

5.7- RESIDENTIALLY SCALED (SMALL) WIND ENERGY CONVERSION FACILITIES

5.7.1 Purpose and Intent

It is the express purpose of this bylaw to accommodate residentially scaled (small) wind energy conversion facilities (hereafter referred to as small wind energy conversion facilities), with a rated nameplate capacity of 60 kilowatts or less, in appropriate locations, while minimizing any adverse visual, safety and environmental impacts of the facilities. The bylaw enables the review of small wind energy conversion facilities by the town's Planning Board or Zoning Board of Appeals in keeping with the town's existing bylaws. This bylaw is intended to be used in conjunction with other regulations adopted by the town, including historic district regulations, site plan review and other local bylaws designed to encourage appropriate land use, environmental protection, and provision of adequate infrastructure development. Commercial and large scale wind energy facilities, with a rated nameplate capacity of greater than 60 kilowatts, are not included in this bylaw; they are covered in bylaw 5.6- Land Based Wind Energy Conversion Facilities.

5.7.2 Definitions

Clear Area: Area surrounding a wind turbine to be kept free of habitable structures.

Distributed Generation: Energy generation that is located at or near the end-user.

Height: The height of a turbine measured to the tip of the blade at its highest point.

Nacelle: The frame and housing at the top of the tower that encloses the gearbox and generator and protects them from the weather.

Rotor: The blades and hub of the wind turbine that rotate during turbine operation.

Special Permit Granting Authority (SPGA): Board designated by zoning ordinance or bylaw with the authority to issue special permits.

Small Wind Energy Conversion Facility: All equipment, machinery and structures utilized in connection with the conversion of wind to electricity, which has a rated nameplate capacity of 60 kilowatts or less. This includes, but is not limited to, all transmission, storage, collection and supply equipment, associated control or conversion electronics, and machinery associated with its use.

Wind Monitoring or Meteorological ("test" or "met") Towers: Tower used for supporting anemometer, wind vane and other equipment to assess the wind resource at a predetermined height above the ground. Includes the tower, base plate, anchors, guy cables, and hardware, anemometers, wind direction vanes, booms to hold the equipment, data loggers, instrument wiring, and any telemetry devices used to monitor or transmit wind speed and wind flow characteristics over a period of time.

Wind Turbine: A device that converts kinetic energy of the wind into rotational energy to turn an electrical generator shaft. A wind turbine typically consists of a rotor, nacelle and supporting tower.

Tower: A free-standing monopole that supports a tower-mounted wind energy turbine.

Tower Height: The height above grade of the fixed portion of the tower, excluding the wind turbine.

Total Height: For tower-mounted wind energy turbines, the total height is the vertical distance measured from grade to the uppermost vertical extension of a rotor blade or the maximum height reached by any part of the wind energy turbine. For structure-mounted wind energy turbines, the total height is the distance measured from the highest point of the adjoining roof or structure, not including chimneys, antennae or similar structures, to the uppermost vertical extension of a rotor blade or the maximum height reached by any part of the wind energy turbine.

Rated Nameplate Capacity: The maximum rated output of electric power production equipment. This output is typically specified by the manufacturer with a “nameplate” on the equipment.

Net Metering: A special metering and billing agreement between utility companies and their customers which facilitates the connection of sustainable energy generating systems to the power grid.

Structure-mounted: A structure-mounted wind energy system fixed to the roof of an existing structure rather than a separate tower that converts wind energy into electricity primarily for on-site use with a maximum output no greater than 10 kilowatts per turbine.

5.7.3 District Regulations

- a) **Use Regulations** - All small wind energy conversion facilities or wind monitoring towers shall require a building permit and may be permitted as follows and irrespective of whether the use is a principal or accessory use:
 1. **Small Wind Energy Conversion Facility** - The construction of any small wind energy conversion facility shall be permitted in all business, industrial, residential, agricultural-residential, and commercial overlay zoning districts, subject to issuance of a Special Permit and provided the proposed use complies with all Dimensional and Special Permit Regulations set forth in Sections 5.7.3c and 5.7.4 of this bylaw (unless waived by the SPGA).
 2. **Wind Monitoring or Meteorological Towers** - Met towers shall be permitted under the same standards as a small wind system, except that the requirements apply to a temporary structure. A permit for a temporary met tower shall be valid for a maximum of 3 years after which an extension may be granted.

Wind monitoring shall be permitted in all zoning districts subject to issuance of a building permit for a temporary structure and subject to reasonable regulations concerning the bulk and height of structures and determining yard-size, lot area, setbacks, open space and building coverage requirements.
- b) **Utility Notification** - No small wind energy system shall be installed until evidence has been given that the utility company has been informed of the customer’s intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.
- c) **Dimensional Requirements** - All wind energy conversion facilities shall comply with the requirements set forth in this section, unless waived by the SPGA as part of the Special Permit review process.

1. **Height** - Small wind energy conversion facilities located on towers shall be no higher than 80 feet above the natural grade. The height of all wind turbines shall be measured to the highest point reached by the rotor blades. The SPGA may allow this height to be exceeded as part of the special permit process if the project proponent can demonstrate that the additional height is needed and that the additional benefits of the higher tower outweigh any increased adverse impacts. Monopole towers are the preferred type of support for wind turbines. If the small wind facility is structure-mounted, the total height of the facility shall not exceed 15 feet from the highest point of the adjoining roof, as defined in section 5.7.2.
2. **Setback or Clear Area** - Each small wind energy conversion facility and its associated equipment shall comply with the building setback provisions of the zoning district in which the facility is located. In addition, a wind tower for a small wind system shall be set back a distance equal to its Total Height from:
 - (i) any public road right of way, unless written permission is granted by the governmental entity with jurisdiction over the road;
 - (ii) any overhead utility lines, unless written permission is granted by the affected utility;
 - (iii) all property lines, unless written permission is granted from the affected land owner or neighbor; and
 - (iv) no part of the system, including guy wire anchors, may be closer than 5 feet from any property boundary.

5.7.4 Special Permit Regulations

The SPGA shall grant a Special Permit only if it finds that the proposal complies with the provisions of this bylaw (unless waived) and is consistent with the applicable criteria for granting Special Permits.

- a) **General** - Proposed small wind energy conversion facilities shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable electrical, construction, noise, safety, environmental and communications requirements.
- b) **Design Standards**
 1. **Visual Impact** - The proponent shall demonstrate through project siting and proposed mitigation that the small wind energy conversion facility minimizes any impact on the visual character of surrounding neighborhoods and the community. This may include, but not be limited to, information regarding site selection, turbine design, buffering, lighting and cable layout.
 2. **Color** - Wind energy conversion facilities shall be painted a non-reflective color that blends with the sky and clouds.
 3. **Equipment Shelters** - All equipment necessary for monitoring and operation of the wind energy conversion facilities should preferably be contained within the turbine tower. If this is infeasible, ancillary equipment may be located outside the tower, provided it is contained either within an underground vault, or enclosed within a separate structure or behind a year-round landscape or vegetated buffer.
 4. **Lighting and Signage:**

- (i) Small wind turbines shall be lighted only if required by the Federal Aviation Administration (FAA). The applicant shall provide a copy of the FAA's determination to establish the required markings and/or lights for the structure;
- (ii) A wind tower and generator shall not be artificially lighted unless such lighting is required by the Federal Aviation Administration. A light temporarily used to inspect a turbine, tower and associated equipment is permissible, providing said light is only used for inspection purposes and not left on for an extended period of time;
- (iii) Signs on the facility shall be limited to: those needed to identify the property and the owner and warn of any danger; and, educational signs providing information on the technology and renewable energy usage; and
- (iv) All signs shall comply with the requirements of the Town's sign regulations.

c) **Environmental Standards**

1. **Wetlands** – Small wind energy conversion facilities shall be located in a manner consistent with all applicable local and state wetlands regulations. Wetland buffer areas may be used for the purposes of providing a clear area.
2. **Land Clearing/Open Space/Rare Species** – Small wind energy conversion facilities shall be designed to minimize land clearing and fragmentation of open space areas and shall avoid permanently protected open space when feasible. Wind turbines should be sited to make use of previously developed areas wherever possible. Small wind energy conversion facilities shall also be located in a manner that does not have significant negative impacts on rare species in the vicinity (particularly avian species, bats, etc.).
3. **Stormwater** - Stormwater run-off and erosion control shall be managed in a manner consistent with all applicable state and local regulations.
4. **Noise** - The small wind energy conversion facility and associated equipment shall conform to Massachusetts noise regulations (310 CMR 7.10).
5. **Shadowing/Flicker** – Small wind energy conversion facilities shall be sited in a manner that does not result in significant shadowing or flicker impacts. The applicant has the burden of proving that this effect does not have significant adverse impact on neighboring or adjacent uses either through siting or mitigation.

- d) **Safety Standards** - No hazardous materials or waste shall be discharged on the site of any small wind energy conversion facility. The tower shall be designed and installed so as to not provide step bolts or a ladder readily accessible to the public for a minimum height of 8 feet above the ground.

5.7.5 Modifications

All modifications to a small wind energy conversion facility made after issuance of the Special Permit shall require approval by the SPGA in accordance with the town's existing process for modifications to Special Permit approvals.

5.7.6 Monitoring and Maintenance

The applicant shall maintain the wind energy conversion facility in good condition. Such

maintenance shall include, but not be limited to, painting, structural integrity of the foundation and support structure and security barrier (if applicable), and maintenance of the buffer areas and landscaping if present.

5.7.7 Abandonment or Discontinuation of Use

- a) At such time that a small wind energy conversion facility is scheduled to be abandoned or discontinued, the applicant will notify the Town Administrator and SPGA by certified U.S. mail of the proposed date of abandonment or discontinuation of operations. In the event that an applicant fails to give such notice, the facility shall be considered abandoned or discontinued if the facility is inoperable for a continuous 12 month period. The Building Inspector may issue a Notice of Abandonment to the owner of a small wind energy system that is deemed to have been abandoned. The Owner shall have the right to respond to the Notice of Abandonment within 30 days from Notice receipt date. The Building Inspector shall withdraw the Notice of Abandonment and notify the owner that the Notice has been withdrawn if the owner provides information that demonstrates the small wind energy system has not been abandoned.
- b) Upon abandonment or discontinuation of use, the Owner shall physically remove the small wind energy conversion facility within 90 days from the date of abandonment or discontinuation of use. This period may be extended at the request of the operator and at the discretion of the SPGA. "Physically remove" shall include, but not be limited to:
 1. Removal of the wind turbine and tower, all machinery, equipment, equipment shelters, security barriers and all appurtenant structures from the subject property.
 2. Proper disposal of all solid or hazardous materials and wastes from the site in accordance with local and state solid waste disposal regulations.
 3. Restoration of the location of the small wind energy conversion facility to its natural condition, except that any landscaping, grading or below-grade foundation may remain in the after-condition.
- c) If an Owner fails to remove a small wind energy conversion facility in accordance with this section of this bylaw, the town shall have the authority to enter the subject property and physically remove the facility, at the Owner's expense.

5.7.8 Application Procedures

- a) **Special Permit Granting Authority (SPGA)** - The SPGA for small wind energy conversion facilities shall be the Planning Board.
- b) **Pre-Application Conference** - Prior to the submission of an application for a Special Permit under this regulation, the applicant is strongly encouraged to meet with the SPGA at a public meeting to discuss the proposed small wind energy conversion facility in general terms and to clarify the filing requirements.
- c) **Pre-Application Filing Requirements** - The purpose of the conference is to inform the SPGA as to the preliminary nature of the proposed small wind energy conversion facility. As such, no formal filings are required for the pre-application conference. However, the applicant is encouraged to prepare sufficient preliminary architectural and/or engineering drawings to inform the SPGA of the location of the proposed

facility, as well as its scale and overall design.

- d) **Professional Fees** – In accordance with Mass. General Laws Chapter 40A, Section 9 and Mass. General Laws Chapter 44, Section 53G, the town may retain a technical expert/consultant to verify information presented by the applicant. The cost for such a technical expert/consultant will be at the expense of the applicant.
- e) **Permit Filing Requirements** - The following shall be included with an application for a Special Permit for each small wind energy conversion facility:
 - 1. **General Filing Requirements:** A building permit shall be required for the installation of a small wind energy system.
 - 2. **Location Filing Requirements:** The building permit application shall be accompanied by a plot plan (5 copies should be provided) which includes the following:
 - (i) Property lines and physical dimensions of the subject property within 2 times the Total Height from the tower location;
 - (ii) Location, dimensions, and types of existing major structures on the property;
 - (iii) Location of the proposed wind system tower, foundations, guy anchors and associated equipment;
 - (iv) The right-of-way of any public road that is contiguous with the property;
 - (v) Any overhead utility lines;
 - (vi) Wind system specifications, including manufacturer and model, rotor diameter, tower height, tower type (freestanding or guyed);
 - (vii) Tower foundation blueprints or drawings signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts; and
 - (viii) Tower blueprint or drawing signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts.
 - 3. **Fees:** The application for a building permit for a small wind energy system must be accompanied by the fee required for a building permit for a Permitted Accessory Use.
 - 4. **Expiration:** A permit issued pursuant to this ordinance shall expire if:
 - (i) The small wind energy system is not installed and functioning within 24 months from the date the permit is issued; or,
 - (ii) The small wind energy system is out of service or otherwise unused for a continuous 12 month period.

5.7.9 Conflict with Other Laws

The provisions of this bylaw shall be considered supplemental of existing zoning bylaws. To the extent that a conflict exists between this bylaw and others, the more restrictive bylaw, or provisions therein, shall apply.

5.7.10 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the

bylaw shall not be affected thereby. The invalidity of any section or sections or parts of any section or sections of this bylaw shall not affect the validity of the remainder of the town's Zoning Bylaw.

5.7.11 Penalties

Any person who fails to comply with any provision of this ordinance or a building permit issued pursuant to this ordinance shall be subject to enforcement and penalties as allowed by applicable law, or take any other action relative thereto.