

## ***Interactive comment on “CFD based design of diffuser augmented wind turbines” by Ertem Vehid***

### **Anonymous Referee #1**

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Title : CFD based design of diffuser augmented wind turbines

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Referee's Comments :

This paper describes a numerical study of the flow around a diffuser augmented wind turbine. The author used a CFD tool provided by Star- CCM+. Although the present paper is a study using CFD, there is no explanation in detail for the method. However, comparing the results between BEM and the present CFD, the author says that the difference in the results comes from methodology. Before reviewing the results and discussions, there are a lot of problems as a scientific paper, because there are no

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explanation about the symbols and the symbols are not unified for the whole paper. It is very hard to read and understand the paper, this is not comprehensive one. For the overall evaluation, the present paper seems to give relatively good numerical results. However, a couple of discussions are insufficient. The referee described those problems below in the detailed points. It seems to the referee that a further improvement and revise still remain for the present paper. If the author can revise largely, the present paper should be accepted for the WES under the present results.

Major points:

For the numerical method, what kind of grid type did the author employ? What is the grid resolutions around the turbine and diffuser? How is large for the computational domain and how is the blockage? Did the author pay attentions to the Reynolds number effect and the grid resolution dependence to make clear the flow characteristics around the ducted wind turbine which shows flow separation and reattachment inside the diffuser, and vortex shedding from the diffuser. It seems that the flow around the ducted turbine both inside and outside of the duct are highly unsteady, unstable and turbulent flows. The reviewer cannot understand the accuracy of CFD presented in this paper.

Furthermore, it is necessary to correct the following points.

Detailed points

1. p. 2, Figure 1; Please describe the definitions of all the symbols in the present paper.  $A$ ?  $U$ ?  $p$ ? What are  $Ad(i)$ ? and  $Ud(i)$  in equation (1)
2. p. 3, line 1; What is the diffuser angle? And What is  $Re$ ? For  $Re$ , what is the reference length?
3. P.4, line 64; What is  $V0$  ( $V0 \cdot V0$ )?  $V0$  is equal to  $U_\infty$  or  $Ud$ ? What is  $\Delta p$ ?
4. And more

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Please also note the supplement to this comment:  
<https://www.wind-energ-sci-discuss.net/wes-2019-75/wes-2019-75-RC1-supplement.pdf>

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