

Chapter 18

WIND ENERGY SYSTEMS

SECTION 18.1 PURPOSE AND INTENT

The purpose of this Chapter is to establish guidelines for installing Wind Energy System (WES) in Eureka Charter Township. The intended goals are as follows:

- A. To promote the safe, effective and efficient use of a WES to reduce the consumption of fossil fuels in producing electricity.
- B. To preserve and protect public health, safety, welfare and quality of life by minimizing the potential adverse impacts of a WES.
- C. To establish standards and procedures by which the siting, design, engineering, installation, operation and maintenance of a WES shall be governed.

SECTION 18.2 DEFINITIONS

- A. **Ambient Sound Level:** The amount of background noise at a given location prior to the installation of a WES which may include, but not be limited to, traffic, machinery, lawnmowers, human activity and the interaction of wind with the landscape. The ambient sound level is measured on the dB (A) weighted scale as defined by the American National Standards Institute.
- B. **Anemometer:** A wind speed indicator constructed at a given site including the tower, base plate, anchors, cables and hardware, wind direction vanes, booms to hold equipment, data logger, instrument wiring and any telemetry devices that are used to monitor or transmit wind speed and wind flow or to characterize the wind resource at a given location. Typically Anemometers are used to analyze the potential for generation electrical energy by measuring wind speed, direction, and duration.
- C. **Anemometer Tower:** Means a freestanding tower, containing instrumentation such as anemometers, designed to provide present moment wind data for use by the supervisory control and data acquisition (SCADA) system which is an accessory land use to a UTILITY GRID WES
- D. **Decibel:** The unit of measure used to express the magnitude of sound pressure and sound intensity. Decibels shall be measured on the dB (A) weighted scale as defined by the American National Standards Institute.
- E. **Decommissioning:** The process of terminating operation and completely removing a WES and all related buildings, structures, foundations, access roads and equipment.
- F. **IEC:** Means the International Electrotechnical Commission.
- G. **ISO:** Means the International Organization for Standardization.

- H. **Large Wind Energy System(s) (LWES):** A tower-mounted WES that converts wind energy into electricity. The LWES has a nameplate capacity that identifies the maximum kilowatts as exceeding 100 kilowatts. The total height exceeds 60' and is primarily used to provide on grid electrical production.
- I. **Lease Unit Boundary:** A boundary around property leased for purposes of a WES including parcels adjacent to the parcel on which the WES tower or equipment is located. For purposes of setback, the lease unit boundary shall not cross road right-of-ways.
- J. **Nacelle:** The encasement that houses all of the generating components, gearbox, drive train and other equipment.
- K. **Net-Metering:** A special metering and billing agreement between utility companies and their customers which facilitates the connection of renewable energy generating systems to the power grid.
- L. **Occupied Building:** A residence, school, hospital, church, public library, business or other building used for public gatherings.
- M. **Operator:** The entity responsible for the day-to-day operation and maintenance of a WES.
- N. **Owner:** The individual or entity, including respective successors and assigns, which has an equity interest or owns the WES.
- O. **Rotor:** Means an element of a WES that acts as a multi-bladed airfoil assembly, thereby extracting through rotation, kinetic energy directly from the wind.
- P. **Shadow Flicker:** The moving shadow, created by the sun shining through the rotating blades of a WES.
- Q. **Small Wind Energy System(s) (SWES):** A structure or tower-mounted SWES has a nameplate capacity that does not exceed 100 kilowatts, and the total height does not exceed 60 feet.
- R. **Sound Pressure:** Means an average rate at which sound energy is transmitted through a unit area in a specified direction. The pressure of the sound measured at a receiver.
- S. **Sound Pressure Level:** Means the sound pressure mapped to a logarithmic scale and reported in decibels (dB).
- T. **Structure:** Any building or other structure, such as a municipal water tower, that is a minimum of 12 feet high at its highest point of roof and is secured to frost footings or a concrete slab.
- U. **Total Height:** The vertical distance measured from the ground level at the base of the tower to the uppermost vertical extension of any blade, or the maximum height reached by any part of the WES or Anemometer.
- V. **Tower:** A freestanding support on which a WES is mounted.
- W. **Wind Energy System (WES):** Any WES that converts wind energy into electricity through the use of equipment that includes any base, blade, foundation, generator, nacelle, rotor, tower, transformer, vane, wire, inverter, batteries or other components used in the system.

SECTION 18.3 APPLICABILITY

- A. This Chapter applies to all WESs proposed to be constructed after the effective date of adoption of section of Zoning Ordinance 79.
- B. All WETs constructed prior to the adoption of this Chapter shall not be required to meet the requirements herein; however, any physical modification to an existing WES that materially alters the size, type, equipment or location shall require a permit under this Ordinance.

SECTION 18.4 TEMPORARY ANEMOMETER USAGE

Anemometers shall be permitted in all zoning districts as a temporary use, subject to the following:

- A. An anemometer shall be permitted for no more than 18 months for a SWES, and no more than three years for a LWES.
- B. The construction, installation or modification of an anemometer tower shall require zoning, building and electrical permits and shall conform to all applicable local, state and federal safety, construction, environmental, electrical, communications and Federal Aviation Administration requirements.
- C. An anemometer shall be subject to the minimum requirements for height, setback, separation, location, safety requirements and decommissioning that correspond to the size of the WES that is proposed to be constructed on the site.

SECTION 18.5 General Consideration for all WES

Following are general consideration required for all WES constructed in Eureka Charter Township.

- A. **APPEARANCE:** A WES, including accessory buildings and related structures, shall be a non-reflective, non-obtrusive color(white. gray, black). The appearance of the turbine tower and any ancillary facility shall be maintained throughout the life of the WES.
- B. **SITTING:** A Zoning Permit is required for siting of all WES installations and all LWES shall obtain a Special Use Permit from the Eureka Charter Township Planning Commission.
- C. **PERMITS AND APPROVALS:** If a Zoning Permit is obtained for a WES, a building permit is required for the structure and tower, and an electrical permit is required for installation of the WES.
- D. **LIGHTING:** WES shall not be artificially lighted except to the extent required by the FAA or other applicable authority, or otherwise necessary for the reasonable safety and security thereof.
- E. **ADVERTISING, ADORNMENT, OR DECORATION:** WES shall not be used for displaying any advertising including flags, streamers or decorative items except for identification of the turbine manufacturer.
- F. **NOISE:** The sound pressure level shall not exceed 55 dB (A) measured at the property lines or the lease unit boundary, whichever is farther from the

source of the noise. This sound pressure level shall not be exceeded for more than three minutes in any hour of the day. If the ambient sound pressure level exceeds 55 dB (A), the standard shall be ambient dB (A) plus 5 dB (A).

G. VIBRATION: Vibrations shall not be produced that are humanly perceptible beyond the property lines or Lease Unit Boundary where the WES is located.

H. QUANTITY: No more than one WES tower shall be installed on a primary residence. Commercial and Industrial buildings in excess of 10,000 sq. ft. may have more than one WES tower installed on the building if all setback requirements are met. The number of reef-mounted systems shall be based on manufacturer recommendations and industry and building code standards.

I. SEPARATION: If more than one WES is installed on a parcel, a distance equal to the height of the highest WES must be maintained between the bases of each WES, and all other setback requirements shall be met.

J. ELECTRICAL SYSTEM: All electrical controls, control wiring, grounding wires, power lines and system components shall be placed underground within the boundary of each parcel at a depth designed to accommodate the existing land use to the maximum extent practicable. Wires necessary to connect the wind generator to the tower wiring are exempt from this requirement. The electrical system must meet current electrical codes.

K. PUBLIC UTILITY CONNECTION: If the WES is connected to a public utility it shall meet the requirements for interconnection and operation as set forth in the public utility's then-current service regulations meeting federal, state and industry standard applicable to wind power generation facilities, and the connection shall be inspected by the appropriate public utility.

L. SAFETY: All WES shall have automatic braking, governing, or a feathering system to prevent uncontrolled rotation or over speeding. All wind towers shall have lighting protection. If a tower is supported by guy wires, the wires shall be clearly visible to a height of at least six feet above the guy wire anchors. The minimum vertical blade tip clearance from grade shall be 20 feet for a WES employing a horizontal axis rotor.

M. SIGNAGE: A clearly visible warning sign regarding voltage shall be placed at the base of the WES.

N. STRUCTURAL INTEGRITY: The structural integrity of each WES shall conform to the design standards of the International Electrical Commission, specifically IEC 61400-1, "Wind Turbine Safety and Design" and/or IEC 61-4000-2, "Small Wind Turbine Safety", IEC 61400-22, "Wind Turbine Certification" and IEC 61400-23, "Blade Structural Testing" Or any similar successor standards.

O. SIGNAL INTERFERENCE: The WES shall not interfere with communication systems such as, but not limited to, radio, telephone, television, satellite or emergency communication systems.

P. DECOMMISSIONING: The WES Owner(s) or Operator(s) shall complete decommissioning within one year (12 months) after the end of the useful life.

Upon request of the Owner(s) or assigns of, and for good cause, the Eureka Charter Township Board may grant a reasonable extension of time. The WES will presume to be at the end of its useful life if no electricity is generated for a continuous period of one year (12 months). All decommissioning expenses are the responsibility of the Owner(s) and/or Operator(s).

SECTION 18.6 Small Wind Energy System Requirements (SWES)

The following are required for installation of a SWES designed to primarily serve the needs of a home, farm, or small business.

A. SETBACKS:

1. Each Anemometer and SWES Tower shall comply with the following setback requirements.

a. The minimum setback for each Anemometer and SWES Tower to each existing structure, road right-of-way, property line or utility line, except for those utility lines servicing the SWES, shall be as specified in the Eureka Charter Township Zoning Ordinance or the Total height of the Tower, whichever is greater.

b. No Anemometer or SWES Tower shall be constructed closer to a Lease Unit Boundary than the Total Height of the Tower.

c. Setbacks from common property lines within a Lease Unit Boundary shall be waived.

2. Exterior structures and equipment part of the SWES shall comply with accessory structure setback requirements for each zoning district.

B. ZONING DISTRICTS: SWES are allowed in all zoning districts except Manufactured Home Park Residential Districts (MHR).

C. TOWER HEIGHT:

a. Small WES and Anemometer installations shall have a tower height of 60 feet or less measuring from grade to the highest vertical point of the turbine blade.

D. ELECTRICAL CAPACITY:

a. Small WES shall have a rated nameplate capacity of 100 Kilowatts or less.

E. ACCESS:

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

b. The tower shall be designed and installed without step bolts, a ladder, etc. to prevent ready access to the public for a minimum height of 8 feet above the ground.

F. SHADOW FLICKER: SWES shall not be placed where shadow flicker disrupts a neighboring primary residence.

G. CONSTRUCTION CODES, TOWERS, AND INTERCONNECTION STANDARDS:

a. SWES, including towers shall obtain all required permits and comply with all applicable state and local construction, electrical building and zoning requirements and standards.

H. INTERCONNECTION:

a. An interconnected SWES shall comply with the Michigan Public Service Commission and Federal Energy Regulatory Commission standards. Off-grid systems are exempt from this requirement.

SECTION 18.7 Large Wind Energy Systems (LWES)

On site WES over 60 feet high or with an electrical capacity exceeding 100 kilowatts of power shall meet the following additional standards:

A. SETBACKS:

1. Each Anemometer and LWES Tower shall comply with the following setback requirements:

a. The minimum setback from each Anemometer and LWES Tower to each existing structure, road right-of-way, property line or utility line, except for those utility lines servicing the LWES. shall be as specified in the Eureka Township Zoning Ordinance or the Total height of the Tower, whichever is greater.

b. No Anemometer or LWES Tower shall be constructed closer to a Lease Unit Boundary than the Total Height of the Tower.

c. Setbacks from common property lines within a Lease Unit Boundary shall be waived.

2. All operations and maintenance buildings, sub-stations, and ancillary equipment shall comply with setback requirements as specified in the Eureka Township Zoning Ordinance.

3. Overhead transmission lines and power poles shall be constructed in compliance with the setback and placement requirements applicable to public utilities.

B. ZONING DISTRICTS: LWES are permitted in SR, RR, AG, IND, and all Commercial Districts provided they can meet all other requirement of this ordinance.

C. SPECIAL USE PERMIT: A Special Land Use Permit application shall be filed with the Zoning Administrator and approved prior to any physical activity to install a LWES.

1. All LWES projects shall comply with all requirements of Section 11 of the Eureka Township Zoning Ordinance 79 with the following additional requirements:

a. Documentation that sound pressure level, construction code, tower, interconnection (if applicable), and safety requirements have been reviewed and the submitted site plan is prepared to show compliance with these issues.

- b. Proof of the applicant's public liability insurance for the project.
- c. A copy of the portion of all the applicant's lease(s) with the land owner(s) granting authority to install the Anemometer Tower and/or Utility Grid Wind Energy System; legal description of the property(ies), Lease Unit(s); and the site plan shows the boundaries of the leases as well as the boundaries of the Lease Unit Boundary.
- d. The phases or parts of construction with a construction schedule.
- e. The project area boundaries.
- f. The location, height, and dimensions of all existing and proposed structures and fencing.
- g. The location, grades, and dimensions of all temporary and permanent on-site and access roads from the nearest county or state maintained road.
- h. All new infrastructures above ground related to the project.
- i. A copy of Manufacturers' Material Safety Data Sheet(s) which shall include the type and quantity of all materials used in the operation of all equipment including, but not limited to, all lubricants and coolants.
- j. Lease unit boundaries encompassing more than one parcel must be approved by the Planning Commission.
- k. For Utility Grid WES only:
 - 1. A copy of a noise modeling and analysis report with the site plan showing location of equipment identified as a source of noise which is placed, based on the analysis, so that the wind energy system will not exceed the maximum permitted sound pressure levels. The noise modeling and analysis shall conform to IEC 61400 and ISO 9613. After installation of the Utility Grid wind energy system, sound pressure level measurements shall be done by a third party, qualified professional according to the procedures in the most current version of ANSI S12.18, at the owner or operator's expense. All sound pressure levels shall be measured with a sound meter that meets or exceeds the most current version of ANSI S1.4 specifications for a Type II sound meter. Documentation of the sound pressure level measurements shall be provided to the Zoning Administrator within 60 days of the commercial operation of the project.
 - 2. A visual impact simulation showing the completed site as proposed on the submitted site plan. The visual impact simulation shall be from four viewable angles.

3. A copy of an Environment Analysis by a third party qualified licensed professional to identify and assess any potential impacts on the natural environment including, but not limited to wetlands and other fragile ecosystems, historical and cultural sites, and antiquities. The applicant shall take appropriate measures to minimize, eliminate or mitigate adverse impacts identified in the analysis, and shall show those measures on the site plan. The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts.

4. A copy of an Avian and Wildlife Impact Analysis by a third party qualified professional to identify and assess any potential impacts on wildlife and endangered species. The applicant shall take appropriate measures to minimize, eliminate or mitigate adverse impacts identified in the analysis, and shall show those measures on the site plan. The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts. (Sites requiring special scrutiny include wildlife refuges, other areas where birds are highly concentrated, bat hibernacula, wooded ridge tops that attract wildlife, sites that are frequented by federally and/or state listed endangered species of birds and bats, significant bird migration pathways, and areas that have landscape features known to attract large number of raptor.) (At a minimum, the analysis shall include a thorough review of existing information regarding species and potential habitats in the vicinity of the project area. Where appropriate, surveys for bats, raptors, and general avian use should be conducted. The analysis shall include the potential effects on species listed under the Federal Endangered Species Act. and Michigan's Endangered Species Protection Law.) (The analysis shall indicate whether a post construction wildlife mortality study will be conducted and, if not, the reasons why such a study does not need to be conducted.)

5. A copy of a shadow flicker analysis at occupied structures to identify the location of shadow flicker that may be caused by the project and the expected durations of the flicker at these locations from sun-rise to sun-set over the course of a year. The site plan shall identify problem areas where shadow flicker may affect the

occupants of the structures and show measures that shall be taken to eliminate or mitigate the problem.

6. A second site plan which shows the restoration plan for the site after completion of the project which includes the following supporting documentation:

- a. The anticipated life of the project.
- b. The estimated decommissioning cost net of salvage value in current dollars.
- c. The method of ensuring that funds will be available for decommissioning and restoration.
- d. The anticipated manner in which the project will be decommissioned and the site restored.

7. A description of the complaint resolution process developed by the applicant to resolve complaints from nearby residents concerning the construction or operation of the project. The process may use an independent mediator or arbitrator and shall include a time limit for acting on a complaint. The process shall not preclude the local government from acting on a complaint. During construction the applicant shall maintain and make available to nearby residents a telephone number where a project representative can be reached during normal business hours.

8. The applicant is responsible for any and all repair costs associated with damage to public roads as the result of the installation, maintenance and /or decommissioning of the LWES, pursuant to Section 19.3 B.

SECTION 18.8 Severability Clause

This Ordinance and each Section, subsection, sentence and provision thereof are hereby declared to be severable. If any part is adjudged by a court of competent jurisdiction to be invalid for any reason, it is hereby provided that the remainder of the Ordinance shall not be affected thereby.