

Interactive comment on “Experimental Validation of a Ducted Wind Turbine Design Strategy” by Benjamin Kanya and Kenneth D. Visser

Anonymous Referee #2

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Adding a duct (or diffuser) to a wind turbine to increase the mass flow and power is a simple modification but it provides significant theoretical and computational challenges. There is no shortage of theories for diffuser augmentation, but little detailed experimental knowledge to guide their development. This paper is a very welcome addition to our experimental knowledge. One of the problems with testing diffuser augmented wind turbines (DAWTs) is that the diffuser increases the turbine cross sectional area and so wind tunnel blockage issues can become important. The tests reported in the paper were done in the large University of Waterloo facility which is, presumably, why “blockage” is not mentioned. The most important results are those shown in Figures 15 and 16 where a significant augmentation of power over the bare turbine is shown. I have several reservations about the experiment. The first is that no detailed description of

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the rotor or the diffuser is given so that future developers of DAWT models do not have the necessary information to test their theories. Secondly, the tests used a permanent magnet generator for which the manufacturer provides the efficiency curve for only one load. The experimental procedure of varying the load in search of the maximum power point is a sensible one, but it does not address the issue of the varying turbine efficiency. This is required to determine the extracted aerodynamic power, which is the usual target of the theories mentioned above.

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