IOSCO TOWNSHIP ZONING

ARTICLE 16

WIND ENERGY CONVERSION SYSTEMS

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Article 16

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Section 16.1 WIND ENERGY CONVERSION SYSTEMS

Purpose and Intent: This Section establishes general guidelines and standards for the use of On Site Use WECSs, anemometers and related devices and structures. This Section is intended to be used as part of the Zoning Ordinance, to further the conservation and preservation of the Township's natural and undeveloped areas and preservation of scenic resources and to minimize adverse impacts of WECSs on neighbors and nearby property owners and to limit such systems to those specific locations in the Township which are most likely to provide for the needs of one's home, home business and/or farm.

1. Further, the intended purpose is to
    a. Allow the use of WECS towers and anemometers of limited height.
    b. Protect residential areas from any potentially adverse visual or noise impacts of WECSs or related devices and structures.
    c. Provide for a land use that will provide an energy source with low associated environmental impacts.
    d. Provide for the removal of abandoned or noncompliant wind energy turbine generator towers, anemometer towers, and/or related devices or structures.

Section 16.2 Wind Energy Definitions

Ambient Noise: The amount of background noise at a given location prior to the installation of a WECS which may include, but is not limited to, traffic, machinery, lawnmowers, general human activity and the interaction of the wind with the landscape. Ambient Sound Level is measured on the Decibel – dB(A) – weighted scale as defined by the American National Standards Institute (ANSI). Such noise levels shall be measured on the property line or on the adjacent property, which is receiving the noise.

Anemometer: An instrument for measuring wind speed. This definition includes an anemograph.

Anemometer 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 WECS.

ANSI: The American National Standards Institute.

dB(A): dB(A) means the sound pressure level in decibels measured on the "A" scale of a standard sound level meter having characteristics defined by the American National Standards Institute, Publication ANSI s1.4-1971.

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

Horizontal axis WECS: A WECS which converts wind energy into electricity through the use of a wind turbine generator with a horizontal axis of rotation. This type of WECS is directional in that it achieves optimal energy production while pointed into or away from the direction of the wind.

Hub Height: The distance measured from the ground level to the center of the turbine hub.

IEC: The International Electrotechnical Commission.

ISO: The International Organization for Standardization.

Lease unit boundary: The boundary around property leased for purposes of a WECS, including adjacent parcels to the parcel on which the WECS tower or equipment is located. For purposes of setback, the lease unit boundary shall not cross road right-of-ways.

On site WECS: A land use for generating electric power from wind that is accessory to a legal principal use and intended to primarily serve the needs of the electric power consumer at that site.

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

Shadow flicker: Alternating changes in light intensity caused by the moving blades of a WECS casting shadows on the ground and stationary objects, such as but not limited to 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).

Survival Wind Speed: The maximum wind speed, as designated by the WECS manufacturer, at which a WECS in unattended operation (not necessarily producing power) is designed to survive without damage to any structural equipment or loss of the ability to function normally.

Tower height: The vertical distance as measured from the ground level of the base of a wind energy conversion system tower to the center of the turbine.

Utility grid WECS: The use of wind power to generate electric power for the principal purpose of supplying electric power to the energy grid, with little or no on-site use of the generated power.

Vertical axis WECS: A WECS which converts wind energy into electricity through the use of a wind turbine generator with a vertical axis of rotation. This type of WECS is not directional in that it does not need to be pointed into or away from the direction of the wind in order to achieve optimal energy production.

Wind energy conversion system (WECS): A land use for generating power by use of wind; utilizing wind turbine generators, including the turbine, blades, and tower as well as related electrical equipment. This does not include wiring to connect the WECS to the electric utility grid. See also on-site WECS and utility grid WECS.

Wind Energy Facility: A power generating facility consisting of one or more wind turbines under common ownership or operation control, and includes substations, MET towers, cables/wires, and other buildings accessory to such facility, whose main purpose is to supply electricity to off-site customers.

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 WECS.

Wind Turbine Generator: A wind energy conversion system which converts wind energy into power. Includes a tower, pylon, or other structure, including all accessory facilities, upon which any, all, or some combination of the following are mounted:

1. A wind vane, blade, or series of wind vanes or blades, or other devices mounted on a rotor for the purpose of converting wind into electrical or mechanical energy.
2. A shaft, gear, belt, or coupling device used to connect the rotor to a generator, alternator, or other electrical or mechanical energy-producing device.
3. A generator, alternator, or other device used to convert the energy created by the rotation of the rotor into electrical or mechanical energy.

Wind Turbine Generator Total Height: The distance between the ground and the highest point of the wind turbine generator including the blade or rotor wind vanes at their highest position.

Section 16.3 Small On site Wind Energy Conversion Systems

16.3.1 All small On-Site WECS shall be an accessory use. On-site WECS will be rated capable of 30 kilowatts or less.

16.3.2 Small WECS shall meet the following standards:

A. Single WECS for On-site Service Only: Single WECS applications of wind energy conversion system, including WECS Testing Facilities, to service the energy needs of only the property where the structure is located may be approved in any zoning district, provided the property upon which the system is to be located is at least three and one-half (3-1/2) acres in size.
B. The tower shall not exceed a height of 80 feet.
C. The blade diameter (tip to tip) shall not exceed 50 feet. Blade Clearance: There shall be a minimum vertical blade tip clearance from the ground of twenty (20) feet.
D. The height of the overall WECS (with the blade in the vertical position) shall not exceed 100 feet above ground level (at normal grade).
E. The distance of the structure from all property lines shall be at least one (1) time the WECS height.
F. Color: WECS shall be painted a non-obtrusive (light color such as white, beige or light gray) color that is non-reflective. No striping or color shall be visible on the blades or tower.
G. Small WECS shall not cause a sound pressure level in excess of fifty-five (55) dB(A) or in excess of five (5) dBA above the background noise, whichever is greater, as measured at the nearest property line. This level may be exceeded during short-term events such as utility outages and severe wind storms.
H. Construction Codes, Towers, & Interconnection Standards: On-site use WECS, including towers shall comply with all applicable state construction and electrical codes and local building permit requirements. On-site use WECS 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.).
I. Connection to Energy Grid: An interconnected on-site use WECS shall comply with Michigan Public Service Commission and Federal Energy Regulatory Commission standards. Off-grid systems are exempt from this requirement.
J. Safety: An on-site use WECS 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 guide wires, the wires shall be clearly visible to a height of at least eight (8) feet above the guide wire anchors.
K. Vibration: Small WECSs shall not cause vibrations through the ground which are perceptible beyond the property line of the parcel on which it is located.

L. Reception Interference: Small WECSs shall not cause interference with television, microwave, navigational or radio reception to neighboring areas.
M. Shadow Flicker: Small WECSs shall not cause shadow flicker upon any structure on a neighboring property.
N. Potential Ice Throw: The potential ice throw or ice shedding for the wind turbine generator shall not cross the property lines of the site nor impinge on any right-of-way or overhead utility line.
O. Accessibility: Towers shall be designed and constructed in such a manner that integrated tower climbing devices are a minimum of twelve (12) feet above the base of the tower and only accessible by using a separate climbing device.
P. Non-commercial on site WECS can be of either monopole or lattice design.
Q. **Labeling of WECS Tower Subsystem -** The following information shall be provided on labels attached to the tower in a visible, easily read, and easily accessible location:
    (1) Equipment weight of the tower subsystem;
    (2) Manufacturer's name and address;
    (3) Model number;
    (4) Serial number;
    (5) The survival wind speed in miles per hour and meters per second;
    (6) Name of installer;
    (7) Name of person responsible for maintenance;
    (8) Emergency telephone number in force for (6) and (7) above.

R. **Labeling of WECS Power Conversion Subsystem**: The following information shall be provided on labels attached to the WECS power conversion subsystem in a visible, easily read, and easily accessible location:
    (1) Maximum power input (KW), rated voltage (volts) and rated current output (amperes) of the generator, alternator, etc.;
    (2) Manufacturer's name and address;
    (3) Model number;
    (4) Serial number;
    (5) Emergency and normal shutdown procedures;
    (6) Underwriters label, where appropriate.

S. **Non-essential Services**: Any anemometer tower or WECS shall not be considered as essential services, public utilities or private utilities.
T. **Other Regulations**: On-site use WECSs shall comply with all applicable State construction and electrical codes, Federal Aviation Administration requirements, Michigan Aeronautics Commission requirements, the Michigan Tall Structures Act (P.A. 259 of 1959, as amended), and the Michigan Public Service Commission and Federal Energy Regulatory

Section 16.4 Utility Grid WECS, on-site WECS and anemometer Towers Rated Over Thirty (30) kW capacity.

16.4.1 Locations Where System Allowed: Utility grid WECS and on-site WECS rated over thirty (30) kW capacity shall be permitted in all the districts with special land use approval by the Township Board in accordance with Article 19.

16.4.2 Clearance above Ground: The minimum blade or rotor clearance for a horizontal axis tower mounted WECS will be at least twenty (20) feet above ground or above any outdoor areas intended for human use. The minimum rotor clearance for a vertical axis WECS installed on-grade will be at least ten (10) feet above ground.

16.4.3 System attached to a Structure or Roof: A WECS may be attached to an existing structure so that the appearance of the structure will not be materially altered or changed. Roof-mounted equipment shall not exceed a height of twenty (20) feet above the surrounding roof surface. The equipment shall not be attached to a portion of the roof that is highly visible.

16.4.4 Height: No utility grid WECS or on-site use WECS shall exceed one hundred fifty(150) feet in height.

16.4.5 Property Setback: The minimum distance between a WECS and the property lines shall be equal to the height of the WECS tower including the top of the blade in its vertical position. The minimum distance between an anemometer tower and the owner's property lines shall be equal to the height of the tower. No part of the WECS structure, including guide wire anchors, may extend closer than ten (10) feet to the owner's property lines, or the distance of the required setback in the respective zoning district, whichever results in the greater setback. Any operations and maintenance office building, a sub-station, or ancillary equipment shall comply with any property set-back requirement of the respective zoning district. Where a WECS is located in the front yard, it shall be setback two hundred (200) feet from the front lot line.

16.4.6 Location of Transmission Lines and Power Poles: Overhead transmission lines and power poles shall comply with the setback and placement requirements applicable to public utilities.

16.4.7 Color: WECS shall be painted a non-obtrusive (light color such as white, beige or light gray) color that is non-reflective. No striping or color shall be visible on the blades or tower.

16.4.8 Sound Pressure Level: WECS shall not cause a sound pressure level in excess of fifty-five (55) dB(A) or in excess of five (5) dBA above the background noise, whichever is greater, as measured at the nearest property line. This level may be exceeded during short-term events such as utility outages and severe wind storms.

16.4.9 Safety Requirements: WECS 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 WECS. 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.

16.4.10 Accessibility: Towers shall be designed and constructed in such a manner that integrated tower climbing devices are a minimum of twelve (12) feet above the base of the tower and only accessible by using a separate climbing device.

16.4.11 Performance Security: Performance guarantee, pursuant to Section 21.03 of this Ordinance, shall be provided for the applicant making repairs to public roads damaged by the construction of the WECS.

16.4.12 Utilities: Power lines shall be placed underground. If the WECS is connected to a public utility system for net metering purposes, it shall meet the requirements for interconnection and operation as set forth in the public utility's current service regulations that meet federal, state and industry standards applicable to wind power generation facilities. Any such connection shall be inspected and approved by the appropriate utility company. Utility grid WECS shall comply with applicable utility, Michigan Public Service Commission and Federal Energy Regulatory Commission interconnection standards.

16.4.13 Permits: WECS shall comply with all applicable state construction and electrical codes and County building permit requirements.

16.4.14 Aviation Hazard: WECS shall comply with Federal Aviation Administration (FAA) requirements, the Michigan Airport Zoning Act (Public Act 23 of 1950 as amended, M.C.L. 259.431 et seq.), and the Michigan Tall Structures Act (Public Act 259 of 1959 as amended, M.C.L. 259.481 et seq.). 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.

Section 16.5 Standards for Utility Grid WECS only.

16.5.1 Visual Impact: Utility grid WECS projects shall use tubular towers and all utility grid WECS in a project shall be finished in a single, non-reflective matte finished color. A project shall be constructed using WECS 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.

16.5.2 Decommissioning: A decommissioning plan shall be provided that indicates

A. the anticipated life of the project,
B. the estimated decommissioning costs 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 and
E. performance guarantee, pursuant to Section 21.03 of this Ordinance.

16.5.3 Electromagnetic Interference: Utility grid WECS shall not 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 WECS. No utility grid WECS shall be installed in any location within the line of sight of an existing microwave communications link where operation of the WECS is likely to produce electromagnetic interference in the link's operation unless the interference is insignificant.

Section 16.6 Site Plan: Additional Site plan requirements for utility grid WECS and on-site WECS with a capacity rating over thirty (30) kW.

16.6.1 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.

16.6.2 Proof of the applicant's public liability insurance for at least one million dollars ($1,000,000) for the project to cover the operator, the landowner and the Township.

16.6.3 A copy of that portion of all the applicant's lease(s) with the land owner(s) granting authority to install the anemometer tower and/or utility grid WECS; 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.

16.6.4 The phases, or parts of construction, with a construction schedule.

16.6.5 The project area boundaries.

16.6.6 The location of all dwellings within three hundred (300) feet of the system.

16.6.7 The location of all guide wires or other support devices.

16.6.8 The location, height, and dimensions of all existing and proposed structures and fencing.

16.6.9 The location, grades, and dimensions of all temporary and permanent on-site and access roads from the nearest county or state maintained road.

16.6.10 All new above ground infrastructure related to the project.

16.6.11 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.

16.6.12 For utility grid WECS only:

A. A copy of a noise modeling and analysis report and the site plan shall show locations of equipment identified as a source of noise. Equipment shall be placed so that the WECS 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 WECS, 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 Iosco Township within sixty (60) days of the commercial operation of the project.

B. 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 and conducted adjacent to property lines or the lease unit boundaries.

C. A copy of an environment analysis by a 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 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.

D. A copy of an avian and wildlife impact analysis by a 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 numbers of raptor.

1. 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

2. The analysis shall indicate whether a post construction wildlife study will be conducted and, if not, the reasons why such a study does not need to be conducted.

3. A copy of a shadow flicker analysis at occupied structures within one thousand (1,000) feet of the proposed system to 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 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 problems.

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

1. The anticipated life of the project.
2. The estimated decommissioning costs net of salvage value in current dollars.
3. The method of ensuring that funds will be available for decommissioning and restoration.
4. The anticipated manner in which the project will be decommissioned and the site restored.

F. 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.