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**BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION**  
**SUPPLEMENTAL**  
**COMMENTS AND RECOMMENDATIONS OF THE**  
**MINNESOTA OFFICE OF ENERGY SECURITY**  
**ENERGY FACILITY PERMITTING STAFF**

DOCKET No. IP-6701/WS-08-1233

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Meeting Date: October 21, 2010.....Agenda Item # \_\_\_\_\_

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Company:           **AWA Goodhue, LLC**

Docket No.       **PUC Docket Number: IP-6701/WS-08-1233**

**In the Matter of the Application of AWA Goodhue, LLC for a Large  
Wind Energy Conversion System (LWECS) Site Permit for the 78 MW  
Goodhue Wind Project in Goodhue County.**

Issue(s):           Should the Commission grant a site permit to Goodhue Wind, LLC for the 78  
MW Goodhue Wind Project?

OES EFP Staff:    Larry B. Hartman .....651-296-5089

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The enclosed materials are work papers of the Office of Energy Security (OES) Energy Facility Permitting (EFP) Staff. They are intended for use by the Public Utilities Commission and are based on information already in the record unless otherwise noted.

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**Documents Attached:**

1. Article 18 Wind Energy Conversion System Regulations, Amended October 5, 2010
2. Memo from Goodhue County Land Use Management, September 28, 2010

Note: see eDockets filings at (08-1233) or the Commission website at:

<http://energyfacilities.puc.state.mn.us/Docket.html?Id=25631> for additional project related documents.

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**Statement of the Issue**

Should the Commission grant a site permit to AWA Goodhue, LLC for the 78 MW Goodhue Wind Project?

**Supplemental OES EFP Staff Comments and Analysis**

On October 13, 2010, the recently adopted (October 5, 2010) Goodhue County Zoning Ordinance [Article 18 Wind Energy Conversion Systems Regulations] was posted to eDockets; it is available for viewing at 08-1233 and is also attached to the OES EFP “Supplemental Comments and Recommendations.” See Attachment 1 in the Commissioner’s packet. OES EFP staff did not have the opportunity to review the Goodhue County ordinance prior to filing its Comments and Recommendations on October 13, 2010.

OES EFP staff has also attached to this document a memorandum dated September 28, 2010, from Goodhue County Land Use Management to the Goodhue County Board. See Attachment 2 in Commissioner’s packet. This memorandum (3 pages) provides a history and background of actions taken in Goodhue County that led to adoption of the “Wind Energy Conversion System Regulations” as amended on October 5, 2010. OES EFP staff is not able to provide any additional information about what may have transpired in Goodhue County regarding development of regulations and would refer the Commission to the appropriate representative of Goodhue County for additional information.

OES EFP staff would like to focus its comments on two sections in the recently adopted Goodhue County Wind Ordinance that could have far reaching consequences for this and future Commission dockets: Section 6, Stray Voltage Testing for Commercial WECS Projects, and Section 4, Neighboring Dwelling.

***Stray Voltage***

In Article 18, Section 6 (Subd 1 through 3), Goodhue County requires the applicant to pay for two pre-construction stray voltage tests for all registered feedlots within the project boundary and within one mile-radius beyond the project boundary, informing the property owners of the results and correcting the problem if caused Commercial WECS.

The topic of stray voltage was addressed by OES EFP in its initial “Comments and Recommendations,” filed on October 13, 2010, and in findings 74 through 81 of the proposed Findings of Fact.

Stray voltage (neutral to earth voltage, or NEV) is an extraneous voltage that appears on grounded surfaces in buildings, barns and other structures. Stray voltage (NEV) and its impact on dairy farms is normally an issue associated with electrical distribution lines and is a condition that can exist between the neutral wire of a service entrance and grounded objects in buildings. The source of stray voltage is a voltage that is developed on the grounded neutral wiring network of a farm and/or the electric power distribution system. In addition, stray voltage may result from a damaged, corroded, or poorly connected wiring or damaged insulation (contact voltage).

NEV is not associated with transmission lines. The electrical collection system proposed for the Goodhue LWECS is designed to be “a separately derived system” as defined in the National Electric Code. The system will have no direct electrical connection (including grounded circuit conductors) to conductors originating in another system. It will not connect with the local distribution systems. The wind farm collection system will have its own substation and transformers and will be connected to the transmission grid via dedicated 69 kV lines.

In addition, OES EFP staff has not been able to document any instances of a wind farm causing stray voltage. No reports of stray voltage have been associated with any of Minnesota’s existing wind farms. OES staff has also checked with the state of Wisconsin and the Province of Ontario and is unable to document any instances of a wind farm leading to or being associated with stray voltage on a dairy farm or feedlot. This was also confirmed by Dr. Reinemann (the author of *Literature Review and Synthesis of Research Findings on the Impact of Stray Voltage on Farm Operations* cited in finding 76), in a reply email dated October 19, 2010.

Consequently, staff concludes that the requirement of Article 18, Section 6 is not relevant to this docket and that stray voltage provisions should not be included in the proposed site permit.

### ***Neighboring Dwellings***

Section 4 [Neighboring Dwellings] provides for a setback of 10 rotor diameters from a non-participating dwelling, unless an owner agrees to a reduced setback. The rationale for adoption of this setback is not provided.

Rotor diameter setbacks have been used by the Commission in previous dockets, as well as in the General Permit Standards, to protect lands and wind rights outside of an applicant’s site control, including the rights of persons outside the project boundary and persons within the project boundary who are not participating in the project. The Commission has historically imposed a wind access buffer of three rotor diameters on the crosswind or secondary axis and five rotor diameters on the predominant or downwind axis. This setback was developed to minimize the effects of wind turbine induced turbulence downwind, thereby promoting efficient use of the resource.

Other setbacks have been related to health, safety and natural resource considerations and have been expressed as exclusion areas or in feet or the distance required to achieve a particular

standard. As noted in the findings and the comments and recommendations, AWA Goodhue will meet and be below the PCA noise standards [Minnesota Rules Chapter 7030] for both participants and non-participants. Public health and safety are adequately protected by existing Commission setback requirements for both participants and non-participants. AWA Goodhue Wind has also incorporated a buffer setback of 1,500 feet for non-participants to further reduce the impact of the project. Under the minimum 1,000 foot setback umbrella, other setback concerns are also addressed, which may include noise, shadow flicker, and ice throw. Evidence of significant adverse impacts beyond a 1,000 foot setback from residences is not readily documented. At a distance of 1,500 feet or more impacts become even more difficult to document or quantify.

The Commission's setback requirements in LWECS site permit have been consistent, while being protective of both public health and safety. The Commission has established a Complaint Report Procedure for all wind farms permitted by the state. If there are complaints, they may be made to the permittee, who is obligated to report them to the Commission on the 15<sup>th</sup> of the month, or people who have a complaint may contact Commission or OES EFP staff. If the complaint can be substantiated the Commission may take the appropriate action to resolve the complaint or require corrective action. To date very few complaints have been received from Minnesota's numerous wind farms.

The requirement of a 10 RD buffer from non-participating landowners would effectively preclude the project from moving forward in this area of Goodhue County. To apply a 10 RD setback from the residences of non-participating landowners would have a significant impact on the project and would effectively require the project, in its present location as configured to eliminate 43 of the 50 turbines.

To date the Commission has not authorized a 10 RD setback in a site permit for non-participating landowners and staff does not believe the 10 RD to be reasonable in this instance.

## Article 18 Wind Energy Conversion System Regulations

### SECTION 1. PURPOSE

**Purpose** – This ordinance is established to regulate the installation and operation of Wind Energy Conversion Systems (WECS) within Goodhue County that have a total nameplate capacity of 5 Megawatts or less (Small Wind Energy Conversion Systems – SWECS) and are not otherwise subject to siting and oversight by the State of Minnesota pursuant to Minnesota Statutes, Chapter 216F, Wind Energy Conversion Systems, as amended. For LWECS, the county does not assume regulatory responsibility or permit authority under MS 216F.08, but any standards more stringent than those of the MPUC are to be considered and applied to LWECS per MS 216F.081

### SECTION 2. DEFINITIONS

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- Subd. 1. **Airfoil:** A part such as a blade, with a flat or curved surface, designed to provide a desired reaction.
- Subd. 2. **Azimuth:** A horizontal angle measured clockwise in degrees with 00° 00' 00" being the north reference point.
- Subd. 3. **Aggregated Project:** Aggregated projects are those which are developed and operated in a coordinated fashion, but which have multiple entities separately owning one or more of the individual WECS within the larger project. Associated infrastructure such as power lines and transformers that service the facility may be owned by a separate entity but are also included as part of the aggregated project.
- Subd. 4. **C-BED Project:** As defined in Minnesota Statutes 216B.1612, as amended. Based on the total name plate generating capacity, C-BED Projects are considered to be (1) Micro-WECS, (2) Non-Commercial WECS or (3) Commercial WECS as defined in this Section.
- Subd. 5. **Commercial WECS:** A WECS of 1 megawatt to 5 megawatts in total name plate generating capacity.
- Subd. 6. **Comprehensive Plan:** Comprehensive Plan means the policies, statements, goals, and interrelated plans for private and public land and water use, transportation, and community facilities including recommendations for plan execution, documented in texts, ordinances and maps which constitute the guide for future development of the unincorporated area of the County.
- Subd. 7. **Decibel:** A unit of measure of sound pressure.
- Subd. 8. **dB (A), A-Weighted Sound Level:** A measure of over-all sound pressure level in decibels, designed to reflect the response of the human ear.
- Subd. 9. **Fall Zone:** The area, defined as the furthest distance from the tower base, in which a guyed tower will collapse in the event of a structural failure. This area is less than the total height of the structure.
- Subd. 10. **Feeder Line:** Any power line that carries electrical power from one or more wind turbines or individual transformers associated with individual wind turbines to the point of interconnection with the electric power grid, in the case of interconnection with the high voltage transmission systems the point of interconnection shall be the substation serving the WECS.

- Subd. 11. **Generator nameplate capacity:** The maximum rated output of electrical power production of a generator under specific conditions designated by the manufacturer with a name plate physically attached to the generator.
- Subd. 12. **Hub Height:** The distance from the ground to the center axis of the turbine rotor.
- Subd. 13. **Large wind energy conversion system or LWECS.** "Large wind energy conversion system" or "LWECS" means any combination of WECS with a combined nameplate capacity of 5,000 kilowatts or more.
- Subd. 14. **Meteorological Tower:** For the purposes of this Wind Energy Conversion System Ordinance, meteorological towers are those towers which are erected primarily to measure wind speed and directions plus other data relevant to siting WECS. Meteorological towers do not include towers and equipment used by airports, the Minnesota Department of Transportation, or other similar applications to monitor weather conditions.
- Subd. 15. **Micro-WECS:** Micro-WECS are WECS of 1 kilowatt nameplate generating capacity or less and utilizing supporting towers of 40 feet or less.
- Subd. 16. **Nacelle:** Contains the key components of the wind turbine, including the gearbox, yaw system, and electrical generator.
- Subd. 17. **Non-Commercial WECS:** A WECS of less than 1 megawatt in total name plate generating Capacity and 225 feet in total height or less.
- Subd. 18. **Non Prevailing Wind:** The non-dominant wind direction in Goodhue County.
- Subd. 19. **Power Purchase Agreement:** A legally enforceable agreement between two or more persons where one or more of the signatories agrees to provide electrical power and one or more of the signatories agrees to purchase of power.
- Subd. 20. **Preliminary Acoustic Study:** A study certifying the WECS will be in compliance with State of Minnesota Noise Standards.
- Subd. 21. **Prevailing Wind:** The predominant wind direction in Goodhue County.
- Subd. 22. **Project:** A WECS or combination of WECS.
- Subd. 23. **Project Boundary:** The boundary line of the area over which the entity applying for a WECS permit has legal control for purposes of installation of a WECS. This control may be attained through fee title ownership, easement, or other appropriate contractual relationship between the project developer and landowner.
- Subd. 24. **Project Owner:** An individual or entity with legal ownership of WECS project.
- Subd. 25. **Public conservation lands:** Land owned in fee title by State or Federal agencies and managed specifically for conservation purposes, including but not limited to State Wildlife Management Areas, State Parks, State Scientific and Natural Areas, federal Wildlife Refuges and Waterfowl Production Areas. For the purposes of this section public conservation lands will also include lands owned in fee title by non-profit conservation organizations. Public conservation lands do not include private lands upon which conservation easements have been sold to public agencies or non-profit conservation organizations.
- Subd. 26. **Qualified Independent Acoustical Consultant:** A person with Full Membership in the Institute of Noise Control Engineers/INCE, or other demonstrated acoustical

engineering certification. The Independent Qualified Acoustical Consultant can have no financial or other connection to a WECS developer or related company.

- Subd. 27. **Rotor:** A system of airfoils connected to a hub that rotates around an axis.
- Subd. 28. **Rotor Blades:** See Airfoil.
- Subd. 29. **Rotor diameter (RD):** The diameter of the circle described by the moving rotor blades.
- Subd. 30. **Small wind energy conversion system or SWECS:** "Small wind energy conversion system" or "SWECS" means any combination of WECS with a combined nameplate capacity of less than 5,000 kilowatts.
- Subd. 31. **Substations:** Any electrical facility designed to convert electricity produced by wind turbines to a voltage greater than 35,000 volts (35 kilovolts) for interconnection with high voltage transmission lines shall be located outside of the road right of way.
- Subd. 32. **Total height:** The highest point, above ground level, reached by a rotor tip or any other part of the WECS.
- Subd. 33. **Total Name Plate Capacity:** The total of the maximum rated output of the electrical power production equipment for a WECS project
- Subd. 34. **Tower:** Towers include vertical structures that support the electrical generator, rotor blades, or meteorological equipment.
- Subd. 35. **Tower height:** The total height of the WECS exclusive of the rotor blades.
- Subd. 36. **Transmission Line:** Those electrical power lines that carry voltages of at least 69,000 volts (69 kilovolts) and are primarily used to carry electric energy over medium to long distances rather than directly interconnecting and supplying electric energy to retail customers.
- Subd. 37. **WECS:** "Wind energy conversion system" or "WECS" means any device such as a wind charger, windmill, or wind turbine and associated facilities that converts wind energy to electrical energy.
- Subd. 38. **Wind Turbine:** A wind turbine is any piece of electrical generating equipment that converts the kinetic energy of blowing wind into electrical energy through the use of airfoils or similar devices to capture the wind.

### **SECTION 3. PROCEDURES**

- Subd. 1. Land Use Permits, Conditional Use Permits, and Variances shall be applied for and reviewed under the procedures established in Article 2, Article 4 and Article 5 of the Goodhue County Zoning Ordinance, except where noted below.
- Subd. 2. The application for WECS that are under the permitting authority of this ordinance shall include the following information:
  - A. The name and address of all project applicants and project owners.
  - B. The legal description, address, and parcel identification numbers associated with the project.

- C. Project description including: the number and type of towers, tower height; if applicable, name plate generating capacity, rotor diameter, and total structure height with blades.
- D. A site plan drawn to scale showing the following information within the project boundary and within one mile of the project boundary, unless otherwise noted, (in the case of single towers, the plan shall show this information within a one mile buffer of the individual tower):
  - 1. The project boundary, parcels lines, and landowner names.
  - 2. Contours: 2 foot – 10 foot depending on the scale of the project.
  - 3. Existing structures including but not limited to: buildings, communication towers, and WECS towers.
  - 4. Existing registered feedlots, registered mining operations, airports, air strips.
  - 5. Natural and Regulatory features as defined in the County's Environmental Constraints Land Use Evaluation (ECLUE) Model.
  - 6. Existing roads.
  - 7. Proposed location of towers, related accessory structures, concrete batch plants, and staging areas. If the location of related structures and staging areas are unknown at the time of application, indicate the proposed size or area dimensions as a note on the plan.
  - 8. Proposed Haul Routes within the County to be utilized for material transport, construction, and maintenance activities. Indicate which roads the anticipated loads are more than posted weight limits.
- E. If energy produced will be used exclusively on-site or connected to a utility electrical grid. If connected to a grid, indicate on the site plan the proposed route and connection points.
- F. A Decommissioning plan as outlined in Section 5 of this article.

The application for Commercial WECS, as defined in this article, shall also include the following information:

- G. Preliminary Stray Voltage Test as outlined in Section 6, Subd. 1 of this article.
- H. A Preliminary Acoustic Study as outlined in Section 8 of this article.
- I. A list of all other State and Federal regulatory permits necessary for the project. Evidence of these permit approvals must be provided to the County prior to the issuance of building permits.
- J. Documentation indicating if the project is a C-BED project. If the project is a C-BED project, the documentation shall indicate the percentage ownership of the project owners.
- K. If the energy produced from a project is not used exclusively on-site but is distributed to a utility electrical grid, provide documentation from the utility companies involved indicating they have entered a Power Purchase Agreement with the project participants.

Subd. 3. Aggregated Projects – Procedures: Aggregated Projects may jointly submit a single application and be reviewed under joint proceedings, including notices, hearings, reviews, and as appropriate, approvals. Permits will be issued and recorded separately. Joint applications will be assessed fees as one project. Aggregated projects having a combined capacity equal to or greater than the threshold for State oversight as set forth in MS Statute 216F.01 through 216F.07 shall be regulated by the State of Minnesota.



- Subd. 4 The County may, at its discretion, require a Development Agreement to address specific technical procedures which may include but are not limited to: road use and repair, telephone line repair, site specific issues, payment in lieu of taxes, other financial securities, or real property value protection plans. The County may negotiate with applicants to limit night time noise to a limit of an annual average of 40 decibels (dBA), corresponding to the sound from a quiet street in a residential area (World Health Organization night noise guidelines for Europe).
- Subd. 5 WECS projects that have a total nameplate capacity of more than 5 megawatts as regulated by the County shall provide to the County copies of all PUC filings and decisions as it pertains to the proposed project. The owners/operators of such WECS projects shall also provide the items listed in this Section to the County at the time of filing with the PUC in order that the County has adequate time to review and comment on the project to the PUC. The County may, at its discretion, hold public meetings to discuss such projects.
- Subd. 6 The applicant must provide proof of liability insurance covering the towers/project covering the lifespan of the project from the initial construction to final decommissioning.

**SECTION 4. DISTRICT REGULATIONS**

- Subd. 1. WECS will be permitted, conditionally permitted or not permitted based on the generating capacity and land use district as established in the table below:

DISTRICT	NON-COMMERCIAL MICRO WECS	NON-COMMERICAL *	COMMERCIAL	METEOROLOGICAL TOWER*
A-1	Permitted	Permitted	Conditionally Permitted	Permitted
A-2	Permitted	Permitted	Conditionally Permitted	Permitted
A-3	Permitted	Conditionally Permitted	Not Permitted	Conditionally Permitted
R-1	Permitted	Not Permitted	Not Permitted	Not Permitted
B-1	Permitted	Conditionally Permitted	Not Permitted	Not Permitted
B-2	Permitted	Conditionally Permitted	Not Permitted	Not Permitted
MXH	Conditionally Permitted	Not Permitted	Not Permitted	Not Permitted
I	Permitted	Permitted	Conditionally Permitted	Permitted
S	Not Permitted	Not Permitted	Not Permitted	Not Permitted
FP	Not Permitted	Not Permitted	Not Permitted	Not Permitted
WS	Not Permitted	Not Permitted	Not Permitted	Not Permitted
CR	Not Permitted	Not Permitted	Not Permitted	Not Permitted
W	Not Permitted	Not Permitted	Not Permitted	Not Permitted

\*. **Setbacks – Wind Turbines and Meteorological Towers**

	<b>WIND TURBINE – NON-COMMERICAL MICRO WECS</b>	<b>WIND TURBINE – NON-COMMERICAL WECS</b>	<b>WIND TURBINE – COMMERCIAL WECS</b>	<b>METEOROLOGICAL TOWERS</b>
Property lines	1.1 times the total height or in A-1 and A-2 Districts only the distance of the fall zone as certified by a professional engineer plus 10 feet.	1.1 times the total height or in A-1 and A-2 Districts only the distance of the fall zone as certified by a professional engineer plus 10 feet.	3 RD Non-prevailing and 5 RD Prevailing***	The fall zone, as certified by a professional engineer plus 10 feet or 1.1 times the total height.
Neighboring Dwellings*	750 feet This setback requirement may be reduced by the Zoning Administrator subject to maintaining adequate health and safety requirements.	750 feet	750 feet from participating neighboring dwellings; non-participating dwelling setbacks are 10 RD; Setbacks can be less if an owner agrees to a reduced setback, but no less than 750 feet.	The fall zone, as certified by a professional engineer plus 10 feet or 1.1 times the total height.
ROAD RIGHTS OF WAY**	The Distance Of The Fall Zone, As Certified By A Professional Engineer Plus 10 Feet Or 1.1 Times The Total Height	The Distance Of The Fall Zone, As Certified By A Professional Engineer Plus 10 Feet Or 1 Times The Total Height	1.1 Times The Height May Be Reduced For Minimum Maintenance Roads Or A Road With An Average Daily Traffic Count Of Less Than 10.	The Fall Zone, As Certified By A Professional Engineer Plus 10 Feet Or 1.1 Times The Total Height.
OTHER RIGHTS-OF-WAY (RAILROADS , POWER LINES, ETC.)	THE LESSER OF 1.1 TIMES THE TOTAL HEIGHT OR THE DISTANCE OF THE FALL ZONE, AS CERTIFIED BY A PROFESSIONAL ENGINEER PLUS 10 FEET.	The fall zone, as certified by a professional engineer plus 10 feet or 1.1 times the total height.	THE LESSER OF 1.1 TIMES THE TOTAL HEIGHT OR THE DISTANCE OF THE FALL ZONE, AS CERTIFIED BY A PROFESSIONAL ENGINEER PLUS 10 FEET.	THE FALL ZONE, AS CERTIFIED BY A PROFESSIONAL ENGINEER PLUS 10 FEET OR 1.1 TIMES THE TOTAL HEIGHT.

	<b>WIND TURBINE – NON-COMMERICAL MICRO WECS</b>	<b>WIND TURBINE – NON-COMMERICAL WECS</b>	<b>WIND TURBINE – COMMERCIAL WECS</b>	<b>METEOROLOGICAL TOWERS</b>
Public conservation lands	1.1 TIMES THE TOTAL HEIGHT	The fall zone, as certified by a professional engineer plus 10 feet or 1.1 times the total height.	3 RD Non-Prevailing and 5 RD Prevailing***	600 feet
Wetlands	1.1 TIMES THE TOTAL HEIGHT	The fall zone, as certified by a professional engineer plus 10 feet or 1.1 times the total height.	1,000 FEET OR 3 RD NON-PREVAILING AND 5 RD PREVAILING***	600 feet
Other Structures	The fall zone, as certified by a professional engineer plus 10 feet or 1.1 times the total height.	3 RD Non-Prevailing and 5 RD Prevailing***	The fall zone, as certified by a professional engineer plus 10 feet or 1.1 times the total height.	The fall zone, as certified by a professional engineer plus 10 feet or 1 times the total height.
Other Existing WECS and Internal Turbine Spacing	NA	750 FEET FROM TOP OF BLUFF (MISSISSIPPI RIVER AND CANNON RIVER), 500 FEET FROM TOP OF BLUFF FROM OTHER BLUFFS IN SHORELAND AREAS OR FOR NON-SHORELAND BLUFFS.	3 RD Non-Prevailing and 5 RD Prevailing	The fall zone, as certified by a professional engineer plus 10 feet or 1 times the total height.  -Extent of wake interference impacts on existing WECS shall be considered
BLUFFS	750 FEET FROM TOP OF BLUFF (MISSISSIPPI RIVER AND CANNON RIVER), 500 FEET FROM TOP OF BLUFF FROM OTHER BLUFFS IN SHORELAND AREAS OR FOR NON-SHORELAND BLUFFS.		1350 FEET FROM TOP OF BLUFF (MISSISSIPPI RIVER AND CANNON RIVER), 500 FEET FROM TOP OF BLUFF FROM OTHER BLUFFS IN SHORELAND AREAS OR FOR NON-SHORELAND BLUFFS.	1350 FEET FROM TOP OF BLUFF (MISSISSIPPI RIVER AND CANNON RIVER), 500 FEET FROM TOP OF BLUFF FROM OTHER BLUFFS IN SHORELAND AREAS OR FOR NON-SHORELAND BLUFFS.

\* The setback for dwellings, schools, churches, health care facilities, campgrounds shall be reciprocal unless the owner or authorized agent signs a letter of understanding waiving this setback, but no less than a 750 foot setback.

\*\* The setback shall be measured from future rights-of-way if a planned changed or expanded right-of-way is known.

\*\*\*Prevailing and Non Prevailing Rotor Diameter setbacks shall be measured horizontally from the

tower base.

- Prevailing Wind –Azimuth between 290 degrees to 30 degrees and between 130 degrees and 230 degrees.
- Non-Prevailing Wind – Azimuth between 30 degrees and 130 degrees and between 230 degrees and 290 degrees.

### **Setbacks – Substations and Accessory Facilities:**

Minimum setback standards for substations and feeder lines shall be consistent with the standards for essential services established in Article 15 (Essential Services) of the Goodhue County Zoning Ordinance.

### **Substation setbacks**

- 0 feet / structure setback from road ROW – located wholly outside the ROW.
- Property lines 0 feet / structure setback from property lines/side yard.

## **SECTION 5. REQUIREMENTS AND STANDARDS**

### Subd. 1. Safety Design Standards

- A. Engineering Certification – For all WECS, a Minnesota licensed engineer shall certify that the turbine, foundation and tower design of the WECS is within accepted professional standards, given local soil and climate conditions.
- B. Clearance – Rotor blades or airfoils must maintain at least 12 feet of clearance between their lowest point and the ground.
- C. Warnings –For all Commercial WECS, a sign or signs shall be posted on the tower, transformer and substation warning of high voltage.

Subd. 2. Total height – Non-Commercial WECS shall have a total height of 225 feet or less.

Subd. 3. Tower configuration – All wind turbines, which are part of a commercial WECS, shall be installed with a tubular, monopole type tower.

Subd. 4. Meteorological towers may be guyed.

Subd. 5. Color and Finish – All wind turbines and towers that are part of a commercial WECS shall be white, grey or another non-obtrusive color. Blades may be black in order to facilitate deicing. Finishes shall be matte or non-reflective. Exceptions may be made for metrological towers, where concerns exist relative to aerial spray applicators.

Subd. 6. Lighting – Lighting, including lighting intensity and frequency of strobe, shall adhere to but not exceed requirements established by Federal Aviation Administration permits and regulations,. Red strobe lights are preferred for night-time illumination to reduce impacts on migrating birds. Red pulsating incandescent lights should be avoided. Exceptions may be made for metrological towers, where concerns exist relative to aerial spray applicators.

Subd. 7. Other Signage – All signage on site shall comply with Article 11 (Performance Standards), Section 18. (Sign Regulations) of the Goodhue County Ordinance. The manufacturer's or owner's company name and/or logo may be placed upon the nacelle of the WECS.

- Subd. 8. Feeder Lines – All communications and feeder lines, equal to or less than 34.5 kilovolts in capacity, installed as part of a WECS shall be buried where reasonably feasible. Feeder lines installed as part of a WECS shall not be considered an essential service. This standard applies to all feeder lines subject to Goodhue County Ordinances.
- Subd. 9. Waste Disposal – Solid and Hazardous wastes, including but not limited to crates, packaging materials, damaged or worn parts, as well as used oils and lubricants, shall be removed from the site promptly and disposed of in accordance with all applicable local, state and federal regulations.
- Subd. 10. Avoidance and mitigation of damages to Public Infrastructure:
- A. All public roads to be used for the purpose of transporting WECS, substation parts, materials, and/or equipment for construction, operation or maintenance of the WECS shall obtain applicable weight and size permits from the impacted road authorities prior to construction.
  - B. Contact the road authority for road closures, road signage removals, road signage re-locating, road signage restoring, moving permits, culverts, access/driveway permits, tile outlet permits, widening road intersections, standard utility permits and any other road activities that may require permits.
  - C. Contact Goodhue County Dispatch prior to any road closures for the re-routing of emergency vehicles. Notify and consult with affected property owners to ensure reasonable access.
  - D. Contact the road authority to conduct an inspection of the road conditions of the haul routes prior to and after construction.
  - E. The applicant shall retain a Minnesota Licensed Engineer approved by the County Engineer to analyze bridges along the haul routes to determine if the bridges have the capacity to support the oversized vehicles. The applicant shall provide a signed report by the registered engineer to the road authority to the use of the bridges identified on the haul routes.
  - F. The applicant shall provide financial assurance in the form of a cash escrow or irrevocable letter of credit in an amount equal to 125% of the cost(s) to repair anticipated damages to public infrastructure including public roads and drainage systems as determined by the road authority, to be held by the County until the Township and/or County road authority have provided the County Public Works Director and the County Finance Director with a written release that all haul routes within their jurisdiction in Goodhue County have been returned to pre-construction condition by the Applicant/Developer. As an alternative for paved roads the road authorities may agree to accept a payment as reimbursement for the road life consumed by the project.
  - G. The developer will be responsible to maintain the haul roads during construction to insure they can be used by the travelling public.
  - H. The road authority will repair the roads if the Applicant/Developer is not responsive and invoice Applicant/Developer.
- Subd. 11. The Applicant shall be responsible for immediate repair of damage to public and private drainage systems stemming from construction, operation, maintenance, or decommissioning.

- Subd. 12. Discontinuation and Decommissioning - A WECS shall be considered a discontinued use after 1 year without energy production, unless a plan is developed and submitted to the Goodhue County Zoning Administrator outlining the steps and schedule for returning the WECS to service.
- A. All WECS towers shall be removed from the properties and properly disposed of, recycled, or reclaimed within 90 days of discontinuation of use. Accessory facilities, footings and foundations must be reviewed by an engineer, geoscientist, and/or the Building Official to determine the reuse or environmental impact of removal within 90 days of the discontinuation of use. If it is determined that the footings or foundations must be removed, a removal plan must be submitted to the County for approval.
  - B. Each WECS shall have a Decommissioning plan outlining the anticipated means and cost of removing WECS at the end of their serviceable life or upon becoming a discontinued use.
  - C. The cost estimates shall be made by a competent party approved by the County; such as a Professional Engineer, a contractor capable of decommissioning or a person with suitable expertise or experience with decommissioning.
  - D. The plan shall also identify the financial resources that will be available to pay for the decommissioning and removal of the WECS and accessory facilities.
  - E. The owner and/or operator shall provide financial security in the form of a cash escrow or an irrevocable letter of credit in an amount equal to 125% of the cost estimate prepared by a competent party (see paragraph C) to ensure that decommissioning of Commercial WECS is completed as required in this subdivision.
- Subd. 13. Orderly Development – Upon issuance of a conditional use permit, all Commercial WECS shall notify the PUC or Department of Commerce, Energy Facility Permitting staff of the project, location, and details on the survey form specified by the PUC.

## **SECTION 6. STRAY VOLTAGE TESTING FOR COMMERCIAL WECS PROJECTS**

- Subd. 1 Pre-construction Stray Voltage Test. The applicant shall offer to perform at least two pre-construction stray voltage tests at all registered feedlots within the proposed project boundary and within a one-mile radius beyond the proposed project boundary. The applicant shall pay for these associated costs.
- Subd. 2. A copy of the test results shall be sent to each of the following: property owners, Minnesota Public Utilities Commission, local utilities, and the County. The applicant shall obtain written permission from property owners prior to stray voltage testing. If permission is denied, all responsibility for stray voltage problems shall be with the property owner.
- Subd. 3 If a registered feedlot owner within the project boundary has a stray voltage test performed for their facility, and it is found that the cause of the stray voltage is attributed to the Commercial WECS project, the project owners shall pay for all costs associated with the testing and correcting of the problem.

**SECTION 7. PRELIMINARY ACOUSTIC STUDY FOR COMMERCIAL WECS PROJECTS**

- Subd. 1. An acoustic study that demonstrates the project will be compliant with State of Minnesota Noise Standards.
- Subd. 2. This shall include the estimated dB (A) levels at all receptors within one (1) mile of the nearest turbine within a project area and shall include accumulated sound within the project.

**SECTION 8. LOCAL EMERGENCY SERVICES NOTIFICATION REQUIREMENTS FOR COMMERCIAL WECS PROJECTS**

- Subd. 1 The Applicant shall provide a copy of the project summary and site plan to local emergency services, including paid or volunteer Fire Department(s) that serve the WECS project area.
- Subd. 2. The Applicant shall coordinate with local emergency response serves for the WECS Project. A copy of the plan shall be submitted to the Goodhue County Office of Emergency Management.

**SECTION 9. OTHER APPLICABLE STANDARDS**

- Subd. 1. Noise – All WECS shall comply with State of Minnesota Noise Standards.
- Subd. 2. Electrical codes and standards – All WECS and accessory equipment and facilities shall comply with the National Electrical Code and other applicable standards.
- Subd. 3. Owner/Operator contact information shall be provided to the County on a yearly basis.
- Subd. 4. Minnesota State Building Code – All WECS shall comply with the Minnesota State Building Code.
- Subd. 5. Interference – The applicant shall minimize or mitigate interference with electromagnetic communications, such as radio, telephone, microwaves, or television signals cause by any WECS. The applicant shall notify all communication tower operators within two miles of the proposed WECS location upon application to the county for permits. No WECS shall be constructed so as to interfere with County or Minnesota Department of Transportation microwave transmissions.



# Goodhue County Land Use Management

Goodhue County Government Center

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Planning • Zoning • Building Code

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September 28, 2010

To: Goodhue County Board

From: Land Use Management

Re: Public Hearing/Zoning Ordinance Text Amendments to Article 18 (WECS Regulations) initiated by Planning Advisory Commission

- Attachments:
1. Current Goodhue County Zoning Ordinance Article 18 (Wind Energy Conversion Systems (WECS) Regulations – adopted October 2, 2007; and
  2. Substantially amended version of Article 18 (dated 9-28-2010) recommended for approval by the County Board by the Planning Advisory Commission; and
  3. Printed copy of PowerPoint Presentation outlining key changes from the current Article 18 included in the revised version of Article 18; and
  4. Copies of Public Comments related to this item.

The Goodhue County Planning Advisory Commission has recommended approval of an various amendments to the text of Article 18 (WECS Regulations) of the Goodhue County Zoning Ordinance. This recommendation from the PAC has resulted from the work of a Sub-Committee of the PAC tasked with evaluating the County's current Wind Energy Conversion System Regulations (Article 18) adopted by the County Board on October 2, 2007. The bullets points below lay various steps which have led to PAC recommendation for amendment to Article 18:

- January 2010, County Residents, Steve Groth and Paul Reese submit an application to request consideration of various amendments to the text of Article 18.
- April 2010, following public hearings held at the March 2010 and April 2010, PAC Meetings, the PAC recommended denial of amendments to Article 18 proposed by Steve Groth and Paul Reese. PAC Chair, Howard Stenersen raised the idea of establishing a PAC Sub-Committee to review Article 18 to conduct a comprehensive review of the County's regulatory approach to Wind Energy Conversion Systems.
- May, 2010, the County Board of Commissioners acted to deny denial of amendments to Article 18 proposed by Steve Groth and Paul Reese (applied for in January, 2010). The Board also authorized the establishment of the PAC Sub-Committee to review Article 18 and report back to the PAC.



- June 2010, County Residents Steve Groth, Paul Reese and Erin Logan made application for a new version of amendments to Article 18.
- July 2010, a public hearing was held by the PAC to consider the new Groth-Reese-Logan proposed amendments to Article 18. The PAC tabled consideration of the item until the August 16, 2010, PAC Meeting.
- The PAC WECS Regulations Sub-Committee held six meetings during period between May 17 and August 3. During this time period the Sub-Committee reviewed the current Article 18 and considered various studies, reports, miscellaneous data, and other Wind Energy Ordinances. The Sub-Committee agreed to forward various “draft revisions” to Article 18 to the full PAC for consideration at the August 16, 2010 PAC Meeting.
- August, 2010, The PAC acted to table consideration of the Groth-Reese-Logan proposed amendments to Article 18 at the request of the applicants. A public hearing was held by the PAC to hear comments on the amendments to Article 18 developed by the WECS Regulations Sub-Committee. After several hours of public comment the PAC acted to table consideration of this item until the September, 2010, PAC Meeting.
- September, 2010, at its September 21, 2010, Regular Meeting the PAC recommended approval of various amendments to Article 18 (see attached Zoning Text Amendments to Article 18 – 9-28-2010). The PAC also recommended denial of the Groth-Reese-Logan proposed amendments to Article 18, recognizing the work undertaken by the PAC WECS Regulations Sub-Committee and noting various similarities between the two zoning text amendment proposals.

Included with this staff report is a copy of a PowerPoint presentation that outlines key differences between the County’s current WECS Regulations and the substantially revised version of Article 18, that had been recommended for approval by the Planning Advisory Commission.

Numerous public comments have been received since advertisement of the Public Hearing for consideration of the WECS Regulations Amendments by the PAC. Copies written received have been included with this staff report. In addition, several hours of testimony were received at the public hearing held by the PAC held on August 16.

During the public hearing significant concerns regarding the potential impact of Large Wind Energy Conversion Systems were expressed by residents, property owners and other interested parties. These concerns ranged from health and safety issues such as noise, shadow flicker, ice throw and blade throw. In addition nuisance and quality of life issues were raised with concerns expressed wind turbines will impact property values, destroy the character of rural Goodhue County, and negatively impact agricultural land uses. Alternatively, comments were received from representatives of Wind Energy Companies that expressed concerns that numerous proposed standards intended to apply to commercial wind energy conversion systems would make unfeasible to develop large wind energy projects in Goodhue County. Comments from these interests focused on key proposed standards such as zero shadow flicker for non-participating dwelling and proposed setback requirements from non-participating neighboring dwellings and

contended that these proposed standards were arbitrary and had no scientific or rational basis.

The proposed amendments to Article 18 in the Sub-Committee's Draft Revisions would clearly significantly impact the potential for development of Commercial Wind Energy Conversion Systems in Goodhue County. The PAC following review of "draft revisions" to Article 18 referred by the WECS Regulation Sub-Committee reached consensus on these changes to the Zoning Ordinance Text of Article 18 that were intended to protect the health and safety of County residents and property owners. If the PAC's recommended amendments to Article 18 are adopted by the County Board; and if they are incorporated into the site permitting process by the Minnesota Public Utilities Commission the potential for Large Wind Energy Conversion System development may be greatly impacted.

When considering the revised Article 18 that has been recommended by the PAC it is important for the County Board to note as stated in the purpose statement that –

**“This ordinance is established to regulate the installation and operation of Wind Energy Conversion Systems (WECS) within Goodhue County that have a total nameplate capacity of 5 Megawatts or less (Small Wind Energy Conversion Systems – SWECS) and are not otherwise subject to Siting and oversight by the State of Minnesota pursuant to Minnesota Statutes, Chapter 216F, Wind Energy Conversion Systems, as amended. For LWECS, the county does not assume regulatory responsibility or permit authority under MS 216F.08, but any standards more stringent than those of the MPUC are to be considered and applied to LWECS per MS 216F.081”**

This statement clearly notes that Goodhue County is limiting its direct regulatory and permitting authority to Small Wind Energy Conversion Systems. However, it also assumes that Goodhue County standards for Commercial Wind Energy Conversion Systems larger than five megawatts included in the revised Article 18 “are to be considered and applied” by the Minnesota Public Utilities Commission. For WECS that have a total nameplate capacity greater than 5 megawatts the standards included in the revised Article 18 would not be administered by Goodhue County. If amendments to Article 18 that would establish standards that would apply to LWECS are approved by the County Board; it is the recommendation of Land Use Management Department that the revised Article 18 be promptly forwarded to the Minnesota Public Utilities Commission with a cover letter summarizing key new standards applicable to any LWECS proposed in Goodhue County.

### **Planning Advisory Commission Recommendation:**

Repeal of Article 18, of the Goodhue County Zoning Ordinance adopted by the County Board on October 2, 2007, and adopted of a substantially revised version of Article 18 (see attached Zoning Ordinance Amendment). Action by the County Board should recognize this Staff Report and attachments and all testimony received during public hearing to be held by the County Board on October 5.