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INTRODUCTION

Rising electricity rates, growing concerns about climate change, and our nation's dependence on imported oil are creating an increased demand for renewable energy in New Hampshire. As new projects are proposed, state and local officials have to make determinations about the siting of the new energy facilities. The siting of wind turbines is one of the more contentious issues where benefits of green energy and property rights are often pitted against visual and auditory impacts. The issue is compounded by the lack of a formal public review process in most towns for the siting of small scale wind turbines, typically defined as units with a rated capacity of 100 kilowatts (kW) or less. For reference, generally a home's power needs can be met with a supply of 4 kW and a 100 kW system could supply enough electricity for 30 homes.

Small scale wind turbines have a generating capacity up to 100 kW and are regulated under this model ordinance. Large scale wind turbines with a generating capacity greater than 100 kW and up to 30 megawatts (MW), have additional siting concerns and are regulated under normal land use regulations. Any utility scale electric generation facility 30 MW or more is regulated under the Energy Facility Siting Process before the Site Evaluation Committee (SEC) [http://www.nh.gov/oep/programs/energy/energy_facility_siting_process.htm]. Any electric generation facility less than 30 MW may petition to go before the SEC and therefore be exempt from local permit regulations.

In the 2008 legislative session, HB310, a bill pertaining to regulation of small wind energy systems, was passed and signed into law by Governor John Lynch. The full bill can be viewed online at <http://www.gencourt.state.nh.us/legislation/2008/HB0310.html>. The following is a summary:

- **Municipal Regulations:** The bill creates RSA 674:63 which states that municipalities cannot unreasonably limit or hinder small wind energy systems through ordinances or regulations. It defines unreasonable limits and hindrances to include:
 - Outright prohibition of small wind energy systems in all districts.
 - Application of a generic building/structure height restriction to prohibit small wind energy systems.



- Requirement of setbacks in excess of 150% of the system height.
- Requirement of setting noise limits lower than 55 decibels or not allowing for limits to exceed noise levels for short-term events (storms, power outages).
- Requirement of stricter electrical or structural design criteria outside of state, federal or international building/electrical codes or laws.
- **Aviation:** Requires small wind energy systems to comply with FAA regulations and RSA 424:5, Airport Zoning Regulations.
- **Abandonment:** Establishes a framework to determine whether a small wind energy system has been abandoned and the process to remove it.
- **Abutter Notification:** Requires the building inspector to notify abutters and the local governing body of pending building permits for a small wind energy system and provide them with a 30 day comment period.
- **Regional Notification:** Requires the building inspector to determine whether the project has the potential for regional impact based on the guidelines established in RSA 36:55. If a project is determined to have potential impacts, the building inspector shall notify the regional planning commission, affected municipalities, and the governing body of their decision. A 30 day comment period shall be provided to them.
- **Refines 672:1, III-a:** This statute gives municipalities the authority to develop and interpret zoning regulations. HB310 clarified the statute's provision on renewable energy to include that municipalities shall not unreasonably limit the installation of such systems, except where necessary to protect the public health, safety and welfare.
- **Refines 672:1, III-d:** This statute defines what shall be construed as unreasonable interpretation of a zoning regulation by a municipality. It was adjusted to state that municipalities shall not encumber renewable energy systems through unreasonable interpretation of zoning regulations.

To assist communities tackling the issue of siting requirements for small wind energy systems, the Office of Energy and Planning has drafted a model ordinance that municipalities could enact to regulate these systems. In developing the ordinance, OEP compiled national models from the American Wind Energy Association and Southwest Windpower, along with state models from Massachusetts and North Carolina. Additionally, ordinances from Barnstable, Scituate, and Shutesbury, MA were used as guides.

It is important to stress that the ordinance attached is a *model* ordinance. Communities should amend the model to address specific local concerns. Sections of the ordinance that communities have expressed an interest in adjusting are listed below, along with our comments.

- **Review Process:** The model ordinance establishes a review process to be carried out by the town building inspector. In municipalities that do not have a building inspector, applications for a small wind energy system

should be reviewed by the appropriate board with the authority to issue such approvals.

- **Rated Capacity of Wind Generators:** Communities have discussed setting a threshold lower than 100 kW to protect the public from negative impacts that may be perceived by small wind energy systems at the upper limit. Caution should be used when adjusting the rating capacity for a small wind energy system. RSA 674:62 defines small wind energy systems as those systems which have a rated capacity “consistent with” net metering specifications (100 kW). Therefore, this model ordinance uses 100 kW as the maximum threshold.
- **Tower Height:** RSA 674:63 allows municipalities to regulate the height of towers for small wind energy systems through a small wind energy systems ordinance. The model ordinance sets 150 feet as the maximum tower height. Municipalities can adjust this but caution should be used. To ensure property owners have access to the best available wind resource, proper small wind energy system ordinances should allow the height of the towers to be 35 feet taller than the surrounding tree canopy.
- **Important Provisions:** Many municipalities may be interested in reducing the number of regulations within the small wind energy system ordinance. This can be done but there are seven key provisions that are recommended for any small wind energy system ordinance. These provisions are:
 - Public Review Process: The framework for the public review process should be clearly outlined.
 - Laws on Small Wind Energy Systems: RSA 674:62-66 should be referenced within the ordinance to call attention to the state laws regulating small wind energy systems.
 - Abutter Notification: Abutters should be notified of all applications for a small wind energy system and there should be a 30 day comment period prior to approval.
 - Regional Impact Assessment: The ordinance should emphasize the requirement for the reviewing body to determine whether there are potential regional impacts, using RSA 36:55 as a guide in making the determination.
 - Setbacks: Setbacks are important to alleviate public safety concerns and reduce the noise concerns. Setbacks are not permitted to be more than 150% of the height of the small wind energy system.
 - Sound: The noise emitted by the turbines is a common concern many abutters raise. A provision should be included that complies with state laws, including RSA 674:63.
 - Approved Wind Generators: Small scale turbines should meet set standards to protect the public’s interests and reduce impacts on abutters. The most comprehensive lists of turbines that meet industry standards are available from the California Energy Commission or the New York State Energy Research and Development Authority.





For additional resources, please visit the Wind Turbines/Wind Resources page [<http://www.nh.gov/oep/resourcelibrary/referencelibrary/w/windturbines/index.htm>] in the OEP Reference Library.

For further information, please contact Eric Steltzer, Energy Policy Analyst, at eric.steltzer@nh.gov or 603-271-1759.

This technical bulletin was created pursuant to Chapter 357:4 of the laws of 2008 (HB310). A public hearing was held on September 18, 2008 after being advertised in the Union Leader on September 5, 2008, and notices posted on the public bulletin boards of the NH Legislative Office Building, NH State House, and the NH Office of Energy and Planning. Further, notices were placed on the OEP website along with the draft of the bulletin, and similarly posted on the Local Government Center website. OEP wishes to acknowledge Rockingham Planning Commission for their contribution to this technical bulletin.

Article [] {Model} Small Wind Energy Systems Ordinance

A. Purpose

This small wind energy systems ordinance is enacted in accordance with RSA 674:62-66, and the purposes outlined in RSA 672:1-III-a. The purpose of this ordinance is to accommodate small wind energy systems in appropriate locations, while protecting the public's health, safety and welfare. In addition, this ordinance provides a permitting process for small wind energy systems to ensure compliance with the provisions of the requirements and standards established herein.

B. Definitions

Meteorological tower (met tower). Includes the tower, base plate, anchors, guy wires and hardware, anemometers (wind speed indicators), wind direction vanes, booms to hold equipment for anemometers and vanes, data loggers, instrument wiring, and any telemetry devices that are used to monitor or transmit wind speed and wind flow characteristics over a period of time for either instantaneous wind information or to characterize the wind resource at a given location. For the purpose of this ordinance, met towers shall refer only to those whose purpose are to analyze the environmental factors needed to assess the potential to install, construct or erect a small wind energy system.

Modification. Any change to the small wind energy system that materially alters the size, type or location of the small wind energy system. Like-kind replacements shall not be construed to be a modification.

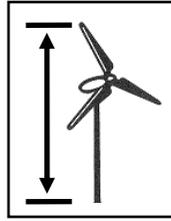
Net metering. The difference between the electricity supplied to a customer over the electric distribution system and the electricity generated by the customer's small wind energy system that is fed back into the electric distribution system over a billing period.

Power grid. The transmission system, managed by ISO New England, created to balance the supply and demand of electricity for consumers in New England.

Shadow flicker. The visible flicker effect when rotating blades of the wind generator cast shadows on the ground and nearby structures causing a repeating pattern of light and shadow.

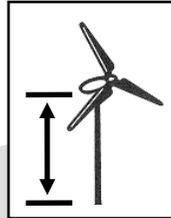
Small wind energy system. A wind energy conversion system consisting of a wind generator, a tower, and associated control or conversion electronics, which has a rated capacity of 100 kilowatts or less and will be used primarily for onsite consumption.

System height. The vertical distance from ground level to the tip of the wind generator blade when it is at its highest point.



Tower. The monopole, guyed monopole or lattice structure that supports a wind generator.

Tower height. The height above grade of the fixed portion of the tower, excluding the wind generator.



Wind generator. The blades and associated mechanical and electrical conversion components mounted on top of the tower whose purpose is to convert kinetic energy of the wind into rotational energy used to generate electricity.

C. Procedure for Review

1. **Building Permit.** Small wind energy systems and met towers are an accessory use permitted in all zoning districts where structures of any sort are allowed. No small wind energy system shall be erected, constructed, or installed without first receiving a building permit from the building inspector. A building permit shall be required for any physical modification to an existing small wind energy system. Met towers that receive a building permit shall be permitted on a temporary basis not to exceed 3 years from the date the building permit was issued.
2. **Application.** Applications submitted to the building inspector shall contain a site plan with the following information:
 - a) Property lines and physical dimensions of the applicant's property.
 - b) Location, dimensions, and types of existing major structures on the property.
 - c) Location of the proposed small wind energy system, foundations, guy anchors and associated equipment.
 - d) Tower foundation blueprints or drawings.
 - e) Tower blueprints or drawings.
 - f) Setback requirements as outlined in this ordinance.

- g) The right-of-way of any public road that is contiguous with the property.
 - h) Any overhead utility lines.
 - i) Small wind energy system specifications, including manufacturer, model, rotor diameter, tower height, tower type, nameplate generation capacity.
 - j) Small wind energy systems that will be connected to the power grid shall include a copy of the application for interconnection with their electric utility provider.
 - k) Sound level analysis prepared by the wind generator manufacturer or qualified engineer.
 - l) Electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the NH State Building Code.
 - m) Evidence of compliance or non-applicability with Federal Aviation Administration requirements.
 - n) List of abutters to the applicant's property.
3. Abutter and Regional Notification: In accordance with RSA 674:66, the building inspector shall notify all abutters and the local governing body by certified mail upon application for a building permit to construct a small wind energy system. The public will be afforded 30 days to submit comments to the building inspector prior to the issuance of the building permit. The building inspector shall review the application for regional impacts per RSA 36:55. If the proposal is determined to have potential regional impacts, the building inspector shall follow the procedures set forth in RSA 36:57, IV.

D. Standards

- 1. The building inspector shall evaluate the application for compliance with the following standards:
 - a) Setbacks: The setback shall be calculated by multiplying the minimum setback requirement number by the system height and measured from the center of the tower base to property line, public roads, or nearest point on the foundation of an occupied building.
 - i. Small wind energy systems must meet all setbacks for principal structures for the zoning district in which the system is located.
 - ii. Guy wires used to support the tower are exempt from the small wind energy system setback requirements.

MINIMUM SETBACK REQUIREMENTS			
Occupied Buildings on Participating Landowner Property	Occupied Buildings on Abutting Property	Property Lines of Abutting Property and Utility Lines	Public Roads
0	1.5	1.1	1.5

- b) Tower: The maximum tower height shall be restricted to 35 feet above the tree canopy within 300 feet of the small wind energy system. In no situation shall the tower height exceed 150 feet.
- c) Sound Level: The small wind energy system shall not exceed 60 decibels using the A scale (dBA), as measured at the site property line, except during short-term events such as severe wind storms and utility outages.
- d) Shadow Flicker: Small wind energy systems shall be sited in a manner that does not result in significant shadow flicker impacts. Significant shadow flicker is defined as more than 30 hours per year on abutting occupied buildings. The applicant has the burden of proving that the shadow flicker will not have significant adverse impact on neighboring or adjacent uses. Potential shadow flicker will be addressed either through siting or mitigation measures.
- e) Signs: All signs, including flags streamers and decorative items, both temporary and permanent, are prohibited on the small wind energy system, except for manufacturer identification or appropriate warning signs.
- f) Code Compliance: The small wind energy system shall comply with all applicable sections of the New Hampshire State Building Code.
- g) Aviation: The small wind energy system shall be built to comply with all applicable Federal Aviation Administration regulations including, but not limited to, 14 C.F.R. part 77, subpart B regarding installations close to airports, and the New Hampshire Aviation regulations including, but not limited to, RSA 422-b and RSA 424.

- h) Visual Impacts: It is inherent that small wind energy systems may pose some visual impacts due to the tower height needed to access wind resources. The purpose of this section is to reduce the visual impacts without restricting the owner's access to the optimal wind resources on the property.
 - i. The applicant shall demonstrate through project site planning and proposed mitigation that the small wind energy system's visual impacts will be minimized for surrounding neighbors and the community. This may include, but not be limited to information regarding site selection, wind generator design or appearance, buffering, and screening of ground mounted electrical and control equipment. All electrical conduits shall be underground, except when the financial costs are prohibitive.
 - ii. The color of the small wind energy system shall either be the stock color from the manufacturer or painted with a non-reflective, unobtrusive color that blends in with the surrounding environment. Approved colors include, but are not limited to, white, off-white or gray.
 - iii. A small wind energy system shall not be artificially lit unless such lighting is required by the Federal Aviation Administration (FAA). If lighting is required, the applicant shall provide a copy of the FAA determination to establish the required markings and/or lights for the small wind energy system.
- i) Approved Wind Generators: The manufacturer and model of the wind generator to be used in the proposed small wind energy system must have been approved by the California Energy Commission or the New York State Energy Research and Development Authority, or a similar list approved by the state of New Hampshire, if available.
- j) Utility Connection: If the proposed small wind energy system is to be connected to the power grid through net metering, it shall adhere to RSA 362-A:9.
- k) Access: The tower shall be designed and installed so as not to provide step bolts or a ladder readily accessible to the public for a minimum height of 8 feet above the ground. All ground-mounted electrical and control equipment shall be labeled and secured to prevent unauthorized access.
- l) Clearing: Clearing of natural vegetation shall be limited to that which is necessary for the construction, operation and maintenance of the small wind energy system and as otherwise prescribed by applicable laws, regulations, and ordinances.

E. Abandonment

1. At such time that a small wind energy system is scheduled to be abandoned or discontinued, the applicant will notify the building inspector by certified U.S. mail of the proposed date of abandonment or discontinuation of operations.
2. Upon abandonment or discontinuation of use, the owner shall physically remove the small wind energy system within 90 days from the date of abandonment or discontinuation of use. This period may be extended at the request of the owner and at the discretion of the building inspector. "Physically remove" shall include, but not be limited to:
 - a. Removal of the wind generator and tower and related above-grade structures.
 - b. Restoration of the location of the small wind energy system to its natural condition, except that any landscaping, grading or below-grade foundation may remain in its same condition at initiation of abandonment.
3. In the event that an applicant fails to give such notice, the system shall be considered abandoned or discontinued if the system is out of service for a continuous 12-month period. After the 12 months of inoperability, the building inspector may issue a Notice of Abandonment to the owner of the small wind energy system. The owner shall have the right to respond to the Notice of Abandonment within 30 days from Notice receipt date. After review of the information provided by the owner, the building inspector shall determine if the small wind energy system has been abandoned. If it is determined that the small wind energy system has not been abandoned, the building inspector shall withdraw the Notice of Abandonment and notify the owner of the withdrawal.
4. If the owner fails to respond to the Notice of Abandonment or if, after review by the building inspector, it is determined that the small wind energy system has been abandoned or discontinued, the owner of the small wind energy system shall remove the wind generator and tower at the owner's sole expense within 3 months of receipt of the Notice of Abandonment. If the owner fails to physically remove the small wind energy system after the Notice of Abandonment procedure, the building inspector may pursue legal action to have the small wind energy system removed at the owner's expense.

F. Violation

It is unlawful for any person to construct, install, or operate a small wind energy system that is not in compliance with this ordinance. Small wind energy systems installed prior to the adoption of this ordinance are exempt from this ordinance except when modifications are proposed to the small wind energy system.

G. 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 NH Revised Statutes Annotated Chapter 676:17.

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