Comments on manuscript WES-2021-54 "A simplified, Efficient Approach to Hybrid Wind and Solar Plant Site Optimization" by Tripp et al.

Optimization of hybrid renewable energy systems (HRES) is a challenging topic of practical relevance with growing interest in the wind energy research community. The authors focus on site layout optimization of a utility-scale wind-solar HRES for given wind turbine specification and nameplate capacities for wind and solar. The approach is based on introducing a set of few representative parameters to be optimized via evolution strategies, where constraints are imposed via a penalty function. The approach is tested for optimizing the annual energy production (AEP) of two sites with different correlation between solar and wind resources and for two generic site boundaries. This manuscript is an interesting contribution to the literature. Nevertheless, a few questions and remarks come to mind.

On wind turbine choice:
Why was the 1.5MW 77m rotor diameter wind turbine chosen? Wouldn't a layout optimization be more likely applied to new plants? If so, wouldn't larger nameplates and rotor sizes, and hence fewer wind turbines for the same capacity, be expected? How would that impact the results?

On wind to solar capacity ratio:
What motivated the choice of wind and solar capacities? It looks like, for the specific choice here, that wind energy would be the dominant contributor to plant AEP and, hence, wake loss minimization is expected to be key. To appreciate this, it would be helpful to state the shares of wind and solar of the overall AEP.
What is the sensitivity of the results to the wind to solar capacity ratio? Would the results change if solar were the dominant AEP contribution? It may be interesting to include a case in the analysis where the choices of nameplate capacities lead to a dominant share of solar in the overall AEP.

On the choice of optimization objective:
As the authors state, other objectives than AEP optimization are possible and, in my view, likely in any practical application. If feasible, it would strengthen the manuscript if an optimization for net present value or internal rate of return were included.

On the site selection:
It may be helpful to the reader if Pearson's coefficient were explained and what range of values could be typically expected. At least stating the equation used and (re)stating the time resolution and length of the data it was computed on is needed, as monthly, annual or multi-annual complementarity could significantly vary at sites.
What was the reasoning for using Pearson's correlation instead of alternatives, e.g. Spearman's correlation? Would that lead to selecting different sites?
While the two selected sites had the lowest and highest Pearson's coefficient in the continental United States, the terms "high and low correlation location" are misleading as both values in magnitude rather indicate a lack of correlation than the implied correlated/anti-correlated behavior. Moreover, could it be that the differences in the results shown were rather driven by the difference in the wind rose than in the complementarity of wind and solar resources?

On the interpretation of results:
Table 2 provides large benefits over the corresponding "baseline", however, this is merely the starting point for the optimization and not a realistic alternative choice. It would be helpful to assess the method also in comparison with a reasonable baseline. For example, how would the results compare to a state-of-the-art wind farm layout optimization, where the solar panels are placed at the southern border of the site?
It looks like, for the cases shown, that the main benefits stem from wake loss minimization – is this true? Some layouts in figures 5 and 6 apparently take advantage of slightly aligning turbines out of the predicted wake. How sensitive are the results to the wake model, i.e. how reliable are the optimization results? Figure 9b could benefit from different scales and zooms.

Finally, the conclusions look more like a summary. Would be nice to get some recommendations.