

A Model Small Wind Energy Zoning Ordinance

Sustainable Dwelling, November 2009

1.0 Purpose.

The purpose of this ordinance is to:

1. Oversee the permitting of small wind energy systems
2. Preserve and protect public health and safety without decreasing the efficiency of a small wind energy system

2.0 Definitions.

1. "Meteorological tower" (met tower) is defined to include the tower, base plate, anchors, guy cables and hardware, anemometers (wind speed indicators), wind direction vanes, booms to hold equipment anemometers and vanes, data logger, instrument wiring, and any telemetry devices that are used to monitor or transmit wind speed and wind flow characteristics over a period of time for either instantaneous wind information or to characterize the wind resource at a given location.
2. "Owner" shall mean the individual or entity that intends to own and operate the small wind energy system in accordance with this ordinance.
3. "Rotor diameter" means the cross sectional dimension of the circle swept by the rotating blades.
4. "Small wind energy system" means a wind energy system that
 - (a) is used to generate electricity;
 - (b) has a nameplate capacity of 10 kilowatts or less; and
5. "Total height" means the vertical distance from ground level to the tip of a wind generator blade when the tip is at its highest point.
6. "Roof mounted" means a system mounted on & totally supported by a legal structure and not extending more than 35 feet above the ground.
7. "Tower" means the monopole, freestanding, or guyed structure that supports a wind generator.
8. "Wind energy system" means equipment that converts and then stores or transfers energy from the wind into usable forms of electrical energy. This equipment includes other components used in the system.
9. "Wind generator" means blades and associated mechanical and electrical conversion components mounted on top of the tower.

3.0 Standards.

A small wind energy system shall be a permitted use in all zoning districts subject to the following requirements:

1. Certification: All Small Wind Energy Systems must either be approved by a certification program recognized by the American Wind Energy Association[AWEA], the British Wind Energy Association[BWEA] or the United States Department of Energy[DOE], or must submit a description of the safety features of the System prepared by a licensed mechanical engineer.
2. Total Height Setback. with the exception of roof mounted wind turbines, a wind tower for a small wind system shall be set back a distance equal to its total height from:
 - (a) any public road right of way
 - (b) any overhead utility lines, including lines that service buildings on the property
 - (c) all property lines if greater than the acoustic setback requirement
 - (d) any habitable building
3. Acoustic Setback Requirement. The acoustic emission sound level of the Small Wind Turbine as measured at the property line, shall not be more than 3dB[A] over the background noise level under any operating conditions, including high winds, yawing, furling, and power outages. Background noise may be calculated using Equation A.1 of the British Wind Energy Association [BWEA], Small Wind Turbine Performance and Safety Standard (February 2008). Measured site specific background noise levels may also be used provided that they are verified via a survey and report prepared by a qualified engineer. The acoustic setback from the property line required to meet the 3dB[A] over background noise level requirement can be satisfied as follows:
 - (a) For Small Wind Turbines that are certified to the BWEA Small Wind Turbine Performance and Safety Standard (February 2008), the wind turbine manufacturer shall provide calculations that use

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BWEA Equation A.2 to quantify the required acoustic setback.

(b) For Small Wind Turbines not certified to the BWEA standard, the wind turbine manufacturer shall provide certified data and calculations prepared by a qualified engineer that quantify the required acoustic setback. These calculations must include a 5dB[A] penalty for any tonality according to ISO 1996-2:2007 Annex D based only on 1/3rd octave band data as follows:

i. The turbine is declared tonal if any 1/3rd octave band (in any of the spectra from section 3.4.16) is higher than its adjacent bands by 15 dB in the low frequency bands (50 to 125 Hz); 8 dB in the mid-frequency bands (160 to 400 Hz); and 5 dB in the high frequency bands (500 to 10000 Hz)

(c) The maximum wind speed used for the submitted calculations shall be the cut-out speed or for wind turbines that do not have a cut-out speed no less than 50 mph.

4. Free Wheeling. Wind Turbine systems shall provide for a dump load circuit or other means to prevent acoustic emissions from free wheeling in the event of power outages for grid tied systems or full battery conditions for off-grid systems.

5. Allowable Tower Height. Tower heights shall be limited by the average height of surrounding trees or buildings within 200 ft of the the wind turbine such that the lowest point of the rotor diameter shall be no more than 30 ft above the average height of the surrounding trees or building whichever is greater.

6. Allowable Wind Turbine sizes: The maximum rotor diameter of a wind turbine in a lot less than 5 acres in size shall be 5 meters; For lot sizes 5 acres or more, the maximum rotor diameter shall be 10 meters; for lot sizes less than 1 acre and for roof mounted wind turbines placed on a garage, workshop, barn, or shed, the maximum size shall be 2 meters.

7. Clearance of blades: No portion of a wind energy system shall extend within twenty feet of the ground. No blades may extend over parking areas, public right of ways, driveways, or sidewalks.

8. Access.

(a) All ground mounted electrical and control equipment shall be labeled or secured to prevent unauthorized access.

(b) The tower shall be designed and installed so as to not provide step bolts or a ladder readily accessible to the public for a minimum height of 8 feet above the ground.

9. Electrical Wires. All exterior electrical wires associated with a small wind energy system, other than wires necessary to connect the wind generator to the tower wiring, the tower wiring to the disconnect junction box, and the grounding wires shall be located underground.

10. Lighting. A wind tower and generator shall not be artificially lighted unless such lighting is required by the Federal Aviation Administration.

11. Lightning arresters. All wind energy systems shall have lightning arresters installed and properly grounded.

12. Appearance, Color, and Finish. The wind generator and tower shall remain painted or finished the color or finish that was originally applied by the manufacturer.

13. Signs. All signs, other than the manufacturer's or installer's identification, appropriate warning signs, or owner identification on a wind generator, tower, building, or other structure associated with a small wind energy system visible from any public road shall be prohibited.

14. Code Compliance. A small wind energy system including tower shall comply with all applicable state construction and electrical codes, and the National Electrical Code.

15. Utility Notification. No residential wind energy system shall be installed until evidence is provided that the utility has been informed of the customers intent to install an interconnected customer-owned generator. Off-grid systems are exempt from this requirement.

16. Met towers shall be permitted under the same standards, permit requirements, restoration requirements, and permit procedures as a small wind energy system.

4.0 Permit Requirements.

1. Building Permit. A building permit shall be required for the installation of a small wind energy system and will require the following submittals:

(a) Property lines and physical dimensions of the property

(b) Location, dimensions, and types of existing major structures on the property

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- (c) Location of the proposed wind system tower
- (d) The right-of-way of any public road that is contiguous with the property;
- (e) Any overhead utility lines and easements, including lines that service buildings on the property.
- (f) Evidence of AWEA, BWEA, DOE, or independent certification of the wind turbine system
- (g) Wind system specifications, including manufacturer and model, rotor diameter, tower height, tower type (freestanding, guyed, building or roof mounted)
- (h) Total Height [tower height plus $\frac{1}{2}$ the rotor diameter]
- (i) Acoustic Setback Calculations and Certification
- (j) A drawing of the wind turbine structure, including the tower, type of tower, monopole, multi-sided or guyed structure, base and footings. An engineering analysis of the tower showing compliance with the Uniform Building Code and certified by a licensed professional engineer shall also be submitted. These drawings and analysis may be provided by the wind turbine manufacturer. Wet stamps shall not be required.
- (k) The property owner shall also provide proof of property insurance before the building permit is issued.

5.0 Abandonment.

1. A small wind energy system that is out-of-service for a continuous 12-month period will be deemed to have been abandoned. The Administrator may issue a Notice of Abandonment to the owner of a small wind energy system that is deemed to have been abandoned. The Owner shall have the right to respond to the Notice of Abandonment within 30 days from Notice receipt date. The Administrator shall withdraw the Notice of Abandonment and notify the owner that the Notice has been withdrawn if the owner provides information that demonstrates the small wind energy system has not been abandoned.

2. If the small wind energy system is determined to be abandoned, the owner of a small wind energy system shall remove the wind generator from the tower at the Owner's sole expense within 3 months of receipt of Notice of Abandonment. If the owner fails to remove the wind generator from the tower, the Administrator may pursue a legal action to have the wind generator removed at the Owner's expense.