Executive Summary #1
Re: Bergey Blades (the new SH3055 vs BW03)
9-Apr-08 15:56
summarized by

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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 write. Email comments to 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.

Affect of New Blades on Noise Reduction of Small Wind Turbine Water Pumping Systems. Brian D. Vick & R. Nolan Clark, USDA-Agricultural Research Service, P.O. Box 10 Bushland, TX 79012.

This study conducted between 2003 and 2005 was done on a 10 kW Bergey turbine which was connected to a Bergey pump controller (no longer sold) which drove a Grudfos water pump (no longer sold). The pump controller limited the power output below the potential of the 10 kW Bergey. The item of primary interest to me is the comparison of the newest airfoil blades (SH3055) to the older BW03 blades. One pump controller died after the 2003 tests so the 2004 & 2005 tests were done on a new controller. Note the difference in power output between the controllers. The controller stopped producing power at higher wind speeds for both blades.

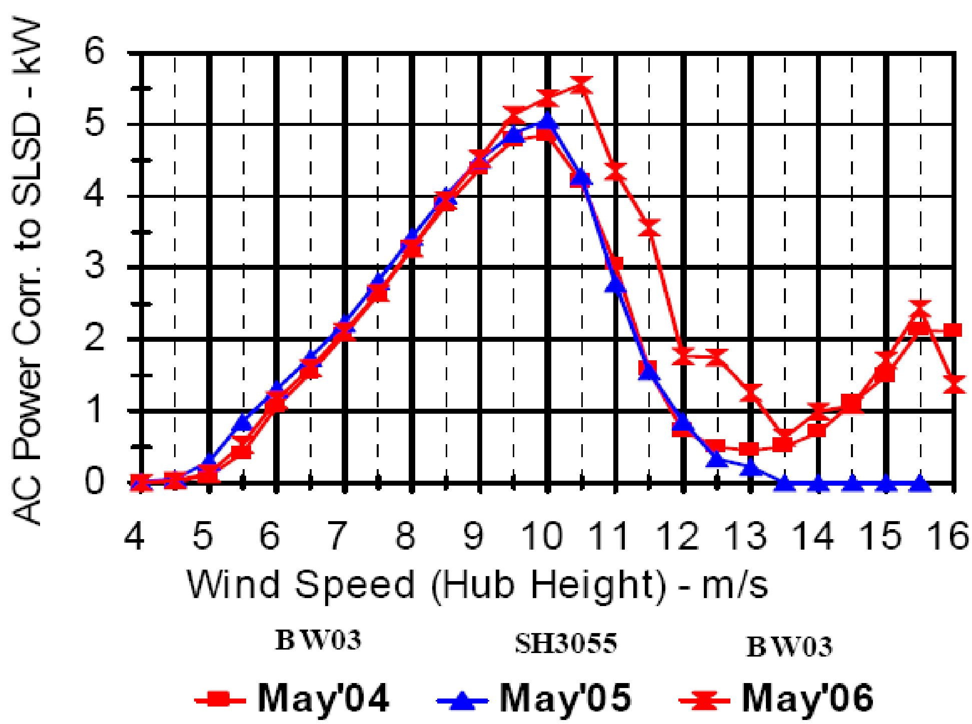

Fig. 13. Power Curves of Bergey 10 kW Blades at 75m head (Bushland, TX).

More data:

There are more data in this study regarding two other SW Windpower turbines. But my main interest in this summary is comparison of blades.

Interpretation:

The 10-kW-turbine is too powerful for the pump power controller. My 10 kW Bergey can produce > 14 kW for brief periods of time. But the water pump this is connected to is a 3.8 kW Grundfos pump hence the output of the controller is more than the pump needs to run a full speed.. My guess is that the power controller is getting overloaded at wind speeds > 10 m/s (22 MPH). My main interest here is to figure out if the SH3055 blades really are better than the BW03. It is probably fair to compare the data only for power outputs < 5 kW before the controller is overloaded. The blue and red curves are very close. No statistics are given: no error bars, no statistical test can be done. But when you look at the scatter of data of similar power curves based on 20 s or 1 min binned means you might come to the conclusion that there is no significant statistical difference.

Why does power output improve (red) at higher wind speeds?

I am not sure here either. I am guessing that the Bergey is auto-furling and reducing its power output enough with the BW03 blades to come back online.

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