

## A Quick look at the Skystream Power Curve

9-Apr-08 15:59

summarized by

Prof. Mel Tyree

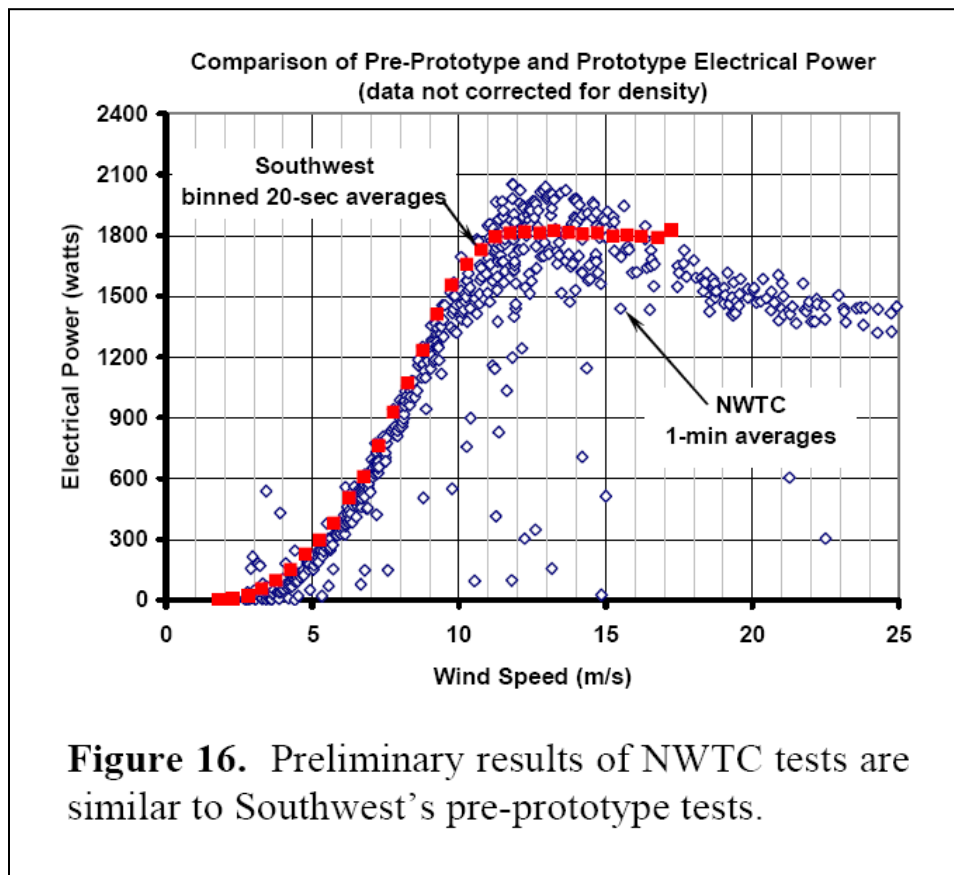
Department of Renewable Resources  
University of Alberta, Edmonton, Canada

Disclaimer: I am not an expert on wind turbines. So I welcome comments from experts so that I can improve this and future summaries I might right. Email comments to [mtyree@ales.ualberta.ca](mailto:mtyree@ales.ualberta.ca)

The full reports are quite long so many people might not be bothered to read them in detail. The full reports can be downloaded from the SWIEP website. Go to:  
<http://www.ualberta.ca/~mtyree/swiep> and go to publications.

Balancing Performance, Noise, Cost and Aesthetics in the Southwest Windpower “Storm” Wind Turbine by P. Migliore and J. Green (National Renewable Energy Laboratory) NREL/CP-506-3815 August 2005.

*This paper shows the test results for the prototype turbine now sold by SW Windpower under the name of “Skystream”. This is rated as a 1.8 kW turbine with a grid-tie inverter.*



Comments:

I am wondering why the binned 20 s averages are tighter than the binned 1-min averages? Here is my guess; the average wind speed is computed from  $\bar{u} = \frac{\sum u_i}{N}$  where  $u_i$  is the instantaneous wind speed reading and  $N$  = number of values going into the average. But the binned average power (kW) is proportional to  $\sum u_i^3$ . In any time interval  $t$  with  $N$  readings, the range of  $u_i$  values will increase with time, i.e., wind velocity is never constant. So for short times you might get a better correlation between wind speed and power. However, there should be a time interval that is too small when the relationship breaks down because of the much smaller mass of the cup anemometer versus the huge mass of the spinning turbine. The anemometer will speed up and slow down much more quickly with changing wind speed than the turbine. Technical Question: What is the optimal time  $t$  for binned values? NREL has used quite long binned values (10 min). What is best?

Note that the Skystream power output is relatively flat out to quite high wind velocities. The Bergey/GridTek10 system is not that good at remaining flat. Why?

***Expert comments will be added to this summary if I get any.***

