# THE CARBON TRUST OFFSHORE WIND ACCELERATOR

## Invitation to Tender for the "Impact of Grid Forming Capabilities on OWF Design and Operation" 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 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, a Final 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 Final 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 Stage IV Contractors' Conditions, and any clarifications agreed in writing. The Award Letter, the Final Scope of Work, the OWA Stage IV Contractors' Conditions, and any clarifications agreed in writing will establish the Contract for the Impact of Grid Forming Capabilities on OWF Design and Operation project (the "**Contract**") between You and the Carbon Trust. With the exception of any minor amendments to the OWA Stage IV Contractors' Conditions which may be requested by the Bidder, the submission of a tender shall constitute unqualified acceptance of the OWA Stage IV Contractors' Conditions. In the event that minor amendments to the OWA Stage IV 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 programme has since expanded during OWA Stages I, II, III and IV to include currently nine offshore wind developers from various countries within the European Economic Area (the "**OWA Partners**"). At the time of issue of this Invitation to Tender the OWA Partners are: SSE Renewables Developments (UK) Limited, Ørsted Wind Power A/S, RWE Offshore Wind GmbH, ScottishPower Renewables (UK) Limited, Equinor ASA, Vattenfall Vindkraft A/S, EnBW Energie Baden-Württemberg AG, Shell Global Solutions International B.V. and TotalEnergies OneTech.

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 Research under the OWA currently falls into five research areas: Cables, Electricals, Foundations, Logistics and O&M, and Energy Yield & Performance. Research, development and demonstration projects are carried out in each of the five research areas to address technology challenges. This Invitation to Tender is related to the OWA research area Electrical.

1.4 Each of the five research areas is managed by the Carbon Trust and governed by a Technical Working Group ("**TWG**") consisting of technical experts appointed by the OWA Partners. The TWG Electrical will supervise the Project, provide technical direction and guidance to the Contractor (where needed) and review the Project Deliverables, findings and other outcomes.

1.5 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 GridForm project

2.1 The OWA Electrical TWG would like to investigate and understand the practical capabilities and physical implications of designing and operating grid forming offshore wind farms.

2.2 Historically, power grids have relied on traditional, fossil fuelled synchronous generation, to establish and maintain stable frequency and voltage levels across their networks. Grid forming capability from offshore wind farms will enable their contribution to grid stability, reliability and allow the power system to move away from conventional power plants towards offshore wind with the ability to control voltage and frequency, maintaining a consistent power supply.

2.3 The main objectives of this work are to:

- Identify, research, and understand the principles of operation and applications of mature and well-established grid forming technologies. Then, assess the benefits and drawbacks of these technologies.
- Identify any gaps or inconsistencies and opportunities for improvement in the grid codes and standards.
- Learn from the experiences of different markets in terms of the implementation of grid forming technologies and their respective grid codes and standards.
- Prove capability of varying grid forming equipment combinations to effectively sustain a stable supply to the onshore grid under specified conditions.
- Develop a set of standardised guidelines and processes for the development of grid forming offshore wind farms including the industrial design steps required and route to commercial readiness.

2.4 The expected benefits of this work are:

- To define the most favourable combinations of hardware from offshore to onshore enabling the provision of grid forming power under varying conditions.
- To develop a working grid forming offshore wind farm model in PSCAD for use by the TWG-E.
- To provide clarity and understanding on the decisions that have been made in developing relevant grid codes and standards and to form cohesion between the key stakeholders involved.

# 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). Bidders shall provide Work Package descriptions in the format set out in Annex 2 to this document. 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;
- specify any input data, background IP, hardware or other inputs that the Bidder requires the Carbon Trust and/or the OWA Partners to provide;
- specify 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
- specify 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 4 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 TWG. The Carbon Trust and TWG 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 Final Scope of Work will be agreed between the Carbon Trust and the Contractor when entering into the Contract. The Final 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 small team of mixed seniority approximately 12 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 GridForm Project, any assumptions will be discussed with the TWG prior to the start of each Work Package.

# Work Packages

| Work Package | Description of work |
|---|---|
| **WP1: Gap Analysis of Previous OWA Work, Technology & Literature Review** | The successful contractor should first review all documentation provided by OWA to understand the grid forming (GFM) offshore wind farm topics already studied and create a gap analysis to determine any capabilities that are outstanding from previous work conducted by OWA. The gap analysis should then inform a technology and literature review, building on previous studies, and outlining the offshore wind farm capabilities required to be able to provide a stable and reliable connection to the grid (Grid Forming). These could be but are not limited to:<br>• Reactive capability<br>• Voltage control and frequency regulation<br>• Phase jump rectification<br>• Synthetic Inertia/Inertial response<br>• Fault ride through capability /fast fault current injection<br>• Black start of offshore and onshore network capability<br>• Islanded and Self-Sustaining capability<br>The technology and literature review should be comprehensive, yet concise and primarily focus on research that is well established and has reached a high level of maturity.<br>The contractor should then look to set out and understand the physical implementation requirements to design and operate grid forming offshore wind farms with the aforementioned capabilities. This should, where possible, include existing methodologies, technologies, control strategies, and case studies. It should be explored whether various control concepts prove beneficial in specific hardware combinations (e.g., Battery Energy Storage System (BESS) or STATCOM with Wind Turbine Generators (WTGs)).<br>Each grid forming control configuration should be assessed based on its potential for being deployed in the market for commercial ancillary services, as well as providing a comprehensive analysis of their respective constraints.<br>Attention should be paid specifically to live and large-scale demonstration projects however notable historic cases can also be highlighted.<br>Please note that the OWA parties may provide additional information to the background work already shared that is relevant for the completion of this work package; however, this should not be assumed during ITT. The bidder should also assume that this information is not at the |

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| | level of granularity to assist with this work package.<br><br>To assist with the completion of all work packages, the contractor should perform stakeholder engagement with OEMs, Universities, and other innovators to assess existing and future technology offerings. To perform this, the contractor is expected to provide a stakeholder engagement plan to the OWA partners, and this should be agreed with partners prior to proceeding with stakeholder engagement. This should include:<br><br>• List of stakeholders<br>• List of questions<br>• Method to approach stakeholders<br>• Information that will be shared/discussed<br><br>The information contained in the background IP provided by the OWA to the contractor must not be shared with external stakeholders.<br><br>The contractor should propose in their bid, and/or in the stakeholder engagement plan, the engagement they intend to carry out throughout the whole project, further to and including what's defined in this scope, such as: interviews, workshops, and surveys etc.<br><br>Included in the plan, the project should specifically engage with wind turbine generator (WTG) OEM's, Transmission System Operators (TSOs) & test/verification laboratories throughout to validate findings and create a common understanding between parties. |
| **Project Deliverables:**<br>- **D01: Stakeholder Engagement Plan**<br>- **D02: Technology & Literature Review, and Gap Analysis Report**<br>- **D03: Presentation to TWG-E** | |
| **WP2: International Market, Grid Codes and Standards Review, Stakeholder Engagement Workshop** | The contractor should provide a market assessment and an up-to-date international grid codes and standards review and explore the definition of grid forming offshore wind farms.<br><br>Examples of the grid codes, standards and documents that should be reviewed are as follows but is not limited to:<br><br>• GC0137.<br>• NG ESO Grid Forming Best Practice Guide.<br>• Guides/standards/Grid Codes produced by European or Internationally recognised bodies.<br><br>The market trends, drivers, and legislation that will impact the implementation and development of grid-forming offshore wind farms should also be assessed. This will involve analysing incentives, limitations, risks, opportunities, and then provide recommendations on further development of the current available guidance and standards. |

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| | The grid codes and standards review should take an international approach and assess the applicability of the current and developing grid codes and standards relating to grid-forming offshore wind farms and their individual items of plant/equipment, such as:<br><br>• Turbines with grid forming converters.<br>• HVDC converters with grid forming control.<br>• STATCOM with/without storage, including grid forming control.<br>• Battery Energy Storage Systems (BESS)<br><br>The review should identify gaps, opportunities for improvement and learnings that various markets can gain from studies and guidance already available in the UK, Europe, Australia etc, or onshore developments.<br><br>A stakeholder engagement workshop should also be held to feed into the review and gather the following non-exhaustive outcomes:<br><br>• Give developers a greater understanding and full visibility of the decision making that has or will go into the writing of the available/future grid forming grid codes and guidance documentation.<br>• Gather an understanding of what technical issues are to be solved and the system studies that need to be carried out to achieve compliance with the inclusion of grid forming capabilities. It should also be determined who should undertake these studies as there is currently no acknowledged method or common understanding on responsibility or incentives between parties.<br>• Gather an understanding of what future mix of technology can lead to compliance.<br>• Understand what the requirements from TSO's are/will be from developers that will affect wind farm business cases.<br>• Better understand OEMs view on how their technology will impact grid stability and protection.<br>• Better understand future requirements from TSO's and whether the OEMs strategy aligns to ensure the technology sufficiently meets those requirements.<br>• Provision of guidance on grid compliance and performance requirements for both the onshore and offshore grid interface point with the Offshore Transmission Owner (OFTO).<br><br>The workshop should also specifically include, but not limited to the following:<br><br>• A presentation from those involved with the formulation of writing GC0137.<br>• A presentation from Tennet regarding their current and forthcoming grid forming strategy from a developer's perspective.<br>• Presentations from any other TSO that could be deemed applicable.<br>• Presentations from OEM's on current and forthcoming technology.<br>• A coordinated discussion between all parties. |

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| **Project Deliverables:**<br>- **D04: Market Assessment, International Grid Codes & Standards Review**<br>- **D05: Stakeholder Engagement Workshop**<br>- **D06: Presentation to TWG-E** | |
| **WP3: Technology Selection, Practical Design Requirements and Feasibility Assessment** | The contractor should define the technology combinations, scenarios, methodologies, control strategies and OWF capabilities deemed necessary and most relevant from previous work packages to provide grid forming power to the grid, with a focus on the physical implementation requirements and specific hardware combinations within an offshore wind farm to do so. This should include both retrofitting and ideal future scenarios and focus on the operation of a standalone wind farm.<br><br>This could include the conjunctive and/or individual use of, but not limited to:<br>• Grid forming converters/turbines<br>• HVDC Converters<br>• Virtual Synchronous Machines<br>• STATCOMs (Onshore/Offshore)<br>• E-STATCOMs<br>• BESS<br>• Synchronous condensers<br>• Utilisation of grid forming controllers<br>• Utilisation of grid following (GFL) controllers<br><br>The contractor should then set out to develop a model encompassing current, future and state of the art, standalone, grid forming wind farm design scenarios. The model should include 132 kV inter array cables, up to and including 21MW turbines, should be completed in PSCAD, and should demonstrate what combination of equipment should be selected and how it would operate within each of the following conditions:<br>• Normal or ideal operation.<br>• A full range of grid conditions from low levels of synchronous generation to high.<br>• A full range of being connected to an area of low short circuit ratio to high.<br>• A full range of high and low levels of GFM & GFL inverter-based generation versus traditional.<br>• Potential mitigation techniques to combat SSTI, Controller Interactions, or any other possible issues with the use of PED's can also be investigated.<br>• Operating an HVDC connected offshore wind farm, this should include a discussion on the whether the use of pre insertion resistors with a DC link is required.<br>• Operating an offshore wind farm with both a long and short HVAC connection.<br>• Being able to provide ancillary services such as grid restoration, inertia provision, reactive power support, etc and at what ratio.<br>• Contingency operation, where one or more export circuits are lost, and the WTG strings experience a significant drop in SCR. |

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| | Contractors should provide their own sources of data and information for this project, and they must propose the sources they plan to use. The OWA partners should not be relied on for the provision of information to conduct this study, however 132 kV cable data and grid forming turbine models may be provided at the discretion of the OWA.<br>Another issue that should be investigated is the occurrence of transient over voltages resulting in an islanded network when a fault occurs on the radial network, and the advantages or disadvantages of operating a GFM equipment vs GFL in this scenario.<br>Additional grid/windfarm scenarios may be proposed and contractors that demonstrate thorough understanding of the challenge may be scored favourably.<br>There should be full transparency of all derivations, calculations, diagrams, models etc. and these should be made fully available to TWG-E.<br>The contractor should then conduct a feasibility assessment based on the various design scenarios and grid conditions specified by TWG-E to establish the applicability of the technologies and design scenarios previously studied, this should include the limitations of the technologies/capabilities in a converter dominated area and discuss potential interactions, along with a route to commercial readiness. This should then be proposed to TWG-E and agreed prior to commencement of WP4. |
| **Project Deliverables:**<br>**D07: Technology Selection, Practical Design Requirements and Feasibility Assessment**<br>**D08: PSCAD Model**<br>**D09: Presentation to TWG-E** | |
| **WP4: Industrial Design Process Guideline Document** | Based on the outcome of all previous work packages and based on comments from the TWG-E, the contractor should produce a guideline document for developers on the physical implications of designing and operating a grid forming offshore wind farm.<br>The guideline document should be immediately usable, establish best practice for offshore wind developers and encompass requirements and standardisation, with a specific focus on examining different hardware interface points from offshore to onshore.<br>The guideline document should demonstrate a common understanding established within the project on how grid forming control is defined, which quality characteristics are crucial and should be tested for this purpose. |
| **Project Deliverables:**<br>- **D10: Industrial Design Process Guideline Document**<br>- **D11: Presentation to TWG-E** | |

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| **WPA. Project Management** | The Bidder should stipulate how it will manage the Project efficiently and effectively.<br>In particular, the following activities should be included (and hence budgeted for)<br>• project management time (including sufficient time for review processes);<br>• regular update calls with the Carbon Trust Project Manager and/or Technical Working Group as required;<br>• the preparation of monthly flash reports (Carbon Trust template) containing key financial data and information of the delivery status of the Project; and<br>• towards the end of the Project<br>  ○ the production of a 3-10 pages Executive Summary Report for the entire Project (for dissemination within the OWA);<br>  ○ the preparation of a Project Closeout Form (Carbon Trust template) which includes a short summary of areas for future and a documentation of all Project Deliverables;<br>  ○ the preparation of a final presentation to the TWG;<br>  ○ time dedicated to presenting the main results, findings and outcomes of the Project in the form of a 1-hour webinar to OWA Partners; and<br>  ○ the provision of inputs for the OWA Cost Model by completing the OWA Cost Model Input Sheet (Carbon Trust template).<br>Bidders should be aware that the Carbon Trust and TWG usually require 2-3 weeks to review and provide feedback on each Project Deliverable, with at least one round of review comments to be accommodated. This should be considered when calculating Your Bid Price. |
| **Project Deliverables:**<br>- **D12: Monthly flash reports**<br>- **D13: Executive Summary Report**<br>- **D14: Final presentation**<br>- **D15: Delivery of webinar**<br>- **D16: Project Closeout Form**<br>- **D17: 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, Knowledge and Input Data

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

5.2 The Carbon Trust and/or the OWA Partners are able to make available the following input data, background IP or other resources to the successful Bidder for the purposes of the completing the Project, subject to the confidentiality conditions in the OWA Stage IV Contractors' Conditions:

a. Literature reviews from up to seven of TWG-E's previous projects to ensure no duplication of research. An NDA may be required to share certain documents.

# 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 range between £140k and £150k.

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.<br>The description should include an initial overview on the approach followed by a description on how each Work Package and task will be delivered.<br>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 OWA TWG, to get information and manage potentially conflicting relationships. |

## CRITERION 2: EXPERIENCE (WEIGHTING: 30%)

| Description | Information required from Bidders |
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| **Experience and knowledge of grid forming technology** | 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.<br>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).<br>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 and knowledge of offshore wind farm design** | |
| **Experience in PSCAD** | |

## CRITERION 3: STAFF SKILLS (WEIGHTING: 15%)

| Description | Information required from Bidders |
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| **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 original equipment manufacturers (OEMs), offshore wind farm developers, wind turbine manufacturers, transmission system operators (TSOs), test and verification laboratories, as well as the OWA Technical Working Group 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: 25%)

| Description | Information required from Bidders |
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| **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.<br><br>Bidders are required to specify expected expenses separate from the estimated budget for each Work Package.<br><br>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).<br><br>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.<br><br>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.<br><br>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

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| 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 Final Scope of Work and the OWA Stage IV 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 Stage IV Contractors' Conditions, and any clarifications agreed in writing. |

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| Contractor | The Bidder (or in the case of a consortium, Bidders) selected for the delivery of the Project. |
| 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. |
| Executive Summary Report | A 3-10 pages report containing a high-level description of the Work Programme and a summary of the relevant results, findings and conclusions of the Project. Information can be taken from summaries written for previous Work Packages |
| Final Scope of Work | The agreed Work Programme for the Project, based on the Scope of Work and the Approach to Work, which is mutually agreed between the Carbon Trust and the Contractor. |
| Flash Report | A template provided by the Carbon Trust at Project start. |
| Invitation to Tender (ITT) | The following group of documents: Description of Tender (this document); OWA Stage IV 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 Impact of Grid Forming Capabilities on OWF Design and Operation or GridForm project. |
| Project Closeout Form | A template provided by the Carbon Trust towards the end of the Project. |
| Project Deliverables | The individual deliverables including, but not limited to, any reports, technical notes, documents, drawings, models, data, webinars to be produced by the Contractor according to the Scope of Work (see section 4) or as otherwise agreed in the Final Scope of Work. |
| OWA | Offshore Wind Accelerator |

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

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| OWA Partners | A group of leading offshore wind farm developers supporting the OWA. |
| OWA Cost Model | The Contractor is not expected to produce a cost model of its own, but rather provide an estimate, with appropriate explanation, for potential cost implications of the research undertaken within the frame of the delivered project. The Carbon Trust will provide a template to assist the Contractor in this process. |
| OWA Cost Model Input Sheet | A form (to be provided by Carbon Trust) which the Contractor should complete in WPA to provide input into the OWA Cost Model. |
| 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 Final Scope of Work. |
| Technical Working Group (TWG) | A group consisting of technical experts appointed by the OWA Partners. The TWG will supervise the Project. |
| 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 from the OWA programme 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. |
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