18th October 2022

Dear Sir/Madam,

Invitation to Tender for the OWA Support Structure Damping project for the Carbon Trust's OWA Programme

You are invited to submit a tender for the OWA Support Structure Damping project (the "Project") which is part of the Offshore Wind Accelerator (OWA) programme. The key objective of the Project is to investigate current and future damping technologies for offshore wind support structures, with a view of extending the use of monopile foundations into deeper waters and for larger wind turbine generators (WTGs).

The Invitation to Tender (ITT) consists of the following documents:

- Description of Tender (this document);
- OWA Support Structure Damping Contractors' Conditions;
- Tender Certificate (Word template);
- Bid Price Calculation Sheet (Excel template);
- Clarification Document (if applicable[1]);

Unless informed to the contrary, tenders and communications shall be sent by e-mail to the following e-mail addresses: robert.keast@carbontrust.com and alicia.stammers@carbontrust.com

Tenders must be submitted before 1st December 2022. Any tenders received after this date and time will be deemed non-compliant.

Your tender must consist of the following, the contents of which are described further below:

- Main Bid Document (pdf) – template not provided;
- Signed Tender Certificate (pdf) – template provided; and
- Bid Price Calculation Sheet (xls) – template provided.

The timeline of this procurement process is as follows:

Deadline for clarification questions	1st November 2022
Clarification Document published[1]	9th November 2022
Submission of full tender	1st December 2022
Bidder interviews	December 2022
Successful Contractor announcement	January 2023
Envisaged Contract award date	January 2023

Please e-mail any clarification questions, including questions about the timing of this ITT, to robert.keast@carbontrust.com and alicia.stammers@carbontrust.com any time before 1st November 2022. The complete set of clarification questions and all answers to clarification questions will be published in the Clarification Document on our website by 9th November 2022 and will hence be visible to all potential Bidders: https://www.carbontrust.com/news-and-events/tenders

[1] A Clarification Document will not be published if no clarification questions are received in relation to this ITT.

For information about the OWA programme, please see the Carbon Trust's website:
https://www.carbontrust.com/our-projects/offshore-wind-accelerator-owa

We look forward to receiving your tender.

Yours sincerely,

…….
Robert Keast and Alicia Stammers
For and on behalf of **THE CARBON TRUST**

THE CARBON TRUST OFFSHORE WIND ACCELERATOR

Invitation to Tender for the "OWA Support Structure Damping" Project

Description of Tender

Contents

IMPORTANT INFORMATION FOR BIDDERS

Publishing

Neither this document, nor any part of it nor any other information supplied in connection with it may, except with the prior written consent of the Carbon Trust, be republished, reproduced, copied, distributed or disclosed to any person for any purpose other than consideration by the recipient of whether or not to submit a tender.

Bid evaluation

The received bids will be evaluated by the Carbon Trust and the OWA Support Structure Damping Partners against the criteria provided in section 7. A shortlist of Bidders will be created and invited for interview. Carbon Trust will do a vetting of the shortlisted bidders. Carbon Trust may request shortlisted bidders to fill-in a Due Diligence Questionnaire to supply additional information prior to being invited for an interview.

Contracting

Bidders should note that the Scope of Work contained in section 4 of this document does not constitute an offer to contract with the Carbon Trust. It only represents a definition of specific requirements and an invitation to submit a tender addressing these requirements.

Issuance of this Invitation to Tender and the subsequent receipt and evaluation of the tenders by the Carbon Trust does not commit the Carbon Trust to enter into a Contract with any Bidder.

Should Your tender be successful, an Agreed Scope of Work that builds upon the Scope of Work contained in section 4 of this document and Your Approach to Work will be mutually agreed between You and the Carbon Trust. Once the Agreed Scope of Work is agreed, your offer will be formally accepted by the Carbon Trust issuing an Award Letter, the Final Scope of Work, the OWA Support Structure Damping Contractors' Conditions, and any clarifications agreed in writing. The Award Letter, the Final Scope of Work, the OWA Support Structure Damping Contractors' Conditions, and any clarifications agreed in writing will establish the Contract for the OWA Support Structure Damping project (the "**Contract**") between You and the Carbon Trust.

Carbon Trust may make amendments to the OWA Support Structure Damping Contractors' Conditions between the issuance of this Invitation to Tender and the issuance of the Contract. These amendments will be mutually agreed with the Contractor prior to the issuance of the Contract.

With the exception of any amendments to the OWA Support Structure Damping Contractors' Conditions which may be requested by the Bidder, the submission of a tender shall constitute unqualified acceptance of the OWA Support Structure Damping Contractors' Conditions. In the event that minor amendments to the OWA Support Structure Damping Contractors' Conditions are requested, such amendments must be clearly stated and the exact alternative wording must be provided in Annex A of the Tender Certificate. Please note that it is at the sole discretion of the Carbon Trust to accept any of the proposed amendments and that the Carbon Trust reserves the right to require the provision of further information in relation to any such request. No minor changes other than those contained in Annex A of the Tender Certificate at the time of submitting the tender will be considered. No material changes will be considered at any time.

Mechanics of the tender process

Bidders should note that:

- it is at the discretion of the Carbon Trust whether to accept any non-compliant tender or whether to reject any non-compliant tenders without progressing such tenders through the evaluation phase;
- the Carbon Trust reserves the right not to accept the lowest priced tender or any tender whatsoever;
- the Carbon Trust reserves the right to accept more than one tender;
- unless a Bidder makes a formal statement to the contrary, the Carbon Trust reserves the right to accept any part of a Bidder's tender without accepting the remainder;
- formal notification that a tender has been successful will be communicated in writing by the Carbon Trust;
- the costs of tendering are the full responsibility of the Bidder; and
- the pricing set by Bidders shall be valid for a minimum of 90 days.

Bids may be submitted by individuals, companies, organisations or consortia.

Bidders should be aware that dates referred to in this Invitation to Tender may be subject to change where this is necessary in the interests of the Project (such changes will be notified in advance).

The Tender Certificate, Main Bid Document and any correspondence must be written in English. This Invitation to Tender, the Contract, its formation, interpretation and performance is subject to and in accordance with the law of England and Wales.

Conflicts of interest

Bidders should be free of any commercial interests, partnership arrangements or contracts underway or other matters which may present a conflict or potential conflict of interest in respect of the provision of these services. As set out in section 3, if a Bidder thinks that it may have any conflict or potential conflict of interest, the Bidder shall describe the details of this conflict and provide details of whether and how it would propose to manage such a conflict in a satisfactory and robust manner in Annex B of the Tender Certificate. The Carbon Trust reserves the right to require the provision of further information in relation to any conflict or potential conflict of interest.

Disclaimer

The information contained in this Description of Tender document and in any documents or information it refers to or incorporates (the "**Disclosed Information**") has been prepared to assist interested parties in deciding whether to make a bid. The Disclosed Information is not a recommendation by the Carbon Trust. It does not purport to be all inclusive or include all the information that a Bidder may require.

Neither the Carbon Trust nor any of its directors, employees, agents or advisers makes any representation or warranty (express or implied) as to the accuracy, reasonableness or completeness of the Disclosed Information. All such persons or entities expressly disclaim any and all liability (other than in respect of fraudulent misrepresentation) based on or relating to the Disclosed Information or any subsequent communication. The Bidder should conduct its own due diligence and seek its own professional, legal, financial and other advice as appropriate. The only information which will have any legal effect and/or upon which any person may rely will be such information (if any) as has been specifically and expressly represented and/or warranted in writing to the successful Bidder in any written contract that may be entered into with the Carbon Trust.

1. Introduction to the Offshore Wind Accelerator

1.1 The Offshore Wind Accelerator ("**OWA**") is an industry-driven collaborative research, development and demonstration programme which was initially launched by the Carbon Trust in 2008 in collaboration with five offshore wind developers. The OWA Support Structure Damping Project is part of the OWA. At the time of issue of this Invitation to Tender the OWA Support Structure Damping Parties are: SSE Renewables Services (UK) Limited, RWE Renewables GmbH, Equinor Energy ASA, Shell Global Solutions International B.V., TotalEnergies OneTech and GE Wind France SAS.

1.2 OWA Stage IV aims to continue the cost reduction of offshore wind to make it cost competitive with other sources of energy generation, overcome market barriers, develop industry best practice, trigger the development of new industry standards and support the international expansion of offshore wind.

1.3 OWA Support Structure Damping is a joint industry project set up under OWA Stage IV. It is funded separately to the core OWA Stage IV programme by five OWA Partners, Equinor, RWE, Shell, SSER and TotalEnergies (the Project Participants). OWA Support Structure Damping is governed by a Project Steering Committee and a Project Technical Committee, consisting of representatives from each of the Project Participants and Carbon Trust. These parties supervise the Project, will provide technical direction and guidance to the Contractor (where needed), and will review the Deliverables, findings, and other outcomes. GE is present in the consortium as a technical adviser, and is a member of the Project Technical Committee but not the Project Steering Committee.

1.4 Please note, the term "Contractor", where used within this document, refers only to the successful Bidder or, in the event that the Contract is awarded to a consortium, the successful Bidders.

2. Background and objective of the OWA Support Structure Damping project

2.1 The OWA Support Structure Damping Project would like to investigate current and future damping technologies for offshore wind support structures, with a view of extending the use of monopile foundations into deeper waters and for larger wind turbine generators (WTGs).

2.2 The monopile foundation is a key component in offshore wind's success story, providing a cheap, reliable, easily manufacturable and installable foundation solution. This has enabled offshore wind to be rolled out and developed quickly. However, without innovation, the use of the monopile is reaching its limits with regards to installation in deeper waters and specifically when used with larger wind turbine structures.

The size of wind turbine generators (WTGs) is ever increasing, and it is expected that 15-20MW turbines will not be uncommon in the near future.

Globally, there are a limited number of suitable shallow-water sites and therefore wind farm developers are starting to consider areas with water depths beyond 50m. Ensuring WTGs can be installed safely and economically in deeper water sites is key to unlocking new geographic locations as well as continuing the development of offshore wind worldwide.

Utilising larger diameter monopiles in deeper waters means that, during WTG idling, the natural frequency of the WTG structure can enter typical sea wave frequencies. This effect causes additional fatigue damage to the monopile. This effect can reduce the technical feasibility of using monopiles for larger WTGs in deeper waters. At present the damping capability is insufficient for larger monopiles in deeper waters.

The overarching aim of the OWA Support Structure Damping project is to investigate using novel damping devices to avoid having to use more expensive foundation solutions, such as jackets, tripods, floaters or more heavily engineered monopiles. Hence to reduce the levelised cost of energy (LCOE) in comparison to other foundation options.

2.3 The main objectives of this work are to investigate the current and future innovative damping technologies and understand and evaluate their impact on design and feasibility of using monopiles in deeper water with larger turbines. This includes active, passive and hybrid dampers, from within and outwith the wind industry.

The project aims to understand the impact these damping technologies will have on the lifetime effects of WTG components, on operation and reliability and the impact on the Levelised Cost of Energy (LCOE).

Ultimately the project will aim to develop guidelines for structural design, modelling and tuning methods for improved damping technologies.

2.4 The expected benefits of this work are to reduce the LCOE by extending the use case for monopiles in deeper waters for larger WTGs. In doing so this will also reduce the LCOE with regards to reducing the tonnage of steel required for monopile foundations, by encouraging more economic installation of monopiles and by unlocking deeper water sites.

2.5 In this tender, the project is currently seeking a *contractor or research partner* to conduct the bulk of the scope. A contractor would be engaged on a commercial basis, and would therefore have limited rights to the results generated. A research partner would provide a contribution to the project (financial or in-kind, etc.) and hence may become a partner with rights to the results, rather than a contractor.

2.6 The project may in future seek additional contractors to conduct other aspects of the scope. For instance, the project may seek one or more independent experts to review the scope and results. The project may in future also seek one or more standards / certification bodies to approve the results of the project.

3. Tender documents for submission

3.1 In response to this Invitation to Tender, Bidders are required to submit

i. A Main Bid Document (pdf) – no template provided;
ii. The signed Tender Certificate (pdf) – template provided; and
iii. The filled-in Bid Price Calculation Sheet (xls) – template provided.

3.2 The Main Bid Document should be no more than 20 pages excluding appendices and no more than 40 pages including appendices. Font should be clearly legible, and be at least font size 11. The Main Bid Document shall as a minimum include the following information:

i. The Bidder's proposed detailed Approach to Work (see section 4 and criterion 1 for more details). No template is provided for this. However, the Approach to Work should:

- include a Gantt chart which describes the timeline for the Project, showing when each Work Package will start and finish;
- outline how the Bidder will deliver the Scope of Work and do so on budget and within the allocated time;
- any Alternative Work (i.e. substitute activities to take place instead of certain activities outlined in the Scope of Work in section 4). If Alternative Work forms part of the Approach to Work, the Bidder is expected to highlight, explain and justify the intended deviation from the Scope of Work. Alternative Work will be considered as non-optional when the tender is evaluated; and
- any Additional Work (i.e. activities to take place in addition to the activities outlined in the Scope of Work in section 4). If Additional Work forms part of the Approach to Work, the Bidder is expected to explain and justify why the Additional Work would be beneficial and to provide a separate quotation for these activities. It is at the discretion of the Carbon Trust to consider Additional Work in the evaluation of the tender.

ii. a pdf copy of the filled-in Bid Price Calculation Sheet;
iii. the offered Bid Price, including any cost assumptions deemed relevant by the Bidder – see section 6 and criterion 4 for more details;
iv. an explanation of experience and staff skills, and how these are relevant to the Approach to Work – see criteria 2 and 3 for more details; and
v. supplementary information to provide experience evidence and skills evidence (e.g. CVs) – see criteria 2 and 3 for more details. This information should be provided as appendices to the Main Bid Document.

3.3 The Tender Certificate must be signed by an authorised signatory. Bidders must fill in the provided template.

3.4 The filled-in Bid Price Calculation Sheet must be provided in Excel format in addition to the information provided in the Main Bid Document. See section 6 and criterion 4 for more details.

3.5 The failure by a bidder to submit either the Main Bid Document, the signed Tender Certificate or the filled-in Bid Price Calculation Sheet shall mean that such tender is a non-compliant tender.

4. Scope of Work

4.1 The Scope of Work is provided in this section 4.

4.2 The Scope of Work comprises 6 Work Packages. The Scope of Work sets out the initial ideas on the key activities that the Contractor is expected to deliver for the Project.

4.3 It is expected that the Contractor will report on Project Deliverables to the Project Technical Committee. The Carbon Trust and Project Technical Committee shall review and provide feedback on each Project Deliverable. There will be at least one round of review comments to be accommodated by the Contractor for each Project Deliverable.

4.4 The Agreed Scope of Work will be agreed between the Carbon Trust and the Contractor when entering into the Contract. The Agreed Scope of Work may reflect any updates, changes or improvements to the Scope of Work as proposed by the Contractor in its Alternative Work or Additional Work and as agreed by the Carbon Trust.

4.5 Due to the breadth of skills and experience required for the Project bidders may decide to build a consortium to successfully meet the objectives of the Project. If a bid is submitted by a consortium it is expected that, in the case that the consortium is selected as the preferred Bidder, Carbon Trust will only enter into a Contract with the Project Coordinator, and that the Project Coordinator will subcontract the other members of the consortium.

4.6 The Carbon Trust appreciates that it will take a team of mixed seniority approximately 20 months to complete the Project.

4.7 Bidders should use the Scope of Work as set out below to create the Approach to Work. Any Alternative Work or Additional Work shall be stated in the Approach to Work at the end of the relevant Work Package description.

4.8 It is expected that simplifying assumptions will be required to complete the work in the given timeframe. These assumptions should, to the extent possible at the time of tender submission, be clearly stated in the Approach to Work. It is expected that during the execution of the OWA Support Structure Damping Project, any assumptions will be discussed with the Project Steering Committee and Project Technical Committee prior to the start of each Work Package.

4.9 The Scope of Work includes five Optional Work Packages. These are Work Packages that the Project Technical Committee will reserve the right to execute or dismiss in the course of the Project. The Bidder's Approach to Work should address these Optional Work Packages, but they should be kept and highlighted as optional in the Bidder's Approach to Work.

Work Packages

Work Package	Description of work
WP1: Literature and market review	The overall aim of this work package is to give a detailed review of the existing and future dampers applicable to offshore wind turbine generators (WTGs). **<u>Input parameters</u>** Prior to commencing the review, the Contractor shall agree with the Project Parties (Carbon Trust, Equinor, RWE, Shell, SSE Renewables, TotalEnergies and GE) a range of input parameters, not only for work package 1, but also for the rest of the study. Whilst these input parameters shall be considered upfront, the input parameters may be iterated throughout the Project. These parameters will include: • **Turbine parameters.** These will include: the number of different turbines to be studied (there could be just one turbine studied, or multiple turbines), model, size, hub heights, rating, stiffness, tower diameter, tower wall thickness, modal mass of 1st system eigenmode, damper location (with respect to height) and targeted damping contribution (e.g. +4/5/6% logarithmic decrement damping to the first mode). The project is interested in ≥15MW turbines, potentially up to 20-21MW. As part of the turbine parameters task, in your bid please indicate: ○ which model(s) you would plan to use for the studies, ○ the size of turbine(s) covered by the model(s), ○ the rationale for proposing the use of the model(s), ○ the possible constraints or limitations placed on dampers by the turbine model (and vice versa). (During the studies it may also be beneficial to review any constraints or limitations placed on dampers by the turbine model (and vice versa) and to iterate the model design accordingly). • **Monopile parameters.** The monopile dimensions will depend on the site(s) selected for study. The project is primarily interested in 10m+ monopiles. • **Site parameters.** These will include: site location, water depth, soil conditions, met ocean conditions (wave height and frequency; wind speed), operational loads. It may be best to select a site that the IEA reference turbine was applied to. The project may be interested in studying one site (e.g. a generic North Sea location (with a soil profile from the PISA project)) with the single site considered for three different depths (shallow, medium, deep). Your view on the site(s) to be studied would be welcome. The core of the Project is interested in

	typical conditions and lifetime damping effects, rather than focussing on extreme events. However, the Project scope may also be extended to study extreme events (including but not limited to seismic loads) in optional Work Packages (see WP1a, WP2a, WP3a, WP4a and WP5a). Your view on this optional work, and how it would affect the site parameters, would be welcome. Regarding operational loads, these shall be calculated based on the IEA 15MW reference model and the corresponding site conditions. The WTG OEM project partner will provide a plausibility check to ensure operational loads are within an expected range. We would welcome your view on these input parameters in your Proposal. If you think there are any other input parameters to agree upfront, please highlight them in your proposal. <u>Literature and market review</u> Once the input parameters are agreed, the literature and market review can commence. The dampers to be considered in the review shall include passive, active and hybrid dampers. The main focus of the project is dampers capable of mitigating lifetime effects. Optional work packages 2a-5a will require knowledge of dampers capable of mitigating extreme events. The Project Participants will decide whether to trigger the optional work packages following this ITT. The review shall look both within the wind industry (onshore and offshore) and also outwith the wind industry (e.g. aerospace, buildings, oil & gas, etc.). However, the damper technology considered must be potentially applicable to offshore WTGs in the short to medium term (next 5-10 years). In your Proposal, please specify how these various dampers will be identified. The review shall cover the dampers' physical and mathematical representation for offshore WTGs. The review shall gain sufficient information from the damping technologies to carry out WP2-5. Damping ability, tuneability (i.e. how easy it is to tune to different 1st eigenfrequencies for different project sites), dimensions and costs (for use in offshore wind) will be required at the very least, along with considerations as to their practical implementation and damping abilities within offshore WTGs. It is expected that the outcome of this review, particularly costs, will be heavily dependent on the input parameters mentioned above. In particular, the Project is interested to understand how the costs of damping vary at different levels of damping contribution (e.g. +4/5/6% logarithmic decrement damping to the first mode).

	The Project is primarily interested in offshore WTGs with monopile foundations; however, if there are aspects you feel are relevant to jacket foundations or floating WTGs, please let us know in your Proposal. Engagement with technology owners will be important. Please specify how you will intend to ensure this input is received, such as a questionnaire, workshop, NDAs, etc. If you feel you will not need input from the technology owners, please specify how this is the case. Some damping technology owners are (amongst others): ESM, Vicoda Group, Flow Engineering, Maurer, TVS-acoustics, GERB, Deicon, ahcustom, etc. The review shall identify current research gaps for dampers for offshore WTGs. The review shall investigate the IP landscape and any restriction IP ownership places on the use of the various dampers identified. For instance, certain damper solutions may only be useable on certain OEM's WTGs.
WP1a: Literature and market review for extreme events (OPTIONAL)	In addition to the review for lifetime effects, this optional work would review literature and the industry with a view of damping for extreme events, such as seismic events. The Project Steering Committee may decide to trigger this optional work package following this ITT. Please provide a cost estimate for WP1a that is separate and additional to the cost estimate for WP1.
Deliverables: **D1.1: Input parameters** Table of all input parameters to be used in the remainder of the Project. To be updated from time-to-time as necessary. **D1.2: Literature and Market Review Report** Report explaining the methods and findings in WP1. **D1.3: Database of dampers** Database of the physical and mathematical representation of the various dampers identified, for use by the Project Parties. (If possible – depends on damper owners' IP constraints.) **D1.4: Literature and Market Review Report (OPTIONAL)** Report explaining the methods and findings in WP1a.	

D1.5: Database of dampers (OPTIONAL) Database of the physical and mathematical representation of the various dampers identified for extreme events, for use by the Project Parties. (If possible – depends on damper owners' IP constraints.)	
WP2: **Lifetime effects**	The overall aim of this work package is to investigate the effects of one or more damping devices (and combinations thereof) on relevant WTG components and structural design loads, through numerical modelling. The purpose of this analysis is to give insights into component fatigue life and consequently on component design and hence CAPEX, which will feed into WP4. This analysis shall include comparing WTG component design with and without dampers, and with dampers of different damping values. A reduced number of fatigue design loads shall be considered. The damping device(s) to consider shall be selected by the Project Parties following WP1. This selection will ensure that sufficient focus is given to the respective damping device(s) being studied in the remainder of the project. One possibility could be one passive, one active and one hybrid damper; however, this will depend on the outcome of WP1. The WTG components of most interest will be selected by the Project Parties following WP1. However, in your Proposal, please highlight which components you believe to be of most interest. A generic WTG model shall be used in WP2. This shall be provided by the Contractor and approved by the Project Parties. Please give details of this in your proposal, for instance do you already have suitable model(s) for large WTGs >14MW or would you need to develop them? The lifetime analysis will be conducted on the basis of the agreed input parameters in WP1. It may (or may not) be possible for the Project Parties (developers and WTG OEM) to provide you with some operational load / damping data. For instance, it may (or may not) be possible to provide some acceleration data, particularly at shut down events. However, this would only give total damping (from both external damping and from the integrated dampers). If this would benefit your work in this Project, please specify how and what data you would like to work with. *However, in your Proposal you should work with the assumption that the Project Parties cannot provide you with operational damping data.*

WP2a: Extreme events effects (OPTIONAL)	In addition to the lifetime effect analysis, this optional work would consider the effect of the selected dampers on the acceleration of sensitive components during extreme/ abnormal events, including but not limited to seismic loads for the APAC region. Your proposal on the conditions and components to consider would be welcome. The impacts of the dampers on OPEX and CAPEX shall be considered and fed into WP4. The Project Steering Committee may decide to trigger this optional work package if additional following this ITT. Please provide a cost estimate for WP2a that is separate and additional to the cost estimate for WP2.
Deliverables: **D2.1 – Lifetime effects report** Report explaining the methods and findings in WP2. **D2.2 – Lifetime effects model(s)** The model(s) used to analyse the lifetime effect, together with the various dampers. **D2.3 – Extreme events effects report (OPTIONAL)** Report explaining the methods and findings in WP2a. **D2.4 – Extreme events effects report (OPTIONAL)** The model(s) used to analyse the extreme events effect, together with the various dampers.	
WP3: **Operation and reliability**	The aim of this work package is to investigate the operation and reliability of the dampers selected following WP1 and investigated in WP2. Aspects of their operation to be investigated are: operational safety; maintenance requirements; replacement requirements; and SCADA integration requirements. For the hybrid and active damping devices the operational aspects themselves shall also be covered, i.e. on/off activation, gradual activation etc. The reliability of the dampers is also to be investigated. Please outline how you will investigate these aspects in your Proposal. For instance, if this can be done through modelling/simulation, what would the model and data requirements be? And how can you ensure you will meet those requirements? Again, it should be assumed that the Project Parties *cannot* give operational acceleration / damping data, though this may change in future. Should you not deem it possible to investigate the operation and reliability of specific future damping solutions, you may consider investigating the broad three categories: passive, active, hybrid.

WP3a: Operation and reliability for dampers for extreme events (OPTIONAL)	In addition to the dampers considered for lifetime effects in WP3, this optional work would consider the operation and reliability of dampers selected to mitigate extreme events. The Project Steering Committee may decide to trigger this optional work package following this ITT. Please provide a cost estimate for WP3a that is separate and additional to the cost estimate for WP3.
Deliverables: **D3.1 – Operation and reliability report** Report explaining the methods and findings of WP3. **D3.2 – Operation and reliability model(s)** The model(s) used to investigate the operation and reliability of the various damping devices (if relevant). **D3.3 – Operation and reliability report for dampers for extreme events (OPTIONAL)** Report explaining the methods and findings in WP3a. **D3.4 – Operation and reliability model(s) for dampers for extreme events (OPTIONAL)** The model(s) used to analyse the operation and reliability of the various damping devices (if relevant).	
WP4: **Cost-benefit analysis and risk analysis**	Building on WP2 and WP3, the aim of this work package is to compare the costs of the various damping devices selected following WP1 with their benefits. The risks associated shall be included in this analysis. Fundamentally, we would like to see the impacts of the various damping devices on LCOE. Examples of the benefits include: steel savings (in monopile / tower), leading to easier manufacture transportation (by avoiding jackets); extending the use of monopiles into deeper waters and for larger turbines; avoiding the need for alternative foundation types (such as jacket, tripod, floater). Risks include supply chain, IP, reliability, remaining technology risks. The cost benefit analysis (CBA) and risk analysis will be carried out on the basis of the input parameters agreed in WP1. In particular, the cost reduction figures are expected to strongly depend on site-specific met ocean conditions and water depth. Possible mitigation methods shall be proposed for the identified risks. One possible mitigation may include working with the supply chain to de-risk the technologies through a follow-on project, which may include: stakeholder workshops; industry roadmap; design competition; and / or technology demonstration.

WP4a: Cost-benefit analysis and risk analysis for dampers for extreme events (OPTIONAL)	In addition to the dampers considered for lifetime effects in WP4, this optional work would consider the cost benefit and risks associated with damping devices for extreme events. The Project Steering Committee may decide to trigger this optional work package following this ITT. Please provide a cost estimate for WP4a that is separate and additional to the cost estimate for WP4.
Deliverables: **D4.1 – Cost-Benefit and Risk Analysis Report** Report explaining the methods and findings of WP4. **D4.2 - CBA model** Microsoft excel CBA model. **D4.3 – Cost-Benefit and Risk Analysis Report (OPTIONAL)** Report explaining the methods and findings of WP4a. **D4.4 - CBA model (OPTIONAL)** Microsoft excel CBA model for WP4a.	
WP5: **Industry guidelines**	The aim of this work package will be to provide guidance on WTG and foundation design, modelling and tuning methods. With a consortium of key developers and a key WTG OEM behind the project, endorsement of such guidelines by this project could help to set standard methods for the industry to assess damping for WTG and foundation design.
WP5a: **Industry guidelines for extreme events (OPTIONAL)**	In addition to the guidelines of WP5, this optional work would develop guidelines for design, modelling and tuning methods for dampers for extreme events. The Project Steering Committee may decide to trigger this optional work package following this ITT. Please provide a cost estimate for WP5a that is separate and additional to the cost estimate for WP5.
Deliverables: **D5.1 – Industry guidelines** Industry guidelines for WTG and foundation design and modelling, with regard to damping considerations.	

D5.2 – Industry guidelines for extreme events (OPTIONAL) Industry guidelines for WTG and foundation design and modelling, with regard to damping considerations for extreme events.	
WP6: **Summary and specification for further work**	This shall summarise the previous work packages. Regarding specification for further work, this could include a follow-on project to further develop or de-risk the damping technologies. As mentioned in WP4, this could entail working with the supply chain. For instance: workshops, developing an industry roadmap (for dissemination to the supply chain development), design competition, and / or technology demonstration (laboratory, prototype and / or real scale).
Deliverables: **D6.1 – Project Final Report** Report summarising the findings of WP 1 to 5 and any specification for further work. **D6.2 – Summary Report** A high level approx. 5-10 pages executive summary (Summary Report) including a high-level description of the Project and selected relevant results and findings. The Summary Report shall be written as if intended for publication. **D6.3 - Project Final Webinar** A final presentation and time dedicated to presenting this in the form of a short webinar to invitees from the Project Parties.	
WPA. Project Management	The Contractor shall stipulate how they will manage the delivery of their services efficiently and effectively. This shall include specific costs for their project management time; quarterly financial and technical progress updates to Carbon Trust Project Manager; and regular (at least bi-weekly) update calls with the Carbon Trust Project Manager and/or Project Parties as required. The Carbon Trust and Project Technical Committee usually require 2-3 weeks to review and provide feedback on each Deliverable, with at least one round of review comments to be accommodated. This shall be considered when calculating Proposal Price.
Deliverables: - **DA.1 Quarterly financial updates.** - **DA.2 Quarterly technical updates.** - **DA.3: Executive Summary Report** - **DA.4: Final presentation** - **DA.5: Delivery of webinar** - **DA.6: Project Closeout Form** - **DA.7: Input sheet for OWA Cost Model**	

Expenses	The Bidder should detail the amount of expenses it expects to incur throughout the Project. Expenses will be paid as incurred up to the amount specified and any unused balance will not be paid.

5. Intellectual Property and Knowledge

5.1 Full details of the intellectual property requirements and conditions can be found in the attached OWA Support Structure Damping Contractors' Conditions.

5.2 The OWA Support Structure Damping Contractors' Conditions have been drafted under the assumption of a commercial contractor delivering the work. However, the project is open to explore the possibility of having a "research partner" (rather than a commercial contract) relationship with the party delivering the work. For instance, a research partner may provide financial or in-kind contribution to the project. In return, a research partner may gain more rights and responsibilities (particularly regarding rights to foreground IP) than a contractor. Should you wish to become a research partner, rather than a commercial contractor, then please make this clear in your bid and request changes to the Contractors' Conditions.

6. Bid Pricing

6.1 To provide Bidders with greater clarity on the nature, level and type of work involved in the various Work Packages, the Total Budget for the delivery of this Project is expected to be around £210,000-£240,000, although this may be subject to negotiation should you feel it is insufficient to properly execute the scope of work. As a guide, we would suggest the following breakdown: WP1 - £25-40k; WP 2 - £70-85k; WP3 - £45-60k; WP4 - £40-55k; WP5 - £15-30k; WP6 - £5-10k.

6.2 The Bid Price submitted with the tender must be derived from the cost breakdown in the Bid Price Calculation Sheet, and must include all expenses. The Bid Price is the price for the activities that will address the Scope of Work (and any Alternative Work proposed by the Bidder). The Bid Price Calculation Sheet and the Bid Price shall not include the price of any Additional Work suggested by the Bidder. Instead, the price for such Additional Work Packages shall be stated separately to the Bid Price in the Main Bid Document.

6.3 If the Bid Price exceeds the expected range of the Total Budget as stated under section 6.1, to avoid receiving a lower score for criterion 4, in the Main Bid Document the Bidder should provide a clear and justified reason why the Bid Price exceeds the expected budget.

6.4 All costs and rates quoted in the Main Bid Document and Bid Price Calculation Sheet must be in GBP (£) and all staff rates quoted in the tender must represent the **Day Rate** for employment of staff members.

6.5 Any expenses must be separately included under Expenses.

7. Tender Evaluation Criteria

Bidders should take the following evaluation criteria into account when preparing and submitting their tenders.

CRITERION 1: APPROACH TO WORK (WEIGHTING: 30%)

Description	Information required from Bidders
Proposed Approach	In the Main Bid Document, Bidders are required to provide a clear and detailed description on how they plan to deliver the work for this Project. The description should include an initial overview on the approach followed by a description on how each Work Package and task will be delivered. Also, Bidders need to justify how their proposed approach meets the objectives of the Project.
Additional Work	If there is any Additional Work proposed by the Bidder, these aspects will be evaluated separately. The suggestion of Additional Work by the Bidder will not have a negative impact on the evaluation of the tender.
Project management	Bidders are required to describe how they will manage the Project utilising appropriate resources and describe how they will work with the various stakeholders, such as the relevant Project Technical Committee, to get information and manage potentially conflicting relationships.

CRITERION 2: EXPERIENCE (WEIGHTING: 30%)

Description	Information required from Bidders
Experience in damping technologies.	In the Main Bid Document, Bidders should elaborate on experience of the criteria described and explain how these past experiences are relevant for this tender. In addition, Bidders should provide at least two examples (with reference to specific roles, responsibilities and activities the Bidder undertook) of previous work which illustrates the Bidder's skills, capabilities, and experience in all of these areas (Bidders may wish to make reference to submitted examples of previous work for other clients). Bidders are advised that experience is considered a key important criterion and partnerships with other companies to support certain areas of experience are welcomed. All experience / case studies should be attached as an appendix to the Main Bid Document.
Experience of modelling and designing monopiles for offshore wind structures.	
Experience and knowledge of developing design guidelines.	

CRITERION 3: STAFF SKILLS (WEIGHTING: 25%)

Description	Information required from Bidders
CVs/Resumes	Bidders are required to provide detailed CVs/Resumes for any key personnel who will be involved with this Contract together with proposed Project structure, intended position of the key personnel in the Project, and main responsibilities. CVs should include professional memberships of proposed staff working on this Project.
Applicable skills	Bidders should elaborate on the most relevant skills of the key personnel that will be involved in the Project.
Prior experience form involved staff	Please include examples of similar work performed by the proposed staff members, explaining how is relevant to the Approach to Work.
Expert engagement	A close working relationship with key stakeholders such as banks' engineers, original equipment manufacturers (OEMs), offshore wind farm developers, wind turbine manufacturers, as well as the Project Technical Committee are seen relevant to the success of this Project. Please supply ideas of how these groups can be engaged and leveraged.

CRITERION 4: BID PRICE (WEIGHTING: 15%)

Description	Information required from Bidders
Day rates and man hours (man-h) for all staff grades	In the Bid Price Calculation Sheet, Bidders are required to provide day rates for all staff grades and to input the man-h involved in each Work Package.
Price for the delivery of the Project	In the Bid Price Calculation Sheet, Bidders are required to provide a cost breakdown by Work Package, including man hours and day rates of personnel completing the work as specified in section 5. Bidders are required to specify expected expenses separate from the estimated budget for each Work Package. The Bid Price will be assessed on the price for the Approach to Work (which includes the price of the Work Packages in the Scope of Work and any Alternative Work proposed by the Bidder). If there is any Additional Work proposed by the Bidder, this will be evaluated separately. The suggestion of Additional Work by the Bidder will not have a negative impact on the evaluation of the tender. Carbon Trust will reimburse reasonable expenses at cost and receipts may be requested. Pre-approval will be required for travel costs over £150 per return journey and combined hotels & subsistence cost exceeding £200 per day. Bidders will be required to confirm or comment on their ability to carry out the activities detailed in the Scope of Work within the initial term of the Contract and provide an outline plan of work.

8. Glossary

Agreed Scope of Work	The agreed work based on the Scope of Work and the Approach to Work, which is mutually agreed between the Carbon Trust and the Contractor.
Approach to Work	Has the meaning set out in section 3.1.
Additional Work	Any activities that are proposed by the Bidder in addition to those in the Scope of Work. It is at the discretion of the Carbon Trust to consider Additional Work in the evaluation of the tender. The suggestion of Additional Work by the Bidder will not have a negative impact on the evaluation of the tender.
Alternative Work	Deviations from the Scope of Work that are proposed by the Bidder, which replace work or tasks in the Scope of Work. Alternative Work will be treated as non-optional in the evaluation of the tender.
Award Letter	A letter, issued by Carbon Trust, informing the Contractor about the award of the Contract. The Award Letter is issued together with the Agreed Scope of Work and the OWA Support Structure Damping Contractors' Conditions.
Bidder	An individual, a company, an organisation or a consortium submitting a bid for the Project.
Bid Price	The total price for the Bidder to complete the Project in line with the Approach to Work. The Bid Price shall include the price for all Work Packages described in the Scope of Work and any Alternative work proposed by the Bidder. The Bid Price shall not include the price of any Additional Work suggested by the Bidder.
Bid Price Calculation Sheet	An Excel template provided by the Carbon Trust that is to be provided by the Bidder in addition to the Main Bid Document.
Carbon Trust Project Manager	The Carbon Trust employee who serves as first point of contact in relation to this ITT and the Project.
Clarification Document	A document containing all received clarification questions and Carbon Trust's responses to these questions.

Contract	A document consisting of the Award Letter, the Final Scope of Work, the OWA Support Structure Damping Contractors' Conditions, and any clarifications agreed in writing.
Contractor	The Bidder (or in the case of a consortium, Bidders) selected for the delivery of the Project.
Deliverables	All data, documentation, reports, minutes and other deliverables produced by the Contractor according to the Scope of Work or as otherwise agreed in the Agreed Scope of Work
Description of Tender	This document.
Due Diligence Questionnaire	A questionnaire that is to be completed by shortlisted Bidders should Carbon Trust's bidders vetting process give reason to conduct a due diligence. In case of a consortium, the Due Diligence Questionnaire is to be filled-in by the designated Project Coordinator.
Invitation to Tender (ITT)	The following group of documents: Description of Tender (this document); OWA Support Structure Damping Contractors' Conditions; Tender Certificate template; Bid Price Calculation Sheet template; and Clarification Document (if applicable[2]).
Main Bid Document	Has the meaning given in section 3.1. No template is provided.
Project	The OWA Support Structure Damping project.
Project Steering Committee	A group consisting of representatives from each of the OWA Support Structure Damping Project Participants and the Carbon Trust, which govern the Project.
Project Technical Committee	A group consisting of technical experts from each of the OWA Support Structure Damping Project Participants, GE and the Carbon Trust, which will supervise the Project.
OWA	Offshore Wind Accelerator
OWA Support Structure Damping Partners	A group of leading offshore wind farm developers supporting the OWA Support Structure Damping project.

[2] A Clarification Document will not be published if no clarification questions are received in relation to this ITT.

Scope of Work	The (preliminary) Work Programme for the Project as defined in section 4 of this document. At Contract award, the Scope of Work will be replaced by the Agreed Scope of Work.
Tender Certificate	A declaration that is to be provided by the Bidder (in case of a consortium: by the designated Project Coordinator) in addition to the Main Bid Document.
Total Budget	The expected amount of money available that will be made available to the Contractor for the delivery the Project.
Work Package	A group of related tasks to be delivered under the Project.
Work Programme	The entirety of all Work Packages.