Response to Reviewer 2

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Before we proceed with our reply, we want to express our gratitude for reading our work and contributing to further improve the content of our paper and future work. We have included below our response to your comments, which are shown in blue. The main modifications made in the paper are included in this document in magenta.

Thank you for this contribution! In general, writing is well done and figures are clear. References to literature is thorough. The innovation of optimizing for the coupled condition that wake steering is or isn't applied to the co-designed farm is a valuable contribution.

Thanks for the feedback! We truly appreciate it.

Figure 17: I understand the pareto front for the multi-objective points, and for the co-design points, I understand they improve with wake steering, but lead to losses without. The sequential points are more mysterious to me, there are some that appear to lose AEP with and without wake steering applied?

Thanks for your comment, we agree that additional explanation is required. Multiple points are included in Fig. 18 (Fig. 17 in the previous version of the manuscript) also for the sequential and the co-design methods as a result of multiple simulations of the same case. This strategy is adopted to prevent a bias in the results caused by the random nature of the genetic algorithm. Therefore, whereas in practice only the best solution is chosen, in our work multiple solutions are presented to enable a probabilistic interpretation of the results. In particular, in this figure there are some solutions for the sequential approach (green dots) that are clearly better than the other solutions obtained with this approach for both objectives, however, all of them are included for the reason explained in this paragraph. To clarify this concept to the reader, an additional explanation is added in the caption of the figure, mentioning that multiple solutions are included also for the sequential and co-design approaches to keep the consistency with the other plots.

Modified caption of Fig. 18: Multi-objective co-design approach based on the multi-objective optimization. Each data point indicates an optimized layout. Multiple data points are included also for the sequential and the co-design approach, resulting from different simulations and providing a probabilistic interpretation of the results in accordance with the other graphs. The axis of the plot refer to the AEP increase with respect to the average AEP value obtained through the traditional sequential approach. The Pareto front is present on the top-right of the plot, resulting from a max-max problem. A cross is included to identify a possible robust solution.

The algorithm for the geometric yaw of Stanley is also implemented and publicly availble within FLORIS: (see for example here: `https://github.com/NREL/floris/blob/main/floris/optimization/yaw_optimization/yaw_optimizer_geometric.py` and here: `https://nrel.github.io/floris/examples/examples_control_optimization/006_compare_yaw_optimizers.html`)

Thanks for pointing this out. The availability of this algorithm in FLORIS has been mentioned in the manuscript, adding this information to the Introduction as follows: This approximation of the optimal yaw angles has also been implemented in the open-source software FLORIS (National Renewable Energy Laboratory, 2024).

This could be interesting to point out. Figure 15 also gives the impression that these improvements

can be fairly critical, and perhaps one of the improved algorithms from this paper could be submitted as a pull request back to FLORIS.

Thanks for your suggestion. We are working on decoupling these algorithm from the software that we have adopted in this work, i.e. PyWake, and we will be keen to integrate them into FLORIS. Therefore, we will soon submit a pull request to FLORIS for this purpose.