RESIDENTIAL WIND TURBINES

Distributed Wind is part of the Answer
Benefits to the Community Include:

• Reduced pollutants from traditional forms of energy
• Reduced demand on the local electricity grid
• Increased local energy independence
• Reduced peak power demands
• Increased in-state electricity generation
• Diversified energy supply portfolio
• Supports American green jobs
Flagging
Prevailing wind →

I
No deformity
Brushing and slight flagging

II
Slight flagging

III
Moderate flagging

IV
Complete flagging

V
Partial throwing

VI
Complete throwing

VII
Carpeting

Griggs-Putnam Index of Deformity

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Sec. 30-87-6. - Wind Energy System, Small.

(A) Purpose and Intent. The purpose of this section is to regulate the placement, construction, and modification of small wind energy systems while promoting the safe, effective and efficient use of small wind energy systems and not unreasonably interfering with the development of independent renewable energy sources. The requirements set forth in this section shall govern the siting of small wind energy systems used to generate electricity or perform work which may be connected to the utility grid pursuant to Virginia’s net metering laws or serve as an independent source of energy.

(B) General Standards:

1. Type of Tower. The tower component of any small wind energy system shall be one that is recommended and certified by the manufacturer.

2. Tower Color. Small wind energy system towers shall maintain a galvanized steel finish, unless Federal Aviation Administration (FAA) standards require otherwise. The zoning administrator may allow a property owner, who is attempting to conform the tower to the surrounding environment and architecture, to paint the tower to reduce its visual obtrusiveness. A photo simulation may be required by the zoning administrator.

3. System Height

   (a) System height is defined as the vertical distance measured from average grade at the base of the tower or other supporting structure, whether mounted on the ground or on a rooftop, to the highest point of the rotor or tip of the turbine blade when extended to its highest elevation.

   (b) A small wind energy system may exceed the height limitations listed in this section if a special use permit has been obtained by the property owner.

   (c) The applicant shall provide evidence that the proposed height of the small wind energy system does not exceed the height recommended by the manufacturer or distributor of the system.

4. Setbacks. The small wind energy system shall be set back a distance at least equal to one hundred ten (110) percent of the height of the wind energy system from all property lines, and roadways. The setbacks for a small wind energy system may be reduced if a special use permit has been obtained by the property owner. Setbacks established in this section or through a special use permit shall supersede any other setback requirements in the zoning ordinance.

5. Ground Clearance. The minimum distance between the ground and any protruding blades utilized on a small wind energy system shall be twenty (20) feet, as measured at the lowest point of the arc of the blades. The lowest point of the arc of the blade shall also be twenty (20) feet above the height of any structure within one hundred forty (140) feet of the base. The supporting tower shall also be enclosed with a six-foot (6') wall or the base of the tower shall not be climbable for a distance of twelve (12') feet.

6. Number of Towers. More than one (1) tower may be permitted on an individual piece of property provided that all setback requirements have been met.

7. Noise. The wind energy system shall not exceed sixty (60) decibels (dBA), as measured at the closest property line, except during short-term events such as severe windstorms.

8. Lighting. No lighting shall be incorporated on the tower or wind turbine unless required by the Federal Aviation Administration (FAA) or other appropriate authority.

9. Advertising. Signs, writing, pictures, flags, streamers, or other decorative items that may be construed as advertising are prohibited on wind energy systems, except as follows:

   (a) Manufacturer's or installer's identification on the wind turbine, and

   (b) Appropriate warning signs and placards.

10. Speed Controls. A small wind energy system shall be equipped with manual (electronic or mechanical) and automatic overspeed controls to limit the blade rotation speed to within the design limits of the small wind energy system.

11. Electric Utility Notification. The applicant shall provide evidence that the provider of electric utility service to the site has been informed of the applicant's intent to install an interconnected customer-owned electric energy generator unless the applicant intends, and so states on the application, that the system will not be connected to the electric grid.

12. Use. A small wind energy system shall be considered an accessory use. The applicant shall provide information demonstrating that the small wind energy system will be used primarily to reduce on-site consumption of electricity.

13. Wind Monitoring or Temporary Meteorological Towers. Small wind energy systems shall comply with the following:

   (a) A wind monitoring meteorological tower with an anemometer and other wind measuring devices may be installed with the issuance of a zoning permit for the purpose of monitoring wind and other environmental conditions relevant to siting wind energy systems and used to determine how much wind power a site can be expected to generate. The zoning permit shall be valid for a period of one (1) year.

   (b) No wind monitoring meteorological tower for small wind energy systems may rise more than the allowable height of the proposed small wind energy system and shall meet the setback requirements in section 30-87-6(B)4 of this ordinance.

14. Removal of Defective or Abandoned Small Wind Energy Systems:

   (a) Each year following the issuance of a zoning permit for a small wind energy system, the owner of each small wind energy system shall submit to the Zoning Administrator an affidavit that verifies continued operation of the wind turbine and compliance with all requirements of this ordinance and other applicable regulations. Failure to submit required documentation shall result in the Zoning Administrator considering the small wind energy system abandoned. The owner of the small wind energy system shall remove the small wind energy system within ninety (90) days of receipt of notice from the County instructing the owner to remove the abandoned small wind energy system.

   (b) Any small wind energy system and micro wind energy system found to be unsafe or inoperable by the building official shall be repaired by the owner to meet federal, state and local safety standards or removed within ninety (90) days.

15. Compliance with Other Regulations: Small wind energy systems shall comply with all applicable local, state and federal regulations.
Southwest Windpower:

Wind Resource Summary: Wind Prospecting...

Your wind rating is:

**Good**

5.2 ± 1.4 m/s

(The rating is based on the average annual wind speeds in a 5km radius.)

Hub Height: 18 meters

0.03 - 4.02 m/s: Not Recommended
4.03 - 4.25 m/s: Poor
4.26 - 4.51 m/s: Marginally Good
4.52 - 4.93 m/s: Good
5.00 + m/s: Excellent

Monthly Mean Wind Speed: Wind Prospecting...

Hub Height: 18 meters

Latitude: 37.224° Longitude: -80.094°

Your lowest wind month is: August

Annual Mean Wind Rose: Wind Prospecting...

Hub Height: 18 meters

Latitude: 37.224° Longitude: -80.094°

Your prevailing wind direction is from the: West North West (WNW)

Wind Speed Distribution: Wind Prospecting...

Hub Height: 18 meters

Latitude: 37.224° Longitude: -80.094°

Weibull A: 5.86

Weibull k: 2.12

Monthly Mean Energy: Wind Prospecting...

Hub Height: 18 meters

Latitude: 37.224° Longitude: -80.094°

Your highest energy month is: January

Your lowest energy month is: August

Annual Mean Energy Rose: Wind Prospecting...

Hub Height: 18 meters

Latitude: 37.224° Longitude: -80.094°

Your prevailing energy direction is from the: West North West (WNW)
Foundation for 100’ SSL Tower

15.5 ft x 15.5 ft x 5.5 ft smaller than most residential swimming pools
Conduit

Plastic pipes protect the wires that run from the turbine to the inverter in the shed/garage and then to the breaker box in the house.
Rebar is Installed
Second Layer of Rebar
Turbine and Blades in Shipping Crates
Template for Tower Bolts
Conduit with the Wires is Positioned Next to One of the Tower Legs
Cement
Smoothing the Foundation
The Tower is Assembled on the Ground
Mounting the Nacelle
Wires are Installed From the Turbine to the Bottom of the Tower
Crane Day!!!
The Crane Boom is Attached to the Tower
Attaching the Tail
Attaching the Blades