

CITY OF DELANO  
COUNTY OF WRIGHT  
STATE OF MINNESOTA

ORDINANCE NO. O-10-02

**AN ORDINANCE AMENDING SECTION 51.01 (DEFINITIONS) AND ADDING  
SUBDIVISION O TO SECTION 51.03 (GENERAL PROVISIONS) OF THE ZONING  
ORDINANCE RELATING TO WIND ENERGY CONVERSION SYSTEMS (WECS)**

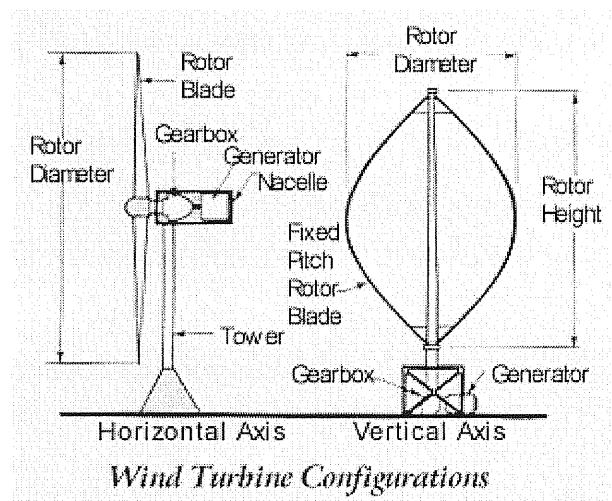
**Section 1.** Section 51.01, Subd. B.2 of the Delano Zoning Ordinance is hereby amended to read as follows:

**Wind Energy Conversion Systems (WECS) Related:**

1. Accessory System: a system designed as a secondary use to existing buildings or facilities, wherein the energy generated is used primarily for on-site consumption.
2. Horizontal Axis Wind Turbine: a wind turbine design in which the rotor shaft is parallel to the ground and the blades are perpendicular to the ground.
3. Hub: the center of a wind generator rotor, which holds the blades in place and attaches to the shaft.
4. Hub Height: the distance measured from natural grade to the center of the turbine hub.
5. Monopole Tower: a tower constructed of tapered tubes that fit together symmetrically and are stacked one section on top of another and bolted to a concrete foundation without support cables.
6. Residential Wind Turbine: a roof-mounted wind turbine of 10 kilowatt (kW) generating capacity or less.
7. Small Wind Turbine: a wind turbine of 100 kilowatt (kW) generating capacity or less.
8. Total Height: the highest point above natural grade reached by a rotor tip or any other part of a wind turbine.
9. Tower: a vertical structure that supports a wind turbine.
10. Utility Wind Turbine: a wind turbine of more than 100 kW nameplate generating capacity.

11. Vertical Axis Wind Turbine: a type of wind turbine where the main rotor shaft runs vertically.
12. Wind Conversion Energy System (WECS): an electrical generating facility that consists of a wind turbine, feeder line, and/or other associated controls and may include a tower.
13. Wind Turbine: 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.

Figure 3 – Wind Turbine Configuration



**Section 2.** Section 51.03, Subd. O of the Delano Zoning Ordinance is hereby added to read as follows:

**Subd. O. Wind Energy Conversion Systems (WECS)**

**1. Purpose and Intent.**

- a. The intent of this Section is to establish standards and procedures by which the installation and operation of wind energy conversion systems and small wind energy conversion systems shall be governed within the City. The city finds that it is in the public interest to encourage alternative energy systems that have a positive impact on energy production and conservation while not having an adverse impact on the community.
- b. Objectives.
  - 1) To create a livable community where development incorporates sustainable design elements such as resource and energy conservation and use of renewable energy.

- 2) To protect and enhance air quality, limit the effects of climate change and decrease use of fossil fuels.
- 3) To encourage alternative energy development in locations where the technology is viable and environmental, economic and social impacts can be mitigated.
- 4) To control potential nuisances and hazards created with the placement of WECS.

**2. Zoning Districts.**

- a. Utility Wind Turbines shall be allowed as an accessory conditional use in the I-1 and I-2 Districts.
- b. Small Wind Turbines shall be allowed as an accessory conditional use in all zoning districts.
- c. Residential Wind Turbines shall be allowed as an accessory administrative use in all residential districts.

**3. Number.** No more than one WECS is allowed per parcel.

**4. Declaration of Conditions.** In addition to the provisions of this Section, the City Council may impose such conditions on the granting of WECS conditional use permit as may be necessary to carry out the purpose and provisions of this Section and to maintain compatibility.

**5. Application Information.** All applications for a WECS conditional use permit or administrative permit shall be accompanied by a detailed plans and specifications including, but not limited to, the following information:

- a. Site Plan showing:
  - 1) Lot lines and dimensions.
  - 2) Location and height of all buildings, structures, above ground utilities, and trees on the lot, including both existing and proposed structures and guy wires anchors.
  - 3) Locations and height of all adjacent buildings, structures, above ground utilities and trees located within three hundred (350) feet of the exterior boundaries of the property in question.
  - 4) Existing and proposed setbacks of all structures located on the property in question.

- b. Scaled drawings accurately depicting the proposed location of the WECS and its relationship to structures on adjacent lots.
- c. WECS specifications including manufacturer and model, rotor diameter, power generation capabilities, engineering analysis and certification of the tower and data pertaining to the tower's safety and stability.
- d. Soil analysis documentation from the manufacturer or a registered soil or geotechnical engineer that the site's soil conditions meet minimum standards as specified by the manufacturer.

**6. Compliance with State Building Code.**

- a. Standard drawings of the structural components of the wind energy conversion system and support structures, including base and footings shall be provided along with the engineering data and calculations to demonstrate compliance with the structural design provisions of the State Building Code especially with regards to wind and icing loads. Drawings and engineering calculations shall be certified by a registered structural engineer.
- b. Roof-mounted WECS shall include detailed plans illustrating roof construction, mounting techniques and wind load capacity.

**7. Compliance with National Electrical Code.** WECS electrical equipment and connections shall be designed and installed in adherence to the National Electrical Code as adopted by the City.

**8. Manufacturer Warranty.** The applicant shall provide documentation or other evidence from the dealer or manufacturer that the WECS has been successfully operated in atmospheric conditions similar to the conditions within the City. The WECS shall be warranted against any system failures reasonably expected in severe weather operation conditions.

**9. Design Standards.**

- a. Height: The permitted maximum height of a WECS shall be determined based on the type of system proposed. In determining the height of the WECS, the total height of the system shall be included.

1) Utility Wind Turbines:

- a) A ratio of one and one half (1.5) feet of the distance to the closest property line to one (1) foot of the height of the system between the base of WECS and the nearest property line.
- b) A maximum system height of three hundred (300) feet.

- c) The height of a WECS must also comply with FAA Regulation Part 77 "Objects Affecting Navigable Air Space" and/or MnDOT Rule 14, MCAR 1.3015 "Criteria for Determining Obstruction to Air Navigation."

2) Small Wind Turbines:

- a) A ratio of one and one half (1.5) feet of the distance to the closest property line to one (1) foot of the height of the system between the base of WECS and the nearest property line.
- b) A maximum system height of one hundred fifty (150) feet.

3) Residential Wind Turbines:

- a) A maximum height of twenty (20) feet above the roofline of the principal structure.
- b. Setbacks: All WECS shall be set back a distance equal to no less than one and one half (1.5) times the total height of the structure between the base of the WECS and the nearest property line, above ground utility, road right-of-way, or existing building on the same lot.
- c. Rotor Clearance: Blade-arcs created by the WECS shall have a minimum of thirty (30) feet of clearance over any structure or tree within a three hundred (300) foot radius. Residential Wind Turbines are exempt from this requirement.
- d. Rotor Design: The blade design and materials are to be designed and constructed to ensure safe operation in an urban/rural area.
- e. Rotor Safety: Each WECS shall be equipped with both a manual and automatic braking device capable of stopping WECS operation in high wind or in conditions of imbalance.
- f. Lightning Protection: Each WECS shall be grounded to protect against natural lightning strikes in conformance with the National Electrical Code as adopted by the City.
- g. Appearance, Color and Finish. The wind turbine and tower shall remain painted and finished the color or finish that was originally applied by the manufacturer, unless otherwise approved as part of the conditional use permit.
- h. Tower Access: To prevent unauthorized climbing, WECS towers must comply with one of the following provisions:

- 1) Tower climbing apparatus shall not be located within twelve (12) feet of the ground.
- 2) A locked anti-climb device shall be installed on the tower.
- 3) Tower capable of being climbed shall be enclosed by a locked, protective fence at least eight (8) feet high.

i. Signs: WECS shall have one sign, not to exceed two (2) square feet at the base of the tower and said sign shall contain the following information:

- 1) Warning high voltage.
- 2) Manufacturer's name.
- 3) Emergency phone number.
- 4) Emergency shutdown procedures.

j. Lightning: WECS shall not have affixed or attached any lights, reflectors, flashers or any other illumination, except for illumination devices required by the FAA or other State or Federal agency.

k. Electromagnetic Interference: WECS shall be designed and constructed so as not to cause interference with radios, televisions or other electronic devices. Electromagnetic interference, as measured at the property line, shall be less than or equal to pre-existing conditions.

l. Noise Emissions: Noises emanating from the operation of WECS shall be in compliance with and regulated by the State of Minnesota Pollution Control Standards, Minnesota Regulations NPC 1 and 2, as amended.

m. Utility Company Interconnection: No WECS shall be interconnected with the local electrical utility company until the utility company and the City Utility Manager have review and approved such proposal. The Utility Manager and the applicant shall negotiate interconnection fees for any excess power generated. The interconnection of the WECS with the utility company shall adhere to the National Electrical Code as adopted by the City. All connecting power lines shall be buried underground.

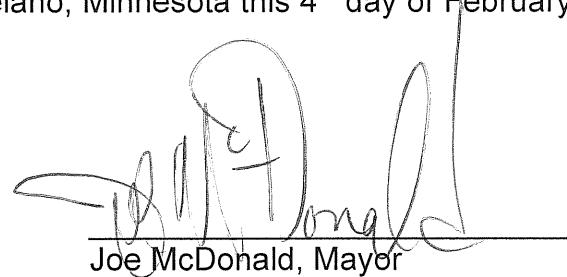
n. Shadow Flicker. A shadow flicker analysis shall be required for all Utility Wind Turbines. This analysis must demonstrate that shadow flicker shall not fall on, or in, any existing residential structure. Shadow flicker expected to fall on a roadway or portion of a residentially zoned property may be acceptable if the flicker does not exceed thirty (30) hours per year; and the flicker will fall more than one hundred (100) feet from an existing residence; or the traffic volumes are less than five hundred (500) vehicles per day (ADT). The shadow flicker model shall:

- 1) Map and describe the topography, existing residences and location of their windows, locations of other structures, wind speeds and directions, existing vegetation and roadways within a one thousand (1,000) foot radius of the proposed WECS. The model shall represent the most probable scenarios of wind constancy, sunshine constancy, wind directions and speed.
- 2) Calculate the locations of shadow flicker caused by the proposed WECS and the expected durations of the flicker in these locations, calculate the total number of hours per year of flicker at all locations.
- 3) Identify problem areas where shadow flicker will interfere with existing or future residences and roadways and describe proposed mitigation measures including, but not limited to, a change in siting of the WECS, a change in the operation of the WECS, or grading and landscaping mitigation measures.

10. **Ornamental Wind Devices.** Ornamental wind devices that are not a WECS shall be exempt from the provisions of this Section and shall conform to other applicable provisions of this Chapter and the City Code.
11. **Building Permit Required.** A building permit shall be required for the installation of a WECS in the City.
12. **Inspection.** The City hereby reserves the right upon issuing any WECS conditional use permit or administrative permit to inspect the premises on which the WECS is located. Utility Wind Turbines shall be inspected annually by a certified installer or registered structural engineer. Small Wind Turbines and Residential Wind Turbines shall be inspected biannually by a certified installer or a registered structural engineer. Proof of inspection shall be submitted to the City as requested. If a WECS is not maintained in operational condition and poses a potential safety hazard, the owner shall upon written notice from the City, take expeditious action to correct the situation.
13. **Abandonment.** Any WECS or tower which is not used for six (6) successive months shall be deemed abandoned and shall be dismantled and removed from the property at the expense of the property owner.

**Section 3. Effective Date.** This ordinance shall be in full force and effect immediately following its passage and publication.

ADOPTED by the Mayor and City Council of Delano, Minnesota this 4<sup>th</sup> day of February 2010.



Joe McDonald, Mayor

ATTEST:



Marlene E. Kittock, Clerk/Treasurer

Motion By: Larry Bartels  
Seconded By: Betsy Stolfa

McDonald: Aye  
Schrupp: Aye  
Hotchkiss: Abstain  
Bartels: Aye  
Stolfa: Aye