

# Evance R9000 vs Proven 6



Comparing wind turbines can be tricky without an understanding of exactly what affects the amount of energy they produce. This guide explains a few important differences between the Evance R9000 and the Proven WT6000.

## The Evance R9000



The Evance R9000 is the latest variant of the long established 5kW small wind turbine from the UK manufacturer Iskra, recently re-branded as Evance.

The R9000 is the first turbine to be equipped with Reactive Pitch technology, a unique control concept developed and patented by Evance. Reactive Pitch guarantees that the blades will capture exactly the right amount of energy according to the wind speed and generator loading conditions.

At low to moderate wind speeds the Reactive Pitch mechanism captures the maximum energy possible from the wind by holding the blades with absolute precision at the maximum efficiency position.

At higher wind speeds, when the energy in the wind exceeds the maximum capacity of the generator, the R9000's unique Reactive Pitch mechanism automatically pitches the blades. This regulates energy capture, rotor speed, and the loads experienced by the turbine structure. It will therefore capture the full 5kW power, and the reduction in stresses mean that the R9000 offers greater safety and survivability.

The R9000 also has a patented high-efficiency generator which converts up to 96% of the energy captured from the wind into useful electricity. The generator is specifically designed for the R9000, and is integrated into the turbine's rotor.

What all that means is that the Evance R9000 can capture more energy across the range of wind speeds, especially the lower and moderate speeds that are normally experienced on the majority of the mainland UK.

The combination of the advanced pitch control, which is much more effective than the Proven's "coning" mechanism, and the more efficient generator enable the Evance R9000 to out perform the Proven WT6000 at lower to moderate wind speeds.

## The Rated Power Myth

Unfortunately, it has become common for wind turbines to be compared by looking at their maximum power output or 'rated power' in kilowatts (kW). The problem with this is that many manufacturers rate their products at very high wind speeds (usually 12m/s or more). This means that the turbine will only produce it's rated power when the wind is blowing very hard - which is not that often.

It makes a lot more sense to see how much power a turbine will generate in the kind of wind speeds that are frequent in most parts of the UK - in the range of 3 - 10m/s. Because these lower speeds are much more common, a turbine that performs well in them will generate much more energy over the course of a year than one that performs best in the 10 - 15m/s range.

The table below illustrates that the advanced design of the Evance R9000 allows it to generate significantly more power than the Proven WT6000 at "normal" wind speeds\*

Wind Speed	Proven WT6000	Evance R9000
3m/s	0.00kW	0.10kW
4m/s	0.08kW	0.31kW
5m/s	0.50kW	0.66kW
6m/s	0.97kW	1.14kW
7m/s	1.48kW	1.76kW
8m/s	2.20kW	2.51kW
9m/s	3.06kW	3.39kW
10m/s	4.13kW	4.20kW

\*Data taken from manufacturer's power curves

## Annual Energy Capture

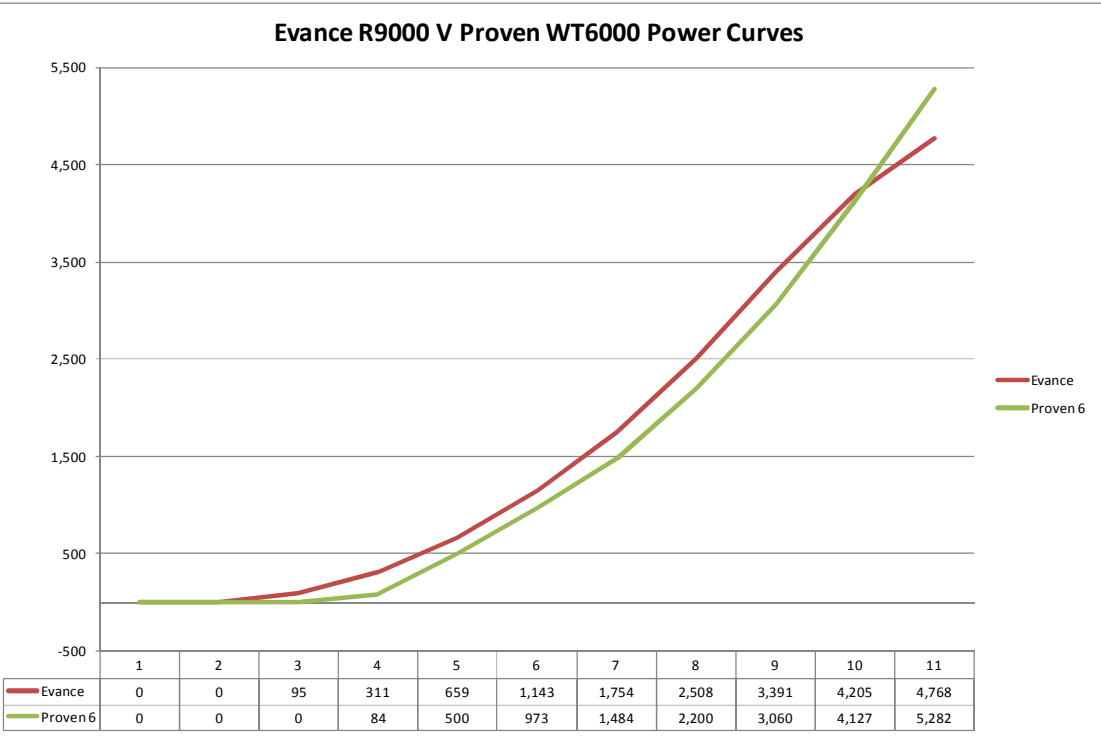
So how much electricity could you expect an Evance R9000 or a Proven WT6000 to generate per annum? Lots of different factors influence energy capture, but it is possible to estimate and make a rough comparison.

The table on the right shows that on a site with an average wind speed of 4.5m/s at 10m height, An Evance R9000 should outperform a Proven WT6000 by about 10%.

Assuming an electricity price of 10p per unit, that translates to approximately an extra £300 per year including the proposed new feed-in tariff from April 2010.

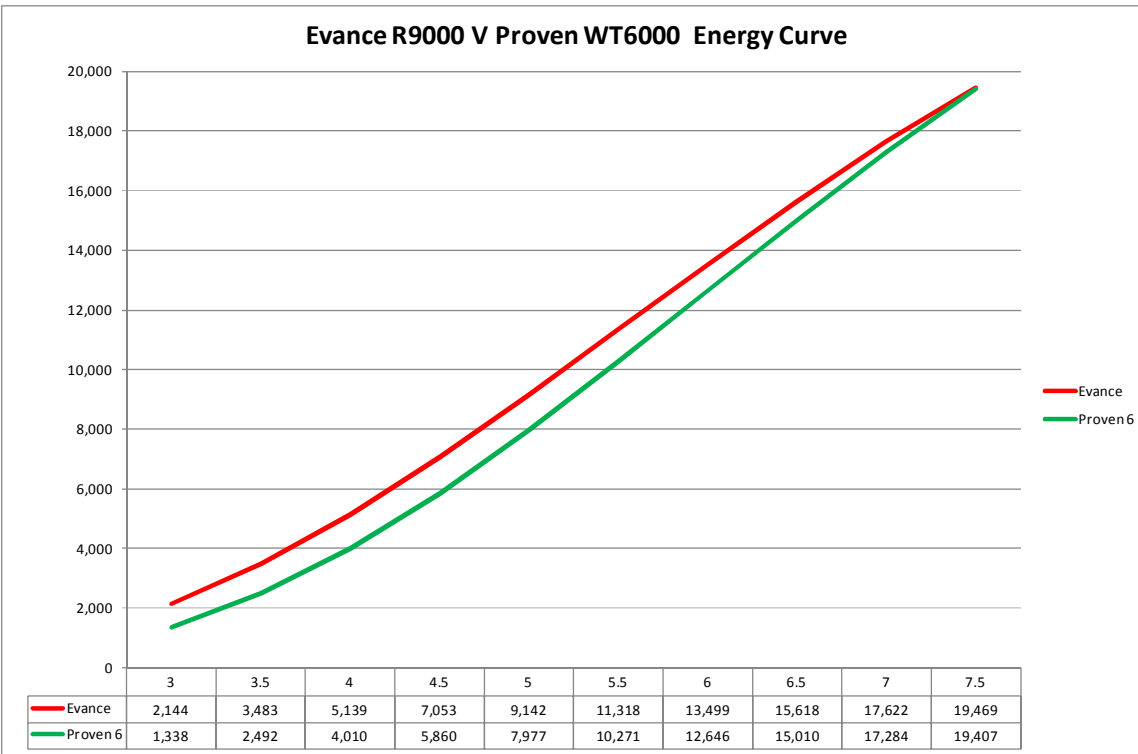
Proven WT6000 (5.0m/s average @ 15m height)	Evance R9000 (5.0m/s average @ 15m height)
7,980kWh (units)	9,010kWh (units)

The graph below shows a comparison of the Proven WT6000 and Evance R9000 power curves showing the power generated at different wind speeds.



As can be seen from the chart to the left, despite its apparently higher rating, the Proven WT6000 does not generate more power than the Evance R9000 until the wind speed reaches 11m/s, (24mph), which only occurs less than 7% of the time at a typical mainland site with an annual mean wind speed of 5m/s.

The result of the Evance's better performance at "normal" wind speeds is that the amount of energy generated by the Evance R9000 throughout the year will be higher than the Proven WT6000 except at extreme sites found in Scottish Highland and Islands.



To find out more about the Evance R9000, please contact your Segen account manager directly or use the details below. The sooner you talk to us, the sooner you could be generating your own renewable energy.

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