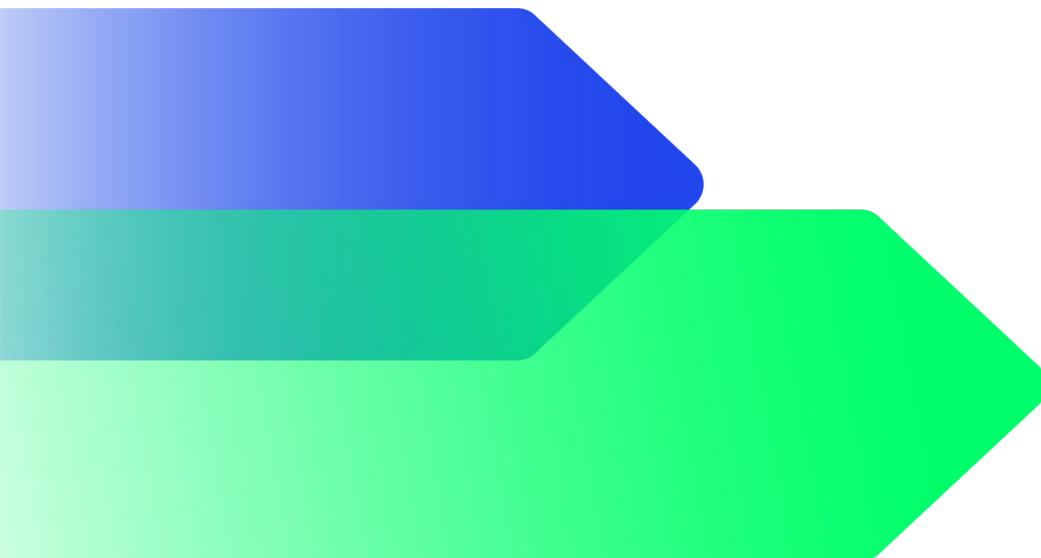


FLOATING WIND JOINT INDUSTRY PROGRAMME S3P3

# Clarification Question Responses

WTG Controller Modification to Reduce Mooring Line Loads Project (CMML)

July 2025



#	Type	Question	Response
1	Project specific	Will FLWJIP distribute floater model / information or is it to contractor to define the floating foundation model to be used for the JIP programme?	<p>The contractor will define the floater model. The ITT states -The baseline scope should consider <b>one</b> floater and mooring system scenario for <b>one</b> site. Previous work, the MRR&amp;I project report findings, relating to controller implementation and mooring fatigue reduction, used the semi-submersible FLWJIP floating foundation from The Carbon Trust reference designs.</p>
2	Project specific	Will FLWJIP recommend offshore site applicable for the study or is it up to contractor to define it in accordance with FLWJIP?	<p>We do not recommend a specific offshore site. This should be defined by the potential contractor. However, the FLWJIP reference designs contain several data sets:</p> <p><b>Reference Designs - Overview</b></p> <p><b><i>Metocean conditions (limited data sets)</i></b>  <i>for Benign, Moderate and Harsh sites are provided. These include information on the wind, wave and current conditions, weather windows and water levels.</i></p> <p><i>There is a PDF document and Excel file for each site type. There is also a separate PDF report on soil conditions which are assumed to be the same across all three sites. The Moderate site conditions were used in the design of the reference cases.</i></p> <p>Please see the Reference Designs - Overview for Project Contractors document uploaded as part of the tender documents for more details.</p>
3	Project specific	Will FLWJIP provide relevant metocean data for a site they are considering or is it to the successful bidder to procure such data (Complete metocean report with sufficient details on site wind wave and current, both for extreme and operational conditions)?	<p>See above,</p> <p>It may be possible to consider a detailed site, if more data is required, and members of FLWJIP are willing to share this data.</p> <p>Potential contractors should not rely on this being the case.</p>

4	Project specific	Can FLWJIP indicate size of WTG to be investigated?	15-22MW is a reasonable range. To date, the most recent FLWJIP work has been conducted using 15MW reference design turbine. Please see the Reference Designs - Overview for Project Contractors document uploaded as part of the tender documents for more details.
5	Project specific	Our base offer would be with a catenary mooring system, is FLWJIP open to additional work testing also taut moorings?	Yes, FLWJIP would be open to additional work. We suggest that any work outside of the original scope and budget be added to the tender as an additional work package.
6	Project specific	The "reference turbine orca flex files" mentioned in the tender documentation also include the WTG model including the controller as a dll and in a readable format, correct?	<p>For the previous MRR&amp;I study. The Dynamic Link Library (DLL) of the Carbon Trust Phase IV Numerical Modelling Guidelines (NMG) project is used. The controller is based on the Reference Open-Source Controller (ROSCO) toolbox by NREL. This and other modified controllers will be available to the winning bidder.</p> <p>The Carbon Trust reference designs used the IEA 15 MW wind turbine - NREL Reference OpenSource Controller (ROSCO)] and the DTU Basic Controller.</p> <p>Please note: The Carbon Trust reference designs are fairly simple/limited in design. It may be a preference to use in-house or other designs.</p>
7	Project specific	Are specific controller modifications anticipated? Shall we mimic commercial controllers and optimize parameters? Or rather develop non conventional solutions? New feedback loops? Even if such developments might be far from commercial implementation?	<p>The initial part of the study is to understand what is possible, defining the unknowns mentioned in the question.</p> <p>The Carbon Trust Reference designs use the Standard ROSCO controller. Previous projects have modified this.</p> <p><i>Are specific controller modifications anticipated?</i> We anticipate this will be the case.</p> <p>Regarding non-conventional solutions, effectively, anything is on the table, within</p>

			<p>budget. The fundamental first question is whether controller modification to reduce mooring line loads is worth pursuing, now or in the future. Turbine OEM engagement will be essential.</p>
8	Project specific	<p>Please clarify the 2nd bullet point. Description of tender 2.4/6</p>	<p>This point should read:</p> <p>The FLWJIP 15MW reference designs and some FLWJIP MRR&amp;I project report findings, relating to controller implementation and mooring fatigue reduction, will be shared as part of this project.</p> <p>The online tender document has been updated accordingly</p>
9	Project specific	<p>It seems like the JIP has a specific foundation in mind. Please explain what the CT will provide. Is it a full complete Orcaflex model? Or just enough data to carry out the hydrodynamic modelling (Dimensions, mass, mass moment of inertia etc.)?</p>	<p>The FLWJIP partners have taken a different approach to this ITT, reducing the amount of project definition. This allows the potential contractor to demonstrate services within the budget. In addition to providing WP extensions outside of the budget where they feel it is necessary.</p> <p>Previous work, the MRR&amp;I project report findings, relating to controller implementation and mooring fatigue reduction, used the semi-submersible FLWJIP floating foundation from The Carbon Trust Reference designs.</p>
10	Project specific	<p>"...consider one floater and mooring system scenario for one site." Does CT have a site in-mind and will metocean data be provided?</p>	<p>See the response to question 2</p>
11	Project specific	<p>Please confirm whether TLPs should be considered.</p>	<p>If the potential contractor feels this is the most applicable first base case and can justify this. Multiple foundation types may be a possible WP extension suggestion.</p>

12	General	Have the conditions changed since the FDTL tender?	Not to the PMS's knowledge. Please get in contact via email if you would like to discuss this further.
13	Project specific	"Prepare documentation/workshop to facilitate engagement with wind turbine OEMs to review controller modification schemes." Clarify whether the JIP will facilitate a workshop(s) with OEMs. Or whether the project shall disseminate results and information for the JIP members to on their own engage with OEMs?	Contractors should lead in engagement with Turbine OEMs.  We do have several OEMs as part of our advisory board; however, this and FLWJIP partner contact with OEMs should not be relied on for this project. Independent stakeholder/working relationships with Turbine OEMs are a project requirement.
14	Project specific	Is the study focusing purely upon mooring design driving fatigue loading, or is it more broadly hoping to explore the ability of the wind turbine controller to impact upon key design drivers of the coupled turbine-floater-mooring system?	The primary project focus is the potential for controller modification to reduce mooring fatigue. Is this possible or realistic, now or in the future?  Initial findings could reveal this is not a major controller design driver; other avenues to controller modification may be worth pursuing, e.g. as WP extension or scope changes based on findings.
15	Project specific	What is the Floating JIP's key objective for the outcome of this project. What do they hope the deliverable will enable them to do next?	See above  Understand if controller modification that reduces mooring system fatigue loads is possible and practical to implement now or in the future.
16	Project specific	Is the engagement with OEMs aimed at achieving a shortlisting of viable controller features that could be commercially available?	OEM engagement is to understand what/if controller modification is possible to reduce mooring system fatigue. A shortlisting of viable controller features that could be commercially available would be part of a beneficial base case to build on. This is also for the contractor to define.
17	Project specific	Is floater type and mooring configuration to be left undefined and agreed at project initialisation? Or should bidders suggest available baseline configurations?	Potential Contractors should suggest this. Final approval by the FLWJIP partners at the start of the project. FLWJIP partner changes are usually

		minor alterations based on the winning contractor tender proposal.
18	Project specific	<p>Is there a perceived benefit to the Floating JIP partners in a shorter project timescale than anticipated (i.e., shorter than 12 months)?</p> <p>If contractors feel they can deliver within a shorter time, please state so. I was suggested that potential contractors consider it takes time for the FLWJIP partners to review deliverables, and holidays can increase review time.</p>
19	Project specific	<p>Description of tender 5.4 "the Floating Wind JIP 15MW reference turbine OrcaFlex files will be shared". Please elaborate on the content of the OrcaFlex files to estimate the modelling effort required. Is it only the turbine or does it comprise a fully coupled base model with defined turbine, floater and mooring system ready to run?</p> <p>This is for the potential contractor to define.</p> <p>Please see the Reference Designs - Overview for Project Contractors document uploaded as part of the tender documents for more details.</p>
20	Project specific	<p>Metocean and Location. Is there a predefined location of interest and will the metocean data for the fatigue analysis be provided? If so, in which format?</p> <p>Please see question 2</p>
21	Project specific	<p>Would the IEA Wind 15-Megawatt Offshore Reference Wind Turbine (data available here: <a href="https://github.com/IEAWindSystems/IEA-15-240-RWT?tab=readme-ov-file">https://github.com/IEAWindSystems/IEA-15-240-RWT?tab=readme-ov-file</a>) be a suitable wind turbine, floater and mooring configuration to be investigated for the project? If not, is there any other OpenFAST model data sets that could be supplied for the project instead?</p> <p>The Carbon Trust reference designs used the IEA 15 MW wind turbine.</p>
22	Project specific	<p>Is there any site data (metocean conditions) that can be supplied as the scenario to be investigated?</p> <p>Please see question 2</p>
23	Project specific	<p>Is there any load time series of mooring loads measurements available that can be supplied for the project?</p> <p>Unlikely, please don't rely on this being available.</p>

24	Project specific	<p>Are other changes to system design that may affect mooring fatigue considered within scope for the interest of benchmarking purposes? (I.e. is the objective solely to evaluate the impact of making controller modifications, or is it also to evaluate the suitability of making controller modifications when compared to other options that can reduce mooring line fatigue?)</p> <p>The scope is to evaluate the impact of making controller modifications on mooring system fatigue. Is this possible, or necessary now or in the future?</p> <p>If potential contractors have an understanding for benchmarking fatigue reduction against another method, this may have merit.</p>
25	Project specific	<p>Is there a specific combination of floater and mooring configuration that is of primary concern for the project?</p> <p>For the contractor to define.</p> <p>The specific combination of the mooring system and floater configuration will undoubtedly have a significant impact. We aim to understand one major case in the first instance of this project. This may influence the mooring system and floater to be chosen.</p> <p>Please note: FLWJIP welcome additions to the scope where differing floaters and mooring systems could be investigated if deemed outside of the scope by the potential contractor.</p>
26	Project Specific	<p>For site conditions will these be proposed by Contractor and agreed during the initial scenario definition or will Carbon Trust provide information for use?</p> <p>Please see question 2</p>

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