

Wind Energ. Sci. Discuss., referee comment RC2
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Comment on wes-2022-29

Anonymous Referee #2

Referee comment on "Grand challenges in the digitalisation of wind energy" by Andrew Clifton et al., Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2022-29-RC2>, 2022

This paper presents, in a concise and easy-to-read way, the various aspects and challenges of digitalisation in the wind industry. The ideas are clear and the writing is argumentative.

Overall, it is a very interesting piece of work, worth the attention of the scientific community besides the targetted audience (policy advisers and funding agencies). I recommend this paper for publication, subject to only minor revision - please refer to the comments and feedback below.

General comments

- In Section 1.2, the authors provide a list of opportunities for the collection and use of data in the wind industry. Although comprehensive, this list is used only to gather examples of applications. I believe it would be valuable to group the opportunities here listed into classes, based on several collection purposes. For instance, I could identify: (i) site assessment for design, (ii) condition and health monitoring (diagnosis and prognosis) for operation and maintenance, (iii) control and electrical engineering for grid integration, (iv) wind resource assessment and array aerodynamics for reliability assessment, performance evaluation and optimisation, (v) all above and any other type of data integrated into virtual/augmented reality for HSE.
- I would recommend moving some of the paragraphs in Section 1.2 (line 93-103) and 1.3 (line 148-154) to Section 1.5, by remaining it into "Scope and objectives of this Grand Challenge for digitalisation". There, the authors explain why the path towards the digitalisation of the wind industry is challenging but essential. These paragraphs set the ground for the assessment performed in the paper, and they would fit best in Section 1.5.
- I would suggest moving Section 1.4 to an appendix, by only briefly referring to it in Section 1.5. Although I found it an interesting and innovative way to engage the reader with the story, this section distracts a bit from the introduction to this research. On the other hand, it can be linked easily to the goal of this paper, which is to identify the

challenges and enablers to make the story come true.

- On the points raised in the first paragraphs of Section 3.4, I agree with the need for wind-wise and across-industries (power generation, at least) taxonomies. For this reason, the RDS-PP (Reference Designation System for Power Plants), and more recently the RDS-PS (... Power System), standards were created. However, the main issues still lie in their accessibility and access (quite pricy).

Some other minor comments

- Line 107: Is it possible to have a reference on these 1 % savings of the CAPEX? What type of studies were performed (and by who) to state this?
- Line 110-112: I would add that digital-enabled asset management, allowing to implement of a condition-based maintenance strategy, also has the potential to reduce and/or challenge the number of recommended inspections and schedule maintenance tasks (see for instance deliverable 4.3 of the COREWIND project, soon to be published open access at <https://corewind.eu/publications/>)
- Line 124-128: I agree with the authors about the need to quantify the potential ROI of the digital services and technologies, and about the current lack of industry-proven cost figures for such investment. However, some researchers have tried to provide some first estimates (e.g. <https://www.sciencedirect.com/science/article/pii/S0951832020308905>)
- Line 144-147: Is there an "and" too much? Please rephrase and/or consider presenting as bullet point (no need for numbered list)
- Figure 2: "Data collection, processing, and analysis were used to help identify..." could be replaced by "Flowchart of..."
- Line 220-221: "The results..." repeats twice "the results of the literature survey" – correct?
- Line 272-274: "And, processes..." is difficult to read, can you please rephrase it?