

## Section 8.04 Commercial/Utility Wind Energy Systems

### 8.04.01 *Purpose*

It is the purpose of this regulation to promote the safe, effective and efficient use of commercial/utility grade wind energy systems within Boone County.

### 8.04.02 *Definitions*

The following are defined for the specific use of this section.

1. **Aggregate Project** shall mean projects that 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 part of the aggregated project.
2. **Applicant** is the person or entity filing an application under this Ordinance. *[Ordinance #95 February 2009]*
3. **Commercial WECS** a.k.a. “Wind Energy Facility (Large)” shall mean a wind energy conversion system of equal to or greater than 100 KW in total nameplate generating capacity. *[Ordinance #95 February 2009]*
4. **Facility Operator (Operator)** is the entity responsible for the day-to-day operation and maintenance of the Wind Energy Facility. *[Ordinance #95 February 2009]*
5. **Facility Owner (Owner)** is the entity or entities having controlling or majority equity interest in the Wind Energy Facility, including their respective successors and assigns. *[Ordinance #95 February 2009]*
6. **Fall Zone** shall mean 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.
7. **Feeder Line** shall mean 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 wind energy conversion system.
8. **Meteorological Tower** shall mean, for purposes of this regulation, a tower which is erected primarily to measure wind speed and directions plus other data relevant to siting a Wind Energy Conversion System. Meteorological towers do not include towers and equipment used by airports or other applications to monitor weather conditions.
9. **Micro-Wind Energy Conversion System** shall mean a Wind Energy Conversion System of 1 kW nameplate generating capacity or less and utilizing supporting towers of 40 feet or less.
10. **Non-Participating Landowner** is any landowner not under agreement with the Facility Owner or Facility Operator. *[Ordinance #95 February 2009]*
11. **Occupied Building** is a residence, school, hospital, church, public library or other building used for public gathering that is occupied or in use when the permit application is submitted. *[Ordinance #95 February 2009]*
12. **Participating Landowner** is a landowner under lease or other property agreements with the Facility Owner or Operator pertaining to the Wind Energy Facility. *[Ordinance #95 February 2009]*
13. **Public Conservation Lands** shall mean 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, federal Wildlife Refuges and Waterfowl Production Areas. For purposes of

this regulation, public conservation lands will also include lands owned in fee title by non-profit conservation organizations, Public conservation lands will also include private lands upon which conservation easements have been sold to public agencies or non-profit conservation organizations.

14. **Public Road** is a full passage Right-of-Way (ROW). *[Ordinance #95 February 2009]*
15. **Rotor Diameter** shall mean the diameter of the circle described by the moving rotor blades.
16. **Shadow Flicker** is the visible flicker effect when rotating turbine blades cast shadows on the ground and nearby structures causing the repeating pattern of light and shadow. *[Ordinance #95 February 2009]*
17. **Small Wind Energy System** shall mean a wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics, which has a rated capacity of not more than 100 KW and which is intended to primarily reduce on-site consumption of utility power.
18. **Substations** shall mean any electrical facility to convert electricity produced by wind turbines to a voltage greater than 35,000 (35,000 KV) for interconnection with high voltage transmission lines.
19. **Total Tower Height or Total Wind Turbine Height** shall mean the highest point, above ground level, reached by a rotor tip or any other part of the Wind Energy Conversion System. *[Ordinance #95 February 2009]*
20. **Tower** shall mean the vertical structures that support the electrical, rotor blades, or meteorological equipment.
21. **Tower Height** shall mean the total height of the Wind Energy Conversion System exclusive of the rotor blades.
22. **Transmission Line** shall mean the 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.
23. **Wind Energy Conservation System** shall mean an electrical generating facility comprised of one or more wind turbines and accessory facilities, including but not limited to: power lines, transformers, substations and meteorological towers that operate by converting the kinetic energy of wind into electrical energy. The energy may be used on-site or distributed into the electrical grid.
24. **Wind Energy Facility** is an electric generating facility, whose main purpose is to supply electricity, consisting of one or more Wind Turbines and other accessory structures and buildings, including substations, meteorological towers, electrical infrastructure, transmission lines and other appurtenant structures & facilities. For the purpose of this Ordinance, the term does not apply to roof-mounted or building integrated roof mounting systems. *[Ordinance #95 February 2009]*
25. **Wind Energy Facility (Small) a.k.a. Small Wind Energy System** is a single system designed to supplement other electricity sources as an accessory use to existing buildings or facilities, wherein the power generated is used primarily for on-site consumption. A small wind energy conversion system consists of a single wind turbine, a tower, and associated control or conversion electronics, which has a total rated capacity of 20 KW or less and which is intended to primarily reduce on-site consumption of utility power. *[Ordinance #95 February 2009]*
26. **Wind Energy Facility (Medium) a.k.a. Medium Wind Energy System** is a wind energy conversion system consisting of one or more wind turbine(s), a

tower(s), and associated control or conversion electronics, which has a total rated capacity of more than 20KW but not greater than 100 KW and which is intended to primarily reduce on-site consumption of utility power. [Ordinance #95 February 2009]

27. **Wind Energy Facility (Large) a.k.a. Commercial WECS** is a wind energy conversion system consisting of one or more wind turbine(s), a tower(s), and associated control or conversion electronics, which has a total rated capacity of more than 100 KW. [Ordinance #95 February 2009]
28. **Wind Power** is the conversion of wind energy into another form of energy. [Ordinance #95 February 2009]
29. **Wind Turbines or Windmills** is a wind energy conversion system that converts the kinetic energy of wind into electricity through the use of a wind turbine generator, and may include a nacelle, rotor tower, guy wires, and pad transformer. [Ordinance #95 February 2009]

8.04.03

### **Requirements**

Commercial/Utility Grade wind energy systems shall be permitted as a *Conditional Use* within any district *where the use is listed and allowed*.

No Wind Energy Facility, or addition of a Wind Turbine to an existing Wind Energy Facility, shall be constructed unless a *Conditional Use Permit* has been issued to the Facility Owner or Facility Operator approving construction of the facility under this Ordinance. Permit application of the expansion shall be based on the total rated capacity, including existing facility but excluding like-kind replacements. [Ordinance #95 February 2009]

Any physical modification to an existing and permitted Wind Energy Facility that materially alters the size and/or type of Wind Turbines or other Equipment shall require a permit modification under this Ordinance. Like-kind replacements shall not require a permit modification. [Ordinance #95 February 2009]

The following requirements and information shall be met and supplied:

1. The name(s) of project applicant.
2. The name of the project owner.
3. The legal description and address of the project.
4. 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.
5. Site layout, including the location of property lines, wind turbines, electrical grid, and all related accessory structures. This site layout shall include distances and be drawn to scale.
6. Engineer's certification.
7. Documentation of land ownership or legal control of the property.
8. The latitude and longitude of individual wind turbines.
9. A USGS topographical map, or map with similar data, of the property and surrounding area, including any other Wind Energy Conversion System, within 10 rotor distances of the proposed Wind Energy Conversion System.
10. Location of wetlands, scenic, and natural areas (including bluffs) within 1,320 feet of the proposed Wind Energy Conversion System.
11. An Acoustical Analysis

12. FAA permit
13. Location of all known Communication Towers within two miles of the proposed Wind Energy Conversion System.
14. Decommissioning Plan
15. Description of potential impacts on nearby Wind Energy Conversion Systems and wind resources on adjacent properties.

8.04.04 **Aggregated Projects**

1. Aggregated projects may jointly submit a single application and be reviewed under joint proceedings, including notices, public hearings, reviews and as appropriate approvals.
2. Permits may be issued and recorded separately.
3. Joint projects will be assessed fees as one project.

8.04.05 **Setbacks**

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

Setbacks provisions may be waived if the following conditions are met:

1. Property owners may waive the setback requirement for Property Lines and/or Occupied Buildings on the participating Landowner property and/or Non-Participating Landowner property by signing a waiver that sets forth the applicable setback provisions(s) and the proposed changes. *[Ordinance #95 February 2009]*
2. The written waiver shall notify applicable property owner(s) of the setback required by this Ordinance, describe how the Wind Energy Facility is not in compliance, and state that consent is granted for the Wind Energy Facility to waive the setback as required by this Ordinance. *[Ordinance #95 February 2009]*
3. Any such waiver shall be signed by the applicant, the Participating Landowner(s) and/or Non-participating Landowner(s), and recorded in the Deeds Office where the property is located. *[Ordinance #95 February 2009]*

**Table 1 Wind Turbine/Meteorological Tower Setbacks**

	<b>Wind Turbine – Non Commercial WECS</b>	<b>Wind Turbine – Commercial/Utility WECS</b>	<b>Meteorological Towers</b>
<b>Property Lines</b>	a.) 1.1 times the total height if in <i>[Ordinance #95 February 2009]</i> Agricultural or Transitional Agricultural Districts only.  b.) In <i>other districts</i> , the setback shall be the distance of the fall zone, as certified by a professional engineer, + ten (10) feet	1.25 times the total height.	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10) feet or 1.1 times the total height.
<b>Neighboring Dwelling Units *</b>		750 feet	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10) feet or 1.1 times the total

			height.
<b>Road Rights-of-Way (ROW)**</b>	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10) feet or one (1) times the total height.	One (1) times the total height.	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10) feet or one (1) times the total height.
<b>Other Rights-of-Way (ROW)</b>	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10) feet or one (1) times the total height.	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10) feet or one times the total height.	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + 10 feet or one (1) times the total height.
<b>Public Conservation Lands</b>	NA	600 feet	600 feet
<b>Wetlands, USFW Types III, IV, and V</b>	NA	600 feet	600 feet
<b>Other Structures</b>	NA	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10) feet or one (1) times the total height.	The <i>greater</i> of: The fall zone, as certified by a professional engineer, + ten (10 )feet or one (1) times the total height.
<b>Other Existing WECS</b>	NA	To be considered based on: 1. Relative size of the <i>existing</i> & <i>proposed</i> WECS 2. <i>Alignment</i> of the WECS relative to the predominant winds 3. Topography 4. Extent of wake interference impacts on existing WECS 5. Property line setback of <i>existing</i> WECS 6. Other setbacks required  <i>Waived for internal setbacks in multiple turbine projects including aggregated projects</i>	
<b>River Bluffs</b>		1,320 feet	

\* The setback for dwelling units shall be reciprocal in that *no dwelling unit shall be constructed within the same distance required for a Commercial/Utility Wind Energy Conversion System.*

\*\* The setback shall be measured from any future Rights-of-Way if a planned change or expanded right-of-Way is known.

8.04.08 ***Special Safety and Design Standards***

All towers shall adhere to the following safety and design standards:

1. ***Clearance of rotor blades or airfoils*** must maintain a *minimum of twelve* (12) feet of clearance between their lowest point and the ground.
2. All Commercial/Utility WECS shall have a sign or signs posted on the tower, transformer and substation, *warning of high voltage*. Other signs shall be posted on the turbine with *emergency contact information*.
3. All wind turbines, which are a part of a Commercial/Utility WECS, shall be installed with a ***tubular, monopole type tower***.
4. Consideration shall be given to painted ***aviation warnings*** on all towers less than 200 feet.
5. ***Color and Finish:***  
All wind turbines and towers that are part of a commercial/utility 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*.
6. ***Lighting:***  
Lighting, including lighting intensity and frequency of strobe, shall adhere to but not exceed requirements established by the Federal Aviation Administration (FAA) permits and regulations. *Red strobe lights shall be used during nighttime illumination to reduce impacts on neighboring uses and migratory birds*. Red pulsating incandescent lights should be *avoided*.
7. ***Other signage:***  
All other signage shall comply with the sign regulations found in these regulations.
8. ***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 feasible. Feeder lines installed as part of a WECS shall not be considered an essential service.
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.
10. ***Discontinuation and Decommissioning:***  
A WECS shall be considered a discontinued use after one (1) year without energy production, *unless* a plan is developed and submitted to the Zoning Administrator outlining the steps and schedule for returning the WECS to service. All WECS and accessory facilities shall be removed to ground level within ninety (90) days of the discontinuation of use.

Each Commercial/Utility WECS shall have a Decommissioning Plan outlining the anticipated means and cost of removing WECS at the end of their serviceable life or upon being 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 decommissioning and removal of the WECS and accessory facilities.

11. **Noise:**  
No Commercial/Utility WECS shall exceed 50 dBA at the nearest structure or use.
12. **Interference:**  
The applicant shall minimize or mitigate interference with electromagnetic communications, such as radio, telephone, microwaves, or television signals caused by any WECS. The applicant shall notify all communication tower operators within five miles of the proposed WECS location upon application to the city/county for permits.
13. **Roads:**  
Applicants shall:
  - a. Identify all county, municipal 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 jurisdictions prior to construction.
  - b. Conduct a pre-construction survey, in coordination with the appropriate jurisdictions to determine existing road conditions. The survey shall include photographs and a written agreement to document the condition of the public facility.
  - c. Be responsible for restoring or paying damages as agreed to by the applicable jurisdiction sufficient to restore the road(s) and bridges to preconstruction conditions.
14. **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.