

## SECTION 528 – WIND ENERGY

Wind Power is permitted in the Agricultural/Rural Residential (A-R) district.

### 1. Definitions

Ambient: Ambient is defined as the sound pressure level exceeded 90% of the time or L90.

Anemometer (MET Tower): A freestanding tower, containing instrumentation such as anemometers, that is 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 Wind Energy Conversion System.

ANSI: American National Standards Institute.

dB(A): The sound pressure level in decibels. Refers to the “a” weighted scale defined by ANSI. A method for weighting the frequency spectrum to mimic the human ear.

dB(C): The sound pressure level in decibels of frequencies below 1k Hz. Refers to the C-weighted scale defined by ANSI.

Decibel: The unit of measure used to express the magnitude of sound pressure and sound intensity.

FAA: Federal Aviation Administration

Hub Height: The distance from ground level base of the structure to the center of the turbine hub or horizontal rotor shaft.

IEC: International Electrotechnical Commission. The IEC is the leading global organization that prepares and publishes international standards for all electrical, electronic and related technologies.

ISO: International Organization for Standardization. ISO is a network of the national standards institutes of 156 countries.

LMax (LAMax or LCMaX): The maximum dB(A) or dB(C) sound level measured using the “fast response” setting of the sound meter (equivalent to 0.125 second exponential averaging time).

On Site Use Wind Energy Conversion Systems: An On Site Use Wind Energy Conversion System is intended to primarily serve the needs of the consumer.

Overall Height of Turbine: The distance from the ground level base of the structure highest point on the tip of a fully vertical rotor blade.

Participating and Non-Participating Parcels:

- a. Participating Parcel: A parcel of record that is to be used, occupied, maintained, let, leased or authorized to be used for any purposes of developing or operating a Utility Grid Wind Energy Conversion System. Evidence of the participation shall be recorded with the Bay County Register of Deeds.

- b. Non-Participating Parcel: A parcel of record that is not a Participating Parcel.

Rotor: An element of a wind energy conversion system that acts as a multi-bladed airfoil assembly, thereby extracting through rotation, kinetic energy directly from the wind.

SCADA Tower: A freestanding tower containing instrumentation such as anemometers that is designed to provide present moment wind data for use by the supervisory control and data acquisition (SCADA) system.

Shadow Flicker: Alternating changes in light intensity caused by the moving blade of a wind energy conversion system casting shadows.

Sound Level Meter: An instrument for the measurement of sound levels that meets the ANSI requirements of S1.4-1983 (or later revision) for Type 1 or 2 instruments. For frequency analysis, octave and 1/3 octave filters shall conform to ANSI S1.11-1986 (or later revision).

Sound Pressure: 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.

Sound Pressure Level: The sound pressure mapped to a logarithmic scale and reported in decibels (dB).

Utility Grid Wind Energy Conversion Systems: A wind energy conversion system greater than sixty-six feet (66') in total height that is designed and intended to provide electricity to the electric utility grid rather than for use on-site.

Wind Energy Conversion System (WECS): A wind energy conversion system which converts wind energy into electricity through the use of a wind turbine generator and includes the turbine, blades, and tower as well as related electrical equipment.

Wind Site Assessment: An assessment to determine the wind speeds at a specific site and the feasibility of using that site for construction of a wind energy conversion system.

## 2. On Site Use Wind Energy Conversion System

An On Site Use Wind energy conversion system is intended to primarily serve the needs of a single consumer. An On Site Use wind energy conversion system with a tower higher than 66 feet shall be considered a Special Land Use. On Site Use wind energy conversion systems with no towers or towers 66 feet or less shall be ~~a Permitted Use in all zoning classifications where structures of any sort are allowed subject to the following requirements~~ considered Special Land Use. Anemometer towers ~~more than 66 feet in height~~ used to conduct a wind site assessment for possible installation of an On Site Use wind energy conversion system shall also be a Special Land Use. Prior to the installation of an On Site Use wind energy conversion system ~~with a tower higher than 66 feet~~, an application for a Special Land Use permit shall be filed with the local government that ~~will include applicant identification, a site plan, documentation that sound pressure level, construction code, tower, interconnection (if applicable), and safety requirements have been met, and proof of the applicant's public liability insurance~~ conforms to all the requirements of Section 528(4) for Utility Grid Wind Energy Conversion Systems.

- a. ~~Property Setback: The distance between an On Site Use wind energy conversion system and the owner's property lines shall be at least 1 ½ times the height of the wind energy conversion~~

~~system tower including the top of the blade in its vertical position. The distance between an anemometer tower and the owner's property lines shall be at least 1 ½ times the height of the tower. No part of the wind energy conversion system structure, including guy wire anchors, may extend closer than ten feet to the owner's property lines.~~

- ~~b. Maximum Height: The height of an On Site Use wind energy conversion system shall not exceed 66 feet.~~
- ~~c. Sound Pressure Level: On Site Use wind energy conversion systems shall not exceed 45 dB(A) L<sub>Max</sub> at the property line closest to the wind energy conversion system. If the ambient sound pressure level exceeds 45 dB(A), the standard shall be ambient dB(A) plus 5 dB(A). The L<sub>r,max</sub> (0.125 sec) metric shall be used for all measurements and modeling.~~
- ~~d. Construction Codes, Towers, & Interconnection Standards: On Site Use wind energy conversion systems including towers shall comply with all applicable state construction and electrical codes and local building permit requirements. On Site Use wind energy conversion systems including towers shall comply with Federal Aviation Administration requirements, the Michigan Airport Zoning Act (Public Act 23 of 1950, MCL 259.431 et seq.), the Michigan Tall Structures Act (Public Act 259 of 1959, MCL 259.481 et seq.), and local jurisdiction airport overlay zone regulations. An interconnected On Site Use wind energy conversion system shall comply with Michigan Public Service Commission and Federal Energy Regulatory Commission standards. Off-grid systems are exempt from this requirement.~~
- ~~e. Safety: An On Site Use wind energy conversion system shall have automatic braking, governing, or a feathering system to prevent uncontrolled rotation or over-speeding. All wind towers shall have lightning 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 50 feet for a wind energy conversion system employing a horizontal axis rotor. An On Site Use wind energy conversion system shall not cast shadow flicker on adjacent property.~~

### 3. Wind Site Assessment For Utility Grid Wind Energy Conversion System

Prior to construction of a Utility Grid wind energy conversion system, a wind site assessment is conducted to determine the wind speeds and the feasibility of using the site. Installation of anemometer towers also known as meteorological or "Met" towers shall be considered a Special Land Use. Prior to the installation of the tower, an application for a Special Land Use permit shall be filed with the local government that will include:

- a. applicant identification,
- b. a site plan,
- c. a copy of that portion of the applicant's lease with the land owner granting authority to install the Met tower and requiring the applicant to remove all equipment and restore the site after completion of the wind site assessment, and
- d. proof of the applicant's public liability insurance. The distance from the center of a Met tower and the property lines between the leased property and the non-leased property shall be at least the height of the Met tower. Leased property can include more than one piece of property and the requirement shall apply to the combined properties.

- e. Installation of an anemometer tower may be permitted as a temporary use that can be permitted for up to 36 months.

#### **4. Utility Grid Wind Energy Conversion Systems**

A Utility Grid wind energy conversion system is designed and built to provide electricity to the electric utility grid. Utility Grid wind energy conversion systems shall be considered a Special Land Use in the Agricultural/Rural Residential (A-R) district. Prior to the installation of a Utility Grid wind energy conversion system, an application for a Special Land Use permit shall be filed with the local government and shall include the following:

- a. Applicant Identification: Applicant name, address, and contact information.
- b. Project Description: A general description of the proposed project including a legal description of the property or properties on which the project would be located and an anticipated construction schedule.
- c. Site Plan: The site plan shall include maps showing the physical features and land uses of the project area, both before and after construction of the proposed project.

The site plan shall include

- i. the project area boundaries,
  - ii. the location, height, and dimensions of all existing and proposed structures and fencing,
  - iii. the location, grades, and dimensions of all temporary and permanent on-site and access roads from the nearest county or state maintained road,
  - iv. existing topography,
  - v. oil wells and oil distribution system,
  - vi. water bodies, waterways, wetlands, and drainage channels, and
  - vii. all new infrastructure above ground related to the project.
- d. Insurance: Proof of the applicant's public liability insurance demonstrating continuous coverage of at least Two Million Dollars (\$2,000,000.00) per wind energy conversion system.
  - e. Lease Agreements: Copies of leasing and participation documents recorded with the Bay County Register of Deeds.
  - f. Sound Pressure Level: Copy of the modeling and analysis report from a third party professional acceptable to the Township demonstrating compliance with the requirements of this Ordinance.
  - g. Certifications: Certification that applicant has complied or will comply with all applicable state and federal laws and regulations. Copies of all such permits and approvals that have been obtained or applied for at time of the application.
  - h. Visual Impact: Visual simulations of how the completed project will look from four viewable angles.

- i. Environmental Impact: Copy of the Environmental Impact analysis.
- j. Avian and Wildlife Impact: Copy of the Avian and Wildlife Impact analysis.
- k. Shadow Flicker: Copy of the Shadow Flicker analysis report from a third party professional acceptable to the Township demonstrating compliance with the requirements of this Ordinance. Shadow flicker shall not be cast upon a non-participating parcel. The model and analysis shall confirm that no shadow flicker is predicted to be cast upon any portion of a non-participating parcel.
- l. Manufacturers’ Material Safety Data Sheet(s): Documentation 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.
- m. Decommissioning: Copy of the decommissioning plan report from a third party professional acceptable to the Township demonstrating compliance with the requirements of this Ordinance.
- n. Complaint Resolution: Description of the complaint resolution process report from a third party professional acceptable to the Township demonstrating compliance with the requirements of this Ordinance.
- o. An applicant shall remit an application fee in the amount specified in the fee schedule adopted by the local government. This schedule shall be based on the cost of the application review from a third party professional acceptable to the Township and may be adjusted from time to time.
- p. The Utility Grid wind energy conversion system project shall meet the following standards and requirements:
  - i. **Setbacks:**
    - 1) The distance between a Utility Grid wind energy conversion system and the property lines of the nearest or adjacent non-participating parcel shall be ~~1,640~~2,000 feet, measured from the property line to the wind turbine tower centerline.
    - 2) The distance between a Utility Grid wind energy conversion system and the right-of-way of a public roadway shall be four times the overall height of the turbine, or ~~1,640~~2,000 feet, whichever is greater, measured from the nearest edge of the right-of-way to the wind turbine tower centerline.
    - 3) Maintenance and operations building(s), substation(s), and ancillary building(s), shall comply with the setback requirements of the underlying zoning district. Such structures shall be located at least 500 feet from non-participating parcels.
    - 4) The distance between a Utility Grid wind energy conversion system and the ordinary high water mark of the Saginaw Bay shall be at least 3 miles.
    - 5) The distance between a Utility Grid wind energy conversion system and the river’s edge of the Kawkawlin River and the North Branch Kawkawlin River shall be at least ~~1-mile~~2 miles.

- 6) A setback for a wind turbine from the property lines of adjacent participating property is not required.
- 7) The overall height of a wind turbine/ Utility Grid wind energy conversion system shall not exceed a 500-feet.
- ii. Setbacks for a MET Tower/SCADA (supervisory control and data acquisition) from adjacent property lines and the right-of-way of a public roadway shall be at least 1.5 times the overall height of the structure. Overhead transmission lines and power poles shall comply with the setback requirements applicable to public utilities.
- iii. Sound Pressure Level: Between the hours of 6:00 am and 10:00 pm, the sound pressure level generated by a Utility Grid wind energy conversion system shall not exceed 45 dB(A) / 55dB(C) measured at the property line of non-participating parcels. The  $L_{Fmax}$  (0.125-sec) metric shall be used for all measurements and modeling.

Between the hours of 10:00 pm and 6:00 am, the sound pressure level generated by a Utility Grid Wind energy conversion system shall not exceed 40 dB(A) / 40 dB(C) measured at the property line of non-participating parcels. The  $L_{Fmax}$  (0.125-sec) metric shall be used for all measurements and modeling.

No vibration in the low frequency range of 0.1 to 20 Hz generated by the Utility Grid wind energy conversion system shall be detected in the air or ground across the property lines of any participating parcel.

As part of the application and prior to installation, the applicant shall provide modeling and analysis that will confirm that the Utility Grid wind energy conversion system will not exceed the maximum permitted sound pressure levels. Modeling and analysis shall conform to IEC 61400 and ISO 9613 and shall be modeled for “worst case scenario” conditions while turbines are operating at full power. Sound modeling utilizing “Noise Reduced Operation” (NRO) is not permitted. After installation of the Utility Grid wind energy conversion system, sound pressure level measurements shall be done by a third party, qualified professional acceptable to the Township according to the procedures in the most current version of ANSI S12.18 and S12.9 Part 3 (Quantities and Procedures for Description and Measurement of Environmental Sound – Part 3: Short-term Measurements with an Observer Present), using Type 1 Sound meter, Fast Response. 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 local government within 60 days of the commercial operation of the project.

- iv. Construction Codes, Towers, and Interconnection Standards: Utility Grid wind energy conversion systems including towers shall comply with all applicable state construction and electrical codes and local building permit requirements. Utility Grid wind energy conversion systems including towers shall comply with Federal Aviation Administration requirements, the Michigan Airport Zoning Act (Public Act 23 of 1950, MCL 259.431 et seq.), the Michigan Tall Structures Act (Public Act 259 of 1959, MCL 259.481 et seq.), and local jurisdiction airport overlay zone regulations. Utility Grid wind energy conversion systems shall comply with applicable utility, Michigan Public Service Commission, and Federal Energy Regulatory Commission interconnection standards.

Utility Grid wind energy conversion systems shall also comply with Michigan Department of Environmental Quality, U.S. Army Corps of Engineers, and Bay County Drain Commission requirements.

- v. MBS International Airport: At the time of submitting an application, the applicant shall demonstrate compliance with the Tri-City Area Joint Airport Authority Ordinance.
- vi. Safety: All Utility Grid wind energy conversion systems shall be designed to prevent unauthorized access to electrical and mechanical components and shall have access doors that are kept securely locked at all times when service personnel are not present. All spent lubricants and cooling fluids shall be properly and safely removed in a timely manner from the site of the wind energy conversion system. A sign shall be posted near the tower or Operations and Maintenance Office building that will contain emergency contact information. Signage placed at the road access shall be used to warn visitors about the potential danger of falling ice. The minimum vertical blade tip clearance from grade shall be 90 feet.
- vii. Visual Impact: Utility Grid wind energy conversion system projects shall use tubular towers and all Utility Grid wind energy conversion systems in a project shall be finished in a single, non-reflective matte finished color. A project shall be constructed using wind energy conversion systems of similar design, size, operation, and appearance throughout the project. No lettering, company insignia, advertising, or graphics shall be on any part of the tower, hub, or blades. Nacelles may have lettering that exhibits the manufacturer's and/or owner's identification. The applicant shall avoid state or federal scenic areas and significant visual resources listed in the local unit of government's comprehensive plan.
- viii. Environmental Impact: The applicant shall have a third party, qualified professional conduct an analysis specific to Kawkawlin Township and the immediate surrounding area in Bay County including relevant portions of the Saginaw Bay, a part of Lake Huron, 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.

The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts. The applicant shall comply with applicable parts of the Michigan Natural Resources and Environmental Protection Act (Act 451 of 1994, MCL 324.101 et seq.) including but not limited to Part 31 Water Resources Protection (MCL 324.3101 et seq.), Part 91 Soil Erosion and Sedimentation Control (MCL 324.9101 et seq.) , Part 301 Inland Lakes and Streams (MCL 324.30101 et seq.), Part 303 Wetlands (MCL 324.30301 et seq.), Part 323 Shoreland Protection and Management (MCL 324.32301 et seq.), Part 325 Great Lakes Submerged Lands (MCL 324.32501 et seq.), and Part 353 Sand Dunes Protection and Management (MCL 324.35301 et seq.). The applicant shall be responsible for making repairs to any public roads damaged by the construction of the Utility Grid wind energy conversion system.

- ix. Avian and Wildlife Impact: The applicant shall have a third party, qualified professional conduct an analysis specific to Kawkawlin Township and the immediate surrounding area in Bay County including relevant portions of the Saginaw Bay, a part of Lake Huron



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. The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts.

Applicant shall follow U.S. Fish and Wildlife Service (USFWS) recommendations. Correspondence from the USFWS indicating engagement with USFWS Land-Based Wind Energy Guidelines and USFWS Eagle Conservation Plan Guidance shall be provided in the application. In addition, the applicant shall also provide evidence indicating compliance with applicable portions of the Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703 et seq.), Bald and Golden Protection Act (Eagle Act; 16 U.S.C. 668-668d), Endangered Species Act (ESA; 16 U.S.C. 1531 et. seq.), Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.), National Environmental Policy Act (42 U.S.C. 4321et. seq.), Clean Water Act (33 U.S.C. 1251 et.seq.), and Michigan’s Endangered Species Protection Law, as amended.

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 numbers of raptors.

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 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. Power lines should be placed underground, when feasible, to prevent avian collisions and electrocutions. All above-ground lines, transformers, or conductors should comply with the Avian Power Line Interaction Committee (APLIC, <http://www.aplic.org/>) published standards to prevent avian mortality.

- x. Signal Interference: No Utility Grid wind energy conversion system shall be installed in any location where its proximity to existing fixed broadcast, retransmission, or reception antennae for radio, television, or wireless phone or other personal communication systems would produce any interference with signal transmission or reception. No Utility Grid wind energy conversion system shall be installed in any location within the line of sight of an existing microwave communications link where operation of the wind energy conversion system is likely to produce any signal interference in the link’s operation.
- xi. Shadow Flicker: The applicant shall model and conduct an analysis on potential shadow flicker at non-participating parcels. Shadow flicker shall not be cast upon a non-participating parcel. The model and analysis shall confirm that no shadow flicker is predicted to be cast upon any portion of a non-participating parcel.
- xii. Decommissioning: The applicant shall submit a decommissioning plan. The plan shall include the anticipated life of the project, the estimated decommissioning costs in current dollars, the method of ensuring that funds will be available for decommissioning and restoration, and the anticipated manner in which the project will be



decommissioned and the site restored. In addition, the application shall demonstrate compliance with the following requirements:

- 1) Up-front payment of decommissioning costs through a surety bond issued to the Township for each turbine with a term of the life of the project plus three years. The surety bond amount for each turbine will be escalated at two times the Consumers Price Index (CPI) each year. The actual decommissioning base cost will be reviewed every three years by soliciting three new estimates.
- 2) The owner/operator of the Utility Grid wind energy conversion system and the participating landowner are responsible for the total cost of the Utility Grid wind energy conversion system decommissioning costs
- 3) Decommissioning costs are determined by using the highest written estimate from estimates obtained from at least three contractors for decommissioning cost prior to installation. The Township shall be responsible for soliciting estimates from qualified professionals. ~~In no event shall the surety bond be less than \$800,000.00 per wind turbine.~~
- 4) The estimates shall include removal of all above-ground and below-ground structures and electrical interconnecting wiring including the entire base of foundations and shall be based upon individual removal costs (not the project as a whole), without regard for any possible salvage value of the materials in question.
- 5) Wind turbine owner/operator shall notify the Township in writing regarding the sale of a Utility Grid wind energy conversion system and shall identify the new owner. All financial responsibility for decommissioning costs will continue to be in place and shall not be interrupted.
- 6) The owner/operator of the Utility Grid wind energy conversion system must notify the Township within 45 days of the sale or leasing of the wind turbine facility to another owner/operator.
- 7) The actual decommissioning will include, at a minimum, all above ground structures and the top six feet of turbine foundations. Participating property owners can determine what additional structure(s) will be removed.
- 8) Wind turbine owner/operator shall pay for all costs for consultants, inspectors, decommissioning cost estimates, legal and administrative costs from the time of the initial special use permit application through the completion of decommissioning
- 9) The turbine owner/operator shall be responsible to the Bay County Road Commission for the repair or replacement of all roads impacted by the wind turbine construction and decommissioning. A Letter of Agreement will be required as part of the special use permit application.
- 10) If a wind turbine hasn't been operational for 180 days, the Township will request that the owner/operator to initiate decommissioning of the structure. The decommissioning is required to start in 60 days with completed decommissioning accomplished in 120 days. If the owner/ doesn't respond the Township will inform the owner/operator that it will draw from the surety bond and initiate the decommissioning process. Any required decommissioning costs beyond the limit of

the surety bond will be the responsibility of the participating land owner. The Township may extend the dates if requested in writing by the owner/operator of the wind turbine, and is provided with an updated decommissioning plan.

11) In the event of any breach of the requirements of this Ordinance, the owner and/or operator of the wind energy company shall be responsible for all court costs and attorney fees incurred by the Township to enforce the terms of this Ordinance.

- xiii. Lighting: Utility Grid wind energy conversion system towers shall not be illuminated unless required by the Federal Aviation Administration (FAA). When illumination is required by the FAA, Utility Grid wind energy conversion systems shall use Aircraft Detection Lighting Systems (ADLS). All tower lighting required by the FAA shall be shielded to the maximum extent possible to reduce glare and visibility from the ground. Continuous nighttime lighting systems are not allowed.
- xiv. Safety Manual: At the time of application, the applicant shall provide an unredacted copy of the manufacturer's safety manual for each model of turbine without distribution restraints.

5. Complaint Resolution:

A complaint resolution process shall be established by the Township. The form shall be, but not limited to:

- a) Receiving and Forwarding of Complaints: A third party answering switchboard, website or equivalent, paid for by the Applicant or WECS or Testing Facility owner. The cost to maintain and support shall be funded in the amount of \$10,000.00 to be placed in escrow and be replenished at least every two (2) years by the Applicant or WECS owner. The Planning Commission shall select a complaint resolution process that is independent of the facility operator or owner and that reports to the Township first and operator second.
- b) Investigation of Complaints: Township shall initiate an investigation into a complaint within sixty (60) days utilizing escrow funds to hire the appropriate expert(s).
- c) Hearing of Complaints: Township Board shall set a hearing date within sixty (60) days of completion of Investigation of Complaints where experts, residents and/or Applicant may present information before the Township Board. Notice of hearing shall be via certified mail.
- d) Decision of Complaints: Township Board shall issue a decision and corrective actions within forty-five (45) days from Hearing of Complaints.