
windpods

WINDPODS TECHNOLOGY

Windpods are patented micro wind turbines for on-site power generation in urban environments. Developed in Fremantle, Western Australia, Windpods feature a modular design approach similar to that of solar / PV. i.e. a plug and play system where consumers buy the number of modules required for the load.

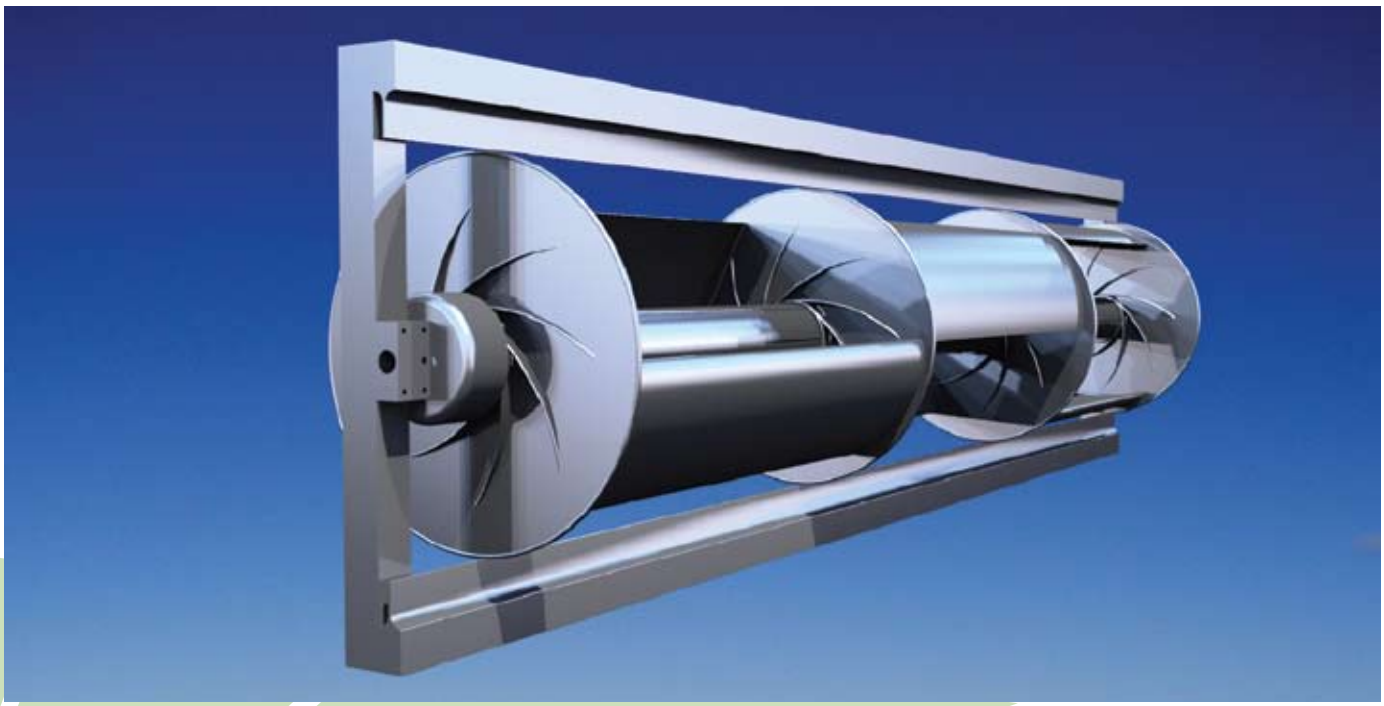
Windpods have aerodynamics designed specifically for variable urban wind environments and offer cost savings and convenience of installation on urban buildings and structures such as roof-top ridge-lines.

The Windpods G1 residential and light-commercial module has an outer frame size of 667mm high x 2530mm in length. The turbine itself has three sections, each with blade positions offset 60 degrees from the next to provide a very smooth torque curve (effectively as smooth as a 6 blade system) and two G1 units can achieve an output of at least 1 kW in 12.5 m/s wind speed.

The frame (including top and bottom deflector plates) can be installed horizontally, vertically or any angle in between. This type of flexibility also gives Windpods the ability to be designed into the architectural features of a project and the modularity permits very wide design scope.

Other importance characteristics of Windpods include :

- Extremely low noise and vibration. The Tip Speed Ratio (TSR) is significantly less than Horizontal Axis Wind Turbines (HAWT's), therefore Windpods have lower noise and vibration.
- Able to operate vertically, horizontally or any angle in-between.
- Able to operate efficiently in gusty and turbulent winds such as typically found in urban environments.
- Able to be modularly mounted onto buildings at low cost in a location where wind is at highest concentration.
- Excellent power production per dollar of cost.
- Slender, elongated turbine tubes of only 460mm diameter that may not require complicated Council planning approvals (depends on individual Council policies).
- Safe to birds. Conventional propeller style (HAWT) turbines can be dangerous to birds because they have no frame surround and feature high TSR thin blades that become virtually invisible when spinning. Windpods have only moderate TSR's and larger, smooth blades plus a complete frame surround (deflectors) and are therefore visually obvious and safe for birdlife.
- In cyclones and extremely strong winds, the Windpods electronic brake system stops the turbine, protecting it from damage.
- Life-span. The only moving parts are bearings and these have a design life of greater than 17 years and replacement of bearings after this time is simple and low cost.
- Compatible with several existing inverter units already on the market such as SMA's Windyboy.

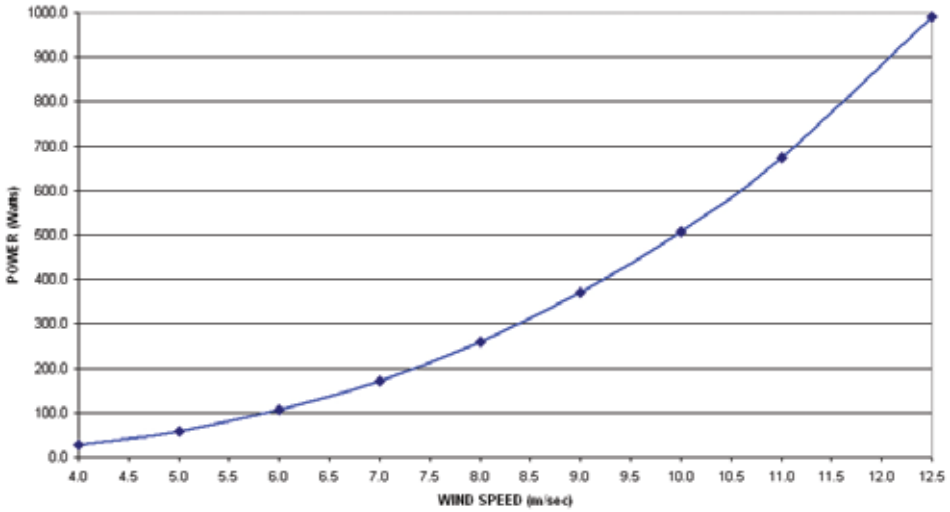


TECHNICAL PERFORMANCE

Windpods have undergone a performance optimization program at the University of Western Australia wind tunnel and pre-production performance data is shown on the chart below.

It can be seen that a significant percentage of household power can be derived from Windpods. Using Fremantle, Western Australia as an example, Fremantle has an annual average wind speed of 5.7 m/sec. A twin G1 module Windpod system can produce approximately 172 Watts on average in a location with that wind speed, which amounts to nearly 24% of the average Australian family's power consumption.

1kW Windpods Unit

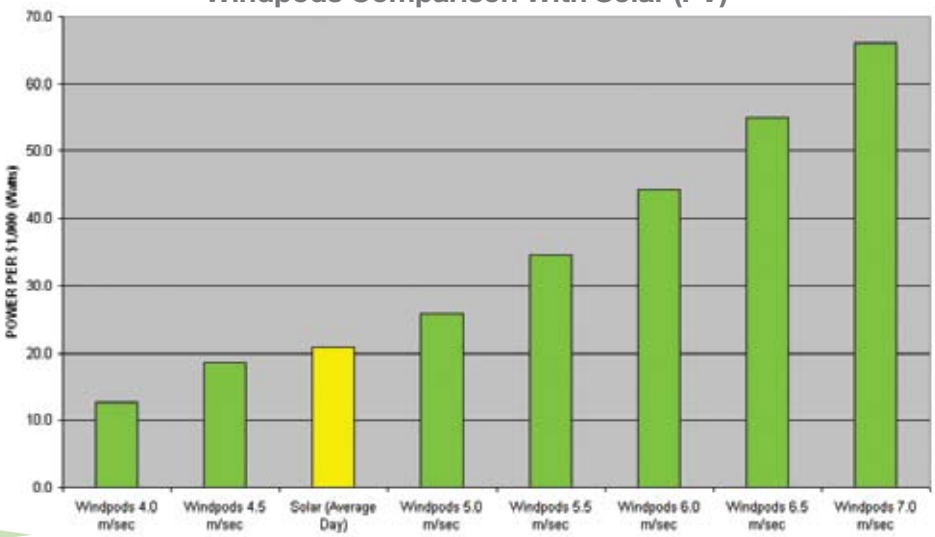


COMPARISON WITH SOLAR/PV

The synergy of Wind and Solar creates an ideal, renewable partnership for distributed power generation. When one is not producing power the other probably is, so the combination tends to smooth the overall output and energy returns. A comparison chart is shown below, comparing Windpods output with solar PV (photovoltaic) output.

Solar data derived from the paper 'Experiences with Residential Grid-Connected Photovoltaic Systems in Australia' by Watt, Morgan and Passey from the University of NSW, 2006. Results are factored up by 1.081 to allow for inverter inefficiency. Windpods power estimates were derived from wind tunnel performance tests, extrapolated via the Weibull distribution method with a shape parameter of 2. Power data is continuous power in Watts for an average 24 hour period, derived from annual averages, per $1,000 of system cost. System costs were based on a typical market price of AUD$9,000 for 1kW of solar panels and AUD$4,500 for 1kW of Windpods (both prices are uninstalled without inverter).

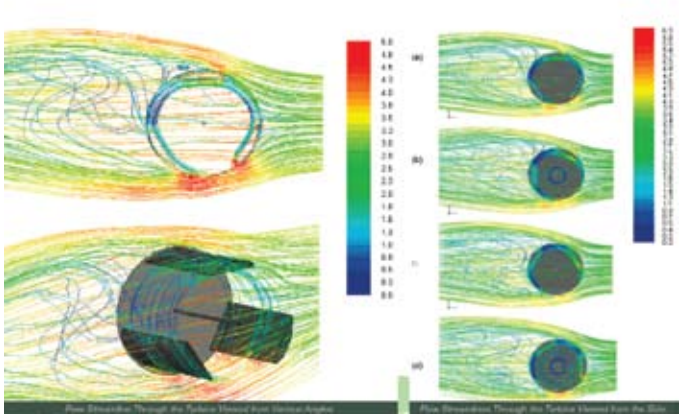
Windpods Comparison With Solar (PV)



HOW WINDPODS WORK

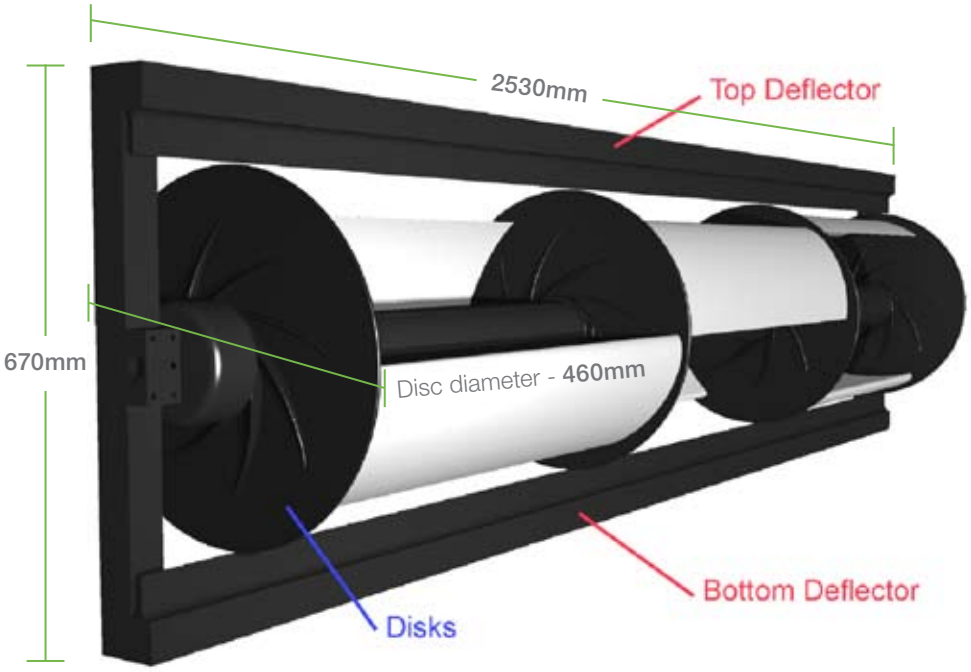
Windpods are a ‘start from scratch’ purpose-built design approach to urban wind power. Initially, the concept started out as a simple design to take advantage of air flow over a roof apex ridge-line. However, via intensive wind tunnel testing, the turbine developed into a very high performance machine with extremely sophisticated aerodynamics. This has resulted in a much wider range of applications and a broad pallet of IP to cover the patented principles resulting from Windpod design breakthroughs.

CFD SIMULATION OF WINDPOD AERODYNAMICS



Important, patented design features of Windpods are as follows:

(a) Deflector Plate Effects.



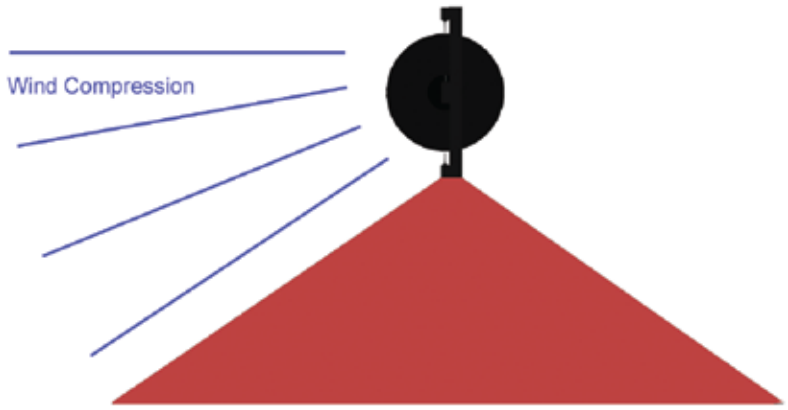
Windpods G1 aluminium model weight approximately **35kg**

(b) Roof-Top Ridge-Line and Corner Mounting.

Leading on from the above mentioned deflector plate effects, not only do roof-top ridge-lines concentrate wind into the turbine, but the angle and gap of this 'deflector' was critical to VAWT performance enhancements. As a result, roof apex lines and building corners not only provide structurally practical mounting points but also significantly improve turbine performance.

Traditional HAWTs (even of small size) usually involve a higher cost to mount them in urban environments than to purchase the HAWT in the first place. However, the size and shape of Windpods makes them easy to mount on buildings and keeps the overall cost down to a very low, economically attractive range.

Depictions of how Windpods modules can be oriented along a roof-top ridge-line to take advantage of wind concentration and compression are shown below :



(c) Windpod Walls.

To date, turbines have needed to be positioned well away from one another to operate efficiently. However, the combination of deflectors, end plates and blade gap combining together to 'seal' the turbine to create a low pressure area is the breakthrough that allows Windpod Walls to be built. Each Windpod module actually works better when positioned in a wall than it does when run individually. This is an extremely important breakthrough in the field of wind power.

MARKET APPLICATIONS

Building Edges

Building corners not only provide structurally practical mounting points but also significantly improve turbine performance via wind concentration and performance enhancement from the edge gap and angle. Vertical and horizontal edges can be utilized.

Australian Retail Pricing

1kW packages will retail for $4500.00 (plus installation).

For an average single storey building, installation including cabling, inverter and roof mounted frame may cost around $3000 per kW.

Self install will be available at a later stage. Please contact the installer in your local area or visit www.windpods.com

Residential

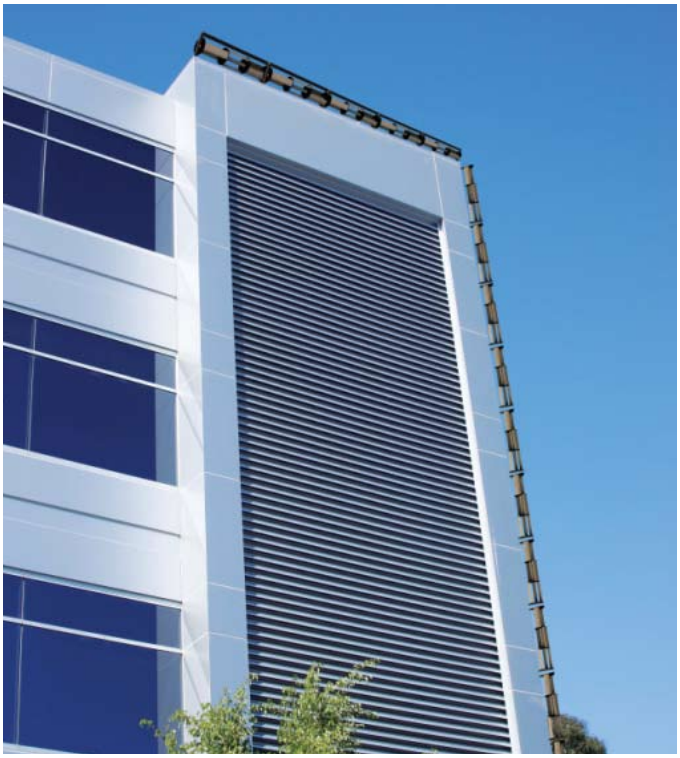
The modular ‘by-the-meter’ ability to mount Windpods on the apex ridges of houses and residential buildings provides a simple solution to structural mounting along the lines of maximum wind concentration.

Bridges

Bridges are an excellent location for Windpods installations as these areas very often have frequent, clean wind corridors.

Windpod Walls

With a very contemporary, high technology look (not unlike the appearance of aluminium louvers used in many new architectural style buildings), Windpods Walls could be used to great effect in modern commercial buildings.



Road Lighting, Fencing and Railings

Windpods can be incorporated quite simply into road and freeway lighting poles to supply power. Fences, railing, gantries architectural walls are also possibilities.