Wes 2019-62

Overall

Abstract

- It is not self-evident that yawed flow conditions must be characterized – elaborate
- Can you provide quantitative values regarding the results in terms of performance
- Can you add a one sentence explanation for WHY the increase and subsequent drop ocurrs?

Introduction

- Enforced visual and noise regulations are not the main reasons why we don't see broad uptake of small / urban wind. LCOE for small wind in urban settings is not competitive with large utility-scale wind farms for several reasons. Some are the environmental and operational conditions for small wind (as you note), others are economies of scale, technology learning and more
- Why DWTs over non DWTs for small urban wind? It is not well justified. A duct can introduce speed ups but the duct itself presents a large additional capital cost. A sentence or two more in motivation would be helpful
- How prevalent are situations operating in yawed flow conditions for small wind DWTs? I would think that passive or active yaw systems would largely obviate this operational condition except for infrequent situations… what does the standard IEC 61400-2 saw about this?
- What is the point of the bare turbine left figure in Figure 1? It is not helpful. Better would be to show two images of DWT, one in normal inflow and one in yawed inflow conditions
- It is strange that in Gilbert and Foreman they saw now change in performance with yaw angle up to 30 degree. This does not agree with recent results in the literature from a myriad of sources. See literature from Paul Fleming, Pieter Gebraad, Jennifer King, Jan-Willem van Wingerden, and many more… you should reference the literature on operation with yaw offset for normal turbines since it is quite relevant and also extensive and recent
- Use of URANS is insufficiently motivated. What did Phillips and company use?

Duct – AD flow model

- Consider making this a subset of section 3 on methodology and computational setup

Methodology and Computationaal setup

- Might also point out why not using LES for the simulations. They are more expensive but when you are investigating physical phenomena, it is often best to start with highest fidelity – i.e. is URANS enough? Explain why and also explain the limitations of using URANS instead of LES

Numerical verification and validation

- Explanation of using 2D instead of 3D URANS for analysis is still week even after updates. Figure 6 shows decent divergence of the experimental and simulation data – comparison with other fidelity analysis tools (i.e. time-averaged stats of LES) would be helpful. Appendix A moves in this direction. I don't think this should be appendix.
- It is important to the overall work. it would be better to elaborate on appendix A statement "despite this source of uncertainty, the overall…." In what ways good agreement? And what are the reasons for the lack of agreement?

Results and discussion

- There are issues in figure 9 – what is going on there? It makes it impossible to read this section
- Cp goes up with the yawed conditions, it would be good to discuss in conclusions / future work about potential impacts on loading
- Something is missing here in terms of discussing the novelty of the findings in the context of other work – why do we care about these results?

Conclusions

- These need to be strengthened considerably – do not use bullets. Speak more critically of the work in the context of the study limitations and also tie into a discussion on future work.