Reviewer #2,

This paper tries to review the unique challenges of floating offshore wind development in Japan towards the large-scale commercialization, which is very important topic. The paper structure needs to be revised slightly, because the earthquake and the Kuroshio Current, which are mentioned in the abstract and conclusion as the uniqueness of Japan, do not seem to be mentioned enough in the main text.

We thank the reviewer for their thoughtful and detailed comments, which we believe will significantly strengthen our manuscript. The reviewer's insights have helped us recognize that our initial draft lacked the necessary discussion on the uniqueness of Japan's situation. We have revised the manuscript extensively to address each of the specific points raised.

R2-1【Title】

The current title may be misinterpreted as a review of research on floating offshore wind energy system in Japan, but there are few reviews of research papers obtained from the past demonstration projects, and the paper is intended to review what needs to be done towards large-scale commercialization. Just for example, like "Floating Offshore Wind in Japan: Addressing the Challenges, Efforts and Research Gaps towards large-scale commercialization.", some words expressing this aspect are better to be added.

We agree with the reviewer's suggestion to make the title more precise. The current title could indeed be misinterpreted. We have revised the title to better reflect the paper's core theme, which is a forward-looking analysis of challenges and research needs for large-scale commercialization in Japan. The reviewer's suggested title, "Floating Offshore Wind in Japan: Addressing the Challenges, Efforts and Research Gaps towards large-scale commercialization" is a good model, and we decided to adopt it.

Modification: Change title to "Floating Offshore Wind in Japan: Addressing the Challenges, Efforts and Research Gaps towards large-scale commercialization"

R2-2 【Section 2.6】

This section of metocean conditions should mention about the current, because the authors refer to Kuroshio in the summary section of line1085. The current is also significantly important especially for mooring line design (Also for O&M).

We thank the reviewer for highlighting the importance of ocean currents, especially in the context of mooring design and O&M. We agree that this is a significant metocean factor, particularly given the reference to the Kuroshio Current. We revised Section 2.6 to include a specific discussion on the role of currents, their impact on project design, and the relevance of Japan's specific oceanographic conditions.

Modification: Added subsection 2.2.5 Current Data

R2-3.【Section 2.6.1 line 306】

...stochastic simulations such as MASCTO are widely used in Japan "to consider the effect of typhoon", might be more clear what the authors want to say.

We appreciate the reviewer's suggestion for a clearer explanation. We rephrased the sentence to explicitly state that stochastic simulations like MASCOT are used "to consider the effect of typhoons on extreme sea states and turbine loads." This will make the purpose of these simulations more understandable to the reader.

Modification: In 2.2.3 rephrased as “Regarding the estimation of extreme wind speed, stochastic simulations such as MASCOT Offshore (Yamaguchi and Ishihara, 2010; Ishihara and Yamaguchi, 2015) are widely used in Japan to consider the effect of typhoon.”

R2-4.【Section 2.6.3 line 343-345】

The following paper is the outcome from Fukushima FORWARD project about this issue.

A. Yamaguchi, T. Ishihara, Numerical prediction of Normal and Extreme Waves at Fukushima Offshore Site, Journal of Physics: Conference Series 1037 (4), 042022, 2018.

Thank you for providing this relevant reference. The paper by Yamaguchi and Ishihara is an excellent example of work from the Fukushima FORWARD project related to wave prediction. We added this reference to this section to support our discussion on normal and extreme waves at the Fukushima offshore site.

Modification: In 2.2.4 rephrased as “In the Fukushima FORWARD project, a wave hindcasting was performed using Wave Watch III, showing good agreement with in-situ measurement data both in normal and extreme conditions (Yamaguchi and Ishihara, 2018).”

R2-5【Section 3.1.2】

Many research in the demonstration projects in Japan or Norway had big efforts to develop dynamic analysis tool to design the optimum floaters. Just as one example, the latest outcome from Fukushima FORAWRD is as follows. Also there are another papers from Goto project, and Demonstration Project of Next-Generation Floating Offshore Wind Turbine. It might be better to refer these latest efforts relating with design of floaters to address the challenge and efforts in Japan or Norway.

T. Ishihara, Y. Liu, Dynamic response analysis of a semi-submersible floating wind turbine in combined wave and current conditions using advanced hydrodynamic models, Energies, 13(21), 5820, 2020

A. Yamaguchi, S. Danupon, T. Ishihara, Numerical prediction of tower loading of floating offshore wind turbine considering effects of wind and wave, Energies,15, 1-18, 2022.

We agree that the development of dynamic analysis tools for floater design is a crucial effort that deserves specific mention. The provided references from the Fukushima FORWARD project (Ishihara and Liu, 2020; Yamaguchi, Danupon, and Ishihara, 2022) are highly relevant. We revised Section 3.1.2 to include a more detailed discussion of these specific research efforts and reference the provided papers to highlight the progress made in this area.

Modification: In 3.1.2 added suggested references.

R2-6.【Section 3.2】

The anchor design also is better to be mentioned. "Anchor design against liquefaction due to the earthquake" is one of characteristic of Japan. In Abstract, the authors mention earthquake in line 4, but there is no specific description about the earthquake in the manuscript. Japan

guideline mentions about this liquefaction issue.
https://www.mlit.go.jp/common/001331376.pdf

We thank the reviewer for pointing out this critical omission. The issue of anchor design against liquefaction due to earthquakes is a uniquely significant challenge for floating offshore wind in Japan. We revised Section 3.2 to include a specific discussion on this topic, referencing the provided MLIT guideline to support our claims. This will better connect the manuscript's content with the earthquake reference in the abstract.

Modification: In 2.2.1 added "The risk of liquefaction on the anchor is mentioned in MLIT(Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Maritime Bureau, 2023)."

R2-7.【Section 3.4】

This section only has Section 3.4.1. Please check the chapter structure.

We apologize for the formatting oversight in the chapter structure. We have corrected the numbering to ensure proper chapter structure throughout the document.

Modification: Eliminate the numbering for subsection 3.4.1 and integrate the content directly under the heading of 3.4.

R2-8.【Section 4.2.2】

Line 830: The following paper discuss the swell effect on weather downtime in Japan.

Y.KIKUCHI, T.ISHIHARA: Assessment of weather downtime for the construction of offshore wind farm by using wind and wave simulations, Journal of Physics: Conference Series 753(9) pp.1-11, 2016.

We appreciate the reviewer providing this relevant reference. The paper by Kikuchi and Ishihara is a valuable resource for discussing the swell effect on weather downtime in Japan. We will add this reference to Section 2.2.6 and Section 4.4 to strengthen our analysis of operational challenges.

Modification: Add suggested reference to Section 2.2.6 and Section 4.4.

R2-9.【Figure 7, Line 1211】

The uniqueness of Japan found in this paper is difficult to understand from Figure 7. Please consider, if possible.

We thank the reviewer for this constructive feedback. We recognize that Figure 7 may not fully convey the unique aspects of Japan's challenges. We reviewed the figure and its caption to either revise the figure to better illustrate the uniqueness or, alternatively, to provide a more detailed and clearer explanation in the text that accompanies the figure, better highlighting how the data presented relates to Japan's specific conditions.

Modification: Prepared a new Figure 7.

R2-10.【Project names】

I think that the demonstration project names in Appendix B are not accurate. Please check them. B0.2 →Fukushima Floating Offshore Wind Farm Demonstration Project (Fukushima FORWARD) B0.3→Demonstration Project of Next-Generation Floating Offshore Wind Turbine (The name of floater is Hibiki, but the project name is different.)

We thank the reviewer for pointing out these inaccuracies.

Modification: We corrected the project names in Appendix B to the official "Fukushima Floating Offshore Wind Farm Demonstration Project (Fukushima FORWARD)" and "Demonstration Project of Next-Generation Floating Offshore Wind Turbine."

(【Noticed typo】Line 596: Tow-to-Side → Tow-to-Shore ? / Line 1211: is summarized in 7 → is summarized in Figure 7.)

We thank the reviewer for pointing out these mistakes.

Modification: We corrected "Tow-to-Side" to "Tow-to-Port" and "is summarized in 7" has been changed to "is summarized in Figure 7".