

EXCERPT FROM EMMET COUNTY ZONING ORDINANCE

SECTION 2102-16 WIND ENERGY SYSTEMS (WES'S)

16. WIND ENERGY SYSTEMS (WES'S)

A. Definitions – For purposes of this section, the following definitions shall apply:

ANEMOMETER TOWER or MET means a freestanding meteorological tower containing instrumentation such as anemometers that is designed to provide present moment wind data.

AMBIENT means the sound pressure level exceeded 90% of the time (L90).

dB(A) means the sound pressure level in decibels. It refers to the “a” weighted scale defined by American National Standards Institute. A method for weighting the frequency spectrum to mimic the human ear.

DECIBEL means the unit of measure used to express the magnitude of sound pressure and sound intensity.

LEASE UNIT BOUNDARY means boundary around property leased or otherwise encumbered for purposes of a Wind Energy System, including adjacent parcels to the parcel on which the Wind Energy System tower or equipment is located. For purposes of setback, the Lease Unit Boundary shall not cross a road right-of-way.

ON-SITE WIND ENERGY SYSTEM means a land use for generating electric power from wind and is an accessory use that is intended to primarily serve the needs of the consumer at that site.

ROTOR means 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.

SHADOW FLICKER means 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 but not limited to a window at a dwelling.

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.

SOUND PRESSURE LEVEL means the sound pressure mapped to a logarithmic scale and reported in decibels (dB).

UTILITY GRID WIND ENERGY SYSTEM means a land use designed and built to provide electricity to the electric utility grid by use of wind and includes accessory uses

such as but not limited to an ANEMOMETER TOWER, electric substation, and related appurtenances.

WIND ENERGY SYSTEM means a land use for generating power by use of wind; 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. See also ON-SITE WIND ENERGY SYSTEM and UTILITY GRID WIND ENERGY SYSTEM.

WIND SITE ASSESSMENT SYSTEM (WSAS) means a land use using a MET or ANEMOMETER TOWER to determine the wind speeds at a specific site and the feasibility of using that site for construction of a wind energy system.

B. On-site Wind Energy Systems (WESs or WES singular) Under Sixty Feet

On-site WESs may be located and permitted in all zoning districts except SR-1 and SR-2 Scenic Resource as an accessory use only if all of the following standards are met:

1. Zoning Administrator Review. The Zoning Administrator shall review all applications for on-site WESs. WESs that meet all of the following standards of Section 2102, Paragraph 17, sub-paragraph B. 2 thru 6 may be approved by the Zoning Administrator.
2. Minimum Site Area. The minimum site area for an on-site WES shall be as necessary to meet required setbacks and other applicable standards of this ordinance.
3. Setbacks. All on-site WESs shall be setback a distance equal to one time the height of the WES from the property line of the property on which the WES is located.
4. Maximum height. The maximum height of an on-site WES shall not exceed sixty (60) feet from the ground to the top of the blade or tower whichever is greater.
5. On-site WESs. On-site WESs are intended to primarily serve the needs of the consumer on the site of the WES and is designed primarily to serve the needs of a home, farm, or business. If the total height exceeds sixty (60) feet, a Special Use Permit is required and must follow the procedures in Section 2102-17-C of this zoning ordinance.
6. Maximum Noise Levels. Any proposed WES shall produce sound pressure levels that are no more than thirty-five (35) decibels as measured on the dB(A) scale at the property lines of the site in question. A manufacturer's specification sheet or similar data shall be provided documenting decibel levels.

C. On-site Wind Energy Systems over Sixty Feet and Wind Site Assessment Systems

On-site WESs over sixty feet (60') and WSASs shall require a Special Use Permit and may be located and permitted in all zoning districts except SR-1 and SR-2 Scenic Resource only if all of the following standards are met:

1. Planning Commission Review. The Planning Commission shall review all applications for WESs over sixty feet (60') and/or WSASs. Notification of the review shall be sent to all property owners within 300' of the property boundary where the WES and/or WSAS is proposed.
2. Minimum Site Area. The minimum site area for a WES shall be as necessary to meet required setbacks and any other applicable standards of this ordinance.
3. Setbacks. All WESs shall be set back a distance equal to one time the height of the WES from the property line of the property on which the WES is located.
4. Maximum Height. The maximum height for on-site WESs or WSASs shall be one hundred fifteen feet (115) feet in residential districts or one hundred ninety nine (199) feet in non-residential districts measured from the ground to the top of the blade or tower, whichever is greater. The Planning Commission, following a duly noted Public Hearing and notification of every land owner within 300' of the parcel where the on-site WES or WSAS will be located, may approve an increased height for on-site WESs and WSASs, if the following conditions are met:
 - a. The increased height will result in the preservation of a substantial stand of trees, existing land forms or structures that would otherwise be removed to increase wind velocity and/or reduce turbulence.
 - b. The increased height is the minimum necessary to achieve a reasonable rate of return on the operation of the WES given the documented wind speeds and other site conditions. A reasonable rate of return is not equivalent to maximizing economic return to the operator. The Planning Commission shall not grant the increased height if economic return is not met due to the use of inefficient equipment that does not utilize current commercial technologies.
 - c. The increased height will not result in increased intensity of lighting on the tower due to FAA requirements.
5. Minimum Rotor Wind Vane or Blade Clearance. The lowest point of the arc created by rotating wind vanes or blades on a WES shall be no less than sixteen (16) feet. Additional clearance may be required by the Planning Commission if potential safety concerns are identified.
6. Maximum Noise Levels. Any proposed WES shall produce sound pressure levels that are no more than thirty-five (35) decibels as measured on the dB(A) scale at the property lines of the site in question. A noise report shall be submitted with any application for a WES.
7. Maximum Vibrations. Any proposed WES shall not produce vibrations humanly perceptible beyond the property on which it is located.
8. Shadow Flicker. The facility shall be designed such that shadow flicker will not be visible on, or in, an existing off-site dwelling. Shadow flicker expected to be visible

on a roadway or a portion of a residential parcel may be acceptable under the following circumstances:

- 1) The flicker will not exceed 30 hours per year; and
 - 2) The flicker will not be visible within 100 feet from a structure designed for human occupancy; and
 - 3) The flicker will not be visible on a county primary road, or state or federal highway.
9. Transmission Lines. The on-site electrical transmission lines connecting the WES to the public utility electricity distribution system shall be located underground.
10. Interference with Commercial/Residential Reception. WESs shall be constructed and operated so that they do not interfere with television, microwave, navigational, or radio reception.
11. Landscaping. Existing natural land forms on the site which effectively screen the base of the WES from adjacent property used for residential purposes shall be preserved to the maximum extent possible.
12. State or Federal Requirements. Any proposed WES shall meet or exceed any standards and regulations of the FAA, the Michigan Public Service Commission, National Electric Safety Code, and any other agency of the state or federal government with the authority to regulate WESs or other tall structures in effect at the time the permit is approved.
13. Safety. All WESs shall have automatic braking, governing, or a feathering system to prevent uncontrolled rotation or over speeding. All WESs shall have lightning protection.
14. Visual Impact. All WESs shall meet the following requirements:
- a. Each WES shall either be white or maintain a galvanized steel finish.
 - b. Each WES shall be sited on the property in a location that reduces to the maximum extent possible any adverse impacts on significant view corridors from adjacent properties, while at the same time maintaining contact with economically viable wind resources.
 - c. Each WES, except for anemometer towers, shall be monopole or monotube style construction (as distinguished from a lattice-style tower) and shall not utilize guy wires. Anemometer towers may, for up to two (2) years, be lattice type towers and may use guy wires.
 - d. Each WES shall be designed to aesthetically complement the color and design of any existing WES within a one-mile radius
15. 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 Emmet County from acting on a complaint.

16. Unintended/misrepresented nuisances: Following construction and operation of the WES, should shadow flicker, noise levels, or vibrations exceed those projected by the developer, the WES shall not be operated until such nuisance is eliminated.

D. Utility Grid Wind Energy System(s)

Utility Grid WESs applications and projects shall comply with the following standards:

1. Planning Commission Review. The Planning Commission shall review all applications for Utility Grid WES(s). Notification of the review shall be sent to all property owners within 300' of the property boundary where the Utility Grid WES is proposed.
2. Minimum Site Area and Location. The minimum site area for a WES shall be as necessary to meet required setbacks and any other applicable standards of this ordinance. Utility Grid WESs may be permitted in the FF-1, FF-2 Farm and Forest, or FR Forest Resource zoning districts.
3. Setbacks. All Utility Grid WESs shall be set back a distance equal to one time the height of the WES from the property line of the property on which the WES is located or from the lease unit boundary, including public rights-of-way.
4. Height. The minimum vertical blade tip clearance from grade shall be forty (40) feet for a WES employing a horizontal axis rotor. The maximum height for Utility Grid WESs and WSASs is four hundred (400) feet.
5. Maximum Noise Levels. Any proposed Utility Grid WES shall produce sound pressure levels that are no more than thirty-five (35) decibels as measured on the dB(A) scale at the property lines of the site in question. A noise report shall be submitted with any application for a WES. A noise report shall be prepared by a qualified professional and shall include the following, at a minimum:
 - a. A description and map of the project's noise producing features, including the range of noise levels expected, and the basis of the expectation.
 - b. Description and map of the noise sensitive environment, including any sensitive noise receptors, i.e. residences, hospitals, libraries, schools, places of worship, parks, areas with outdoor workers and other facilities where quiet is important or where noise could be a nuisance within two (2) miles of the proposed facility.
 - c. A survey and report prepared by a qualified engineer that analyzes the preexisting ambient noise (including seasonal variation) and the affected sensitive receptors located within two (2) miles of the proposed project site. Potential sensitive receptors at relatively less windy or quieter locations than the project shall be emphasized and any problem areas identified;

- d. A description and map of the cumulative noise impacts with any problem areas identified; and
 - e. A description of the project's proposed noise control features and specific measures proposed to mitigate noise impacts for sensitive receptors as identified above to a level of insignificance.
6. Maximum Vibrations. Any proposed Utility Grid WES shall not produce vibrations humanly perceptible beyond the property on which it is located.
7. Shadow Flicker: The applicant shall provide a shadow flicker model for any proposed WES. The model shall:
 - a. Map and describe within a one-mile radius of the proposed project site the topography, existing residences, locations of other structures, wind speeds and directions, existing vegetation and roadways;
 - b. The model shall represent the most probable scenarios of wind constancy, sunshine constancy, wind directions and speeds, moon positions and reflection directions;
 - c. Calculate the locations of shadow flicker caused by the proposed project and the expected durations of the flicker at these locations;
 - d. Calculate the total number of hours per year of flicker at all locations;
 - e. Identify problem areas where shadow flicker will interfere with existing or future residences and roadways and describe proposed measures to mitigate these problems, including, but not limited to, a change in site location of the facility, a change in the operation of the facility, or grading or landscaping mitigation measures.
 - f. The facility shall be designed such that shadow flicker will not be visible on, or in, any existing dwelling. Shadow flicker expected to be visible on a roadway or a portion of a residential parcel may be acceptable under the following circumstances:
 - 1) The flicker will not exceed 30 hours per year; and
 - 2) The flicker will not be visible within 100 feet from a structure designed for human occupancy; and
 - 3) The flicker will not be visible on a county primary road, or state or federal highway.
8. Transmission Lines. The on-site electrical transmission lines connecting the Utility Grid WES to the public utility electricity distribution system shall be located underground.
9. Interference with Commercial/Residential Reception. Utility Grid WESs shall be constructed and operated so that they do not interfere with television, microwave, navigational, or radio reception.
10. Landscaping. Existing natural land forms on the site which effectively screen the base of the WES from adjacent property used for residential purposes shall be preserved to the maximum extent possible.

11. State or Federal Requirements. Any proposed Utility Grid WES shall meet or exceed any standards and regulations of the FAA, the Michigan Public Service Commission, National Electric Safety Code, and any other agency of the state or federal government with the authority to regulate Utility Grid WESs or other tall structures in effect at the time the permit is approved. Certification that the applicant has complied with or will comply with all applicable state and federal laws and regulations including copies of all such permits and approvals that have been obtained or applied for at time of the application shall be required.
12. Safety All WESs shall have automatic braking, governing, or a feathering system to prevent uncontrolled rotation or over speeding. All WESs shall have lightning protection.
13. Visual Impact. All Utility Grid WESs shall meet the following requirements:
 - a. Each Utility Grid WES shall either be white or maintain a galvanized steel finish.
 - b. Each Utility Grid WES shall be sited on the property in a location that reduces to the maximum extent possible any adverse impacts on significant view corridors from adjacent properties, while at the same time maintaining contact with economically viable wind resources.
 - c. Each Utility Grid WES shall be monopole or monotube style construction (as distinguished from a lattice-style tower) and shall not utilize guy wires.
 - d. Each Utility Grid WES shall be designed to aesthetically complement the color and design of any existing WES within a one-mile radius.
 - e. Visual simulations of how the completed project will look from a minimum of four viewable angles shall be provided by the applicant.
14. Soil Conditions. A proposal for any Utility Grid WES tower shall be accompanied by a report of the soils present on the site based on soil borings, and a description of the proposed foundation size, materials, and depth.
15. Sign. A sign of no more than four (4) square feet in area displaying an address and telephone number for emergency calls and informational inquiries shall be posted at the WES site. The emergency telephone number shall allow a caller to contact a responsible individual to address emergencies at any time during or after regular business hours, on weekends or holidays. No Utility Grid WES tower or anemometer tower or site shall include any advertising sign.
16. Lighting. WESs shall not be artificially lighted, unless required by the FAA or other applicable governmental authority. If lighting is required, the lighting alternatives and design chosen:
 - a. Shall be the lowest intensity allowable under FAA regulations.
 - b. Shall not be strobe lighting or other intermittent white lighting fixtures, unless expressly required by the FAA. Such intermittent lighting shall be alternated with steady red lights at night if acceptable to the FAA.
 - c. May be a red top light that does not pulsate or blink.

- d. All tower lighting required by the FAA shall be shielded to the extent possible and acceptable to the FAA to reduce glare and visibility from the ground.
- e. The Planning Commission may require design changes in order to lessen the visual clutter associated with the site location of multiple wind turbines with non-complementary, inconsistent design within sight of each other.

17. Removal of Abandoned or Unsafe WESs

Any WES that is not operated for a continuous period of twelve (12) months shall be considered abandoned. Any WES found to be unsafe or not in compliance with the standards related to noise or shadow flicker shall be found to be in violation of the permit. The owner of any WES that is abandoned or in violation of the permit shall remove the same within twelve (12) months of receipt of notice from the County of such abandonment or violation. In addition to removing the WES or anemometer tower, the owner shall restore the site of the WES to its original condition prior to location of the WES, subject to reasonable wear and tear. Any foundation associated with a WES shall be removed to grade. Failure to remove an abandoned WES within the twelve (12) month period provided in this subsection shall be grounds for the County to remove the WES at the owner's expense. The Planning Commission shall require the applicant to provide a performance guarantee equal to the reasonable cost of removing the WES and attendant accessory structures as a condition of a permit given pursuant to this section.

18. 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 Emmet County from acting on a complaint.

19. Unintended/misrepresented nuisances: Following construction and operation of the WES, should shadow flicker, noise levels, or vibrations exceed those projected by the developer, the WES shall not be operated until such nuisance is eliminated.

20. Site Plan Review: In addition to the Special Use Permit standards and review, a site plan and a site plan review, meeting the requirements of Section 2405 of the Emmet County Zoning Ordinance, shall be required.

21. Additional requirements for Utility Grid WESs:

The application shall also include:

- a. A copy of an Environment Analysis by a third party qualified 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 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.

- b. A copy of the 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, 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.

22. Maps shall be presented showing all of the following:
 - a. The physical features and land uses of the project area, both before and after construction of the proposed project;
 - b. Project area boundaries;
 - c. The location, height, dimensions, color, and materials of all existing and proposed structures and fencing;
 - d. The location, grades, and dimensions of all temporary and permanent on-site and access roads from the nearest county or state maintained road; and
 - e. All new infrastructure above ground related to the project.

23. Insurance: Proof of the applicant's public liability insurance shall be provided prior to issuance of a Zoning Permit. This insurance shall be maintained throughout the life of the project and proof provided upon the County's request.

24. Technical assistance: For wind energy systems and/or meteorological data regarded to be complex the Planning Commission may require additional studies, information, and/or review. The applicant shall be required to reimburse the actual cost of any such independent review prior to a decision by the Planning Commission.