

## Clean. Simple. **Smart.**<sup>™</sup>

The Windspire<sup>®</sup> wind turbine is an aesthetically designed vertical axis wind turbine that stands only 9 meters tall, and operates quietly while generating electricity for immediate use in your home or business.

The Windspire is also the lowest priced alternative energy system in the one kilowatt range on the market.

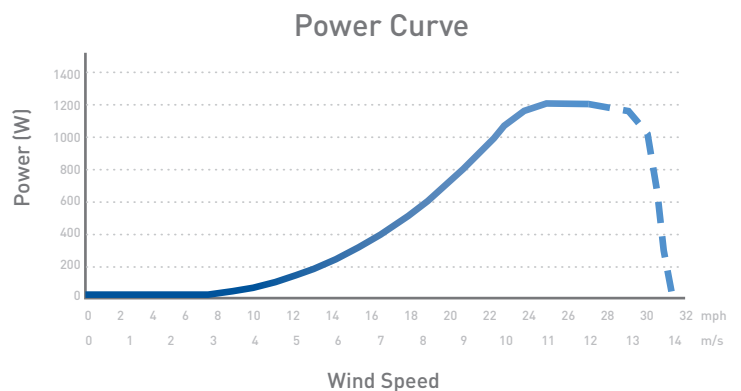
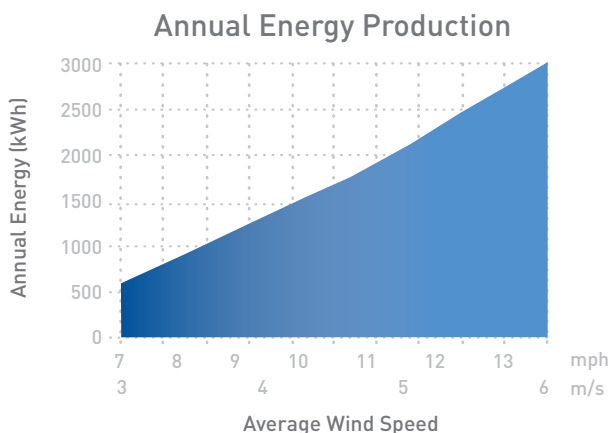
And it's manufactured in the USA. Windspire invites everyone to explore the potential of clean energy from the natural power of the wind.

### WIND REQUIREMENTS

The Windspire wind turbine was designed to operate in areas with minimum average wind speeds of at least 10 mph (4.5 m/s) though it works best with average winds of 11 mph (5 m/s). A special Windspire for extreme winds is also available for locations subject to unusually high wind events. Wind speeds vary by location, even within a property. Your authorized Windspire Dealer can discuss site guidelines with you in more detail.

WINDSPIRE SPECIFICATIONS - STANDARD UNIT 1.2kW	
Annual Energy Production	2000 kWh/yr <sup>1</sup>
Rated Power	1200 watts <sup>2</sup>
Cut-in Wind Speed	8.5 mph   3.8 m/s
AEP Average Wind Speed	11.2 mph   5 m/s (AWEA Standard)
Rated Power Wind Speed	24 mph   10.7 m/s
Survival Wind Speed	105 mph   47 m/s
Standard Unit Height	30 ft   9.1m (pole extension available)
Total Weight	624 lb   283 kg
Unit Color	Soft Silver
Sound Output	6 dBA above ambient (15 mph wind, 6ft from base)
Warranty	5 Year Limited
Rotor Type	Vertical Axis - Low Speed Giromill
Rotor Height/Diameter	20 ft   6.1m /4.1 FT   1.2 m
Swept Area	80 sq ft   7.43 sq m
Max Rotor Speed	420 RPM <sup>3</sup>
Tip Speed Ratio	2.3
Speed Control	Redundant Electronic
Wind Tracking	Instantaneous
Generator	High Efficiency Brushless Permanent Magnet
Inverter	Inverter Custom Integrated Grid Tie 120 VAC 60 Hz
Inverter Certification	Meets IEEE 1547.1; UL 1741
Performance Monitor	Integrated Wireless Zigbee Modem
Foundation	Poured Concrete
Foundation Size	2 ft diameter by 7 ft base <sup>4</sup>
Rotor Material	Aircraft Grade Extruded Aluminum
Monopole/Structure Material	Recycled High Grade Steel
Finish	2 Coats, Corrosion-Resistant Industrial Grade Paint
Coatings	Rust Veto & Zinc Olive Drab

Notes: 1: AEP is based on the power curve and standard assumptions including a Rayleigh wind distribution and 1400m air density. 2,3: Performance is based on independent test data (site specific). 4: Foundation size may vary for non-standard soil conditions or non-standard heights.



## Frequently Asked Questions

### What is the difference between Energy and Power?

At wind speeds greater than 3.5 m/s, the Windspire® will begin producing power, which is measured in Watts (W) or kilowatts (kW). Power output jumps up and down as quickly as the wind changes speed, so the industry measures energy in kilowatt-hours (kWh), which is how many watts of power are consumed over a full hour. Your electric company charges you for energy usage based on a rate/kWh. Over the course of a year, each 1.2kW Windspire will produce approximately 2000 kWh in 5 m/s average winds to help offset the energy you require from the electric company. Elevation will affect energy production.

### How does it work?

Windspires operate with three sets of tall, narrow airfoils that catch the wind while spinning around a vertical axis. As the rotor turns, a generator conditions the energy into electricity. The grid-tie inverter then converts the electricity from a direct current (DC) to an alternating current (AC) that can be used for buildings and homes.

### Are There Specific Requirements for Potential Customers?

A Windspire site requires access to unobstructed wind and adequate space for installation. The Windspire also needs at least class two winds – ideally class three (an average of 5 m/s) – and a tie to the power grid.

### Is the Windspire a Grid-Tie or Off-Grid Product?

The currently available Windspire is grid-tie, which requires the unit to be tied into the local utility grid.

### Can I sell electricity back to the grid?

Some utilities offer net metering agreements that allow credit for excess power sent back to the grid.

### Is the Windspire Independently Tested and Certified?

The Windspire is independently tested at Windward Engineering in Spanish Forks, Utah. This testing allows customers to know what level of power production to expect from specific wind ranges.

### Is it Safe for Birds?

The Windspire rotates at a lower speed than most wind turbines and is more visible to flying birds. So far, we have had no reports of collisions – and we have had one report of a nest built under an active unit.

### How Does the Braking System Work?

The Windspire is designed to operate in wind speeds of 3-11 m/s. At wind speeds higher than 11 m/s the redundant electronic braking system will engage as a safety feature. While it may seem counterintuitive to engage brakes and therefore cease energy production during high winds, this is essential to the safety and reliability of the Windspire. Per grid specifications, the Windspire will also engage the brake if the grid voltage or grid frequency falls outside the regulatory ranges.

Changing the world.

**One revolution at a time.™**



## Clean. Simple. **Smart.**<sup>™</sup>

The Extreme Wind Windspire<sup>®</sup> turbine is an aesthetically designed vertical axis wind turbine that operates quietly while generating electricity in areas that periodically experience very high wind events.

And it's made in the USA. Windspire invites everyone to explore the potential of clean energy from the natural power of the wind.

### WIND REQUIREMENTS

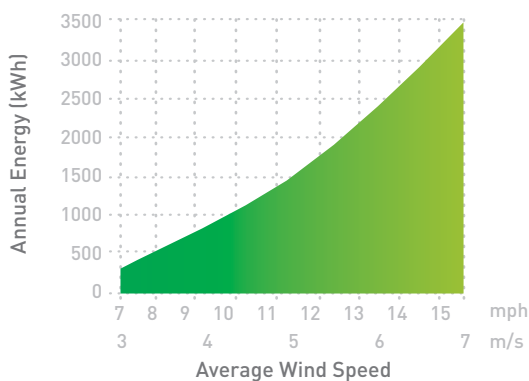
The Extreme Wind Windspire turbine was designed to operate in areas subject to unusually high wind events, with minimum average wind speeds of at least 10 mph (4.5 m/s) though it works best with average winds of 12.5 mph (5.7 m/s). Wind speeds vary by location, even within a property. Your Windspire Dealer can discuss site guidelines with you in more detail.

### WINDSPIRE SPECIFICATIONS - EXTREME WIND UNIT 1.2kW

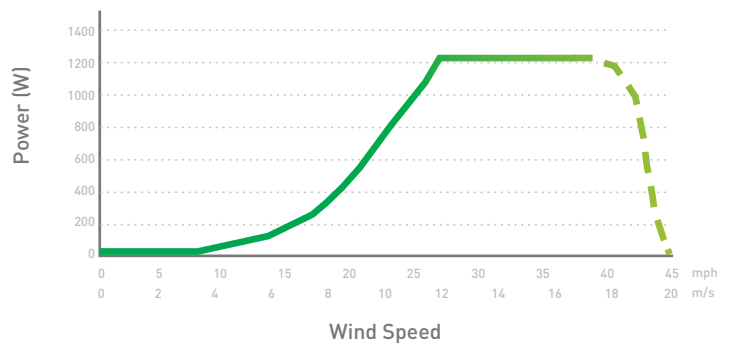
<b>Annual Energy Production</b>	2000 kWh/yr <sup>1</sup>
<b>Rated Power</b>	1200 watts <sup>2</sup>
<b>Cut-in Wind Speed</b>	8.5 mph   3.8 m/s
<b>AEP Average Wind Speed</b>	12.5 mph   5.7 m/s
<b>Rated Power Wind Speed</b>	26.8 mph   12 m/s
<b>Survival Wind Speed</b>	160 mph   71.5 m/s
<b>Standard Unit Height</b>	23 ft   7.1m (pole extension available)
<b>Total Weight</b>	567 lb   257 kg
<b>Unit Color</b>	Soft Silver
<b>Sound Output</b>	6 dBA above ambient (15 mph wind, 6ft from base)
<b>Warranty</b>	5 Year Limited
<b>Rotor Type</b>	Vertical Axis - Low Speed Giromill
<b>Rotor Height/Diameter</b>	13.2 ft   4m /4.1 FT   1.2 m
<b>Swept Area</b>	52.7 sq ft   4.89 sq m
<b>Max Rotor Speed</b>	420 RPM <sup>3</sup>
<b>Tip Speed Ratio</b>	2.3
<b>Speed Control</b>	Redundant Electronic
<b>Wind Tracking</b>	Instantaneous
<b>Generator</b>	High Efficiency Brushless Permanent Magnet
<b>Inverter</b>	Inverter Custom Integrated Grid Tie 120 VAC 60 Hz
<b>Inverter Certification</b>	Meets IEEE 1547.1; UL 1741
<b>Performance Monitor</b>	Integrated Wireless Zigbee Modem
<b>Foundation</b>	Poured Concrete
<b>Foundation Size</b>	2 ft diameter by 7 ft base <sup>4</sup>
<b>Rotor Material</b>	Aircraft Grade Extruded Aluminum
<b>Monopole/Structure Material</b>	Recycled High Grade Steel
<b>Finish</b>	2 Coats, Corrosion-Resistant Industrial Grade Paint
<b>Coatings</b>	Rust Veto & Zinc Olive Drab

Notes: 1: AEP is based on the power curve and standard assumptions including a Rayleigh wind distribution and 1400m air density. 2,3: Performance is based on initial field test data. Final testing is currently underway. 4: Foundation size may vary for non-standard soil conditions or non-standard heights.

### Annual Energy Production



### Power Curve



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### **Are There Specific Requirements for Potential Customers?**

A Windspire site requires access to unobstructed wind and adequate space for installation. The Extreme Windspire also needs average annual winds of 5 m/s – and a tie to the power grid.

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The Windspire is designed to operate in wind speeds of 3-15 m/s. At wind speeds higher than 16.5 m/s the redundant electronic braking system will engage as a safety feature. While it may seem counterintuitive to engage brakes and therefore cease energy production during high winds, this is essential to the safety and reliability of the Windspire. Per grid specifications, the Windspire will also engage the brake if the grid voltage or grid frequency falls outside the regulatory ranges.

