

## FACT SHEET ON RESIDENTIAL TURBINES:

- 50' to 100' ft. is ideal height for these turbines
- Fall, winter, and spring are “peak wind” times.
- Anything over 120' ft. is not feasible due to construction constraints.
- Utility companies limit at 300 **kilowatts** on 3 phase grids.
- 25 kilowatts on 1 phase grids.
- National average of energy consumption is 800 **kilowatts** per month.
- With a wind turbine there is expected to be an average of 40% to 60% reduction in utility generated electrical consumption. **It is important to note that this is an annual figure, and that on average a residential wind turbine operates at 25 to 40% of its rated capacity.**
- Some utility companies offer a 1.9 cent per kilowatt annual reimbursement.
- Some companies offer no reimbursement at all.
- Average cost of a typical residential-commercial turbine system is typically between \$17,000-\$**40,000** dollars.
- There are two (2) types of tower systems, mono pole and guide wire systems. Monopole towers consist of a single piece tower that is placed on a 6x6 concrete pad with 8.5 cubic yards of concrete and buried at 48” inches. Guide wire towers are also installed in the ground, but have six (6) steel cables radiating out from the tower and secured into the surrounding ground. Typically these wires stretch out to a distance half the length of the tower.
- There is no minimum recommend parcel size for installation, but it is advised that a “clear drop zone” be established where if the tower were to fall, it wouldn't fall on the primary residence, or onto neighboring properties.
- This “clear drop zone” provision is up to each township to decide upon.
- Financing for these systems is starting to be offered by banks.
- There are also grants available to homeowners installing these systems in conjunction with other “green” components in their houses.
- Most likely the construction of these towers will be seen on parcels of land where new homes are being constructed. The cost of the tower can then be lumped into the total mortgage amount.
- Utility companies regulate the types of turbines that can be tied into their grids.
- Maximum decibel levels need to be examined and established. These levels will vary with the height of the towers. A taller tower will have less noticeable decibel levels simply because it is located higher up in the air.
- In regards to lightning protection, the towers are grounded to the homes electrical system, and also have an additional ground installed next to the tower.
- The actual turbines are only 15 to 20% of the total cost of the whole system. The tower and subsequent engineering make up the bulk of the total price.

## **POSSIBLE TOPICS TO CONSIDER FOR ZONING:**

1. Make them a permitted use *up to an established height* perhaps anything over 100' ft. in height should require a conditional use permit.
2. Under a permitted use, be sure to note the maximum height requirement for all other structures in the Township does not apply to wind turbines, which will have their own maximum heights.
3. Require that the parcel where a wind turbine is located at be large enough to accommodate a "clear drop zone" whereupon if the structure were to fall, it would not fall onto the primary residence of the property, or onto the neighboring property. Given this constraint, a minimum parcel size would not be required since this provision would in effect self regulate the necessary parcel size.
4. Require a detailed engineering report, prepared at the applicant's expense, be submitted with each permit request. In this report some items to be shown should include total size and depth of the concrete mounting pad, an average decibel rating, any safety measures such as grounding apparatuses and lightening protection, anti-climb devices, a dismantling plan, and a maintenance plan. Documentation from the utility company should also be included that outlines what will happen to any excess power that may be generated. Also, data and specifications such as the kilowatt size and generating capacity of the unit should be included.
5. Limit the maximum decibel level for all units to 50-70 decibels. Require all applicants to provide this information in an engineering report with the stipulation that this information is obtained from the manufacturer of the unit. (Manufacturer's Specifications).

**Amendment to \_\_\_\_\_ Township Zoning Resolution**

The \_\_\_\_\_ Township, Wood County, Ohio Zoning Resolution is hereby amended to add a new Article, which shall in its entirety as follows:

**Amendment to \_\_\_\_\_ Township Zoning Resolution**

**Section Purpose:**

The purpose of this amendment is to establish general guidelines for the location of wind turbine generators (sometimes referred to herein as “WTG”) and anemometer towers in \_\_\_\_\_ Township, Wood County, Ohio (The “Township”). This amendment is consistent with the stated primary purpose of the \_\_\_\_\_ Township Zoning Resolution: “Protecting the public health, safety, comfort, and general welfare” of \_\_\_\_\_ Township residents. The Township recognizes in some specific instances, under carefully controlled circumstances, it may be in the public interest to permit the placement of wind turbine generators in certain areas of the Township. The Township also recognizes the need to protect the scenic beauty of the Township from unnecessary and unreasonable visual interference, noise radiation, and that wind turbine generators may have negative health, safety, welfare, and aesthetic impacts upon adjoining and neighboring uses. As such, this amendment seeks to:

1. Protect residential and agricultural areas from potential adverse impact of wind turbine generators;
2. Permit wind turbine generators in selected areas by on-site residential, commercial, or industrial users, subject to the terms, conditions, and provisions hereof;
3. Ensure the public health, welfare, and safety of the Township’s residents in connection with wind turbine generators; and
4. Avoid potential damage to real and personal property from the wind turbine generators or anemometer towers or the failure of such structures and related operations.

## **Section ----- Procedure**

Any proposed construction, erection, or siting of a wind turbine generator or anemometer shall be permitted only by issuance of a Conditional Use Permit in accordance with Section \_\_\_\_\_ of this Resolution, as amended hereof.

**DEFINITIONS: For purposes of the regulation of residential, commercial, and industrial use of wind turbine generators.**

**Accessory Structures:** Structures such as sheds, storage sheds, pool houses, unattached garages, and barns.

**Anemometer:** An instrument that measures the force and direction of the wind.

**Clear Fall Zone:** An area surrounding the wind turbine unit into which the turbine and - or turbine components might fall due to inclement weather, poor maintenance, faulty construction methods, or any other condition causing turbine failure that shall remain unobstructed and confined within the property lines of the primary parcel where the turbine is located at, the purpose being that if the turbine should fall or otherwise become damaged, the falling structure will be confined to the primary parcel and will not fall onto dwellings, **any inhabited buildings**, and will not intrude onto a neighboring property.

**Cowling:** A streamlined removable metal that covers the turbine's nacelle.

**Decibel:** A unit of relative loudness equal to ten times the common logarithm of the ratio of two readings. For sound, the decibel scale runs from zero for the least perceptible sound to 130 for sound that causes pain.

**Nacelle:** A separate streamlined metal enclosure that covers the essential mechanical components of the turbine.

**Primary Structure.** For each property, the structure that one or more persons occupy the majority of time on that property for either business or personal reasons. Primary structures include structures such as residences, commercial buildings, hospitals, and day care facilities. Primary structures exclude structures such as hunting sheds, storage sheds, pool houses, unattached garages, and barns.

**Professional Engineer.** A qualified individual who is licensed as a Professional Engineer in the State of Ohio.

**Wind Power Turbine Owner.** The person or persons who owns the Wind Turbine structure.

**Wind Power Turbine Tower.** The support structure to which the turbine and rotor are attached.

**Wind Power Turbine Tower Height.** The distance from the rotor blade at its highest point to the top surface of the Wind Power Generating Facility (WPGF) foundation.

## ARTICLE I WIND TURBINES

\_\_\_\_\_ Township, recognizes the importance of clean, sustainable and renewable energy sources. To that end, \_\_\_\_\_ Township permits the use of residential wind turbines under the following regulations to ensure the safety and welfare of all township residents is met.

- I. Wind turbines shall be a *permitted use* in all districts under the following conditions:
  - A. The maximum height of any turbine shall be 100' ft. For purposes of this Particular zoning item, maximum height shall be considered the total height of the turbine system including the tower, and the maximum vertical height of the turbine's blades. Maximum height therefore shall be calculated by measuring the length of a prop at maximum vertical rotation to the ground level of the tower.
  - B. Setbacks: the following shall apply in regards to setbacks.
    1. Any turbine erected on a parcel of land will need to establish a "clear fall zone" from all neighboring property lines, structures, as well as any **inhabited** structures on the parcel intended for the turbine. A turbine will need to be erected and placed in such a manner that if it were to fall, whatever direction the fall occurs would be contained solely on the property where the turbine is located at, and would not strike any structures including the primary dwelling, and any **inhabited structures**.

C. Maintenance

1. Wind turbines must be maintained in good working order. Turbines that become inoperable for more than **24** months must be removed by the owner within thirty (30) days of issuance of zoning violation. Removal includes removal of all apparatuses, supports, and or other hardware associated with the existing turbine.

D. Decibel Levels

- 1. All units shall operate within a decibel range of 50 to 70 decibels. This information shall be included in the engineering report described below in Section II of this document. This information shall be obtained from the manufacturer of the turbine, and all decibel readings, if necessary, shall be taken from the nearest neighboring property.**

E. Wiring:

- 1. All wires associated with the operation of a wind turbine unit shall be located underground.**

II. Permits

- A. A permit shall be required before construction can commence on an individual wind turbine system.
- B. As part of the permit process, the applicant shall inquire with the Wood County Planning Commission as to whether or not additional height restrictions are applicable due to the unit's location in relation to either the Wood County Airport, or Toledo Metcalf Field.
- C. Applicant shall then provide the Township Zoning Inspector with the following items and or information when applying for a permit:
  1. Location of all public and private airports in relation to the location of the turbine.
  2. An engineering report signed and sealed by a professional engineer that shows:
    - a. The total size and height of the unit
    - b. The total size and depth on the unit's concrete mounting pad, as well as soil and bedrock data.

- c. A list and or depiction of all safety measures that will be on the unit including anti-climb devices, grounding devices, and lightning protection,
  - d. Data specifying the kilowatt size and generating capacity of the particular unit.
  - e. **The maximum decibel level of the particular unit. This information must be obtained from the manufacturer of the turbine unit.**
3. A site drawing showing the location of the unit in relation to existing structures on the property, roads and other public right of ways, and neighboring properties.
  4. Evidence of a “clear fall zone” with manufacturer’s recommendation must be attached to the engineering report.
  5. A maintenance schedule as well as a dismantling plan that outlines how the unit will be dismantled shall be required as part of the permit.