

**OFFSHORE WIND ACCELERATOR S4Y3** 

## Clarification Question Responses

TWG-F – Sea Ice Loads on Offshore Dynamic Structures (ILoDS)

May 2022



#	Туре	Question	Response
1	General	Reference is made in the ITT Description of Tender document to Annex B of the Tender Certificate. Where is Annex B?	A new Tender Certificate has been published on the Carbon Trust website which contains Annex B.
2	General	Reference in the ITT document is made to "Bidders shall provide Work Package descriptions in the format set out in Annex 2 to this document". Where is Annex 2?	We apologise, Annex 2 does not exist in the ITT Description of Tender document. Please provide work package descriptions in the format set out in section 4 'Work Packages'.
3	Project specific	The document mentions monopiles often (sections 2.1, 2.2, 2.3 and WP2), though the scope could be considered to include jackets and floating support structures as well. Are there any expectations with respect to these other support structure types?	The intension was to keep the focus on monopiles but if it is possible to consider jacket and floating support structures as part of this work package, within the budget, then this would be welcomed.
4	Project specific	WP2: In WP2 it is mentioned that "the contractor should consider the large-scale properties, such as ice thickness, concentration, occurrence frequency, floe size, ridge frequency and composure and drift speeds." Please note that the variability of such properties is extremely high depending on the geographical location. Is it possible to focus on a certain region in Europe, e.g., the Baltic Sea, where the most of OWTs affected by sea ice will be built in the nearest future? Will the case study identify some specific area?	Yes, the contractor may consider using a geographic case study to provide context for the ice assessment in WP2. During the delivery of this project there will be opportunity for the contractor to consult with the OWA Foundations Technical Working Group to establish a preferred case study for this work. Suggestions for a geographic case study, such as the Baltic Sea, may be put forward as part of a project bid and is encouraged.
F	Project		UPDATE 16/06/2022: Objective 2.3v relates to Work Package 2 and Work

		"The main objectives of this work are to establish widely accepted guidelines for the design methods and modelling of sea ice loads on monopiles and their support structures. To achieve this, the following objectives have been set: v. To evaluate the relevant sea ice load cases and response models". Does it mean that methodologies to model ice interaction scenarios with wind turbines shall be analysed? Is it required to model ice interaction scenarios, for example, simulate identified ice failure models and structural response?	<ol> <li>The intension is that the different methodologies to model sea ice interaction with monopiles should be considered and evaluated in line with the work package descriptions. This includes identifying, outlining and evaluating data sources for the sea ice assessment, in order to outline the available methods for deriving the conditions and parameters relevant to monopile design and load calculations.</li> <li>It is hoped that a generalised numerical model for sea ice conditions could be developed as part of the WP2 deliverables. A case study, which is to be agreed with the OWA Foundations Technical Working Group (TWG-F), should be used in WP2 to provide context for the evaluation and analysis undertaken. The OWA TWG-F welcomes proposals from bidders with regards to the approach for developing the generalised numerical model.</li> </ol>
6	Project specific	WP2: Does it mean that a numerical model for the prediction of ice conditions must be established? What should be included in a deliverable under generalised numerical model for assessing sea ice conditions?	The aim of this work package is to identify and outline the available methods for deriving conditions and parameters relevant to the design of offshore dynamic structures such as monopiles for WTG's. The contractor should evaluate the reliability and applicability of these methods and establish and propose a generalised numerical model for site specific ice conditions. The contractor may use a case study in WP2 to provide context for this ice assessment, as described in question 4.
7	Project specific	WP3: What does "This must include recommendation, and description, of the design load cases which are not currently represented" mean? Does it mean to give recommendations for updates in IEC	From the findings in WP1 and the review of current industry standards/guidelines at the start of WP3, the aim here is for the contractor to describe any design load cases which are exist but may not be represented in the current industry standards/guidelines, including IEC 61400-3-1:2019 and other relevant standards.

		61400-3-1:2019 based on the conducted studied of publicly available load cases?	
8	Project specific	<b>WP4:</b> Do evaluation criteria include primary ULS and FLS?	Yes, these may be considered as part of the evaluation of the different sea ice loadings.
9	Project specific	WP4: Does it mean that dynamic ice-structure interaction scenarios must be simulated or just analysed based on the publicly available data? For example, ice crushing and frequency lock-in time-varying actions to be analysed or simulated as well?	The intension here is to define the evaluation criteria required for sea ice load and response models to enable the effects of the sea ice interaction with dynamic structures such as monopiles to be modelled. This analysis should include the resulting loads and response. If simulation is feasible then this would be welcomed.
10	Project specific	WP4: In WP4 it is mentioned to "Undertake a cost benefit analysis of the different modelling approaches.". What does this cost benefit analysis refer to, the use of the models or the final design of a support structure? It is not clear what does "cost benefit analysis" means. Does cost benefit analysis include only modelling and design phases, or production/fabrication cost as well?	The intension here is for the contractor to undertake a cost-benefit analysis of the different modelling approaches for the sea ice load modelling methods/approaches which have been identified during this study.

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