Consumer's Guide to Residential Wind Turbines in Massachusetts

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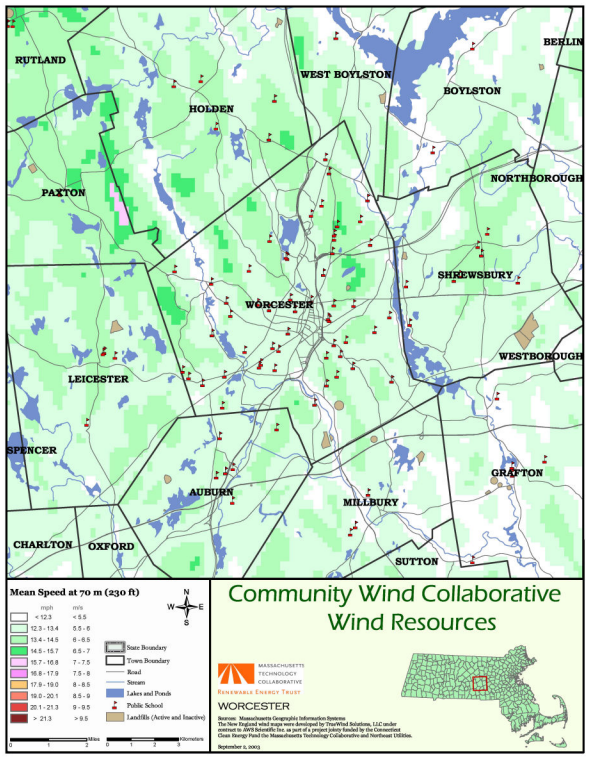
The goal of this project was to create a guide for Massachusetts consumers who were in the market to purchase a wind turbine to place on their residential property. These turbines would either be rooftop or stand alone. The definition of residential property for all purposes of this project is approximately a quarter acre plot. The consumer guide would include an easy to use table that uses the average wind speed in the consumer's location and diameter of the turbine to show the available power output for the consumer's needs. The turbine would be required to comply with state and local zoning laws.



Wind Turbines are a relatively basic design, like an aircraft's propellers, the blades turn in the moving air and power an **electric generator** that supplies an electric current. A wind turbine is essentially the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. The wind turns the blades, which spin the shaft, which is connected to a generator which produces the electricity.

Wind Turbines come in all sizes, in order to be practical for their intended location and purpose. Micro turbines are especially useful for residential areas. Residential areas and communities would most likely not support the use of a large turbine, for both zoning laws and environmental issues. That is why micro turbines provide the opportunity for clean renewable energy to power homes and businesses.

Pros:

- Green
- Renewable Energy
- Upfront cost with energy every year

Cons:

- It requires at least 5.4 mph wind speed to work
- More efficient at higher heights
- Wind reduction in urban areas
- Useless if blocked by a taller object
- Long payback period
- Small percentage of yearly household average of 36,000 kWh

Power Generation of Wind Turbines based on Wind Speed and Blade Diameter (kWh)

Wind Speed (MPH) \ Diameter (ft)	6.8	8.5	9.2	10.6	13.1	16.4	20.4	22.9	26.2
12.3	1140	1790	2090	2780	4240	6650	10280	12960	16960
13.4	1480	2310	2700	3590	5480	8590	13300	16760	21930
14.5	1870	2930	3430	4550	6950	10890	16840	21230	27790
15.7	2380	3710	4350	5770	8820	13820	21390	26950	35280
16.8	2910	4550	5330	7080	10810	16940	26210	33020	43220
17.9	3520	5500	6450	8560	13070	20490	31700	39940	52280
19.0	4210	6580	7710	10230	15630	24500	37970	47770	62530
20.1	4990	7790	9130	12120	18510	29010	44880	56550	74030
21.3	5930	9270	10860	14420	22020	34520	53410	67300	88100