Dear Andrew P.J Stanley,

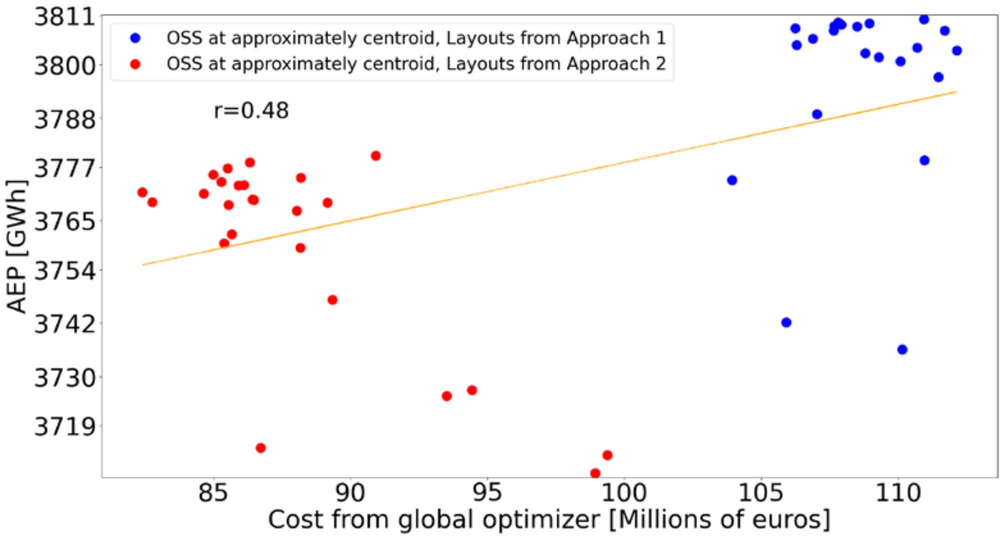
Thanks for taking your time to review our manuscript, for suggesting valuable changes for it, and for appreciating the contributions of our research. See changes after your comments in the new version of the article in Orange color. Find below responses to each of your comments:

COMMENT 1: First, in the literature review I think you should mention the paper "Wind plant system engineering through optimization of layout and yaw control" by Fleming et al. This paper focuses yaw control and layout optimization, but they make cabling considerations in the layout optimization.

RESPONSE 1: We have added the paper by Fleming et al. under the same category as the articles of Sanchez Perez-Moreno et al., Wade et al., and Amaral and Castro are classified. All these works include some considerations related to the effect of the cable length or investment, either as part of the objective function or as a constraint. However, they typically employ simple unconstrained heuristics (like Prim or Kruskal). In this paper, we take it further by proposing tailor-made heuristics that provide reasonably good cost estimation of the cable layout, which actually work satisfactorily in the context of simultaneous WT and cable layout optimization. The tailor-made heuristic supports for capacitated constraint to model maximum capacity, while ignoring other constraints to counteract the inherit suboptimal nature of heuristics. We also guarantee fully feasible designs taking into account the common engineering constraints of both problems.

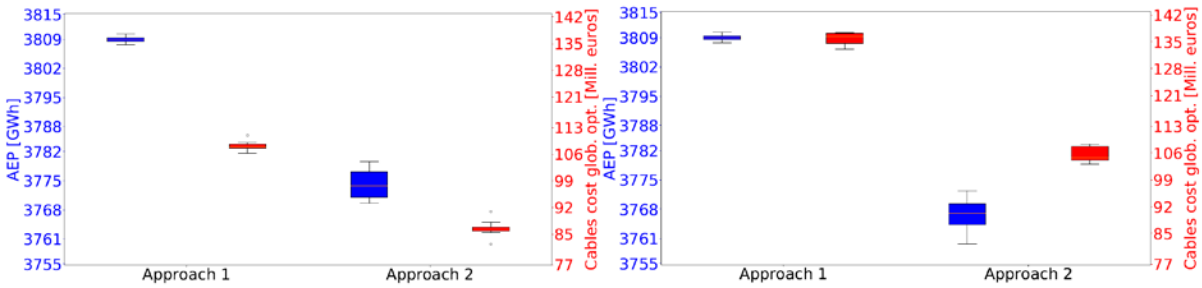
COMMENT 2: Second, in the results I would like to see the correlation between AEP and cabling cost. There are several ways this could be presented, but I'm imagining a figure or figures like 9 and 10, which shows the AEP vs average length between wind turbines and/or AEP vs the costs from the global optimizer. I think this is important to show the reader and will help explain some of the results you talk about later.

RESPONSE 2: Thank you for the suggestion. Following the request, we produced the suggested graph (displayed below). Since the Pearson coefficient is 0.48, which represents a rather weak linear relationship, we are not sure if the plot would serve the purpose and transmit a clear message.



Instead, we chose to show the relationship between AEP and cabling cost as below. We think that this figure captures the relationship between AEP vs cable layout cost, transmitting a clearer message to the reader. The Figure is discussed as follows:

The observed differences of IRR between approaches presented in Fig. 12 are broken down in terms of AEP of cable layout cost in Fig. 13. Approach 1 consistently provides WT layouts with greater AEP than Approach 2 in both OSS locations, at expenses of more costly collection system networks; this illustrates the (most likely nonlinear) correlation between AEP vs cable layout cost. The robustness of the AEP maximization process when neglecting the cable layout (Approach 1) is evidenced by the rather low standard deviation (0.79 MW, approximately 0.02% of the average value). The previously elucidated variability of IRR in Approach 2 (Fig. 12) is also reflected in the AEP spread, which has a standard deviation of roughly 0.1% of the average value for both OSS locations. Oppositely, the spread of the cable layout cost is not as marked as for the AEP, yet a larger variation between Approach 1 and 2 is still observable.



(a) Results for OSS at approximately centroid.

(b) Results for OSS at external location.

Figure 13. Comparison of AEP and cable layout cost between Approach 1 and Approach 2.

COMMENT 3: Third, I think you should discuss some you expect the results to change as your parameters change. For example, as energy prices increase, you'd expect the optimizer to favor AEP more heavily, as distance from shore increases you would expect… The results for this paper are very interesting and sufficient to demonstrate your method, but I think this is important to discuss because you have only provided results for one set of parameters.

RESPONSE 3: Key parameters that affect the performance of Approach 2 are: energy price, cable costs, OSS location, and available area. Typical values for all of them have been used to set up the case study. A specific rigorous study could be conducted to quantify the effects of the variations of such inputs to the overall results. This is left for future works. The following paragraphs have been added to the manuscript.

At the end of Section 3:

The presented results are project-dependent, and therefore are vulnerable to variations of the set of input parameters. An increase in energy price would result in a heavier weighting of AEP during the optimization process, giving priority to a more spread out WT layout. The cable costs are another important parameter, that in turn if greater, could favor more strongly the cable layout design by bringing together the WTs; similar logic applies for OSS location further away to the WTs. The available area is also deemed as key, since larger areas would give more room to exploit trade-offs between WT and cable layouts when applying the design Approach 2.

At the end of the conclusions:

Typical values for the input parameters (energy price, cable costs, available area, OSS location, among others) are utilized to set up the case study. However, the outperforming capacity of Approach 2 over Approach 1 is affected by variations of those conditions: more expensive energy prices can result in a better performance of a sequential design approach, while greater cable costs could have the opposite effect. A more detailed analysis of the impact of those parameters over the results of the optimization could constitute future work.

COMMENT 4: Line 245: "Subsequently, the IRR metric may weight out more the AEP…" – This sounds off. Probably a good idea to reword.

RESPONSE 4: This has been changed to:

Therefore, IRR could implicitly favor AEP (cash flow) over cable cost (CAPEX)

COMMENT 5: Line 282: I don't think this necessarily guarantees there is no overlap between turbines and the OSS. What if the 4 turbines nearest the centroid were not arranged in a square? Like, a triangle with one in the middle but still meeting minimum spacing constraints?

RESPONSE 5: Thanks for the observation. This is true. What we mean is that the proposed approach is a simple heuristic that helps overcome the described situation of overlapping. It is definitely not a bulletproof concept, but it gives good results in fast computing time. The paragraph has been changed to:

Since, in theory, the location of the OSS, {x1,y1}, can take infinite values, a course of action is to fix the OSS location in the centroid of the WTs. However, only considering the project area centroid could lead to unrealistic designs, as presented in Fig. 7, where an overlapping between a WT and the OSS appears. In order to decrease the occurrence likelihood of this erratic design, a simple heuristic rule for the OSS location is presented in Fig. 7. The OSS is displaced to the centroid of the four nearest WTs, in case of the original distance between the points denoted by the OSS and nearest WT is under a specific threshold. For the particular case of a square disposition of WTs, assuming a minimum distance between WTs of 2D, a minimum distance between OSS and WT of √2D is ensured after this correction. This heuristic does not guarantee success in respecting the distance threshold for any WTs arrangement; however, it represents a good compromise between effectiveness and computing burden.

COMMENT 6: Figure 8 (or anywhere talking about the resource): It's worth mentioning the number of wind speed bins you used

RESPONSE 6: Thank you for the suggestion. This information has been added to the caption of Figure 8.

COMMENT 7: Line 322: "trough" – typo

RESPONSE 7: Thanks for the observation. We have corrected this typo.

COMMENT 8: "The main takeaway…" - I would reword this sentence, it's hard to follow.

RESPONSE 8: Thanks for the observation. We have changed this sentence by:

"This figure confirms the initial expectation regarding the placement…"