Thank you for your careful review and insightful suggestions. Please see our responses and proposed strengthening actions below.

Summary of changes:

1. We clarified our rationale for using AEP at the end of Section 3.2, Objective Design
2. We clarified our rationale for using the mix of solar and wind capacities to Section 3.2.
   a. This capacity mix yields an approximate AEP balance between solar and wind at the high correlation location
3. We discussed our of choice of correlation coefficients and site selection process in the first paragraph of Section 4.
4. We explained how interior solar can sometimes be better than southern solar placements to the second paragraph of Section 3.1.
5. We added a discussion of the impacts of wind and solar capacity ratios on site layout solutions to Section 4.2 and added Figure 9, showing solutions for various solar-to-wind capacity ratios.
6. We added Table 3 which lists the performance statistics (solar and wind AEP's, losses) for each solution in Figures 5-8. This table allows the reader to more deeply explore the relative contributions of wind and solar to AEP for each layout.
7. We added discussion of land use restrictions to both the objective function section and included exploring land use issues further in the future work listed in the conclusion.

On wind turbine choice:

We chose the default turbine in the SAM library, knowing that it could be replaced with any size turbine desired. For this paper, the nameplate capacity of the wind and solar were fixed, and so too was the number of turbines. Using 2MW turbines we would have 37 or 38 turbines to place, and this would have made the turbine grid less dense. Without running it, it's hard to say exactly which aspects would change the most in the resulting layout candidates. However, the overall layout optimization problem and the effectiveness of this approach would be similar.

On wind to solar capacity ratio:

The nameplate wind capacity was fixed at 75 MW, which is roughly half of the typical pure wind power density on the circular site (approximately 5.2MW/km2 over a 3 km radius circle). Because the wind resource was stronger than the solar resource on these sites we chose a solar capacity of 50 MW. **We added a breakdown of the solar and wind contributions to AEP for the layouts shown, a discussion of the impacts of the wind to solar ratio on the layouts found, and generated layouts for a variety of wind and solar capacity ratios.**

On the choice of optimization objective:

We aim to provide a proof of concept that stochastic optimization of low-dimensional parametrized layouts is an effective method for producing efficient hybrid plant layouts. With that in mind, **we chose to optimize AEP because it provides a clear yet challenging objective function without the additional complexity and sensitivity to assumptions which an objective such as net present value brings with it.** NPV introduces many pricing and cost assumptions, and the resulting layouts can be highly sensitive to these assumptions, which could easily conflate and cloud the proof-of-concept we aim to demonstrate with this work. Since we fixed the nameplate capacities and we did not use a detailed cost model, the costs of each candidate don't change. Revenue in an NPV objective would change depending on how prices vary with time, whereas AEP with fixed capacities can stand-in for a constant price of energy, therefore providing an objective which is both similar to a practical objective like NPV, but simple and clear enough to provide a proof-of-concept. **We added a passage to the document clarifying our rationale for using an AEP objective.**

Additionally, we agree that interconnect utilization, particularly with land use constraints in mind, can be a useful optimization objective. To demonstrate the method's ability to optimize objectives other than AEP, **we included an additional subsection and figure showing and discussing the results of optimizing layouts with this objective for interconnect capacities ranging from 40 to 65MW, added additional discussion of interconnect utilization in the objective function section, and expanded our discussion of applying the optimizer to additional objectives to the future work section in the conclusion.**

On site selection:

Pearson Correlation Coefficient is most commonly used in this type of analysis (https://www.sciencedirect.com/science/article/pii/S0038092X19311831, https://www.nrel.gov/docs/fy13osti/57816.pdf, https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8749030). It is true that Pearson Correlation Coefficient relies on the assumption of bi-variate normality for the two variables while no distributional assumptions are required for Spearman's Rank Correlation Coefficient. However, Spearman's CC is generally considered more appropriate for use on ordinal (i.e. ranked) data. Furthermore, Pearson is most commonly used for timeseries data. When we examined the dataset closely using multiple correlation coefficients (including both Pearson and Spearman), Pearson CC was most reflective of the complementarity seen. **We added discussion of our choice of correlation coefficients and additional supporting details on the example site selection process to the document,** Including the equation and nature of the data used in selecting the test sites. Both wind rose and resource correlations impacted our AEP objective; it is expected that different site layouts would be found for different resource correlations or wind roses. We amended our analysis of the results to reflect this fact.

On the interpretation of results:

You are correct: placing solar on the interior of the site can allow for greater separation between turbines and therefore reduce wake losses. When this is done in a way which reduces wake losses by more than the flicker and shading losses which might be incurred by an interior placement, the interior solar placement layout is superior to a southern boundary placement. *In this sense, the largest benefits from allowing flexible solar placement are typically in reducing wake losses.* **We updated our text to clarify this point, and to motivate the flexible placement of the solar region.**

The prior distribution on the solar region placement ("solar y position") used to initialize the optimization is set in a way which biases the search towards exploring candidates which place the solar region along the southern boundary of the site. In Figure 10's optimizer trajectory plot we see that the optimizer indeed often finds good layouts which have solar regions on or near the southern boundary of the site. However, as seen in Figures 5-8, these are not the only high-performance layouts for any of the four example scenarios.

Additional concerns and tradeoffs must be made even if layouts are constrained to solar along the southern boundary, such as where along the boundary to place the solar region ("solar x position"), what shape and density of solar region to use as lower solar densities reduce internal shading but also increase wake losses by increasing turbine density ("solar gcr" and "solar aspect power"), and how large of a setback to use between the solar region and turbines, which trades off turbine-solar shading and flicker losses for wake losses ("solar x buffer" and "solar s buffer").

Stanley et al.'s "Massive simplification of the wind farm layout optimization problem" demonstrated that the turbine parameterization we used performs competitively with non-parameterized state of the art layout optimization. Therefore, if we constrained solar placement to a fixed reasonable placement along the southern boundary, and only optimized the turbine layout, we will find solutions which are comparable with a state-of-the-art turbine layout optimization, where the solar region is placed at a fixed region along the southern border of the site.

As with many turbine layout optimization methods, the results are moderately sensitive to the wake model. However, the restrictions imposed by parameterizing turbine placement mitigate wake model sensitivity in comparison to a non-parameterized approach. A non-parameterized optimizer's flexibility allows it to make micro-siting adjustments, moving individual turbines just right to exploit weaknesses in the wake model. **In contrast, our parameterized turbine grid simply cannot make these micro-adjustments and therefore is less likely to generate layouts which depend on artifacts of the particular wake model used and which may have little real-world benefit.** One way of thinking about this effect is that the parametrization applies a strong regularization to the optimization problem, which increases the robustness of solutions and decreases solution sensitivity to the peculiarities of any models used.

On Land use restrictions:

We agree that land use restrictions are an important concern for many hybrid plant installations. Land use constraints can be applied to the optimization process in the same way that boundary constraints were applied: solar modules were simply excluded from disallowed zones while turbines were moved to the nearest valid location (if no valid location was identified, they were simply removed from the layout). By associating a quadratic penalty with invalid turbine placements, we encourage the solver to focus its efforts on generating valid layouts. Variable land use costs could also be incorporated in a similar fashion if these costs are accounted for by the objective function. **We added discussion of land**

use restrictions to both the objective function section and included exploring land use issues further in the future work listed in the conclusion.