

## ***Interactive comment on “Comparison of electrical collection topologies for multi-rotor wind turbines” by Paul Pirrie et al.***

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Received and published: 27 April 2020

General comments:

The paper is well written. The topic of electrical topologies for MRWT's is novel and only little research has been published on this so far. The method is well described. Uncertainties and assumptions have been outlined clearly. The results lead to favourite design(s) and show a path where to do more research on. A sensitivity study would be beneficial to better understand the influence of the sometimes large uncertainties in component cost and mass.

Specific comments:

Line 24: I recommend "more and better material" instead of "more material" Line 94:

C1

Why did you not use the same rated power as in Innwind (444 kW instead of 500 kW)? Is there a specific reason, e.g. power boost option? Line 108: How does the tower connect to the space frame? It would be good to understand from figure 1, whether the tower reaches to the top, to the bottom or somewhere in between the space frame. In line 133 and line 142 you mention the "base of the structure". What does it mean in particular and is it in conflict with line 108? Maybe it would be good to define the overall support structure and its elements (tower and space frame). A visualization of support structure and the electrical components within would be excellent.

Figure 8: Why are there only 4 wt's? Shouldn't it be 5?

Table 1: - For which power range is the table valid? - Some of the cost equations contain physical units, e.g. GBP/kVA and some contain variables, e.g. P. I recommend to keep it consistent - LSST in kNm? - Why do you call a 1500 rpm generator "medium speed". I thought this is high speed. Please clarify or cite a definition for medium and high speed Line 186: You name a 2012 paper "up to date". I understand that it is more up to date than the 2006 paper you refer on, but still it is not up to date in absolute terms.

Line 196: 1500 rpm is high speed in my opinion and needs 3 stage gearbox. Several hundred rpm is medium speed and needs 1 to 2 stages. Rotor speed is low speed and does not require gearbox. Maybe I am wrong with this definition, therefore please check and ideally cite a definition of high and medium speed.

Line 199: The torque density (kNm/kg) has been increased in recent years and is an ongoing research and optimization topic. The torque densities from 2006 to 2020 might have doubled approximately. As such your assumption "that the mass of gearboxes has not decreased considerably" might be wrong. Line 327: Wouldn't it be better then to call it "simplified cost of energy"? OPEX and losses are a huge factor. I guess any wind farm influences (cable losses, wake effects, HV station ) are not considered? I can understand that it is difficult to consider all these effects, but then it would be fair

C2

to name them simplified CoE. Line 330: Which k-factor of the Weibull distribution has been used?

Line 378: I would recommend not to make a guess here. E.g. in offshore wind farms, cables can and have been damaged by ships. This will not be the case for MRWT internal cables. Without having a database on root causes, I would recommend not to make guesses here.

Line 389: What do you mean by "similar"? Why did you not describe the approach to estimate the DTU-RWT cost? When you apply the same approach as you used for the MRWT, what will the result be for the DTU-RWT?

Table 4: Element AC star/Component count: here you give a "+" with high component count. At DC series/parallel you give a "0" with high component count? On which basis did you make the rankings and why the difference between the two?

Technical comments:

Line 2 (an others): MRWT Line 163: "it" Line 166: "string" Line 200 "shaft torque (LSST)" in kNm? Line 235 Why do you write kV A instead of kVA?

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Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2020-19>, 2020.