

“Do I have a good site for wind power?”

Wind-powered battery-charging systems can be cost-effective if the average wind speed is nine miles per hour or more at the location of the wind generator. If you are using wind in combination with photovoltaic power, it may be cost-effective if good wind is available only during part of the year. 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. At 15 mph, they will deliver about 1/8 their rated power. A wind generator should be mounted

at least 20 feet higher than any obstruction within 300 feet to avoid turbulence. The power output of a wind generator will decrease roughly 3% for every 1000 feet of elevation. 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 will be twice what is measured at ground level and power output will be more than twice the output at 30 feet, and about 6 times the output at ground level.

Measuring Wind Speed

If you do not have a wind gauge, you can get a rough idea of wind speed from the table below.

Wind speed	Wind effect
0-1 mph	Smoke rises vertically
2-3	Direction of wind shown by smoke drift but not by wind vanes.
4-7	Wind felt on face; leaves rustle; ordinary wind vane moves
8-12	Leaves and twigs in constant motion; wind extends a light flag
13-18	Raises dust, loose paper; small branches are moved
19-24	Trees in leaf begin to sway; crested wavelets form on water
25-31	Large branches in motion; whistling heard in power lines

Kestrel

1000 Pocket Wind Meter

The Kestrel 1000 measures instantaneous, maximum and average wind speeds. Measurement unit options are knots, meters per second, kilometers per hour, miles per hour, feet per minute and Beaufort. Just hold it up to measure wind speed. Large, easy-to-read liquid crystal display with +/-3% accuracy. Measure down to 0.3 m/s.

Impeller and protective housing pop out for easy and inexpensive replacement. Includes slip-on hard case that protects the impeller, buttons and display from damage in your pocket or toolbox. It is waterproof and it floats. The replaceable battery provides 400 hours of use. One-year warranty.



Description	Item code	Price
Kestrel 1000 pocket wind meter	016-00253	\$85
Kestrel 1000 replacement impellor	016-00255	\$19

APRS

NEW! 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.

Description	Item code	Price
APRS 6060 wind data logger	016-00270	\$1,125
Side-of-pole mount for module	014-06011	\$57

Towers

We do not recommend mounting wind generators on roofs. Though it is possible with a wind generator of 500 watts or less output, it will be noisy. Freestanding towers, guyed towers or guyed poles may be used with wind generators.

Wind generators can be mounted on freestanding towers designed for antennas. They require a large, engineered concrete base for support, but since they do not require guy wires, they can be installed in a smaller space. Guyed steel truss towers, also designed for antenna mounting, are less costly and 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. Steel tubing can be purchased locally to save freight.



They suffered from irreconcilable similarities.

You're concerned about the price of electricity. She's worried about global warming. You want less reliance on imported energy. He wants more energy freedom. Well, at least you can agree on a residential wind generator. Designed specifically for grid-connected homes, the Skystream 3.7[®] allows you to take control of your energy needs by converting the free energy in the wind into electricity. Skystream can lower your electric bill by as much as 80%, protect you against volatile electricity prices, reduce your dependence on foreign oil, and produce clean green energy that doesn't cause global warming. Most importantly, it provides greater independence and stability for you and your family. This, we can all agree on.

SKYSTREAM 3.7[®]

Visit skystreamenergy.com or call 1-866-807-9463 for a dealer near you.

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 it 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. A stop switch is included with the Marine versions; it can be ordered separately (016-01351; \$33) for the Land versions.

Volts / Use	AIR X		AIR Breeze	
	Item code	Price	Item code	Price
12V Land	016-01032	\$750	016-00985	\$870
24V Land	016-01035	\$750	016-00984	\$870
48V Land	016-01037	\$750		
12V Marine	016-01050	\$950	016-00987	\$1,098
24V Marine	016-01053	\$950	016-00989	\$1,098
48V Marine	016-01055	\$950		

AIR-Industrial Wind Generators

The Air-Industrial is capable of resisting the harsh environments that generally accompany mountaintop telecommunication sites, environmental monitoring sites and off-shore oil platforms. It has specially formulated blade material that can stand up to sub-zero temperatures, and its blades are spaced farther from the tower so that it can operate at sustained winds up to 130 miles per hour. Maintenance-free performance, easy installation and high power output make the AIR-Industrial ideal for any remote battery-charging application. The AIR-Industrial does not have an internal controller, so an external controller must be installed on the battery bank. The recommended external controllers are Morningstar TriStar TS-45 or TS-60, or a Xantrex C40. Set controller in "diversion load" configuration and add an air- or water-heating diversion load (see page 118). 3-year warranty.



Description	Item code	Price
AIR403 12V Industrial w/o controller	016-01056	\$1,120
AIR403 24V Industrial w/o controller	016-01062	\$1,120
AIR403 48V Industrial w/o controller	016-01074	\$1,120

AIR Tower Kits

AIR tower kits are available in roof mount, 27' (8.1m) and 45' (13.5m) heights. These kits are Professional Engineer Certified (PE Certified). Each tower kit comes with all hardware necessary to install a tower, except guy supports, pipe and cement. All parts bolt or clamp together and no welding is required. Purchase 1-7/8" steel tubing from chain link fence supplier. Roof



mounts include vibration isolators, wall brace clamps and a safety leash, but do not include pole or lag screws.

Earth Auger Sets

Screw-in "auger" type guy anchors can be used in loamy and gravelly soils. Other soil types may require concrete footings or expansion bolts. Consult an engineer or geologist if you have questions about guy supports.

AIR Shutoff/Circuit Breaker

This interlocked pair of 60-amp circuit breakers protects wind-generator-to-battery wiring and allows you to disconnect and stop the wind generator for service. UL Listed breakers and NEMA 1 enclosure. For indoor mounting only. Can be used with all AIR-X wind generators.



Description	Item code	Price
AIR Marine tower hardware kit	016-01128	\$220
9' AIR Marine aluminum mast and 2 stays	016-01131	\$234
Roof kit without roof seal	016-01134	\$120
Roof kit with roof seal	016-01137	\$137
Roof seal – for roof mount kit	016-01140	\$65
27' AIR guyed tower kit (AIR only)	016-01086	\$190
45' AIR guyed tower kit (AIR only)	016-01092	\$310
36" Auger – set of 4; use with 24' & 27' towers	016-01113	\$129
36 Galvanized auger set of 4; for 24' & 27' towers	016-01116	\$182
48 Auger set of 4 32' - 50' towers	016-01119	\$140
48 Galvanized auger set of 4 32'-50' towers	016-01122	\$214
AIR Shutoff/circuit breaker	016-09003	\$172
30 amp circuit breaker kit	016-01225	\$25
50 amp circuit breaker kit	016-01226	\$25
100 amp circuit breaker kit	016-01222	\$57
Amp meter kit	016-01223	\$30
Stop Switch for Land Versions	016-01351	\$33

Southwest Windpower

The Whisper 100 and 200 from Southwest Windpower are shipped in a 24-volt configuration, but can easily be changed to 12, 36, or 48 volts by the installer. The included controller is adjustable for use with 12-, 24-, 36- and 48-volt battery systems and the voltage can be adjusted for any battery type. The control can be set to stop the blade from spinning when the battery is fully charged, avoiding wear when power is not needed. The control has a “selectable silent mode” setting that allows the user to select any specific period to automatically turn the wind turbine on or off.

An optional digital display may be added to the control to display total kilowatt hours, peak amps, and peak and average wind speed. To measure wind speed, the optional wind speed sensor must be ordered. Use NRG model #40 anemometer available at: <http://www.nrgsystems.com/>



All Whisper generators have a 5-year warranty.

Whisper 100 Wind Generator

The Whisper 100 is designed to operate in a site with wind speed averages of 12 mph and greater. It delivers 900 watts peak power at 28 mph (12.5 m/s). It can provide 100+ kWh per month, 3.4 kWh per day, in a 12 mph average wind speed location. The 100, with its 7 ft. (2.1 m) rotor diameter and 40 sq. ft. swept area, is rugged enough for extreme environments. The 3-blade design lasts longer and is more stable in turbulent wind. The Marine version is sealed and powder-coated for use in coastal and nautical environments.

Whisper 200 Wind Generator

The Whisper 200 is designed for the user who lives in low to moderate wind speed averages (less than 12 mph). The bigger brother to the 100, the 200 features a 10 ft (3.1 m) 3-blade rotor diameter and an 80 sq. ft. swept area that provides the user with greater output at low wind speed averages. The 200 has twice the swept blade area, providing double the potential energy, compared to the 100. It delivers 1000 watts peak power at 28 mph (12.5 m/s), but has a higher output than the 100 at lower wind speeds.

Whisper 500 Wind Generator

The Whisper 500 is a 3000-watt rated turbine that will deliver in excess of 500 kWh per month in a 12 mph wind. This machine has a 14-foot, 2 blade rotor providing 500 sq. ft. of swept area. It features a handmade fiberglass and foam core blade for smooth, high efficiency operation and low wind start-up. It also incorporates the patented “angle governor” design for quiet operation in high winds. The 500 is an excellent machine for village power projects, farms, ranches, backup power and remote homes with large energy demands. The Whisper 500 comes in two boxes and is shipped truck freight.

The Whisper 500 is available in 24-volt and 48-volt versions.

Description	Weight	Item code	Price
Whisper 100 w/ charge controller	73 lbs	016-01154	\$3,090
Whisper 100 Marine w/ charge controller	80 lbs	016-01162	\$3,400
Whisper 200 w/charge controller	85 lbs	016-01180	\$3,740
Whisper 200 Marine w/ charge controller	90 lbs	016-01189	\$4,075
Charge controller display for 100/200/500	1 lb	016-01211	\$130
Whisper 500 w/ charge controller 24V	310 lbs	016-01144	\$9,675
Whisper 500 w/ charge controller 48V	310 lbs	016-01145	\$9,675

Whisper 100/200 Tower Kits

Whisper 100/200 tower kits come in 24' (7.2m), 30' (9m), 50' (15m), 65' (19.5m), and 80' (24m) heights. Each tower kit comes with all hardware necessary to install a tower, except guy supports, pipe and cement. All parts bolt or clamp together and no welding is required. These tower kits use 2-1/2" (63.5mm) CQ40 fence pipe or schedule 40 water pipe. Actual O.D. is 2.875" (73mm)

Whisper 500 Tower Kits

Whisper 500 Tower Kits are available in 30' (9.1m), 42' (12.8m) and 70' (21.3m) heights. Uses 5" schedule-40 pipe.

Earth Auger Sets

Screw-in auger-type guy anchors can be used in loamy and gravelly soils. Other soil types may require concrete footings or expansion bolts. Use 36" and 48" augers with Whisper 100/200 installations and 48" and 60" augers on Whisper 500 installations. Consult an engineer or geologist if you have questions about guy supports. Do not use these auger sets with Whisper 500 towers.

Description	Item code	Price
Whisper 100 & 200 24' guyed tower kit	016-01083	\$364
Whisper 100 & 200 30' guyed tower kit	016-01089	\$585
Whisper 100 & 200 50' guyed tower kit	016-01095	\$812
Whisper 100 & 200 65' guyed tower kit	016-01098	\$1,072
Whisper 100 & 200 80' guyed tower kit	016-01101	\$1,268
Whisper 500 30' guyed tower kit	016-01110	\$1,164
Whisper 500 42' guyed tower kit	016-01104	\$1,268
Whisper 500 70' guyed tower kit	016-01107	\$1,788
36 Galvanized auger set of 4 - 24' 27' towers	016-01116	\$182
48 Galvanized auger set of 4 - 32'-50' towers	016-01122	\$214
60 Galvanized auger set of 4 - 65'-80' towers	016-01125	\$280
Whisper 100/200 60 amp brake switch	016-01202	\$75

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.

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 neighborhood 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.



Model	Description	Item code	Price
Skystream 3.7 120V Land	Skystream 1.9 kW generator for 120V 60 Hz	016-01003-120	\$5,400
Skystream 3.7 208V Land	Skystream 1.9 kW generator for 208V 60 Hz	016-01003-208	\$5,400
Skystream 3.7 240V Land	Skystream 1.9 kW generator for 240V 60 Hz	016-01003-240	\$5,400
Skystream 3.7 120V Marine	Skystream 1.9 kW marine generator for 120V 60 Hz	016-01005-120	\$6,100
Skystream 3.7 208V Marine	Skystream 1.9 kW marine generator for 208V 60 Hz	016-01005-208	\$6,100
Skystream 3.7 240V Marine	Skystream 1.9 kW marine generator for 240V 60 Hz	016-01005-240	\$6,100
Skystream 60 FT monopole tower	60-foot 2-piece free-standing tower (no guy wires); price includes shipping*	016-01006	\$9,100
Skystream 45 FT monopole tower	45 foot tower free-standing tower (no guy wires); price includes shipping*	016-01007	\$4,244
Skystream 33.5 FT monopole tower	33.5 foot tower free-standing tower (no guy wires); price includes shipping*	016-01008	\$3,395
Foundation bolt kit 32"	Includes bolts and bolt template for 33-ft monopole tower on mat foundation	016-01010	\$467
Foundation bolt kit 42"	Includes bolts and bolt template for 33-ft, 45-ft and 60-ft tower on pier foundation	016-01009	\$549
Gin pole kit	Includes gin pole, shackles and wire	016-01011	\$364
Hinge plate kit	Includes hinge plate and hardware	016-01012	\$322
Wireless remote display kit 916 MHz	Includes wireless display, antenna and AC adaptor	016-01015	\$335
USB converter kit	Includes remote to USB adaptor and software	016-01016	\$99
Tower adaptor kit (5")	Includes aluminum casting and hardware to attach Skystream to Whisper 500 guyed tower kits or any 5" schedule 40 pipe	016-01017	\$139
Wireless remote batt. sensor 916 MHz	Includes battery voltage sensor and antenna (required for all battery charging)	016-01018	\$250

* Tower price includes freight and delivery charges in the USA, except Alaska and Hawaii. Customer responsible for unloading the tower from the truck.