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Interactive comment on "Computational Analysis of High Lift Generating Airfoils for Diffuser Augmented Wind Turbines" *by* Aniruddha Deepak Paranjape et al.

Anonymous Referee #2

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1 Summary

The paper aims to determine the most suitable of 12 high lift airfoil types for design of a diffuser augmented wind turbine. Simplifications are introduced. The diffuser is represented in a 2D configuration of mirror imaged airfoils and the airfoils are evaluated on the basis of maximizing average flow velocity across an actuator disc with fixed thrust coefficient. The analysis method is state of the art CFD and after filtering out poorer performers in preliminary studies, 6 remaining airfoils were evaluated with added flanges. It was concluded that the Eppler E423 is best.

2 Quality

The analytical procedures look very good - nothing to add to comments of RC1

3 Limitations

I have serious concerns about the overall concept of the paper. It may be premature to consider optimization of airfoil choice using rather high end computational methods on a configuration that is relatively remote from a realistic design configuration which would have an axisymmetric structure, optimized loading and wake rotation. In particular, the work of McLaren-Gow (various published papers and thesis) shows, albeit considering only axisymmetric inviscid flow, that the highest performing (maximum Cp) duct shapes within a given volumetric envelop (fixed duct length and area ratio) realise maximum Cp at (relatively) the lowest Ct values. In the penultimate sentence of Section 3.4, it is mentioned that "a constant duct thrust coefficient in maintained ...." Please state the value chosen for Ct. Size of the duct is a cost factor and therefore it may be best to compare always at fixed area ratio although I would concede that it is worth knowing the variation with angle and area ratio.

4 Very minor detail

I recommend presenting the velocity values in Table 1 with the same number of significant figures (3 would surely be enough?) and making Table 3 consistent.

5 Overall evaluation

I think the manuscript needs major revisions but can become satisfactory if substantially expanded along the lines indicated by RC1. Given that the conceptual structure of the paper may be flawed but the numerical work is very good, the paper can be justified on the basis that there is value for future consideration in good data if it is presented clearly and in adequate detail.

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