

The wind turbine you can't hear

There aren't many Australian-made wind turbines on the market, but we look at a new design that is not only Aussie designed and made, but is dead quiet too

Possibly the biggest problem with implementing wind turbines in urban areas is that they just make too much noise. Most neighbours don't like the idea of high-speed blades whistling away all night long. What's more, most turbines will vibrate when mounted on rigid structures (such as houses), as they are rarely perfectly balanced.

Arthur O'Connor, a former funeral director from Sunbury in Victoria, has been working on a solution to this problem for around 23 years, and he now believes he has a machine that could revolutionise the way home-owners are provided with energy. He hopes to see one of his turbines on every home in Australia. This is a high target to set, but we think this turbine could certainly go some way to reducing Australia's domestic (and commercial) greenhouse emissions.

Unique design

Arthur's wind turbine is designed to run at relatively low speeds compared to conventional horizontal axis turbines. Because of this, and the use of an annular ring that joins the tips of the many angled blades, the turbine is virtually silent. It is also capable of being accurately balanced to minimise vibration, and the blade design can make much better use of turbulent air than standard two- and three-blade turbines. Arthur plans to manufacture the turbine rotor in 1 to 5 metre diameters.

When the opportunity arose for the Alternative Technology Association (ATA, publishers of *ReNew*) to help in this endeavour by installing one of the 1m units on our empty wind turbine



The Hush turbine newly installed on the tower at CERES, before the wiring was complete.

tower at CERES Environment Park in East Brunswick, Melbourne, we jumped at the chance.

The turbine was installed in early February with the help of a large cherry picker and numerous workers. The turbine generates power at around 180 volts, which is fed into an AERL (Australian Energy Research Laboratories) controller that reduces the voltage to suit the 24 volt battery bank in one of ATA's power systems.

The energy from the turbine is converted by the ATA's Trace SW3024 inverter into 240 volt AC power and is fed into the mains grid. In case the mains should become unavailable to accept the

power, (during a blackout for example), the AERL controller also has a resistive load dump connected.

The turbine has already been recognised for its innovative design—the one metre model won the People's Choice Award for the best invention at the *Watts 'n' drops expo* in September last year at Sydney's Powerhouse Museum.

Performance

A five metre diameter Hush turbine was fitted to an 18 metre tower in Diggers Rest in September 2003. This turbine produces enough energy to run several homes or a small factory.

'Our turbines are unique in design



← The turbine from the front looks like a jet engine when not rotating. When running, the blades will be far less visible, just like any other wind turbine, but should pose far less risk to birds due to the semi-solid appearance of the rotor.

→ The AERL controller does all the hard work of keeping the turbine output matched to the battery requirements.



and quite suitable for domestic or commercial use. From a number of perspectives, the turbine is superior to other designs already in use, because it works effectively at generating power in lower wind speed conditions. This creates more energy output per turbine. Having our turbines operating silently is also a great benefit, hence the name “Hush Turbine”,’ said Arthur.

‘We now have something the whole world wants and that’s a great feeling. These turbines will really help the environment and that’s so important,’

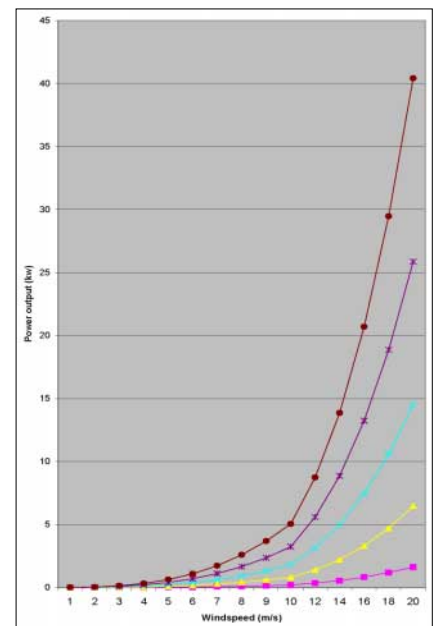
Arthur said.

And to prove this is no small claim he is already negotiating to sell the larger five metre turbines to communities and businesses across northern Australia. Further afield there is significant international interest in the Hush turbine to power remote and poorer world communities. ✨

For more information contact Arthur O’Connor at Hush Energy, ph:(03) 8746 9770 or occonnor@hushenergy.com.au, www.hushenergy.com.au

Speed (m/s)	Blade diameter (metres)				
	1	2	3	4	5
1	0.00	0.00	0.00	0.00	0.01
2	0.00	0.01	0.01	0.03	0.04
3	0.01	0.02	0.05	0.09	0.14
4	0.01	0.05	0.12	0.21	0.32
5	0.03	0.10	0.23	0.40	0.63
6	0.04	0.17	0.39	0.70	1.09
7	0.07	0.28	0.62	1.11	1.73
8	0.10	0.41	0.93	1.66	2.59
9	0.15	0.59	1.33	2.36	3.68
10	0.20	0.81	1.82	3.23	5.05
12	0.35	1.40	3.14	5.59	8.73
14	0.55	2.22	4.99	8.87	13.86
16	0.83	3.31	7.45	13.24	20.69
18	1.18	4.71	10.60	18.85	29.46
20	1.62	6.47	14.55	25.86	40.41

Power output in kW of the different turbine sizes at various wind speeds, based on a Cp (coefficient of performance) of 0.42 and a TSR (tip-speed ratio) of 0.9.



That’s a big truck for such a small wind turbine, but the Hush turbine is quite heavy as it is built to be very robust.