30 March 2021

Dear Sir/Madam,

**Invitation to Tender for the Condition-based Monitoring (CBM) and Predictive Maintenance for HVDC and HVAC Substation Equipment project for the Carbon Trust's OWA Programme**

You are invited to submit a tender for the Condition-based Monitoring (CBM) and Predictive Maintenance for HVDC and HVAC Substation Equipment project (the "CBM-S project" or "Project") which is part of the Offshore Wind Accelerator (OWA) programme. The key objective of the Project is to investigate condition based monitoring and predictive maintenance methods for HVDC and HVAC substation equipment.

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

- Description of Tender (this document);
- OWA Stage IV Contractors' Conditions;
- Tender Certificate (Word template);
- Bid Price Calculation Sheet (Excel template);
- Clarification Document (if applicable[1]);
- Project Closeout Form (for information purposes only – no need to complete); and
- OWA Cost Model Input Sheet (for information purposes only – no need to complete).

Unless informed to the contrary, tenders and communications shall be sent by e-mail to the following e-mail address: David.Plunkett@carbontrust.com with Ivan.Savitsky@carbontrust.com in copy.

Tenders must be submitted before 13:00 BST 11 May 2021. 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 | 16 April 2021 |
| Clarification Document published[1] | 20 April 2021 |
| Submission of full tender | 13:00 BST 11 May 2021 |
| Bidder interviews | May 2021 |
| Successful Contractor announcement | June 2021 |
| Envisaged Contract award date | June 2021 |

Please e-mail any clarification questions, including questions about the timing of this ITT, to David.Plunkett@carbontrust.com any time before 16 April 2021. The complete set of clarification questions and all answers to clarification questions will be published in the Clarification Document on our website by 20 April 2021 and will hence be visible to all potential Bidders: https://www.carbontrust.com/news-and-events/tenders

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

We look forward to receiving Your tender.

[1] A Clarification Document will not be published if no clarification questions are received in relation to this ITT.



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Yours sincerely,

David Plunkett
For and on behalf of **THE CARBON TRUST**



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## The Carbon Trust Offshore Wind Accelerator

# Invitation to Tender for the "Condition-based Monitoring (CBM) and Predictive Maintenance for HVDC and HVAC Substation Equipment" Project

## Description of Tender

**Contents**





The Carbon Trust
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## 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 Condition-based Monitoring (CBM) and Predictive Maintenance for HVDC and HVAC Substation Equipment 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;



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- 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.



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## 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 eight 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 Renewables GmbH, ScottishPower Renewables (UK) Limited, Equinor ASA, Vattenfall Vindkraft A/S, EnBW Energie Baden-Württemberg AG, Shell Global Solutions International B.V. and Total E&P UK Limited.

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 E.

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 E 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 CBM-S project

2.1. The OWA TWG E would like to investigate condition based monitoring and predictive maintenance methods for HVDC and HVAC substation equipment.

2.2. This project seeks for further understanding of existing and innovative condition-based monitoring methods for existing substation equipment both onshore and offshore; and to identify required adaptations and other key considerations

2.3. The main objectives of this work are to analyse condition-based monitoring solutions available for HVAC and VSC HVDC substation equipment with a focus on offshore wind projects with a comparison to traditional maintenance regimes.

2.4. The expected benefits of this work are to provide an optimised O&M approach for substation equipment and help extend asset lifetime.

## 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.



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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;
- 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 5 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



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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 12-18 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 CBM-S Project, any assumptions will be discussed with the TWG prior to the start of each Work Package.

4.9. The Scope of Work includes one Optional Work Packages. The TWG 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.



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**Work Packages**

| WORK PACKAGE | Description of work |
|---|---|
| **WP1: Market and Literature Review** | The successful contractor should conduct a detailed state-of-the-art market survey and technology analysis of the offshore wind industry to determine significant condition-based monitoring integrated solutions for VSC HVDC and HVAC substation equipment.<br><br>The Contractor should specifically engage with all of the main component OEMs, relevant O&M companies involved in repair and maintenance of substation equipment, and any other relevant stakeholders (such as Wind farm owners, TSO, universities).<br><br>The OWA members may provide some relevant information to support this study but this is not guaranteed. It should be assumed that the information held by the OWF operators (OWA members) is not at the level of granularity required for this study.<br><br>The focus of the analysis should be on existing technologies and their merits against traditional approaches (such as routine maintenance). The Contractor should provide an overview of the most beneficial CBM methods and/or those perceived to have the most significant impact (in metrics such as cost or reliability).<br><br>The content of the detailed review may include, but not be limited to:<br>• Identification of operating modes of the HVDC Converter & HVAC substation that impact health profile of the equipment for complete lifespan<br>• Identification of critical equipment prone to failure in HVDC (onshore and offshore). A non-exhaustive list of main components is given below<br>○ HVDC Converter (MMC VSC)<br>○ DC Reactors<br>○ Phase/Arm Reactors<br>○ DC capacitors<br>○ Control and Protection<br>○ DC and AC Switchgear<br>○ DC and AC Surge Arresters<br>○ DC and AC Instrument Transformer<br>○ HVDC Chopper / Dynamic Breaking resistor<br>○ Pre-Insertion resistor<br>○ HVDC cable discharge resistor<br>○ Converter cooling systems<br>○ Converter Transformer<br>○ Auxiliary Transformer<br>○ Auxiliary power systems including battery systems<br>○ Networks and Telecommunication systems<br>○ Platform cooling systems<br>• Identification of critical equipment prone to failure in HVAC systems (onshore and offshore). A non-exhaustive list of main components is given below<br>○ Grid Connection Transformer<br>○ Auxiliary Transformer<br>○ Active Reactive compensation units (STATCOM, SVC)<br>○ Passive Reactive compensation units (Shunt Reactors, MCSR Magnetically Controlled Shunt Reactors, etc.) |



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|---|---|
| | ○ Control and Protection<br>○ Harmonic Filters<br>○ HV switchgears<br>○ Instrument transformers<br>○ Pre-insertion resistors<br>○ Surge Arresters<br>○ Auxiliary power systems including battery systems<br>○ Networks and Telecommunication systems<br>○ Platform Cooling systems<br>• The report shall cover Identification of health condition indicators of critical equipment. Further the contractor shall identify critical items that are prone to failure and their diagnostics methods. The analysis shall be based on available and implemented technologies in energy sector and/or related industries.<br>• The Contractor shall investigate and include State of the art CBM devices that can be applied to improve the predictive maintenance of the substation and complement the existing maintenance practices.<br>• The Contractor should provide recommendations to improve the design of the electrical equipment with the aim to increase the availability figures.<br>Outside of technical evaluation, the analysis report should also consider:<br>• Safety<br>• Reliability<br>• Cost-effectiveness |
| **Project Deliverables:**<br>- **D01: WP1 Report**<br>○ Detailed technology review and analysis of available and innovative CBM methods for VSC HVDC and HVAC substation equipment<br>○ Stakeholder engagement overview<br>- **D02: Presentation to TWG-E** | |
| **WP2: Adaptations to implement CBM** | The successful contractor should identify the adaptations required to implement CBM methods identified in WP1 into substation equipment.<br>The Contractor should identify any special considerations for integrating CBM equipment which is required for offshore applications such as networks; communications; cybersecurity; and spatial requirements.<br>The Contractor (where applicable) should detail recommended design improvements to allow for the implementation of CBM solutions; and where improvements could be made within the CBM method, including special requirement for main electrical equipment (such as PD sensors to switchgear, inbuilt sensors, etc.).<br>The report shall contain diagnostic methods employed in the CBM, including how the state of health of the equipment is identified and analysis of root cause failure. The root cause failure shall be based on real life/field examples. |
| **Project Deliverables:**<br>- **D03: WP2 Report** | |



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<table>
<tr><td colspan="2">
<ul>
<li>Identification of adaptations required to implement various CBM methods on substation equipment; including special considerations for offshore and onshore equipment</li>
</ul>
- D04: Presentation to TWG-E
</td></tr>
<tr><td>WP3: Cost-benefit Analysis</td><td>The successful contractor should produce a cost-benefit analysis of predictive vs periodic maintenance; comparing current best-practice with proposed CBM solutions. The Cost Benefit Analysis (CBA) should be a quantitative approach to enable making economic decisions. The process compares the total expected on-line monitoring costs against the total expected benefits of one or more solutions in order to choose the best or most effective option. The aim of the CBA is to gauge the efficiency/effectiveness of the on-line monitoring investment and resulting changes in maintenance and operating practices.<br><br>A report should be produced which should detail and provide cases demonstrating the cost of implementing CBM for the critical equipment identified in WP1. The analysis should also consider the savings that could incur from an accurate spare parts purchase strategy through CBM. The report should contain comparison of the maintenance strategies regarding required additional equipment and return of investment<br><br>The output of this work should be in the form of a quantitative spreadsheet.</td></tr>
<tr><td colspan="2">Project Deliverables:<br>- D05: Cost-benefit Analysis<br>o Summary report and spreadsheet demonstrating best-practice with CBM solutions<br>- D06: Presentation to TWG-E</td></tr>
<tr><td>WP4: Guidelines of CBM based predictive maintenance</td><td>The report shall contain guideline of maintenance strategies and business model in regards to reliability, cost effectiveness and HSE.<br><br>The Contractor should identify and evaluate innovative technologies and methods for measurement and data analytics for the real-time condition monitoring of power converters to enable a predictive maintenance strategy. The aim of CBM is to improve the availability of the substation equipment and optimize the O&M of the wind farms. The predictive maintenance strategies should include the economic life expectancy of the component incorporating a depreciation cost. The following topics shall be included in the report,<br>• Evaluation of different predictive maintenance methods<br>• Future trends of CBM<br>• Effectiveness of CBM in real-time applications. (i.e. accuracy. reliability, sensitivity, practicality, etc.)<br>• Case studies where CBM based predictive maintenance are implemented in Wind energy projects. If there are no reference projects available for HVDC connected windfarms, then HVDC Interconnector reference can be accepted.<br><br>Specification for integrated CBM for substations that can used as a technical requirement. The specification should consist of CBM requirements for each critical equipment identified in WP1 including</td></tr>
</table>



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| | but not limited to communication, network, electrical/mechanical, interface, testing and verification requirements.<br><br>This work package should also include an executive summary, consolidating all information found from all work packages. |
| **Project Deliverables:**<br>- **D07: WP4 Report**<br>  o Guideline of maintenance strategies and business model in regards to reliability, cost effectiveness and HSE<br>- **D08: Presentation to TWG-E** | |
| **WP5 (Optional): Strategy or demonstration for implementation** | *WP5 is an optional work package and the OWA TWG-E will decide after WP4 whether or not to proceed with WP5. Within bid submissions, WP5 should be detailed like any of the other work packages with approach to work, specified staff, total hours, budget etc. provided.*<br><br>The successful contractor should produce a strategy and/or next steps to develop a pilot project in integrating CBM solutions into a substation. This should be in the form of a small-scale pilot scheme to demonstrate feasibility and any differences to that found in literature.<br><br>The Contractor should specify the requirements for an appropriate practical demonstration of the monitoring system hardware. |
| **Project Deliverables:**<br>- **D09: WP5 Report**<br>  o Strategy including considerations to implement CBM in an offshore and onshore substation<br>- **D10: Presentation to TWG-E** | |
| **WPA. Project Management** | The Bidder should stipulate how it will manage the Project efficiently and effectively.<br><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>  o the production of a 3-10 pages Executive Summary Report for the entire Project (for dissemination within the OWA);<br>  o the preparation of a Project Closeout Form (Carbon Trust template) which includes a short summary of areas for future research and a documentation of all Project Deliverables;<br>  o the preparation of a final presentation to the TWG;<br>  o 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>  o the provision of inputs for the OWA Cost Model by completing the OWA Cost Model Input Sheet (Carbon Trust template). |



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| | |
|---|---|
| | 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>- **D11: Monthly flash reports**<br>- **D12: Executive Summary Report**<br>- **D13: Final presentation**<br>- **D14: Delivery of webinar**<br>- **D15: Project Closeout Form**<br>- **D16: 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. |



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## 5. Intellectual Property and Knowledge

Full details of the intellectual property requirements and conditions can be found in the attached OWA Stage IV 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 range between £100k and £120k.

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.



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## 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* |
|---|---|
| Experience in HVAC and HVDC substation maintenance | 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 in HVAC and HVDC substation failure modes and root cause analysis | |
| Experience and knowledge of HVAC and HVDC substation equipment | |



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**Criterion 3: Staff Skills (Weighting: 20%)**

| *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 HVAC and HVDC substation component OEMs, relevant O&M companies involved in the repair and refurbishment of HVAC and HVDC substation components, offshore wind farm developers, 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: 20%)**

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



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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. |
| 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. |



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| 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. |
| 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[1]). |
| Main Bid Document | Has the meaning given in section 3.1. No template is provided. |
| Project | The Condition-based Monitoring (CBM) and Predictive Maintenance for HVDC and HVAC Substation Equipment or CBM-S 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 |
| 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. |

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



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| 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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