FAQ for Small Wind Systems

FOR MORE INFORMATION, PLEASE CONTACT:

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General Information about Small Wind Systems

Small Wind Turbines are electric generators that use the energy of the wind to produce clean, emissions-free power for individual homes, farms, and small businesses. With this simple and increasingly popular technology, individuals can generate their own power and cut their energy bills while helping to protect the environment. Unlike utility-scale turbines, small turbines can be suitable for use on properties as small as one acre of land in most areas of the country.

What size turbine is needed to power an entire home? On average, a typical American home would require a small turbine with a 5-kilowatt (kW) generating capacity to meet all its electricity needs. A machine of this size has a diameter of approximately 18 feet. The exact size needed to power a home, however, can range from 2 kW to 10 kW (12-25 ft. diameter) based on a home's energy use, average wind speeds, and the turbine's height above ground (which affects its productivity).

How tall are they? The average height of a small wind turbine (of any capacity) is about 80ft. (about twice the height of a neighborhood telephone pole), with a range of 30-140 ft. Generator size and tower height are not generally related; a 5-kW turbine could be on a tower anywhere from 30-140 ft. in height, for example.

What is the average payback period? The length of the payback period depends on the turbine, the quality of wind at the installation site, prevailing electricity rates, and available financing and incentives. Depending on these and other factors, the time it takes to fully recover the cost of a small wind turbine can take anywhere from 6 to 30 years.

How much do they cost? The purchase and installation of a system large enough to power an entire home costs, on average, $30,000, but the price can range from $10,000 to $70,000 depending on system size, height, and installation expenses. The purchase and installation of very small (<1 kW) off-grid turbines generally cost $4,000 to $9,000, and a 100-kW turbine can cost $350,000. The federal government and many states have rebate or tax credit programs in place to encourage investment in small wind (see http://dsireusa.org).

What happens when the wind does not blow? For grid-connected systems, the user will not notice a difference when the wind is not blowing. The utility provides electricity when the wind does not blow, and any extra electricity the turbine generates is sent back to the utility system to be used by a neighbor. Off-grid turbines store power in batteries for on-demand use and are often complemented by solar electric panels to provide more consistent generation.

Do I need to take wind measurements? Taking detailed measurements to gauge your wind resource is often unnecessary. Experienced installers/dealers or manufacturers can determine whether your property is suitable for a system by inspecting the surrounding area.

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How much land and wind are required? Will my town let me install a turbine?
Installers recommend sites with average wind speeds of at least 12 mph, but specific land requirements vary from place to place. Zoning codes sometimes impose a minimum requirement on lot size or on the distance a turbine may be placed from a property line, and may vary depending on the height of the proposed turbine. Also, it is essential to have a site with unobstructed access to winds, which most often requires higher towers, larger land lots, and non-urban locations. Currently, less than 1% of all small wind turbines are used in urban applications partly due to zoning restrictions, but mostly because wind quality is much poorer in densely built environments. Contact your turbine factory dealer or see AWEA small-wind permitting guide at www.awea.org/smallwind for help navigating the permitting process.

How does the rated capacity of a small wind system compare to its actual performance?
Rated capacity indicates the electric power (kilowatts) at a given wind speed, so the answer depends on wind speed - and the turbine. A more accurate indicator of energy production, however, is swept area. A 5-kW turbine (average residential size, 18ft. rotor diameter) produces around 8,000 kWh per year in 12-mph average winds, which is about 100% of what an average U.S. home requires. At the larger end of the spectrum, a 100-kW turbine (60ft. diameter) in these conditions will generate around 200,000 kWh per year.

Are batteries or other storage needed?
There are two types of systems: those connected to the electricity grid ("on-grid") and those used off-grid (for battery charging) or backup power. Many systems sold today are off-grid, but demand is rising for on-grid systems which essentially use the grid as a "battery": when the wind blows, the owner uses electricity from the turbine; when winds are low and consumption is high, the owner uses electricity from the grid. The smallest wind turbines are used in conjunction with solar photovoltaic technology.

How are small wind systems maintained?
Routine inspections should be performed once a year of a turbine's 20+-year lifespan. A professional installer or trained technician (usually the manufacturer or dealer that sold the turbine) maintains the turbine and tower through physical inspections, though some turbines can be monitored remotely from a home computer.

How can I advocate for good policies?
AWEA, our members, and our allies actively engage state and federal lawmakers to promote good policies for small wind, such as tax credits, streamlined zoning and permitting, net metering, and standardized grid interconnection rules. Grassroots activism is a key component of our efforts. To join, visit the following link:
http://www.awea.org/issues/grassroots/index.cfm

Where can I go for more information?
The American Wind Energy Association has a toolbox of information on its Web site for people interested in installing a small wind system at www.awea.org/smallwind. On this site, you can find advice from an expert, some state-specific information about buying and installing a small wind turbine, success stories, technical information, and much more.

Also see "Wind Turbine Buyer's Guide" by Mick Sagrillo and Ian Woofenden in *Home Power* magazine (June/July 2007) http://www.homepower.com/view/?file=HP131_pg38_Sagrillo.