

Wind Energ. Sci. Discuss., referee comment RC2  
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## **Comment on wes-2021-112**

Martin Hansen (Referee)

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Referee comment on "Computational-fluid-dynamics analysis of a Darrieus vertical-axis wind turbine installation on the rooftop of buildings under turbulent-inflow conditions" by Pradip Zamre and Thorsten Lutz, Wind Energ. Sci. Discuss.,  
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It is a well written paper and the CFD part is of very high quality as is also the discussion and conclusions. I do, however, have a few comments that should be addressed

On page 2 line 41 is stated that the wake recovery is faster for a VAWT than a HAWT. Is this a postulate or can you give a reference clearly showing this ?

The chosen VAWT has a very low aspect ratio of  $L/D=0.6$ , that must give a highly 3-D flow due to large end effects and makes the calculations more challenging and perhaps more uncertain. This is not mentioned and some flow visualizations of the flow past the rotor would be nice. The turbine also have an unconventional  $C_p$ -lambda curve for a VAWT, Fig. 8. The peak  $C_p$  occurs at a very low tip speed ratio and can you explain why.

On page 9 is referred to a 2-D DES simulation. I assume this is 2.5D ?

On page 11 is stated that the tip speed ratio is kept constant by varying the rotational speed. This must cause a large variation in airfoil Re number. Could this be important for the solution ? Perhaps you could state the Re range.

You may state it somewhere, but please specify more clearly the flow direction used in Figure 9. The resulting flow on the roof tops must be very dependent on wind direction.