General comments:

The paper addresses the scaling trends of semi-submersible type floating offshore wind turbine support structures, considering the trend of further increasing wind turbine MW-classes. The presented approach is quite simplistic; however, relevant aspects are touched on in some more detailed discussion and sensitivity studies. Overall, the work presents a valuable insight into the development of larger floating support structures, which is a suitable basis for further research and future detailed investigations on floating wind turbine structures and economics.
Overall, the paper is well written (apart from some minor mistakes mentioned under technical corrections). The simplistic approach might leave some room for more investigations and detailed discussion (noted under specific comments).

Specific comments:

- "generalized upscaling relations that can be used for other semi-submersible platforms" (Abstract) or "This study is the first to develop generalized upscaling relations for semi-submersible FOWT platforms" (1 Introduction) or "to upscale any semi-submersible platform" (4.4)
    - These formulations are a bit misleading, based on which something more generalized is expected by the reader.
    - Semi-submersibles are much more different in terms of their designs as just the two very similar floaters considered in this case study. A significant difference, for example, would have been a design with just three columns and the turbine on one edge of the triangle or a design with four columns.
    - These are too ambitious formulations. The study is still considering only a specific semi-submersible floater design. Due to the high similarity of the investigated two designs, it is questionable if the found scaling factors are applicable to other semi-submersible designs in general.
    - Please add a discussion on the "universality" of your approach, as there are so many different design solutions for semi-submersibles, which are not covered by the two systems considered in this case study.
- Assuming constant values – Need of further elaborations and discussion. Where are limits of this approach, keeping the draft and especially the wall thickness constant?
    - Keeping the wall thickness constant. – Is this a realistic and feasible approach, considering that the diameters of the columns might increase? Has this approach been checked wrt structural integrity? It is furthermore striking that the wall thickness for the IEA-based designs (thus, the larger ones) are even kept constant at a smaller value than those of the OC4-based design. Is this suitable? The resulting numbers (lines 319-321) might change significantly if the wall thickness is changed as well if this is required for structural integrity reasons. This last aspect, however, is addressed later in your discussion. Maybe it can be pointed to this already here in lines 319-321, when presenting the results.
    - Using a constant value for the gap between bottom of rotor plane and water line. – Is this a reasonable approach? In your upscaling approach, you only keep the pitch motion constant, but not the heave motion as well.
- Chapter 1 (Introduction), lines 33-34: I would add here, what size is already addressed by the industry, e.g. 18 MW (https://www.rechargenews.com/wind/ge-has-18mw-offshore-wind-turbine-giant-in-the-works-vernova-chief-strazik/2-1-

1418184?utm_source=email_campaign&utm_medium=email&utm_campaign=2023-03-13&utm_term=recharge&utm_content=daily).

- Chapter 2 (Background):
  - The literature review might be extended. It is not at all addressed the huge diversity of semi-submersible designs and related different upscaling approaches.
  - The scaling approach by Leimeister is not only applied to obtain a 7.5 MW design but also to obtain a 10 MW design. This was part of another publication (M. Leimeister, E.E. Bachynski, M. Muskulus, and P. Thomas, 2016. 'Design Optimization and Upscaling of a Semi-Submersible Floating Platform'. *Proceedings of the WindEurope Summit 2016, September 27-29, 2016, Hamburg, Germany*.). But both information is also contained in the Master Thesis available at: http://resolver.tudelft.nl/uuid:7f6b5eda-15d8-4228-ad9a-8c27f8c5c258.
- Chapter 3 (Methodology):
  - Figure 3: X-/surge is mainly directed by the main wind direction. This is not always equal to the wave direction. The information in the figure is a bit misleading.
  - You are talking about validation (Section 3.3 – line 249). This is, however, just a verification. This is just a verification. And the large discrepancies would not directly lead to the conclusion that the model is verified (and not at all validated). However, the approximate results might be sufficient for the focus and application in this study. – Please rephrase and at least add some justification.
  - The approach needs to be presented in some more detail. Furthermore, please elaborate on why this approach is followed. Such a root-finding problem is not really needed for finding the value of alpha that results in equal rated platform pitch angles, as you have the underlying equations, based on which you can determine the required scaling constant, what you also did later in the paper. This is, however, furthermore not a new approach, as this was already done in (Leimeister, 2016). What are the differences and maybe advantages of this approach compared to the direct calculation? Right now I see a disadvantage of having more simulations/calculations with this root-finding problem approach. Please elaborate on this, maybe in Section 4.5.
  - You mention that the pitch natural period is calculated and checked that it is not in the predominant wave period range. How large do you define this range? And what is done if the pitch natural period would be close to the predominant wave period range?
- Chapter 4 (Results and Discussion)
  - The structure is not clear at the very beginning. When reading, the reader thinks about some shortcomings, which, however, are later on discussed.
  - Please refer at certain points (e.g., 4.1 and 4.2 when presenting the results for alpha) to further discussions done (e.g., 4.5 comparison to the analytical calculations).
  - Tables 9 and 10: Please discuss on the different trends in the percent steel mass for OC4 and IEA systems.
  - Section 4.4 and Table 13: Please include the results from Leimeister, 2016 for the 10 MW upscaled design and correct the information in line 395: No constant scaling factor of 1 is used for the entire platform. There are different scaling factors used for different parts of the floater (main column and upper columns).
  - Good investigations and discussion in Section 4.5.
  - Great to have a sensitivity study. However, the final resume of the second sensitivity study (4.6.2) is missing.
- Chapter 5 (Conclusion): The shortcomings and outlook might be extended and elaborated on in more detail. This might then be moved to a separate section before the conclusion. Please also add a discussion on the "universality" of your approach, as there are so many different design

solutions for semi-submersibles, which are not covered by the two systems considered in this case study.

Technical corrections:

- Throughout the paper, please write parameters (both within the text and in equations) in math environment/formula style.
- Please simplify your equations. There are very often brackets used where no brackets are needed.
- Please write out parameter descriptions (referring to the third and fourth line in Table 5).
- For reasons of consistency, please write 8° instead of 8 deg in line 232.
- Line 232: "of 25.5 s" should rather be "is 25.5 s".
- Line 243: "36% error is" should rather be "36% error in".
- Line 268: "which is increased in from 0 to 2 in increments of 0.005". There seems to be something wrong. I would delete the first "in".
- Line 291: The draft has a unit of "m" and not "MW".
- Line 376: Missing full stop after "research study".
- Line 513: Delete the "In" at the very beginning of this sentence.
- Lines 519/520: Use intext citation.