

Interactive comment on “Performance analysis of a Darrieus-type wind turbine for a series of 4-digit NACA airfoils” by Krzysztof Rogowski et al.

Anonymous Referee #2

Received and published: 15 April 2020

Performance analysis of a Darrieus-type wind turbine for a series of 4-digit NACA airfoils

The authors present results of a study of aerodynamic performance analysis of an H-VAWT by varying airfoil thickness and camber for NACA airfoils. In general, the results show trends as expected with airfoil thickness, TSR, etc. However, it's not clear the new contribution given existing published work that has not been referenced. The authors should provide some clarification on the novelty points of their paper and update their literature review.

Comments: 1. The authors based their study on the McDonnell 40kW machines. Was any comparison to experimental data from this machine performed? Why was this machine selected over others VAWT testbeds having rich data sets for comparison?

C1

2. In conclusion, the authors note that CFD has better agreement with experimental polars for C_l values and XFOIL has better agreement for C_d values. Can some explanation for this be provided? 3. The research in this paper is very dependent on the aerodynamic polar data. But, there is no exhaustive polar analysis of all airfoils (including symmetric and cambered airfoils) used in the analysis to understand the general trends and stall performance of all airfoils. However, such a detailed analysis has already been done in other published works not referenced in this manuscript (see next point). 4. The following two works appear to present all or most of the findings in the present manuscript, in particular the first paper. These papers present similar but comprehensive numerical and experimental studies for VAWT aerodynamic performance: 4.1. “Investigation on aerodynamic performance of vertical axis wind turbine with different series airfoil shapes” Renewable Energy 2018. Link to paper follows. * <https://www.sciencedirect.com/science/article/pii/S0960148118302398> 4.2. “Study on stall behavior of a straight-bladed vertical axis wind turbine with numerical and experimental investigations” Journal of Wind Energy and Industrial Aerodynamics 2017. Link to paper follows: * <https://www.sciencedirect.com/science/article/pii/S016761051630174X> 5. Following point #4 above, the authors should clarify the novelty points of their work versus these works and other relevant similar works.

Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2019-98>, 2019.

C2