

***Interactive comment on* “Optimal scheduling of the next preventive maintenance activity for a wind farm” by Quanjiang Yu et al.**

Katherine Dykes (Editor)

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Received and published: 28 January 2021

This comment from an anonymous reviewer came after the comment period closed:

Review for manuscript: wes-2020-129 “Optimal scheduling of the next preventive maintenance activity for a wind farm” This paper considers the interesting problem of maintenance for wind turbines. Effectively managing turbine maintenance is a key problem for wind farm operators, and has the potential impact of substantially lowering metrics such as the LCOE for wind energy. The authors present an optimisation model for the problem of maintaining a single turbine. They then present three examples of applying the models with different parameterisations. Overall, I am unclear on what contribution this paper makes to the literature on maintenance in general, or turbine

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maintenance in particular. The problem context that is presented – maintenance of a single turbine comprising four components – seems like a substantial simplification of the actual problem facing wind farm operators, and so some reflection on how this work would actually be applied in a practical setting would be useful. Section 1: in the discussion on maintenance literature, it will be useful to be clearer which papers are specific to wind turbine maintenance, as it currently reads as if these are all generic maintenance studies. More broadly, it would be useful to have more of a review of the literature on turbine maintenance – there is a substantial body of research in this area, and it is unclear exactly what the contribution of this paper is. Section 3.5: the differences between the authors work and the PMSPIC model could be clearer – this section presents the mathematical formulation PMSPIC, but more reflection on how these differences can be interpreted would be useful, including the differences which give rise to the substantial differences in computing times that are mentioned in Section 4. Section 4: It would be useful to clarify whether the data used in the numerical studies is intended to represent onshore or offshore turbine maintenance (there is no clear statement in the paper as to which type of problem this model is intended for). The statement “ Among other things, the graph explains why the choice of $r = 80$ is justified” should be clarified. I’m not clear as to the purpose of the three studies, or the sub-parts within the studies. It would be useful to have the analysis approach set out more clearly to emphasise what the authors are aiming to demonstrate. Tables 4-6 aren’t numbered and don’t have any captions. Its not clear to me how the discussion and interpretation in Section 4.3 relate to the data that us shown in the tables. There is no real explanation on what the “matlab” and “AMPL” times actually represent. Also, the PMSPIC algorithm seems to identify solutions which are more optimal, but there is no reflection on this. If I am correctly understanding the optimal PM times that are shown throughout Section 4, these seem extremely long (e.g. 4 years plus). Typical planned maintenance schedules for turbines are much more frequent, so it would be useful to have some reflection on why these results are so different.

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Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2020-129>, 2020.

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