

WIND POWER

Do you have a good wind site?

Wind powered battery charging systems can be cost-effective if the average wind-speed is **TWELVE** miles per hour or more at the site where the wind generator will be located. (19 kilometers per hour or more). If you are using a wind generator in combination with photovoltaic power, it may be cost effective if you have enough wind only during part of the year. The power available from wind is proportional to the cube of the wind speed. When the wind speed doubles the power delivered is eight times as great. Most wind generators are designed to deliver maximum power at a wind speed of 30 mph (48 kph). At 15 mph (24 kph), they will deliver about 1/8 their rated power. A wind generator should be mounted **at least 30 feet higher** than any obstruction, regardless of direction, within **300 feet** to avoid turbulence, which will cause the turbine to oscillate from side-to-side and dramatically reduce power output.

Measuring The Wind

When considering buying a wind generator, many people think they have a site with good wind potential. This, more often than not, proves to be wishful thinking rather than an actual fact. It is best to do a wind site survey, conducted over a minimum of one year's time, to determine if a wind generator is actually feasible at your site. Measuring wind velocities and their duration is a slow but important process. This may save you much expense and effort if your site proves to be less than required to justify buying and installing a wind generator.

You can use one of the measuring devices listed on these pages to determine wind speed at your location. The Wind Data Logger acts like an odometer in a car, giving you the total wind passage over time. It provides you with the most complete information on the power producing potential of your designated site. The Kestrel wind speed indicator is like a speedometer, displaying wind speed at the time you are looking at it, but it does not record any information for further reference. It can be mounted on a tower to give you an idea of wind speed where the generator will be located.

If you measure wind speed at ground level, you can expect about 1.5 times the wind speed 30 feet up, which equates to about three times the power. At 120 feet above the ground, wind speed may be twice what is measured at ground level and power output will be more than twice the output at 30 feet.

Wiring

It is important to avoid excessive loss of power from voltage drop in a wire from the wind generator to the batteries. It is not necessary to use a wire size that minimizes voltage drop for maximum generator output. It will be more economical to choose a wire size that gives a 2% voltage drop at the average generator output for your site. But remember, **even large size wire is comparatively cheap** when considering that for a few dollars more you can probably eliminate the 2% loss altogether.

Check out the wire loss chart on page 80 of this catalog to decide on wire size. Use a wire designed to carry 1/2 the rated current of the generator you are using, but remember, three conductors (wires) are required.

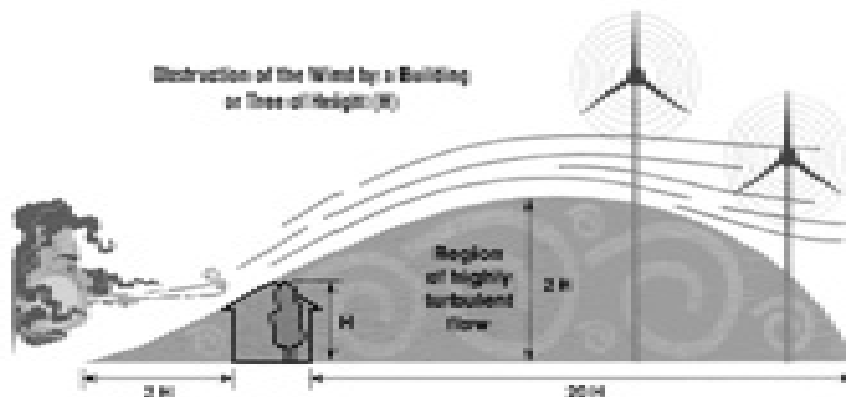
Towers

Mounting wind generators on a building should include vibration isolators, like the kits listed on page 19. We do not recommend doing this with turbines larger than 500 watts as noise and vibration will be a problem. Larger wind generators can cause severe damage to a building. Free standing towers, guyed towers or guyed poles or pipes are the best choices for installing any wind turbine—regardless of size.

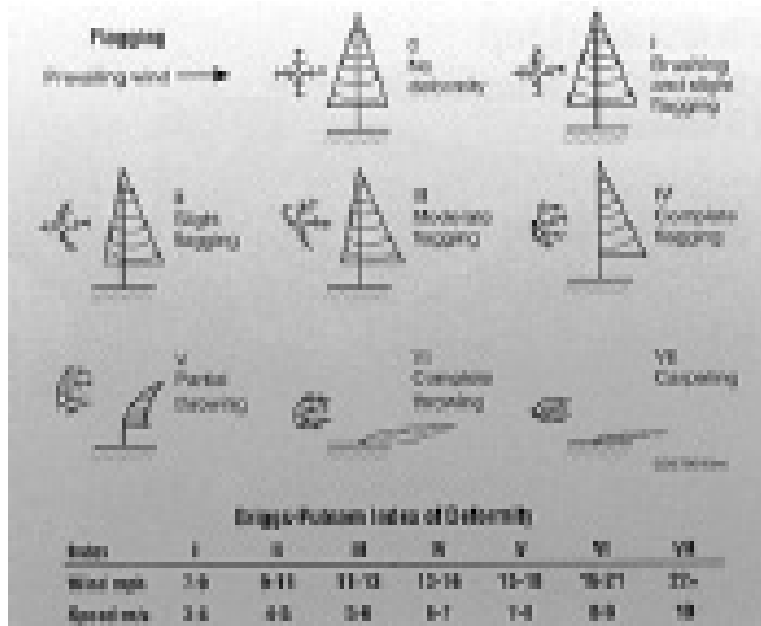
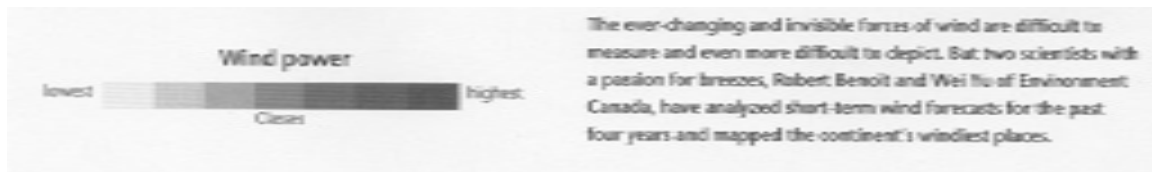
Freestanding towers designed for antennas can be used. They require a large, engineered concrete base for support, but since they do not require guy wires, they can be installed in the smallest space. Guyed steel truss towers, also designed for antenna mounting are less costly, but require a large area for guy wire placement.

A tilt-up pole tower is the most economical and the easiest to install. Wiring and mounting of the wind generator are done before the tower is erected. No climbing is necessary. Four or five inch steel tubing can be bought locally to save freight charges.

Some areas with zoning bylaws may not allow installing a tower over a certain height. If your location is within the glide path of an airport or public landing strip, this may also be the case. Check with your local zoning commission or airport authority before buying and erecting a wind generator tower of any kind. Hazard warning beacons may also be required atop a tower and at intervals along its length.



WIND POWER



Griggs-Putnum Wind Energy Index

WIND POWER

Kestral 1000 Pocket wind Meter



The Kestral 1000 pocket wind meter is accurate, tough and affordable. It requires no setup—just hold it up to measure the wind speed whenever needed. It can track maximum and average wind speeds along with current readings and allows you to choose the measurement units which suit your application. The Kestral 1000 measures wind speed with a precision ultra light impeller which turns on jewel bearings, providing excellent accuracy (+/- 3%) and the ability to measure the slightest breeze (0.3 M/S). The impeller and protective housing pop out for easy and inexpensive replacement, ensuring that the Kestral's high accuracy can be maintained even if the impeller mechanism becomes damaged or worn. The Kestral 1000 is built to withstand daily use in tough outdoor conditions. The slip-on hard case buttons and protects the impeller and LCD display from damage in your pocket or toolbox. The user replaceable battery provides 400 hours of use. The Kestral 1000 is also protected by a full one-year warranty.

16-511	Kestral 1000 Pocket Wind Meter	\$129
16-512	Replacement Impeller	\$ 28

Solar Powered Wind Data Logger



The Wind Data Logger is designed to provide an affordable and easy-to-use solution for wind site evaluation and wind generator performance. It records wind speed, as well as the time and date directly to a Secure Digital (SDTM) card to provide convenient data downloads. An inexpensive 128 megabyte SDTM card will store weeks of data at 30 second intervals and months of data at longer logging intervals. Microsoft Excel, OpenOffice.org, or practically any spreadsheet program can be used to view, graph, and analyze your wind data. Web-based software that makes your analysis even easier is provided. Simply upload your data and our software will automatically plot the data as well as provide basic statistics.

The Wind Data Logger comes in a waterproof enclosure with a 10-watt module and 7 amp-hour battery. Order side-of-pole mount for solar module separately if needed.

16-525	Wind Data Logger	\$1,569
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WIND TURBINES

Skystream 3.7

The Southwest Windpower Skystream 3.7 is a residential wind generator that hooks up to your home to reduce or eliminate your monthly electrical bill. It's the first all-inclusive UL Listed wind generator (with controls and inverter built in) designed to provide quiet, clean electricity in very low winds. The Skystream is ideal for residential homes and small businesses connected to the power grid.

Skystream connects directly to your home. When the wind is blowing, your home is powered (in part) by Skystream; when it's not, your home is seamlessly powered by your utility, as usual. During periods of strong winds, Skystream can actually produce excess electricity. Depending on your utility, your meter will spin backwards – giving you credit for a later date. Estimated energy production is 400 kWh per month in a 12 mph wind.

If your site fits the following criteria, Southwest Windpower's Skystream 3.7 may work for you:

- At least 10 mph average wind speed (best results at 12 mph or more)
- Your property is at least a half acre and has unobstructed views
- The local zoning allows a structure that is at least 42' tall
- Your utility has an existing interconnection agreement for homeowners

With a rated capacity of 1.9 kW, Skystream can provide anywhere from 40 to 100 percent of the total energy needs of a household or small business. Its sleek, distinctive 12-foot diameter swept-wing blades and elegant form make Skystream an attractive addition to any home. With a guyless tower, Skystream blends in like a neighbourhood street lamp. And because it operates at a low rpm, Skystream is as quiet as the trees blowing in the wind.

An optional two-way remote display unit lets you control your Skystream from up to 1000 feet (300 meters) away. You can also monitor performance and download energy performance data to your personal computer via USB converter.

5-year limited warranty.

16-301	Skystream 3.7 Land w/45' monopole	\$13,854
16-304	Skystream 3.7 Land w/60' monopole	\$18,492
16-311	Skystream 3.7 Land w/70' monopole	\$19,678



WIND TURBINES

Southwest Windpower

AIR X 400W and AIR Breeze 200W Wind Generators

The AIR Breeze, introduced in 2007, is the next generation of the AIR X turbine. Both the AIR Breeze and the AIR X come in 12- and 24-volt versions. The AIR X is also available in 48-volt. Both are available in land and marine versions. The quieter AIR Breeze features newly designed blades and higher power output at wind speeds below 12 mph. Because of its increased efficiency at lower wind speeds and advanced blade design, the AIR Breeze is the best choice for small wind applications unless average wind speed is well over 12 mph.

The Marine versions are corrosion-proofed for use in coastal and nautical applications. A white powder-coated housing and sealed electronics prevent damage from salt spray.

All units weigh 13 lbs, have a 46-inch rotor diameter and come with a 3-year warranty. The AIR Breeze is rated at 200 watts at 28 mph wind and the Air X is rated at 400 watts at 28 mph wind.

Features:

- Durable composite blades
- Delivers 33kWh/mo @ 12 mph avg wind speed (Air Breeze)
38kWh/mo @ 12 mph avg wind speed (Air-X)
- start up wind speed: 6 mph (Air Breeze)
7 mph (Air-X)
- survival wind speed: 110 mph

16-130	AIR X/AIR Breeze Land, w/built in regulator	\$ 849
16-131	AIR X/AIR Breeze Marine, w/built in regulator	\$1,195
53-650	Stop Switch	\$ 150
16-167	Roof Mount Kit with Seal	\$ 194
16-168	27' AIR Guyed Tower Kit (does not include poles & anchors)	\$ 289
16-169	45' AIR Guyed Tower Kit (does not include poles & anchors)	\$ 565



Whisper Wind Generators

Whisper wind turbines feature a patented side furling angle governor to protect the turbine in high winds by turning the alternator and blades out of the wind. Other features include field adjustable voltage, a four bearing spindle for efficiency, upgraded yaw shaft and a new bushing for smoother operation. Voltage is factory set at 24 Vdc and is adjustable to 12/36/48 Vdc. High voltage versions of the Whisper 200 and 500 produce 220 Vac transmitting to a step down transformer that changes it to nominal system voltage (transformer sold separately). High voltage versions are used in applications where there is a long distance from the turbine to the batteries.

Every Whisper 100 and 200 comes with the Whisper Charge Controller except for HV and pump models. The SCR-based shunt type controller, housed in a single unit, is dedicated to wind only. LED lights indicate regulation operation and Power ON. Other features include individually rectified phases, battery/turbine shunt isolation, quiet diversion-powered fan, a large heat sink and easy access block connectors for turbine and battery wires.

The marine versions, designed for coastal and offshore applications, feature powder coating for corrosion protection, stainless steel hardware, marine-grade wire and watertight housings. 5-year warranty.

16-205	WHI-100 w/Controller	\$ 3,249
16-206	WHI-200 w/Controller	\$ 4,258
16-207	Optional Controller Display (for WHI-100/WHI-200)	\$ 175
16-208	WHI 500w & EZ Wire (24V or 48V incl. Controller)	\$10,825

Tower Kits for the WHI 100, WHI 200& WHI500

Does not include pipe and anchors.

16-155	24' Tower Kit	\$ 644
16-156	30' Tower Kit	\$1,098
16-157	50' Tower Kit	\$1,568
16-158	65' Tower Kit	\$1,824
16-159	80' Tower Kit	\$2,553
16-160	36" Galvanized Augers (for 24')	\$ 269
16-161	48" Galvanized Augers (for 30', 50')	\$ 312
16-162	60" Galvanized Augers (for 65', 80')	\$ 498
16-163	30' Tower Kit (WHI 500)	\$1,994
16-164	42' Tower Kit (WHI 500)	\$1,739
16-165	70' Tower Kit (WHI 500)	\$2,539



WHI 500



WHI 100/200