

www.GreenerEnergy.ca

WINDSPIRE



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The Windspire is a low cost, attractive, plug-n-produce wind power appliance that provides a safe and attractive method for harnessing power from the wind. At only 30 feet tall and 2 feet in radius, Windspire is distinguished by its sleek propeller-free design, ultra quiet operation, rugged construction, and affordable pricing. Designed for operation where we live and work, **it sells for \$4,995** and comes complete with a high efficiency generator, integrated inverter, hinged monopole, and wireless performance monitor.

Attractive - Manufactured with corrosion-resistant soft silver paint that can be repainted in any color, Windspire provides a truly aesthetically-inspiring renewable wind power option. It is appropriate for rural, suburban, and some urban residential environments alike, and at 30 feet, it is below typical residential and urban zoning restrictions. Several Windspires placed artistically in arrays can form an interesting display of kinetic art in front of small businesses, commercial buildings, resorts, etc.

Extremely Quiet - Our uniquely slender vertical axis design allows Windspire to operate with a low tip speed ratio (the edges of the rotor spin just 2 to 3 times the speed of the wind), which makes it virtually silent.

Durable, Simple Installation, Low Maintenance - Rugged yet simple construction means durability - Windspire is rated for winds up to 100 mph - and low maintenance for customers. Installation is simple, and can be completed by a professional installer in a matter of hours. The Windspire kit comes complete with everything you will typically need, except the concrete, so installers do not need to source numerous other components. Once installed, you can "plug 'n produce" - plug it into your outlet to begin drawing power from the wind. Alternatively you can have it hard-wired into your building. Regular maintenance is limited to a couple of minutes a year to oil the bearings, located 9 feet above the ground.

Power from Advanced Technology - Patented technology includes a rotor, generator, and inverter designed as a complete system to optimize the conversion of wind energy into electricity. The 1.2 kW (1.2 kilowatt, or 1200 watts) Windspire will produce approximately 2000* kilowatt hours per year in 12 mile per hour average winds. The Windspire also includes an internal wireless modem that can continuously transmit power production information directly to your computer so you can check your power production at any time.

With so many advantages, and priced well below other renewable energy products, Windspire is the natural choice.

*annual energy production is estimated based on initial test data.

Why Choose Windspire?

Windspire offers clean, renewable energy that can reduce your electricity bills, with key advantages over other renewable energy systems:

Aesthetically Inspiring

Windspire was designed to be uniquely aesthetic and compatible for the areas where we live and work. The low-profile, unobtrusive design blends in easily with the surrounding environment. Mesmerizing and relaxing to watch, the Windspire is truly visually inspiring.

Virtually Silent

Windspire is nearly silent. We estimate the maximum noise level at about 45 dB, taken 5 feet from the base (if you are standing right under it). This is well below the 65 to 100 dB noise levels of many turbines on the market.

Low Cost

At an MSRP of only \$4995 for a 1.2kW wind generator, the Windspire is priced well below other renewable alternatives. If rebates are available in your area, your net cost would be even lower. The price includes the poles, inverter, wireless performance monitor, and the hinged monopole, so there are no expensive extras to buy.

Easy to Install

No cranes, no guy wires - the Windspire really is simple to install. Your installer will simply pour a concrete foundation, assemble the unit on the ground, and raise the hinged unit with a winch (or motor or vehicle). Once the foundation has set, the installation can be completed in just a few hours. Our Plug 'n Produce system allows you to simply plug the Windspire into your home or building like an appliance, or alternatively you can have it hard-wired, to begin providing power.

Extremely Low Maintenance

Windspire is very easy to maintain. Once a year, add a little grease to an easy-to-reach bearing. Simple!

High Quality

Windspire uses durable corrosion-protected steel and aircraft grade aluminum construction, designed to operate for 20 years or more. With quality oversized bearings combined with a very simple mechanical structure, it is sure to provide reliable operation for years, even in high winds (up to 100 mph), snow and ice.

Clean, Abundant Renewable Energy

Wind power is from a clean, natural source that does not emit pollution of any kind. No emissions to lower our air quality or exacerbate global warming; no nuclear waste to bury away - just pure, clean wind. Wind will be a source of power as long as the earth orbits the sun and we have night and day. Wind is infinitely renewable, and it's there for the taking. Why waste wind?

Offset Global Warming

Wind is a source of power which doesn't require burning fossil fuels like coal, gas, oil, or other hydrocarbon fuels. By drawing power from a clean source, you are offsetting the need for power from dirty sources which emit greenhouse gases and contribute to the ill effects of global warming, not to mention poor air quality at ground level.

Personal Independence from Grid Power and Grid Prices

Electricity rates have been steadily rising for the last few years. For many people, the electricity bill is like paying a high rent on top of the mortgage. When temperatures hit record highs and lows, energy bills and rates can skyrocket. Worse, blackouts have shown the grid to be less reliable than most assumed. By adding your own source of renewable wind energy, you hedge against the risk of rising electricity rates (the higher the rates, the greater your benefit).

Savings on your Electricity Bill

When you supply your own power, you no longer need to buy as much electricity from your utility. This means ongoing savings every month for 20 plus years.

Improved Local and National Security

In the big picture, many matters of national security revolve around our energy security, namely fossil fuels that are frequently imported from foreign nations. By reducing your need for fossil fuel power, you are reducing the nation's need, and thus taking one small step towards easing tensions around many matters of national security.

[Windspire Applications](#)

Current Applications

Residential

Use one or more Windspires to power your home. Place them in the back yard, or display them in front of your home. Line a path, driveway, or your entry, using Windspires as power-generating pillars. Great for homes in the country, but also appropriate for many suburban and urban settings.

Business

Set up an array of Windspires in front of your building to provide you with electricity. Use this attractive form of renewable energy to visibly display your corporation's values and environmental responsibility, while lowering your energy bills.

Kinetic Sculptures for Resorts, Hotels, Office Towers, etc.

A group of Windspires arranged artistically in an array, painted with custom colors, can form a novel display of renewable energy that provides usable electricity, visual appeal, and a strong message to passers-by. Take your outdoor display to a new level by incorporating Windspires.

Coming Soon...

Off-Grid/Remote Power

Remote homes, cabins, telecommunications equipment, water pumps, monitoring sites, and other off-grid power needs can be fulfilled with renewable wind energy. As a bonus, Windspire's noiseless operation will still allow you to enjoy the sounds of nature.

240 V AC Version

Live in a country with 240V AC requirements? In the works is an electronic panel that incorporates a built-in transformer to condition the electricity for international electricity needs.

Windspire Technology

Windspire is a complete consumer-friendly appliance that is designed for plug-and-produce installation. All of the components were designed for integration together to provide seamless, reliable operation and easy installation.

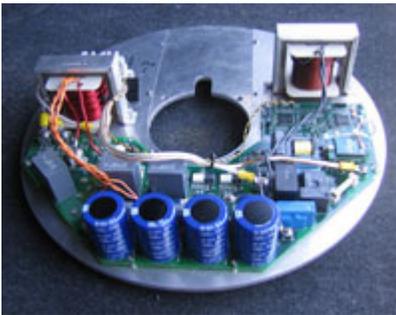


Optimized Rotor

The rotor is a low speed giromill (straight-bladed Darrieus) design optimized for energy capture efficiency by Ecole Polytechnique Montreal. The Darrieus rotor was researched and developed extensively by Sandia National Laboratories in the 1980's. Our rotor has modified this proven, high efficiency configuration into a size and form optimal for personal power generation. The changes also lowered the operating speed, making it nearly silent, while also improving self-starting capabilities. Constructed from aircraft grade aluminum, the rotor is both high strength and low cost.

Advanced Generator

Double Rotating Air Core motors and generators are seen as the future. They provide the highest efficiencies ever achieved, with some operating at over 99.0 percent. New manufacturing Technology allows them to be produced with both the highest possible efficiency and simultaneously at low cost. The Double Rotating Air Core generator used in Windspire is designed specifically for the rotor to efficiently capture as much energy as possible at all wind speeds. The Windspire generator technology was dynamometer tested and its performance verified by Oregon State University and the University of Nevada, Reno, under a program sponsored by the National Renewable Energy Laboratory (NREL). It achieved over 98% efficiency.



Integrated Inverter

The Windspire has its own integrated inverter to convert the raw electrical power from the generator into regulated electricity that ties in with the grid. The high-efficiency inverter was custom designed by the best electronics designers in the industry, to optimize operation with the rotor and generator. The inverter technology continuously maximizes the conversion of wind energy into electric power provided to your home or business, over the range of wind speeds.

Wireless Modem

Sometimes it can be nice to know how much energy you're producing each month, let alone how much you made from that big windstorm last week. A click of your computer can provide you all of that. The Windspire has a built-in wireless modem that's always transmitting power production information. With the zigbee dongle (much like a flash drive) plugged into your computer's USB drive, you can monitor the performance of your Windspire. It doesn't get any simpler.



What It Means to You

Through creative innovation with advanced engineering has developed the optimal and most cost-effective wind power appliance for residential and commercial needs. Windspire is a truly revolutionary wind energy solution.

Why Windspire is So Revolutionary

You may wonder why you haven't seen a product like Windspire on the market before, or why it's taken so long to see a viable Vertical Axis Wind Turbine (VAWT). Unfortunately, VAWTs have had a rocky history in the market, mainly due to low efficiencies. It is an engineering challenge to harness sufficient power from low rates of rotation in a cost-effective manner.

We began by developing an extremely efficient generator that is optimized for those low rates of rotation, and followed this with breakthroughs in rotor design and construction. In the end, we developed a solution that finally overcomes the hurdles of cost and efficiency, with our truly revolutionary Windspire wind power appliance. Finally, to really set Windspire apart from the rest, we verified our results with rigorous independent, third party testing. With multiple international patents protecting our innovations, Windspire is poised to change renewable wind power forever. Join in the revolution!

Windspire Specifications

General

Annual Energy Production (AEP)	2000 kWh*
Instantaneous Power Rating (IPR)	1.2 kW (1200 watts)*
Standard Unit Height	30 ft 9.1 m
Total Weight	600 lb 273 kg
Color	Soft Silver
Sound	20 decibels @ 40 ft 12 m
Warranty	5 year limited warranty

Rotor

Rotor Type	Vertical Axis - Low Speed Giromill
Rotor Height; Radius	20 ft 6.1 m; 2 ft radius 0.6 m
Swept Area	80 sq ft 7.43 sq m
Max Rotor Speed	500 RPM*
Peak Tip Speed Ratio	2.8
Speed Control	Dual Redundant: passive aerodynamic; electronic
Wind Tracking	Instantaneous

Electronics

Generator	High Efficiency Brushless Permanent Magnet
Inverter	Custom Integrated Grid Tie 120 VAC 60 Hz
Inverter Certification	ETL: Meets IEEE 1547.1; UL 1741
Performance Monitor	Integrated Wireless Zigbee Modem

Wind Ratings

Cut-in Wind Speed	9 mph 4 m/s
AEP Average Wind Speed	12 mph 5.4 m/s
IPR Rated Wind Speed	25 mph 11.2 m/s
Survival Wind Speed	100 mph 45 m/s

Construction

Foundation	Poured Concrete
Foundation Size	2 ft diameter by 6 ft base*
Rotor Material	Aircraft Grade Extruded Aluminum
Monopole/Structure Material	Recycled High Grade Steel
Coatings	Corrosion-resistant industrial grade paint

*Notes: Performance data is based on initial test data and expected final test results. Final testing is currently underway. AEP is based on assumptions, including a Rayleigh wind speed distribution and sea level air density. Foundation size may vary for non-standard soil conditions or non-standard heights.

Test Data

Initial Test Results are In!

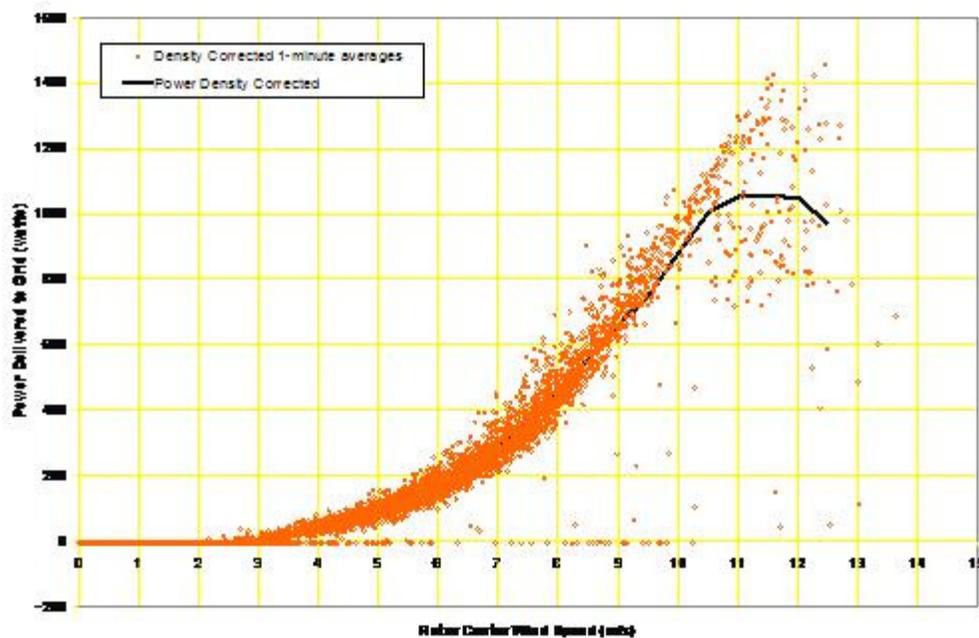
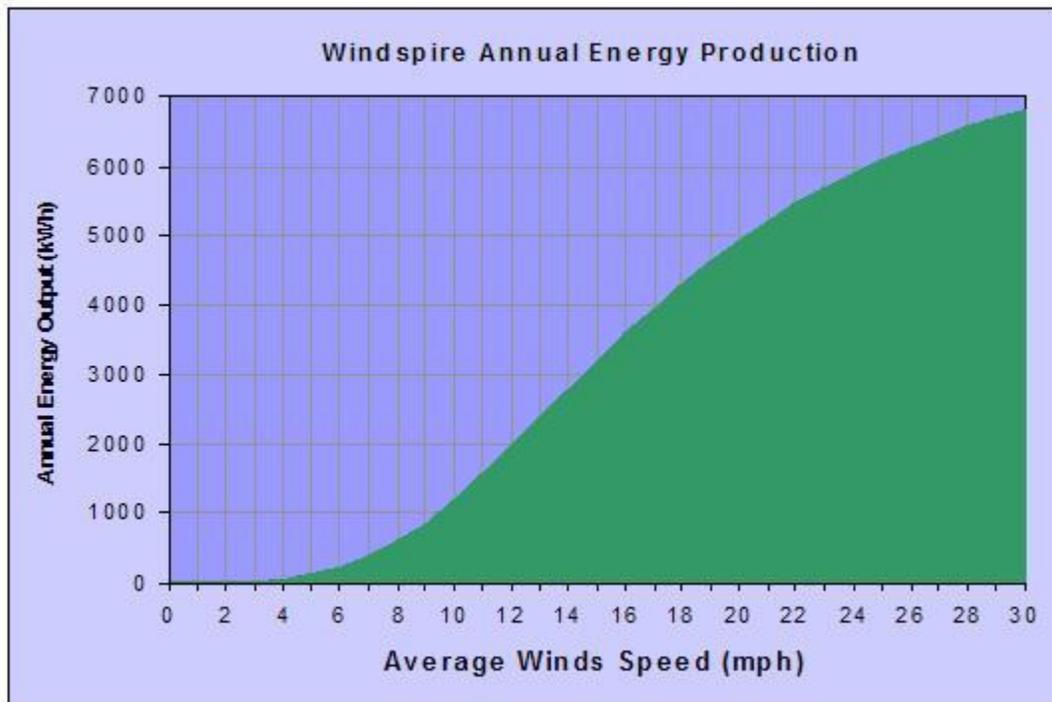
Below are initial test results from independent, third-party testing in Spanish Forks, Utah. The Windward Engineering test site offers a class 6 wind zone, and full testing and monitoring equipment. The Windspire will be tested for a full year at this site, and final test results will be announced in due course. We are proud to base our product ratings on real world test data.

In addition, Windspire is proud to have been selected to participate in NREL's small wind independent testing program. The Windspire will be tested for a full year near Boulder, Colorado, and at the end performance results as well as noise and durability testing data will be released (mid-2009). Test data will be posted at the NREL website.

We take pride in setting high performance standards for our technology, and in putting our unit through stringent real-world, in-ground testing to honestly assess and rate its performance. While this process has taken some time, ***rest assured that this level of testing is unusual: it is undertaken by very few companies in the industry.*** We chose to pursue real-world, independent testing in the interest of delivering a truly high performance product to our customers.

Testing of Other Products

We continue to develop and perfect a number of related technologies, including the original Savonius design of the Windspire. More information on products in our pipeline is available in the "Applications" section of the "Windspire" menu.



Maintenance

Bearings

Windspire utilizes two bearings. One bearing is sealed for life. For the other bearing, we recommend the addition of a finger swipe of grease to it about every year. Both bearings are located near ground level and are easily accessible, as well as replaceable.

Rotor

New Giromill Design

The efficiency of energy capture is very sensitive to the shape of the airfoils. For this reason, we recommend cleaning any accumulated dirt off the airfoils periodically. Also, should an airfoil become damaged, we recommend replacing it.

Savonius Design (product in development)

This design utilizes UV stabilized HDPE plastic panels. This material is designed for long life. However over time, the UV rays of the sun will cause degradation of any plastic and they will require replacement. The expected life is about 7-10 years, but this will vary by location. The panels are very inexpensive and can be easily replaced by lowering your Windspire, sliding the old panels out and new ones into the rotor frame.

Inverter

Windspire utilizes a smart inverter designed to provide long reliable generation. The expected life is about 10-20 years. As with all electronic hardware, electrical components will eventually degrade and will need to be replaced. The inverter is not overly expensive and can be easily replaced by unbolting it from the generator and installing a new one.

Generator

The Windspire generator was designed to operate with very high efficiency and to be maintenance-free. Should the generator become damaged for any reason, we recommend replacing it.

The New Design



Savonius Design





What's Included When You Buy a Windspire

We sell a complete wind power system, not just a turbine. When you buy a Windspire for the low price of \$4995, you get far more than just a wind turbine. You get:

- The rotor ("turbine")
- The generator
- The inverter
- The hinged monopole and pole stand
- Wiring up to 100 feet from the base
- The WiFi modem to monitor performance
- Owner's Manual
- A 5-year warranty

Your Windspire can be easily and quickly installed by an authorized dealer/installer. We are currently accepting applications for dealers and installers.

Installation

How is Windspire Installed?

The Windspire is designed to be quickly and easily installed by an authorized dealer/installer. Dealers are provided with a complete installation kit, including all components except the concrete.

The Installation Steps

1. Choose a suitable Windspire location.
2. Auger a 6-foot deep, 2-foot diameter hole (typical foundation).
3. Install the foundation form and secure the threaded anchor rods.
4. Pour the concrete, and wait for it to fully cure.
5. Dig a trench to your electrical connection for wiring.
6. Assemble the Windspire horizontally, connected to the hinge plate on the base.
7. Raise the Windspire with a winch or motor, using the cable and gin pole set.
8. Run the electrical wire and connect your Windspire to your house or building.

Estimated Installation Costs

Costs vary with local installation conditions (soil type, ground hardness) and local rates. In general, we estimate installation costs at around \$1000 for a system with a simple electrical connection and favorable local conditions.

Windspire Warranty

Note: It is important that our customers know what they are buying, and that we stand behind what we sell - so we've posted our full warranty here. However, the following warranty is still considered a "draft", and may be subject to further revisions.

Warranty Coverage

Mariah Power Inc. warrants the Windspire™ and all components of the Windspire™ generating system to be free from defects in material and/or workmanship for a 5-year warranty period, beginning on the date of delivery. This warranty covers the generating equipment against breakdown or degradation of electrical output of not more than 10% from the originally rated output. Should any of the above components fail during the specified warranty period, Mariah Power Inc. will, upon prompt notice and at no cost to the CUSTOMER, diagnose and repair or replace the malfunctioning component of the Windspire™ or, at the discretion of Mariah Power Inc., repair or replace the entire Windspire™ structure.

This warranty extends to the original purchaser and to any subsequent purchasers or owners at the same location during the warranty period. For the purpose of this warranty, the terms "purchaser," "subsequent owner," and "purchase" include a lessee, assignee of a lease, and a lease transaction.

Warranty Limitations

This warranty will become void if:

The Windspire™ is not lowered and protected during extreme wind storms with gusts reaching 100 mph or more; The Windspire™ is not installed, operated, maintained, or repaired in accordance with manufacturer's instructions;

Any other structures, other than those sold or recommended by Mariah Power Inc., are installed on the top of the unit or are otherwise attached to the unit in such a manner as to alter, modify, or stress the structure;

The Windspire™ is lowered and raised excessively, meaning more than 10 times in any one year.

The Windspire™ is moved from its original place of installation.

This warranty does not apply to damage, malfunction, or degradation of electrical output caused: by failure to properly operate or maintain the system in accordance with the manufacturer's instructions. by any repair or replacement using a part or service not provided or authorized in writing by the warrantor. during installation by CUSTOMER, reseller, or third party installer, other than if it is installed directly by Mariah Power Inc. by abuse, accident, alteration, improper use, negligence or vandalism, or from ground movement (from any source), earthquake, fire, flood, lightening, tornado, hurricane, volcano, tsunami, or other acts of God.

Mariah Power Inc. provides no warranty, express or implied, other than those contained herein. No dealer or other person has the authority to make any warranties or representations concerning Mariah Power products. Accordingly, Mariah Power Inc. is not responsible for any such warranties or representations.

Mariah Power Inc. assumes no liability for lost electricity production due to product failure, or any extra cost of electricity associated therewith. Mariah Power Inc. assumes no liability for lost time, interruption of business, lost profits, lost data, inconvenience, incidental expenses such as telephone calls, labor, or material charges incurred in connection with the removal or replacement of the equipment, or any other incidental or consequential damages.

Mariah Power Inc. assumes no liability for any damage or loss to any items or products connected to, powered by, or otherwise attached to the Windspire™. The total cumulative liability to CUSTOMER, from all causes of action and all theories of liability, will be limited to and will not exceed the purchase price of the product paid by the CUSTOMER.

Defects or failures resulting from mistreatment or neglect by buyer, or warranty claims that are deemed invalid for any reason, shall be repaired or serviced at CUSTOMERS expense.

Warranty Procedures

In order to obtain the benefits of this warranty, the CUSTOMER must:

Register the product within 60 days of the purchase date;

Notify Mariah Power Inc. by telephone or in writing as soon as possible following discovery of the defect, but no later than the expiration date of the warranty period for the component, as listed in this warranty, and obtain a Return Authorization number. Notification must include a statement describing the problem, the manner in which the wind generator was used, the serial number, the original date of purchase, delivery, and completion of installation, and the complete name, address, and telephone number of the party requesting warranty service.

Return the defective part(s), as determined in the Return Authorization, at the expense and risk of the CUSTOMER, within 60 days of the issuance of the Return Authorization number. The Return Authorization will become void if the part(s) have not been shipped within 60 days of its issuance. The CUSTOMER is responsible for adequate packaging and insurance during shipping. Returned part(s) that are replaced shall become the property of Mariah Power Inc. on the date that the replacement is shipped back to the CUSTOMER.