

**OTSEGO COUNTY**  
**Zoning Ordinance Amendment # \_\_\_\_\_**

AN ORDINANCE TO AMEND THE OTSEGO COUNTY ZONING ORDINANCE TO PROVIDE WIND GENERATION AND ANEMOMETER TOWERS AS USES BY SPECIAL USE PERMIT IN THE COUNTY AND TO PROVIDE REVIEW PROCEDURES AND STANDARDS FOR WIND GENERATION AND ANEMOMETER APPROVAL

THE COUNTY OF OTSEGO, STATE OF MICHIGAN ORDAINS:

**Section 1. Amendment of Article \_\_\_\_\_.**

Article 2 of the Otsego County Zoning Ordinance is hereby amended to add the following definitions in their appropriate alphabetic locations, which definitions shall read in their entirety as follows:

**ANEMOMETER**

An instrument for measuring and recording the speed of the wind.

**TEMPORARY ANEMOMETER TOWER**

A structure, including all accessory facilities, temporarily erected, on which an anemometer is mounted for the purposes of documenting whether a site has wind resources sufficient for the operation of wind generation.

**PRIVATE WIND TURBINE GENERATION**

WTG used primarily to generate electricity or produce mechanical energy for use on the property where located with a wind generation tower height of 100 feet or less, AND GENERATE 25kw OR LESS OF ELECTRICITY. Sale of electric power via Net Metering is allowed.

**WIND TURBINE GENERATION (WTG) OR UTILITY WTG**

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 GENERATION TOWER HEIGHT**

1. Horizontal Axis Wind Turbine Rotors: The distance between the ground and the highest point on the arc of the rotor wind blades mounted on a horizontal axis wind turbine generator.
2. Vertical Axis Wind Turbine: The distance between the ground and the highest point of the wind turbine generator.

## **Section 2. Amendment of Article 2.**

The definition of ESSENTIAL SERVICES within Article 2 of the Otsego County Zoning Ordinance is hereby amended to read in its entirety as follows:

### **ESSENTIAL SERVICES**

The erection, construction, alteration or maintenance of underground, surface, or overhead gas, electrical, steam or water transmission or distribution systems; collection, communication, supply or disposal systems, including mains, drains, sewers, pipes, conduits, wires, cables, fire alarm boxes, traffic signals, hydrants, towers, poles, electrical substations, gas regulator stations, and other similar equipment, and applicable accessories reasonably necessary for the furnishing of adequate service by such public utilities or municipal departments or commissions or for the public health, safety, and general welfare. Provided, however, that telecommunication towers, alternative tower structures, antennas, **WTG** and anemometer towers shall not be considered essential services.

## **Section 8. Amendment of Article 18.**

Article 18 of the Otsego County Zoning Ordinance is hereby amended to add a new Section 18. 47, which shall read in its entirety as follows:

### **SECTION 18. 47. WIND GENERATION**

#### **18.xx.1 Purpose.**

The purpose of this section is to establish REQUIREMENTS for the location of Wind Turbine Generators (WTG), commonly known as wind turbines or windmills, and anemometer towers. The county recognizes that it is in the public interest to permit the location of wind turbine generators within the county. The county also recognizes the need to protect the scenic beauty of Otsego County from unnecessary and unreasonable visual interference. As such, this ordinance seeks to:

- a. REGULATE the development of renewable energy resources in a prudent manner.
- b. Protect ALL AREAS OF THE COUNTY from any potential adverse impacts of WTG and anemometer towers;
- c. REGULATE the location of WTG and anemometer towers in THE COUNTY;
- d. PROTECT the public health, safety AND WELFARE
- e. Avoid potential damage to adjacent property from the failure of WTG and anemometer towers.

#### **18.XX.1(A) Exceptions**

Wind Turbine Generator regulations provided in this Section 18.47 shall not apply to Private WTGs 35 feet high or less with a rotor blade clearance above ground level a minimum of 15' and with a rotor blade not to exceed 20 feet in diameter. If the afore mentioned WTG is not attached to the principal dwelling or use. The WTG shall be regulated as an accessory structure in accordance with Section 18.1 of the Zoning Ordinance.

18.xx.2 **Application Requirements.**

In addition to the application requirements of Article 16 of this ordinance, an application for a special use permit for A PUBLIC OR PRIVATE WTG or an anemometer tower shall include all of the following information, unless expressly indicated otherwise:

- a. A site plan meeting all of the requirements of Article 20 of this Ordinance.
- b. A detailed analysis by a professional engineer, licensed in the State of Michigan, describing the specific WTG structure(s) or anemometer tower proposed and all phases for implementing the development IN COMPLIANCE WITH THE STANDARDS SET FORTH IN SECTION 18.XX.5.
- c. A study prepared by a professional engineer, licensed in the State of Michigan, documenting that the site of the WTG has sufficient wind resources for the proposed WTG equipment. Provided, however, this application requirement shall not apply an anemometer tower.
- d. A resume or other written summary of the education, experience, and other qualifications of all experts providing information concerning the WTG or anemometer tower project.
- e. An avian study based on U.S. Fish and Wildlife Service, "Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines", Federal Register: July 10, 2003 (Volume 68, Number 132). Provided, however, this application requirement shall not apply to an anemometer tower.
- f. Analysis, measurements and projections of WTG noise propagation shall conform to International Electromechanical Commission (IEC) Standard 61400-11 Part 11, as that standard may be amended or updated from time to time. Acoustic Noise Measurement Techniques, with optional noise directivity requirements (see below), infrasound (low frequency) projections, low frequency noise (between 20 and 100 Hz) measurement and analysis and impulsivity measurement (noise pressure of potential "thumping" sounds). Analysis shall include but is not limited to:
  1. A survey of the existing ambient background noise levels. Analysis shall include day time measurements and also at least two ambient noise measurements between 9:00 PM and 11:59PM and two between 1:00 AM and 5:00AM.
  2. A prediction of the WTG noise levels at the property border. This can be made with manufacturer's data or data from a private testing agency for proposed WTGs or by direct measurement for WTGs in place, so long as measurements are conducted according to IEC and 61400-11 part 11 as that standard may be amended or updated from time to time. Including infrasound and low frequency noise between 20 and 100 Hz, modeling must identify likely pure tone sources.
  3. Identification and support for a model for sound propagation. The model may be hemispherical or spherical but particular attention must be paid to the noise propagation downwind of the proposed installation site and the propagation of sound at differing atmospheric densities.

4. A comparison of calculated wind sound pressure levels with and without the WTG or proposed WTGs. This confirms the baseline for permitted sound levels once the WTGs are operating.

This application requirement shall not apply to an anemometer tower.

- f. A detailed written statement, with supporting evidence, demonstrating how the proposed WTG or anemometer tower will comply with all of the standards for approval.
- g. Written documentation PROJECTING THE shadow flicker on any existing structures located off the property on which the WTG will be constructed, and the extent and duration of the shadow flicker on these existing structures. Provided, however, this application requirement shall not apply to an anemometer tower.
- h. Written documentation that the applicant has notified the FAA, Otsego County Airport and any other applicable state and federal regulatory agencies of the proposed WTG or anemometer tower.
- i. Elevation drawings, computer generated SOUND MODELS OR simulations and other aids OR DOCUMENTATION PROJECTING THE SOUND REACHING OFF THE PROPERTY ON WHICH WTG WILL BE CONSTRUCTED, AND THE EXTENT AND DURATION OF THE SOUND. Provided, however, this application requirement shall not apply to AN ANEMOMETER TOWER.
- j. Elevation drawings, computer generated photographic simulations and other images, or other visual aids that depict how the WTG tower and all accessory structures will appear as constructed on the proposed site from vantage points north, south, east, and west of the WTG tower. Provided, however, this application requirement shall not apply to AN ANEMOMETER TOWER.

18.xx.3 DELETED

18.xx.4 DELETED

18.xx.5 **Standards for WTG and Anemometer Tower Approval.**

The Planning Commission shall approve, or approve with conditions, an application for WTG or an anemometer tower only upon a finding that the proposed WTG or anemometer tower complies with all of the following applicable standards, AND THE APPROVAL STANDARDS AS FOUND IN ARTICLE 16 OF THE ZONING ORDINANCE.

- a. The proposed site shall have documented annual wind resources sufficient for the operation of the proposed WTG. The wind resource documentation shall detail, at a minimum, ambient wind at the maximum height permitted by this ordinance. Lower elevations (consistent with anemometer tower approval) shall also be provided by the applicant. This standard shall not apply to an anemometer tower.

- b. The minimum site area for WTG or an anemometer tower shall be as necessary to meet required setbacks and any other standards of this section.
- c. Noise permitted from WTGs is governed by the ORIGINAL ambient baseline noise study performed in accordance with Section 18.2(f) FOR THE FIRST WTG ON THE SUBJECT PROPERTY and ORIGINAL fixed noise pressure limits above baseline for both day and night operations.
- d. Broadband noise from any WTG shall be limited to no more than 10 decibels above the ORIGINAL ambient baseline sound level (or that level which is exceeded 90% of the time) beyond the property line, considering both daytime and night measurements as reported in the engineer's sound propagation model required in section 18.2(f). The day and night requirements will be different. The harmonic mean of the night measurements will set the baseline for night noise limits and the harmonic mean of the daytime measurements will set the baseline for daytime limits. Pure tones, defined as an octave band (at any frequency), are limited to no more than 3 decibels above the adjacent higher and lower octave bands.
- d. deleted
- e. The potential ice throw or ice shedding for the proposed WTG shall not cross the property lines of the site in question nor impinge on any public Right-of-Way or overhead utility line. Compliance shall be demonstrated in the permit application by **specific analysis method** but such model shall not alleviate the applicant of the need to comply with this subsection under all atmospheric conditions, for the life of the structure. This standard shall not apply to an anemometer tower.
- f. A WTG shall meet a setback from any adjoining lot line and any adjoining public or private road a distance equal to  $1.5x(D+H)$ , but setbacks shall not be reduced to less than 1250 feet for a Public WTG and shall not be reduced to less than 180 feet for a Private WTG, where the proposed WTG meets standards c, d, and e above and where  $D$  = the diameter of the rotor and  $H$  = the height of the rotor axis above the ground at the base of the tower. This standard shall not apply to an anemometer tower.
- g. An anemometer tower shall meet a setback from any adjoining lot line and any adjoining public or private road or overhead utility line a distance equal to the 1.5 times the height of the anemometer tower as measured to the highest point. The setback shall be measured from the outermost point on the base of the anemometer tower, **not the guide wire or support wires**.

- h. The maximum wind generation tower height shall be 300 feet for a WTG. The maximum height of an anemometer tower shall be 300 feet. The Planning Commission **may** approve an increased height for a Public WTG, not to exceed 400 feet, if the following SPECIFIC conditions are met ALONG WITH THE GENERAL CONDITIONS SET FORTH IN SECTION OF 16.7 OF THE ZONING ORDINANCE. The increased height, however, shall be the smallest increase necessary to meet the following conditions:
1. The increased height is necessary for the preservation of a substantial stand of trees, existing land forms or structures that would otherwise be removed to increase wind velocity.
  2. TO IMPROVE THE SOUND MODEL AND/OR IMPROVE COMPLIANCE WITH PARAGRAPHS 5(c), (d) or (e) of this WTG ORDINANCE..

This standard shall not apply to an anemometer tower.

- i. For both horizontal and vertical axis WTG turbines, the rotor shall be located on the tower such that the minimum blade clearance above the ground level is 25 feet for Private WTG in excess of 35 feet in height and 50 feet for WTG.
- j. All WTG turbines shall be equipped with controls to limit the rotational speed of the blades within design limits for the specific WTG. This standard shall not apply to an anemometer tower.
- k. The on-site electrical transmission lines connecting the WTG to a public utility electricity distribution system shall be located underground. In addition all other utility lines shall be located underground. Provided, however, this standard shall not apply to an anemometer tower.
- l. The WTG or anemometer tower shall, subject to any applicable standards of the FAA, be painted a neutral color so as to reduce visual obtrusiveness. Excessively bright or neon colors are not acceptable. The Planning Commission, however, may approve an alternate color if the WTG or anemometer tower is located within an avian migratory route or if an alternate color would otherwise benefit the neighborhood.
- m. The WTG or anemometer tower shall not be artificially lighted unless required, in writing, by the FAA. Where the FAA requires lighting, the lighting shall be the lowest intensity allowable under FAA regulations, the fixtures shall be shielded and directed to the greatest extent possible to minimize glare and visibility from the ground, and no strobe lighting shall be permitted, unless expressly required by the FAA
- n. The WTG or anemometer tower shall be designed and constructed in such a manner that access is limited, to the extent possible, to authorize personnel only.

- o. The WTG or anemometer tower shall be constructed and operated so that it does not interfere with television, radio, CELLULAR TELEPHONE or microwave reception in neighboring areas. If degradation of television, radio, CELLULAR TELEPHONE or microwave reception occurs as the result of the WTG or anemometer tower, the developer shall pay to correct the television, radio, CELLULAR TELEPHONE or microwave reception.
- p. A WTG shall be a monopole or monotube style construction (as distinguished from a lattice-style tower) and shall not utilize guy wires. A Private WTG or anemometer tower may be a lattice-style tower and may utilize guy wires, providing access limitations are maintained to prevent climbing by unauthorized persons.
- q. The WTG or anemometer tower shall have posted on the site in a visible, easily accessible location two signs no more than four (4) square feet in area displaying an address and telephone number for emergency calls. 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 and on weekends or holidays. Provided, however, this standard shall not apply to private wind generation. One sign shall be located AT the service drive ENTRANCE to the WTG at the minimum setback distance.
- r. The WTG or anemometer tower shall have no advertising painted on or attached to the tower or any other structure of the WTG.
- s. The WTG shall be designed and sited in such a manner to MINIMIZE SHADOW FLICKER ON A ROADWAY. IN ADDITION THE WTG SHALL BE DESIGNED AND SITED IN A MANNER TO PREVENT SHADOW FLICKER on any existing structures located off the property on which the WTG is constructed. IT SHALL BE THE RESPONSIBILTIY OF THE WTG OPERATOR TO MODIFY OPERATIONS TO ALSO PREVENT SHADOW FLICKER ON DWELLINGS CONSTRUCTED AND/OR OCCUPIED AFTER INSTALLATION OF THE WTG. If necessary to prevent shadow flicker from crossing occupied structures the WTG may be programmed to stop rotating during times the WTG shadow crosses these structures. THE WTG OPERATOR MAY OBTAIN a written easement or other written agreement which specifically allows SHADOW FLICKER TO CROSS AN OCCUPIED STRUCTURE.
- t. DELETED
- u. Structural integrity of all components not under the jurisdiction of the Michigan Building Code shall be certified by a professional engineer licensed in the State of Michigan. Certification shall include; verification that ultimate strength exceeds that needed to withstand all factored loads and load combinations specified in SIE/ASCE 7-02 "Minimum Design Loads For Buildings And Other Structures". First Order Reliability Analysis shall demonstrate a reliability coefficient (Beta) of not less than 3.54 for any failure mode that could result in any portion of the WTG falling to the ground. In lieu of First Order Reliability Analysis, adequate structural reliability may be demonstrated via analysis methods specified in the Michigan Building Code.

18.xx.6 **Conditions.**

The Planning Commission may attach reasonable conditions to the approval of a WTG or anemometer tower. These conditions may include those necessary to insure that public services and facilities affected by the WTG or anemometer tower will be capable of accommodating increased service and facility loads caused by the WTG or anemometer tower, to protect the natural environment and conserve natural resources and energy, to insure compatibility with adjacent uses of land, and to promote the use of land in a socially and economically desirable manner. Any conditions imposed, however, shall meet all of the following requirements:

- a. Be designed to protect natural resources, the health, safety, and welfare and the social and economic well being of those who will use the WTG or anemometer tower under consideration, residents and landowners immediately adjacent to the proposed WTG or anemometer tower, and the community as a whole.
- b. Be related to the valid exercise of the police power, and purposes which are affected by the proposed WTG or anemometer tower.
- c. Be necessary to meet the intent and purpose of the zoning ordinance, be related to the standards established in the ordinance for the WTG or anemometer tower under consideration, and be necessary to insure compliance with those standards.

18.xx.7 **Ongoing Compliance.**

- a. The noise propagation, blade flicker and ice hazard standards developed in permitting of WTGs are absolute. Once WTGs are permitted, the owners have the option of compliance or discontinuation of operations.
- b. The owner of a WTG shall conduct physical inspections of the WTG structure(s) and associated equipment annually to ensure continuing compliance with this section and any conditions imposed with the approval of the WTG. Copies of all inspection reports shall be submitted to the zoning administrator within thirty (30) days of the inspection. IN THE EVENT AN OWNER FAILS TO COMPLY WITH THIS SECTION THE COUNTY SHALL HAVE THE AUTHORITY TO HAVE THE WTG INSPECTED AND ASSOCIATED COSTS ASSIGNED AS A LIEN ON THE PERSONAL PROPERTY OF THE WTG OWNER IN QUESTION.
- c. Noise exceeding permitted levels. The ordinance recognizes that certain wind and weather conditions and altitude densities can enhance temporary noise pressure that exceeds permitted levels. If non-compliance with the noise standards is brought to the attention of Otsego County enforcement officials the complaint will be investigated and if confirmed, written notice will be sent to the WTG owner requiring post permit documentation of corrective measures taken to address the sound. Documentation could include statements from those adjusting or modifying the WTG and may, at the option of Otsego County, include additional noise propagation certification, conducted in a manner similar to that presented in section 18.2(f) tailored to the specific problem being addressed.

**18.xx.8 Performance Guarantee.**

In connection with the approval of a WTG or anemometer tower, the Planning Commission shall require the owner of the WTG to furnish the county with a performance guarantee in the form of a cash deposit, certified check, irrevocable bank letter of credit, or surety bond acceptable to the county in an amount equal to the estimated costs associated with removal of the WTG or anemometer tower and all associated equipment and accessory structures and restoration of the site to a reusable condition which shall include the removal of all underground structures to a depth of ten feet (10') below the natural ground level at that location.

A detailed cost estimate for the removal of the tower shall be provided with the application and shall be based on Means Construction Estimating Guide or similar accepted pricing schedule and shall not include credit for the salvageable value of any materials. The amount of the performance guarantee shall include future value calculations based on 20 year inflation at a rate equal to the average of the previous 10 years Consumer Price Index, but not less than 3.5% per year.

**18.xx.9 Removal of WTG and Anemometer Towers**

WTG and anemometer towers that are not operated for a continuous period of twelve (12) months shall be removed by the owner of the WTG or anemometer tower within 90 days of receipt of a notice from the county requiring such removal. For purposes of this section, non-operation shall be deemed to include, but shall not be limited to, the anemometer instrument(s) being removed from the anemometer tower or disconnected so that wind resources are no longer being measured, the blades of the WTG remaining stationary so that wind resources are not being converted into electric or mechanical energy, or the WTG is no longer connected to the public utility electricity distribution system. IN THE EVENT A WTG OWNER FAILS TO REMOVE THE WTG TOWER OR THE ANEMOMETER TOWER AS REQUIRED BY THIS SECTION THE COUNTY SHALL HAVE THE AUTHORITY TO REMOVE THE TOWER AND SHALL UTILIZE THE PERFORMANCE BOND TO COVER THE COSTS OF SUCH REMOVAL. IF THE PERFORMANCE BOND IS NOT SUFFICIENT TO COVER THE COST OF THE REMOVAL ADDITIONAL COSTS ASSOCIATED WITH THE REMOVAL SHALL BE ASSIGNED AS A LIEN ON THE PERSONAL PROPERTY OF THE WTG OWNER IN QUESTION. IF THE PERFORMANCE BOND HAS EXPIRED OR IS NOT AVAILABLE THE COUNTY SHALL HAVE THE AUTHORITY TO HAVE THE TOWER REMOVED AND ASSOCIATED COSTS ASSIGNED AS A LIEN ON THE PERSONAL PROPERTY OF THE WTG OWNER IN QUESTION.

**18.xx.10 Duration of Permit**

A permit to operate a temporary anemometer tower shall be valid for one year and may be extended for a maximum of one additional year. A permit to operate a WTG shall be valid for 20 years WITH REVIEW OF THE OPERATION BY THE COUNTY PLANNING COMMISSION AT A PUBLIC HEARING EVERY FIVE (5) YEARS.

**18.xx.11 Use of Current Technology**

WTGs shall be designed to the current state of the technology. Used, outdated or obsolete WTG equipment shall not be permitted to be constructed or installed. With respect to performance standards set forth in this ordinance, repairs and parts replacement shall not be of lesser quality than that of the original permitted equipment and shall be upgraded to the performance standards current at the time of the repair. In no case shall repairs or alterations be allowed which will decrease the degree to which the WTG complies with this ordinance.

**18.xx.12 Major Equipment Replacement During Life of the Permit**

Should the WTG operator wish to replace major components such as turbine blades, generator, main gear box, nacelle, or the entire WTG the operator shall demonstrate that the WTG will substantially meet the then current criteria for new WTG permits, except that setback distances will not be increased. In no case shall replacement or alterations be allowed which will decrease the degree to which the WTG complies with this ordinance.

**18.xx.13 WTG Permit Renewal**

At any time the operator of a WTG may elect to seek a new permit for a given site. A new WTG permit shall not allow aspects of the previous permit to be "grandfathered". To qualify for a new permit the WTG installation shall meet all criteria of the then current standards.

**Section 9. Severability.**

If any section, clause, or provision of this Ordinance is declared unconstitutional or otherwise invalid by a court of competent jurisdiction, said declaration shall not affect the validity of the remainder of the Ordinance as a whole or any part thereof, other than the part so declared to be unconstitutional or invalid.

**Section 10. Effective Date.**

This Ordinance shall become effective eight (8) days after being published in a newspaper of general circulation within the County.