right to install wind turbines on their property. The DNR cannot deprive these landowners of their rights simply because Park visitors may be able to see them.
>
> Further, the State and EcoHarmony are also interested in making efficient use of the wind resource. The law requires the Commission to not only consider environmental impacts but to site wind projects to make efficient use of the wind resource. Minn. Stat. § 216F.03. Elimination of certain

[75] *Id*. at 4. The *Work Plan* is available in the eDockets system as Document ID No. 5717601 (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=5717601).
[76] *Id*. at 5.

> locations to protect a viewshed could make the project less efficient from an energy standpoint.[77]

As to the potential impact on eagles, EcoHarmony indicated that its consultant, Natural Resources Consulting, Inc., currently studying avian and bat impacts, will specifically address the eagle population in that study. The report is expected near the conclusion of the year. EcoHarmony committed to discussing the completed study with both the DNR and the U.S. Fish & Wildlife Service. As to setbacks from eagle roosts, EcoHarmony indicated that its initial turbine siting resulted in setbacks of over one mile from known eagle roosts.[78]

EcoHarmony relied on the Environmental Report on the issue of property values. In the Environmental Report, the OES concluded, "Negative impacts to property value due to the EcoHarmony West Wind project are not anticipated."[79] As to the Daniel Dayton/Ravine House, EcoHarmony stated:

> The Ravine House is located at 295th Avenue and 146th Street, south of County Road 22 just to the west of the City of Harmony. The approximate location can be identified on Figure 2, which is part of the Site Permit application. After inspection, it appears to the Applicant that the Ravine House is in a state of disrepair, with broken windows and an interior in bad shape. EcoHarmony has determined that three turbines will be located south of the location of the Ravine House; the nearest turbine will be over 1800 feet away and the other two are over 2000 feet from the house. No impact to the Ravine House itself is anticipated. In addition, EcoHarmony will perform a cultural resource survey of each proposed turbine site and consult with the Minnesota State Historic Preservation Officer as appropriate prior to construction.[80]

EcoHarmony maintains that no one has contested the need for the Project. The Applicant maintains that it demonstrated the need for the EcoHarmony West Wind Project and demonstrated that the Project will comply with all applicable state requirements for a large wind energy conversion system. For these reasons, EcoHarmony urged the Commission to grant both a Certificate of Need and a Site Permit for the Project.[81]

No other written comments from the public were received.

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[77] *Id*. at 5.
[78] *Id*. at 6.
[79] Ex. 1, at 28.
[80] *Id*. at 6-7. Figure 2 is located in a document accompanying the Site Application, Doc. ID No. 5717597 (https://www.edockets.state.mn.us/EFiling/ShowFile.do?DocNumber=5717597).
[81] *Id*. at 7.

Dated this _21st_ day of December, 2009.

/s/ Steve M. Mihalchick
STEVE M. MIHALCHICK
Administrative Law Judge

Reported: Christine Simons, Shaddix and Associates
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