

## SECTION 528 – WIND ENERGY

Wind Power is permitted in the [Agricultural/Rural Residential \(A-R\)](#)~~Agricultural~~ district.

### 1. Definitions

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

**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.

**Inhabited Structure:** [Any existing structure usable for living or non-agricultural commercial purposes, which includes but is not limited to working, sleeping, eating, cooking, recreation, office, office storage, or any combination thereof. An area used only for storage incidental to a residential use, including agricultural barns, is not included in this definition.](#)

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

**LMax (LAMax or LCMa):** [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 Systems:** An On Site Use wind energy 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.](#)

**Rotor:** An element of a wind energy 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 system casting shadows ~~on the ground and stationary objects, such as a window at a dwelling.~~

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 Systems: A Utility Grid wind energy system is designed and built to provide electricity to the electric utility grid.

Wind Energy System: 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. ~~This does not include wiring to connect the wind energy system to the grid.~~

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 system.

## 2. On Site Use Wind Energy Systems

An On Site Use Wind Energy system is intended to primarily serve the needs of the consumer. An On Site Use wind energy system with a tower higher than ~~20 meters~~66 feet shall be considered a Special Land Use. On Site Use wind energy systems with no towers or towers ~~66 feet~~20 meters or less shall be a Permitted Use in all zoning classifications where structures of any sort are allowed subject to the following requirements. Anemometer towers more than ~~66 feet~~20 meters in height used to conduct a wind site assessment for possible installation of an On Site Use wind energy system shall also be a Special Land Use. Prior to the installation of an On Site Use wind energy system with a tower higher than ~~66 feet~~20 meters, 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.

a. Property Set-back: The distance between an On Site Use wind energy system and the owner's property lines shall be at least 1 ½ times the height of the wind energy 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 system structure, including guy wire anchors, may extend closer than ten feet to the owner's property lines.

~~a.~~b. Maximum Height: The height of an On Site Use wind energy system shall not exceed 75-feet.

~~b.~~c. Sound Pressure Level: On Site Use wind energy systems shall not exceed ~~55~~45 dB(A) at the property line closest to the wind energy system. This sound pressure level may be exceeded during short-term events such as utility outages and/or severe wind storms. If the ambient sound pressure level exceeds ~~55~~45 dB(A), the standard shall be ambient dB(A) plus 5 dB(A).

~~c.~~d. Construction Codes, Towers, & Interconnection Standards: On Site Use wind energy systems including towers shall comply with all applicable state construction and electrical codes and

local building permit requirements. On Site Use wind energy 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 system shall comply with Michigan Public Service Commission and Federal Energy Regulatory Commission standards. Off-grid systems are exempt from this requirement.

~~d.e.~~ Safety: An On Site Use wind energy 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 ~~20~~50 feet for a wind energy system employing a horizontal axis rotor. An On Site Use wind energy systems shall not cast shadow flicker on adjacent property.

### 3. Wind Site Assessment For Utility Grid Wind Energy Systems

Prior to construction of a Utility Grid wind energy 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.

~~d.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 Systems

A Utility Grid wind energy system is designed and built to provide electricity to the electric utility grid. Utility Grid wind energy systems shall be considered a Special Land Use. Prior to the installation of a Utility Grid wind energy 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.~~ iv. existing topography,
  - ~~v.~~ v. oil wells and oil distribution system,
  - ~~vi.~~ vi. water bodies, waterways, wetlands, and drainage channels, and
  - ~~vi.~~ vii. all new infrastructure above ground related to the project.
- d. Insurance: Proof of the applicant’s public liability insurance.
  - e. ~~Consent Documents~~Lease Agreements: Copies of ~~any written waivers from neighboring property owners~~leasing and participation documents recorded with the Bay County Register of Deeds.
  - f. Sound Pressure Level: Copy of the modeling and analysis report.
  - 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.
  - 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.
  - n. Complaint Resolution: Description of the complaint resolution process.
  - 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 and may be adjusted from time to time.
  - p. The Utility Grid wind energy system project shall meet the following standards and requirements:

- i. Overlay Zone: If the site of the proposed project is subject to an overlay zone, the proposed project shall meet or exceed the applicable standards in the overlay zone.
- ii. ~~Property Set-Back~~Setbacks:
  - 1) The distance between a Utility Grid wind energy system and the property lines of the nearest or adjacent non-participating parcel shall be 1,320 feet, measured from the property line to the wind turbine tower centerline. ~~The distance between a Utility Grid wind energy system and the property lines of adjacent non-leased properties including public rights of way shall be at least the height of the wind energy system tower including the top of the blade in its vertical position.~~
  - 2) The distance between a Utility Grid wind energy system and inhabited structure(s) located on a participating parcel shall be at least 2.0 times the overall height of the turbine.
  - 3) The distance between a Utility Grid wind energy system and the right-of-way of a public roadway shall be at least 1.5 times the overall height of the turbine or 750 feet, whichever is greater.
  - 4) 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.
  - 5) The distance between a Utility Grid wind energy system and the ordinary high water mark of the Saginaw Bay shall be at least 3 miles.
  - 6) The distance between a Utility Grid wind energy system and the river’s edge of the Kawkawlin River and the North Branch Kawkawlin River shall be at least 1 mile.
  - 7) ~~A setback for a wind turbine from the property lines of adjacent participating property is not required. Where property is leased on both sides of a public right of way, a wind energy system may be placed no closer than one rotor radius from the closest edge of the right of way. Leased property can include more than one piece of property and the requirement shall apply to the combined properties.~~
  - ii.8) The overall height of a wind turbine/ Utility Grid wind energy system shall not exceed a 500-feet.
- iii. Setbacks for a SCADA (supervisory control and data acquisition) from adjacent property lines and the right-of-way of a public roadway shall be at least 1.0 times the overall height of the structure. ~~or meteorological (Met) towers shall also comply with the property set-back requirement. The set-back shall be at least the height of the SCADA or Met tower. An Operations and Maintenance Office building, a sub-station, or ancillary equipment shall comply with any property set-back requirement that may be applicable to that type of building or equipment. Overhead transmission lines and power poles shall comply with the~~ set-back~~setback~~ requirements applicable to public utilities.
- iv. Sound Pressure Level: The sound pressure level generated by a Utility Grid wind energy system shall not exceed ~~55~~45 dB(A) measured at the property ~~lines between leased and non-leased property~~line of non-participating parcels. ~~This sound pressure level shall not~~

~~be exceeded for more than 3 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). 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 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 system will not exceed the maximum permitted sound pressure levels. 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. 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.

- v. Construction Codes, Towers, and Interconnection Standards: Utility Grid wind energy systems including towers shall comply with all applicable state construction and electrical codes and local building permit requirements. Utility Grid wind energy 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. ~~The minimum FAA lighting standards shall not be exceeded. All tower lighting required by the FAA shall be shielded to the extent possible to reduce glare and visibility from the ground. The tower shaft shall not be illuminated unless required by the FAA.~~ Utility Grid wind energy systems shall comply with applicable utility, Michigan Public Service Commission, and Federal Energy Regulatory Commission interconnection standards. Utility Grid wind energy systems shall also comply with Michigan Department of Environmental Quality, U.S. Army Corps of Engineers, and Bay County Drain Commission requirements.
- ~~v.~~vi. 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.~~vii. Safety: All Utility Grid wind energy 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 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 20-90 feet ~~for a wind energy system employing a horizontal axis rotor.~~
- ~~vii.~~viii. Visual Impact: Utility Grid wind energy system projects shall use tubular towers and all Utility Grid wind energy systems in a project shall be finished in a single, non-reflective matte finished color. A project shall be constructed using wind energy 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.~~ix. 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 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 system.

~~ix.~~x. 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 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 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. 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.

- ~~xi.~~ xi. Electromagnetic Interference: No Utility Grid wind energy 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 electromagnetic interference with signal transmission or reception unless the applicant provides a replacement signal to the affected party that will restore reception to at least the level present before operation of the wind energy system. No Utility Grid wind energy system shall be installed in any location within the line of sight of an existing microwave communications link where operation of the wind energy system is likely to produce electromagnetic interference in the link’s operation unless the interference is insignificant.
- ~~xi.~~ xii. Shadow Flicker: The applicant shall model and conduct an analysis on potential shadow flicker at occupied structures at non-participating parcels. ~~The analysis shall identify the locations 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 analysis shall identify problem areas where shadow flicker may affect the occupants of the structures and describe measures that shall be taken to eliminate or mitigate the problems.~~ Shadow flicker on non-participating parcels is not allowed. The model and analysis shall confirm that no shadow flicker is predicted to be cast upon any portion of a non-participating parcel.
- xiii. Decommissioning: The applicant shall submit a decommissioning plan. The plan shall include the anticipated life of the project, the estimated decommissioning costs ~~net of salvage value~~ in current dollars, the method of ensuring that funds will be available for decommissioning and restoration, and ~~4)~~ 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 an irrevocable letter of credit (or equivalent) issued to the Township for each turbine with a term of the life of the wind turbine plus three years. The irrevocable letter of credit (or equivalent) 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 system and the participating landowner are responsible for the total cost of the Utility Grid wind energy system decommissioning costs
  - 3) Decommissioning costs are determined by averaging the written cost from at least three contractors for decommissioning cost prior to installation. The Township shall be responsible for soliciting estimates from qualified professionals.
  - 4) The estimates shall include removal of all above-ground and below-ground structures and electrical interconnecting wiring including the entire base of foundations.
  - 5) Wind turbine owner/operator shall notify the Township in writing regarding the sale of a Utility Grid wind energy 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 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 four 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 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 irrevocable line of credit and initiate the decommissioning process. Any required decommissioning costs beyond the limit of the irrevocable letter of credit 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.
- xiv. Lighting: Utility Grid wind energy 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 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.

~~xii.~~xv. 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: The applicant shall develop a process 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~~The~~ applicant shall maintain and make available to nearby residents a telephone number where a project representative can be reached during normal business hours. The applicant shall submit quarterly summaries to the Planning Commission detailing all submitted complaints for the period, including the actions taken to address and resolve the complaint(s).