

Reply to the comments of the editors

We totally agree with the editors that the final comment, cited below, is very important. To address this comment we made two changes in the article.

Comment. Your paper is now nearly accepted I would like to improve the discussion of comment36, as outlined by the associate editor: "One issue that still is not addressed and needs to be in particular is comment 36 / response 36. I should have made my concern on this stronger as this was one of my biggest concerns around the whole study and its validity from a wind turbine domain perspective (again compared to the state of the art). If you look for example at the O&M Model from ECN you all see that a key distinction is that the failure rates for minor to major repairs to full component replacements are quite different. You need to heavily qualify the entire study and findings based on the lack of distinguish between repairs and replacements and to heavily qualify the overall results based on the input assumptions. This needs to be corrected before final publication." Please includes such aspects in your discussion. with such a more technical correction your paper will be accepted. Best Joachim Peinke (Chief editor)

Change 1. In the case study section, just before Section 4.3, we added

"The optimal times for the next PM activity have landed in the range between 43 and 50 months and seem to be quite short. This is explained by the particular choice of the model parameters presented in Table 1: under the assumption of independence between the lives of the four components, the average time until the first failure is slightly below 50 months. (Notice that in this case study, the estimated parameters for the components' life lengths are based on the data collected for wind turbines from year 1994 to 2004. For the modern wind turbines, the mean survival times will be longer.) Another important contributing factor is the assumption of low PM costs, with higher PM costs the optimal next PM activity would be scheduled at a later time. In the special case with equal PM and CM costs, the optimal solution is to forget about PM planning and fully rely the pure CM strategy. "

Change 2. In the conclusion section, in the very end of Section 5, we replaced

"In the future, we plan to use NextPM as a key module in a maintenance scheduling app for wind turbines, after adding a module for processing condition monitoring data."

by

"The notable limitation of our setting is that it neglects such important maintenance activities as inspections, minor and major repairs. By considering full replacements as the only kind of CM and PM activities allowed in the model, we were able to tame the mathematical challenge of the problem in hand. Still, even within this simplified model framework, our computational analysis may bring useful insights of more efficient PM planning depending on a few key parameters of a concrete wind farm. Our results should be viewed as a first promising step towards a much more sophisticated mathematical optimization model that would take into account available condition monitoring data and even recognizing the difference in the failure rates for minor repairs, major repairs, and component replacements."