

Interactive comment on “Evaluation of tilt control for wind-turbine arrays in the atmospheric boundary layer” by Carlo Cossu

Anonymous Referee #2

Received and published: 8 January 2021

The author investigates the impact of rotor tilt angles and thrust coefficients on power gains of groups of turbines across varying atmospheric boundary layer heights. Additionally, the influence of rotor diameter is examined on performance gains and streak amplification across the various conditions. The performance gains found are quite significant, although they are only determined for wind-aligned operation. The paper is well written and thorough in its explanation and analyses. The author has a few minor comments/suggestions:

1) The author examines a range of positive tilt angles including 20, 30, and 40 degrees, finding across all the conditions that a tilt angle of 30 degrees gives the greatest increase in power production. The author also states that these tilt angles would best be accomplished with downwind rotors/blades. However, a tilt angle of 30 degrees

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seems significantly larger than what is currently reasonable with turbine designs. The reviewer feels the reader would benefit from some discussion of the practicality of tilt angles in this range to help ground the results.

2) Along the lines of comment 1, including some discussion of the potential impact on turbine loading would be useful to the reader as well.

3) The flow diagrams in figures 3 and 4 are very useful to the reader in order to visualize the benefits of using positive tilt angles to deflect the wakes and draw higher velocity flows downwards for the downwind turbine. While the reviewer can understand why the author may have only included flow diagrams for once case in order to keep the main body of the paper concise, it could be helpful/interesting to the reader to include flow diagrams of some of the other cases in the appendices. Unless of course the flow is not significantly different, in which the author should then state that in the manuscript.

4) In the conclusion, the author acknowledges that more work is to be done to determine the gains that would be possible across a typical wind rose. The reviewer believes the paper would be strengthened by including discussion on what the results may look like in a partially waked case, as the high velocity streaks would not be as well aligned with the downwind turbines, and could even cause undesirable loads across the rotor.

Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2020-106>, 2020.

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