This paper is a useful addition to the literature on diffuser-augmented wind turbines (DAWTs) addressing the issues of maximum performance and appropriate duct length, which are of major practical importance. The computational mesh shown in figure 3 looks to be of high quality and the grid independence study confirms the validity of the results.

The recent review by Bontempo & Manna (2020, additional references below) concluded that the maximum performance of a DAWT is an open question still and did not seriously address the issue of duct length. It has been argued, at least as far back as Lubitz & Shomer (2014), that DAWT performance based on maximum duct area was no better than that of a bare turbine which is subject to the Betz-Joukowsky limit, Okulov & van Kuik (2012). Further numerical and experimental data is analyzed by Limacher et al. (2020). The present paper suggests that a modest improvement is possible with an airfoil-shaped, but surprisingly short, duct.

It has also become fashionable to use a duct shape that is simpler in cross-section than an airfoil, and an exit flange. Limacher et al. (2020) show that this arrangement is not optimal and that a "lifting" duct is needed. Hjorst & Larsen (2014) considered a multi-element duct which would allow re-energizing of the boundary layer and I would like to see a discussion of relative merits of this and a single element. Other minor comments are:

1. pattern search methods have developed since Hooke & Jeeves (1961, reference in paper). For example, the methods used in Matlab were published at the end of the 20th century. The optimization method does not influence the accuracy of the individual simulations but the issue of whether an optimum is obtained is a difficult one.

2. I take it that the thin radial line in figure 7 is the actuator disk. This should be stated in the figure caption.

3. Given the importance of the duct length and the lack of information on its optimal value in the literature, I was surprised that it was not mentioned in the conclusions. I suggest that the authors remedy this deficiency.

Additional References

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