

(Existing) Wind Energy

The Lincoln Ridge is among the best wind sites in New England. However, most of this property is national forest. Small scale wind generation in the Valley is possible in certain areas and various projects have been proposed. Given the ever rising costs of continued reliance on fossil fuels, there is likely to be increased interest in developing wind projects in the Valley. While Warren encourages the use of solar and small scale wind, a delicate balance must be sought in deciding the placement of solar and wind energy equipment.

Wind Energy

The Town of Warren has potential for the development of wind energy generation facilities. While this potential has been mapped using computer models, very little actual wind testing has been done at this point. The computer model wind potential is mapped as part of The Renewable Energy Atlas of Vermont, and can be viewed at www.vtenergyatlas.com.

The Town of Warren has always encouraged the use of renewable energy generation, and we continue to see wind energy as an important part of the Town's efforts to meet the needs of the Town. In alignment with the State Comprehensive Energy Plan we hope to see 25% of our total electrical needs (currently about 25Mw) met by Warren based renewable generation by the year 2025. Electricity generated by wind should be able to provide 20% of that goal or 5% of total electric needs.

The Town of Warren should continue to facilitate development of Warren based wind projects in order to achieve these renewable energy goals by means of community distributed and small-scale wind projects, particularly ones that can take advantage of net-metering.

At this time, the Town of Warren does not see large-scale or utility-scale wind generation as an appropriate fit for our town due to a variety of issues including a lack of adequate transmission facilities, conservation of forest lands as a renewable resource within our Forest Reserve District (see Chapter 10), and protection of certain scenic view-sheds.

Implementation Strategies:

- *(existing)* Allow flexible standards in the Land Use and Development Regulations for renewable energy generation and transmission facilities.
- The Town of Warren should consider developing generic siting guidelines for developers of wind projects, to aid permit process uniformity and provide guidance on aesthetics and other common issues.
- Site decommissioning plans for wind projects should cover criteria for deconstruction and remediation upon permanent retirement of each turbine, where appropriate, as well as the entire site

Article 10 Definitions

Community wind: Wind generation projects that are locally owned by farmers, investors, businesses, cooperatives, schools, utilities or other public or private entities who utilize wind energy to support and reduce energy costs to the local community. The key feature is that local community members have a significant direct financial stake in the project beyond land lease payments and tax revenue. Projects may be used for on-site power or to generate wholesale power for sale, usually on a commercial-scale greater than 100 kW.

Distributed wind: includes small and midsize turbines [100 kilowatts [kW] through 1 megawatt [MW]. Distributed wind generation is the generation of small-scale wind energy at the individual level distributed over a local area. For example, individual homes, farms or businesses may have their own wind turbine(s) and generate their own electricity for personal/business use. These turbines are much smaller than utility-scale turbines. Residential turbines generate less than 10 kilowatts [kW] and small industrial/business scale turbines range from 11 kW to 100 kW in size. In many locations if the turbine is connected to the grid excess electricity not used by the owner or the turbine can be sold to the local utility and distributed for more widespread use.

Electric Grid or Grid: a network of transmission lines, substations, transformers and more that deliver electricity from power plants to consumers. In the continental U.S. the electric grid consists of three systems: Eastern, Western Interconnect and Texas Interconnects.

Lattice Tower: a tower constructed of vertical metal struts and cross braces forming a square or triangular structure that tapers from the foundation.

Kilowatt: a measure of 1,000 watts of electrical power.

Kilowatt Hour: a measure of electrical energy equivalent to a power consumption of 1,000 watts for 1 hour. The consumption of electrical energy by homes and small businesses is usually measured in kilowatt-hours.

Large wind turbine: is typically in the range of 100 kilowatts [kW] to 5 megawatts [MW] and are used as central-station wind farms, distributed power, and offshore wind generating stations. Wind resources of 5.6 meters per second [12.5 mph – DOE Class 3] or better are required for large wind turbines.

Megawatt: a measure of 1,000,000 watts or 1,000 kilowatts of electrical power, used especially as a measure of the output of a power station.

Monopole Tower: a tower constructed of a single, self-supporting metal tube, anchored to a foundation.

Rotor radius: the distance between the center point of the rotor or the outermost point on the rotor or blade.

Small wind turbine: The U.S. Department of Energy's National Renewable Energy Laboratory [NREL] defines small wind turbines as those smaller than or equal to 100 kilowatts [kW]. Small wind turbines may be used for a variety of applications including on- or off-grid residences, telecom towers, rural schools, remote monitoring and other purposes that require energy where there is no electric grid, or where the grid is unstable. Small wind turbines may be as small as a fifty-watt generator for boat or caravan use.

Turbine: a machine for producing continuous power in which a wheel or rotor, typically fitted with vanes, is made to revolve by a fast-moving flow of water, steam, gas, air or other fluid.

Turbine height: the distance between the base of the tower or other supporting structure, whether mounted on the ground or on a rooftop, and the outermost point of the rotor or blade at its maximum vertical extension.

Utility-scale wind or Large-scale wind: applies to group of turbines over a megawatt in larger installations requiring hundreds of millions to billions of dollars in financing and years of permitting studies. Utility-scale installations usually require a transmission system interconnection that can take even longer to build than the wind project itself. Typically the electricity is sold rather than used on-site.

Wind energy facility: a wind turbine and such associated structures as substations, transmission lines and meteorological towers.

Wind turbine: a wind energy conversion system that converts wind energy into electricity through use of a wind turbine generator and includes such elements as a wind turbine generator hub, blade or rotor, tower and transformer.

Wind turbine hub: an electric power generator to which the blade or rotor of a wind turbine is attached.