

Model Wind Ordinance – 2005

Interest and development of wind energy has increased in Minnesota, both in the volume and geographically. During the 1990's, several counties adopted wind ordinances to address local wind development. Over time, zoning issues have arisen and it was found that modifications to the ordinances were desired to promote the health, safety, morals, and general welfare of the community. To address these issues and provide consistencies between counties in wind development, the development of a model wind ordinance and supporting explanation document were identified as a benefit to all Minnesota Counties who are experiencing wind development, and to the Clean Energy Resource Teams who advocate renewable energy development.

The Model Ordinance (attached) and supporting explanatory document (completion anticipated in early November 2005) are being prepared in partnership by:

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Wind Turbine Zoning Summary of Standards

Counties, Cities, and Townships are enabled to regulate land use under Minnesota Statutes 394 and 462 for the purpose of: "promoting the health, safety, morals, and general welfare of the community"

Key Factors in Model Wind Ordinance

- 1) Distinguish between Commercial and Non-Commercial wind turbines.
 - a. Commercial ≥ 40 kW (or 100 kW)
 - b. Non Commercial < 40 kW (or 100 kW)
 - c. Optional: Micro ≤ 1 kW and short tower
- 2) Define Necessary Permits
 - a. Commercial:
 - i. Conditional Use Permit in Ag and Industrial Zones
 - ii. "Conservation" or special protection Districts – examine purpose of the districts to determine if CUP is appropriate.
 - iii. Not permitted elsewhere, including Shoreland or Wild and Scenic River
 - iv. Alternatively – establish a wind energy overlay district.

- b. Non-Commercial
 - i. Permitted in Ag and Industrial Zones
 - ii. Conditionally Permitted in Rural (large lot) Residential, Highway Commercial, Urban Expansion, Shoreland, Wild and Scenic River
 - iii. Not-Permitted: Rural Town Site (small lot residential), General Business,
- 3) Establish Setbacks
 - a. Commercial
 - i. Homes 750 feet
 - ii. Property lines 1.1 – 1.25 x total height
 - iii. Road Rights-of-Way 1 x total height
 - iv. Other ROWs to be considered
 - v. Conservation lands 600 feet
 - vi. Type III, IV and V wetlands 600 feet
 - vii. Scenic River Bluffs 500 – 1340 feet.
 - b. Non-Commercial
 - i. Property 1.1 x total height
 - ii. ROWs 1 x total height (or fall zone + 10')
- 4) Establish Safety Standards
 - a. Engineers Certification on system
 - b. 12' minimum ground clearance
 - c. Markings on guy cables
- 5) Establish Design Standards
 - a. Tubular towers on commercial turbines
 - b. White, grey or non-obtrusive color
 - i. Consideration for aviation warning on met towers
 - c. Lighting limited to FAA requirement
 - d. Signage limited to appropriate warnings and turbine mfg / owner on nacelle.
 - e. Power lines buried
 - f. Power lines between projects and off-site substations buried.
 - g. Substations comply with essential service standards
 - h. Discontinued Use and Decommissioning – considered abandoned after 1 year no production / 90 days for removal. – Plan required
- 6) Establish Other Applicable Standards
 - a. Comply with state noise rules (50 decibels at nearest farm house),
 - b. Electrical codes, and
 - c. FAA regulations
- 7) Minimize Infrastructure Impacts
 - a. Road damage mitigation
 - b. Drainage system damage mitigation
 - c. Interference – minimize or mitigate interference with electromagnetic telecommunications.

Note: text in brackets [] is to note that there are some reasonable alternatives that the local unit of government may choose in adopting an ordinance. Those alternatives are listed but separated by a slash / Example:

Commercial WECS: A WECS of equal to or greater than [100/40] kW in name plate generating capacity.

This means that the local unit may prefer a larger (100 kW) or smaller (40 kW) threshold for defining a Commercial WECS.

Wind Energy Conversion System Ordinance

Purpose – This ordinance is established to regulate the installation and operation of Wind Energy Conversion Systems (WECS) within _____ County not otherwise subject to siting and oversight by the State of Minnesota under the Minnesota Power Plant Siting Act (MS 116C.51-116C.697.)

Interpretation, Conflict and Separability¹

Interpretation – In interpreting these regulations and their application, the provisions of these regulations shall be held to be the minimum requirements for the protection of public health, safety and general welfare. These regulations shall be constructed to broadly promote the purposes for which they are adopted.

Conflict - These regulations are not intended to interfere with, abrogate or annul any other ordinance, rule or regulation, statute or other provision of law except as provided in these regulations. If any provision of these regulations that impose restrictions different from any other ordinance, rule or regulation, statute or provision of law, the provision that is more restrictive or imposes higher standards shall control.

Separability – If any part or provision of these regulations or the application of these regulations to any developer or circumstances is found invalid by any competent jurisdiction, the judgment shall be confined in its operation to the part, provision or application directly involved in the controversy in which the judgment shall be rendered and shall not affect or impair the validity of the remainder of these regulations or the application of them to other developers or circumstances.

Enforcement, Violations, Remedies and Penalties

Enforcement of the Wind Energy Conversion System Ordinance shall be done in accordance with process and procedures established in Section _____ of the _____ County Zoning Ordinance.

¹ The County may wish to examine the Interpretation, Conflict and Separability language in its other ordinances and utilize consistent language.

Definitions

WECS - Wind Energy Conversion System: An electrical generating facility comprised of one or more wind turbines and accessory facilities, including but not limited to: power lines, transformers, substations and metrological towers, that operate by converting the kinetic energy of wind into electrical energy. The energy maybe used on-site or distributed into the electrical grid.

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.

Commercial WECS: A WECS of equal to or greater than [100/40] kW in total name plate generating capacity.²

Non-Commercial WECS: A WECS of less than [100/40] kW in total name plate generating Capacity.

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.

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.

Meteorological Tower: For the purposes of this Wind Energy Conversation 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.

Micro-WECS: Micro-WECS are WECS of 1 kW nameplate generating capacity or less and utilizing supporting towers of 40 feet or less.

² 40 kW and 100 kW are both reasonable standards for defining the Commercial WECS threshold. In Minnesota, renewable energy projects of less than 40 kW are covered by a "Net Metering" law. This allows the electrical generating facility to effectively receive retail rate for all energy sold to the local utility. 100 kW is a significantly larger, but is still a relatively small electric generator. Federal and state laws also have established relatively favorable procedures and rates for interconnecting renewable generators of under 100 kW capacity. Refurbished wind turbines are currently available in capacities between 40 and 100 kW. Some counties may find that that these turbines are fully consistent with surrounding land uses and opt for a less rigorous set of standards and conditions.

Property line: The boundary line of the area over which the entity applying for a WECS permit has legal control for the 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.

Rotor diameter: The diameter of the circle described by the moving rotor blades.

Substations: Any electrical facility designed to convert electricity produced by wind turbines to a voltage greater than 35,000 (35,000 KV) for interconnection with high voltage transmission lines shall be located outside of the road right of way.

Total height: The highest point, above ground level, reached by a rotor tip or any other part of the WECS.

Tower: Towers include vertical structures that support the electrical generator, rotor blades, or meteorological equipment.

Tower height: The total height of the WECS exclusive of the rotor blades.

Transmission Line: Those electrical power lines that carry voltages of at least 69,000 volts (69 KV) and are primarily used to carry electric energy over medium to long distances rather than directly interconnecting and supplying electric energy to retail customers.

Public conservation lands: Land owned in fee title by State or Federal agencies and managed specifically for [grassland] 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.

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.

Procedures:

[Zoning / Land Use] Permits, Conditional Use Permits and Variances shall be applied for and reviewed under the procedures established in Section _____ of the _____ County's Zoning Ordinance, except where noted below.

The application for all WECS shall include the following information:

- ? The names of project applicant
- ? The name of the project owner
- ? The legal description and address of the project.
- ? A description of the project including: Number, type, name plate generating capacity, tower height, rotor diameter, and total height of all wind turbines and means of interconnecting with the electrical grid.
- ? Site layout, including the location of property lines, wind turbines, electrical wires, interconnection points with the electrical grid, and all related accessory structures. The site layout shall include distances and be drawn to scale.
- ? Engineer's certification
- ? Documentation of land ownership or legal control of the property

The application for Commercial WECS shall also include:

- ? The latitude and longitude of individual wind turbines.
- ? A USGS topographical map, or map with similar data, of the property and surrounding area, including any other WECS within 10 rotor diameters of the Proposed WECS.
- ? Location of wetlands, scenic, and natural areas [including bluffs] within 1,320 feet of the proposed WECS.
- ? [An Acoustical analysis]
- ? FAA Permit Application
- ? Location of all known Communications Towers within 2 miles of the proposed WECS.
- ? Decommissioning Plan
- ? Description of potential impacts on nearby WECS and wind resources on adjacent properties.

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 116C.691 through 116C.697 shall be regulated by the State of Minnesota.]³

District Regulations

³ Aggregated projects have been a grey area, with some regulated by the State and some regulated by Counties. The County may wish to remove uncertainty by directing that all aggregated projects over the 5 MW threshold currently outlined in statute be subject to state regulation. During late 2004, however, the Minnesota Environmental Quality Board determined that aggregated projects of 5 MW or more are the jurisdiction of the State, as long as the projects are using one substation and being installed by one developer.

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*	Commercial	Meteorological Tower[*]
Agriculture (A-1, A-2, A-3)	Permitted	Conditionally Permitted	Permitted
Rural Residential	Conditionally permitted	Not permitted	Not Permitted
Rural Town Site	Not permitted	Not permitted	Not Permitted
General Business District	Not permitted	Not Permitted	Not permitted
Highway Commercial	Conditionally permitted	Not Permitted	Permitted
Light Industry	Permitted	Conditionally Permitted	Permitted
Heavy Industry	Permitted	Conditionally Permitted	Permitted
Shoreland	[may depend upon the lake and the specific district]	Not permitted	Not permitted
Urban Expansion Overlay District	Conditionally permitted	Not permitted	Not permitted
Conservation / Special Protection	[Requires examination of the district purpose, the underlying resource and the impacts of a wind turbine on that resource]	[Requires examination of the district purpose, the underlying resource and the impacts of a wind turbine on that resource]	[Requires examination of the district purpose, the underlying resource and the impacts of a wind turbine on that resource]
Shoreland	Conditionally permitted	Not permitted	Not permitted
Wild and Scenic River	Conditionally permitted	Not permitted	Not permitted

[* Non-Commercial WECS and Meteorological towers shall require a conditional use permit if over _____ feet in height in accordance with Section _____ of the _____ County Zoning Ordinance.]

[The county may choose to establish a Wind Energy Development Overlay District in lieu of permitting or not permitting wind in existing zoning districts. Counties may also consider a third category of WECS, “Micro Turbines” which have a name plate capacity equal to or less than 1 kW and utilizing towers of less than 40 feet. Permitting would be more permissive for these machines.]

Setbacks – Wind Turbines and Meteorological Towers

All towers shall adhere to the setbacks established in the following table.

	Wind Turbine – Non- Commercial WECS	Wind Turbine - Commercial WECS	Meteorological Towers ⁴
Property lines	1.1 times the total height or in Agricultural or Industrial Land Use Districts only. the distance of the fall zone, as certified by a professional engineer + 10 feet	[1.1 / 1.25] times the total height	The fall zone, as certified by a professional engineer + 10 feet or 1.1 times the total height.
[Neighboring] Dwellings[*]		750 feet	The fall zone, as certified by a professional engineer + 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 + 10 feet or 1 times the total height. [Or equivalent to centerline]	1 times the height, may be reduced for minimum maintenance roads or a road with an Average Daily Traffic Count of less than 10. [Or equivalent to centerline]	The fall zone, as certified by a professional engineer + 10 feet or 1 times the total height.
Other Rights-of-Way (Railroads, power lines, etc)	The lesser of 1 times the total height or the distance of the fall zone, as certified by a professional engineer + 10 feet.	To be considered by the planning commission	The fall zone, as certified by a professional engineer + 10 feet or 1 times the total height.
Public conservation lands managed as grasslands	NA	600 feet	600 feet
Wetlands, USFW Types III, IV and V	NA	600 feet	600 feet
Other Structures		To be considered	
Other Existing WECS	NA	To be considered based on: - Relative size of the existing and proposed WECS -Alignment of the WECS relative to the predominant	

⁴ The county may have an existing tower ordinance in place, and may choose to regulate meteorological towers under that ordinance.

		winds. -Topography -Extent of wake interference impacts on existing WECS. -Property line setback of existing WECS. -Other setbacks required. Waived for internal setbacks in multiple turbine projects including aggregated projects.	
_____ River Bluff ⁵		[500 / 1,000 / 1,320]	

[* The setback for dwellings shall be reciprocal in that no dwelling shall be constructed within 750 feet of a commercial wind turbine.]

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

Setbacks – substations and accessory facilities

Minimum setback standards for substations and feeder lines shall be consistent with the standards for essential services established in Section _____ of the _____ 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.]⁶

⁵ The intent here is to minimize the impact on the scenic qualities of major rivers valleys such as the Mississippi, St. Croix and Minnesota. Care should be taken to avoid excessive setbacks, particularly from bluffs overlooking smaller tributaries to the major river. Wabasha County Minnesota has adopted ¼ mile setbacks from bluffs overlooking tributaries as well as the Mississippi River. This effectively creates a broad corridor where WECS are prohibited. It may be more appropriate in areas with complex terrain to develop an overlay map that identifies specific areas where wind development is prohibited.

⁶ Nearly all zoning ordinances address “essential services” which usually include electric power lines, and related equipment such as substations. Most substations are sited adjacent to the road ROWs. This conserves farmland and reduces costs for such facilities, but creates some concerns for road authorities including site-lines, snow drifting, and financial liabilities that might result from road re-construction. It is recommended that substations associated with WECS be regulated in a manner consistent with essential service regulations. However, if those regulations are not clear then it may be appropriate to establish specific setbacks in the WECS ordinance.

Requirements and Standards

Safety Design Standards

Engineering Certification – For all WECS, the manufacture’s engineer or another qualified engineer shall certify that the turbine, foundation and tower design of the WECS is within accepted professional standards, given local soil and climate conditions.

Clearance – Rotor blades or airfoils must maintain at least 12 feet of clearance between their lowest point and the ground.

Warnings –

For all Commercial WECS, a sign or signs shall be posted on the tower, transformer and substation warning of high voltage. [Signs with emergency contact information shall also be posted on the turbine or at another suitable point.]

For all guyed towers, visible and reflective objects, such as plastic sleeves, reflectors or tape, shall be placed on the guy wire anchor points and along the outer and innermost guy wires up to a height of 8 feet above the ground. [Visible fencing shall be installed around anchor points of guy wires.]

[Consideration shall be given to painted aviation warning on metrological towers of less than 200 feet.]

Standards

Total height – Non-Commercial WECS shall have a total height of less than 200 feet.

[Section _____ of this ordinance requires a conditional use for all structures over _____ feet in total height. In those districts where meteorological towers are a permitted use, meteorological towers of less than 200 feet shall be exempt from Conditional Use process established for structures of over _____ feet in height.]⁷

⁷ In adopting this ordinance, care should be taken to ensure that this section and the District Regulations section are consistent. Most county zoning ordinances require a Conditional Use Permit for structures of 100’ or greater. If a county chooses to exempt meteorological towers from the CUP process, it should include that language here, and not include the reference back to that section in the District regulations. Conversely, if the county does not wish to exempt meteorological towers from the height triggers for CUP, this language should not be adopted.

Tower configuration –

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

Meteorological towers may be guyed.

Color and Finish – All c 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 matt or non-reflective. [Exceptions may be made for metrological towers, where concerns exist relative to aerial spray applicators.]

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.]

Other Signage – All signage on site shall comply with section [sign ordinance] of the _____ County Ordinance. The manufacturer's or owner's company name and/or logo may be placed upon the nacelle, compartment containing the electrical generator, of the WECS.

Feeder Lines – All communications and feeder lines, equal to or less than 34.5 kV 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 _____ County authority.⁸

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.

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 _____ County Zoning Administrator outlining the steps and schedule for returning the WECS to service. All WECS and

⁸ The model ordinance references the Essential Services Ordinance for determining setbacks for substations and feeder lines in the Setback Section. However, the intent is not to necessarily define the feeder lines as an essential service. The model ordinance anticipates that there will be projects that run feeder lines to interconnection points that are off site. The ordinance does not intend to provide commercial projects with the same prerogatives as a essential services, but rather to simplify determination of setbacks and placement of substations and feeder lines relative to rights-of-way.

accessory facilities shall be removed to [ground level / four feet below ground level] within 90 days of the discontinuation of use.⁹

Each Commercial 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. The cost estimates shall be made by a competent party; such as a Professional Engineer, a contractor capable of decommissioning or a person with suitable expertise or experience with decommissioning. 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.

Orderly Development – Upon issuance of a conditional use permit, all Commercial WECS shall notify the Environmental Quality Board Power Plant Siting Act program Staff of the project location and details on the survey form specified by the Environmental Quality Board.

Other Applicable Standards

Noise – All WECS shall comply with Minnesota Rules 7030 governing noise.

Electrical codes and standards – All WECS and accessory equipment and facilities shall comply with the National Electrical Code and other applicable standards.

Federal Aviation Administration– All WECS shall comply with FAA standards and permits.

[Uniform Building Code – All WECS shall comply with the Uniform Building Code adopted by the State of Minnesota.]

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 / five] 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.

⁹ Removal of materials will provide differing protections to the public welfare. Removal to ground level will eliminate the potential for blight and safety concerns associated with un-maintained equipment left standing. Deeper removal will facilitate the return of the site to agricultural production or other uses. The shallow removal will allow resumption of cropping, and the deeper removal will allow for future tiling or drainage projects.

Avoidance and Mitigation of Damages to Public Infrastructure –

Roads – Applicants shall:

Identify all county, city or township roads to be used for the purpose of transporting WECS, substation parts, cement, and/or equipment for construction, operation or maintenance of the WECS and obtain applicable weight and size permits from the impacted road authority(ies) prior to construction.

[Conduct a pre-construction survey, in coordination with the impacted local road authority(ies) to determine existing road conditions. The survey shall include photographs and a written agreement to document the condition of the public facility.

Be responsible for restoring or paying damages as agreed to by the applicable road authority(ies) sufficient to restore the road(s) and bridges to preconstruction conditions.]

Drainage System – The Applicant shall be responsible for immediate repair of damage to public drainage systems stemming from construction, operation or maintenance of the WECS.