

WES-2021-54

Overall

- Nice work and very interesting. As written, the paper undercuts the novelty of the work in moving towards physical design optimization of HPP (see detailed notes below). The core contributions surround the learnings related to HPP design under different conditions. Too much emphasis is placed on the mechanics of the optimization rather than the results (which are really interesting!). Again, see detailed notes below.
- Lots of aronyms are used without definiton on first use – it is particularly important to correct this as many of them are solar related and this is a wind journal. People will not know these
- Generally, the article could benefit from a primer for wind people on solar. It is particularly hard to follow section 2.3 which seems to be a very interesting and relevant contribution of the work

Abstract

- Avoid acronyms in the abstract – if used, you need to put them next to the word on first use (i.e. line 7)
- What is scientifically interesting about the work? The tutorial is not really a scientific contribution. Consider replacing the last sentence with something of interest that was discovered in the optimization process – surprising trends in the designs, trade-offs that were significant, etc

Introduction

- It would be helpful to define hybrid power plants in the intro – dont assume the reader is familiar or has the same understanding of HPPs
- Many WFLO problems in literature focus on cost of energy or cost/energy – work looking only at energy optimization is a bit outdated
- I think it is important to distinguish a bit more on the topics of hybrid power plant optimization problems. You mention sizing – there is a TON of literature in this space and most of these fall into the category of MILP sine they focus on sizing the assets time-series energy production. Here you are going BEYOND sizing to look at physical design – which is a a nascent area wehre little research has been done. Make sure that message is clear in the abstract, intro and conclusions
- Please remove the section 1.1 and transform this into a paragraph. Bullets should onlybe used if absolutely necessary and they are not here.
- The last sentence in section 1 "We aim..." reads a bit funny... maybe just say, In this work, we provide a proof of concept of stochastic optimization of low-d parameterized layouts as an effective method...
- Consider adding a paper roadmap at the very end of section 1

Hybrid plant model

- For sections 2.1 and 2.2 can you elaborate a bit more on the limitations of the selected wind and solar plant model – there are many model choices here and they aren't well justified
- Section 2.3 is hard to follow. Figure 1 is particularly interesting but only 3 time steps per hour seems like pretty low resolution- is there any validation of this?
- Figure 2 bounds don't need to be so big as there is negligible effects beyond +/-200 and are these meters? Nothing is labeled
- Consider putting a picture ahead of figures 1 and 2 that shows the layout of the turbines and PV being simulated. Without having such a visual, it's hard to tell what is going on... there is a lot of information described in text where diagrams would be helpful
- Is this model described anywhere else? I don't see any citations. If there is not enough space in situ, an appendix that more thoroughly describes the model would be helpful

Optimization methodology

- Again, some diagrams could be helpful here – using the baseline plants for example. It is hard to follow table 1 on first inspection. I had to reread the section several times and scrolled down to figure 5 and 6 to in any case to help interpret it
- I think it is fine to choose AEP as this is a first study of this type so it is good to start there rather than add additional complexity. The long discussion is not necessary and could be moved to future work. Again, it's important to emphasize in the introduction that this is a physical design study to differentiate from all the work on sizing of HPPs that already exists
- It seems there is a lot of work going into the constraints handling that is manually programmed. Can you describe this more in an appendix or refer to code documentation? Generally it would be nice to see references to the code here
- ES is a good starting point but certainly an area for future work as well
- Do you have a reference on random search?

Experimental results

- Consider using a table for the properties of the two sites. Again, a lot of things are described in text where diagrams or tables would be better
- Interesting that the high correlation sites have a lot more spread in terms of AEP gains... I'd like to see more discussion on this and explanation
- In section 4.1, A core scientific contribution of this paper is on how the difference in correlation supports different trends (exploiting trade-offs differently) in system design. I would have liked to see a partitioning of the effects of the correlation versus the wind rose. It would be nice to see the wind roses swapped to tease apart the effect of the strength of directionality of the wind rose versus the strength of the correlation in terms of influencing the design trends. Maybe you can speak to this a bit more without having to do the optimizations themselves...
- Section 4.4 can be an appendix – instead it would be nice to see more elaboration on sections 4.2 and 4.3 – the value of the paper is in explaining and understanding the influence of site conditions and problem formulation on design trends for HPPs. The particulars of the algorithm are secondary

Conclusions

- I recommend rewriting the conclusions completely. The emphasis should be on the results and interpretation of the HPP design optimization – not the optimization mechanics.
- Future work could be extended quite a bit – a lot of the discussion in 3.2 could be brought here