

THE CARBON TRUST OFFSHORE WIND ACCELERATOR

Invitation to Tender for the “Triggers of Sub-Synchronous Oscillation (SSO) Events” Project

Description of Tender

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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.

Tender evaluation

The received tenders will be evaluated by the Carbon Trust and the OWA Partners against the criteria provided in section 7 and the Bidder authorises the Carbon Trust to share its submitted Tender with the OWA Partners for this purpose. 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 Triggers of Sub-Synchronous Oscillation (SSO) Events 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 submit a Tender. 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 SSOT project

2.1 The OWA TWG Electrical would like to:

- Understand and mitigate offshore wind farm risk concerning SSO during the design and development stage of a project.
- Determine scenarios where the system will be more susceptible to SSO events.
- Develop the best practice guidelines to study SSO and develop suitable mitigation methods for offshore wind farms (both AC & HVDC connected)
- Identify the data/model requirement for study SSO with responsible stakeholders of this data/model.
- Identify the best possible parties to conduct the SSO studies and role of each party (WF developer, OEMs, TSO and study consultants etc.)
- Provide more availability and transparency of the TSO network model and OEM control models.
- Improve the TSO network model with developer insights.

2.2 Large-scale offshore wind development in areas of weak grid introduces known integration challenges due to Sub-Synchronous Oscillations (SSOs). These oscillations can destabilise the grid, damage transmission assets, and ultimately curtail generation which poses significant concerns for offshore wind farm (OWF) developers.

SSO events have occurred throughout world grid systems with a number of grid events. The paper “Real-World Sub-synchronous Oscillation Events in Power Grids with High Penetrations of Inverter-Based Resources” provides a good overview of the SSO events occurred with different grids with possible route case of the SSO events. CIGRE TB 909 “Guidelines for Sub-synchronous Oscillation Studies in Power Electronics Dominated Power Systems” provides a comprehensive guideline for understanding the relevant SSO phenomenon, study methodology, mitigation/prevention techniques and protection mechanisms.

SSO is well known phenomenon in general power system with high penetration of inverter-based power systems. However, there is a gap of identifying SSO risk of integrating offshore windfarms (both HVAC and HVDC connected) especially weak grids such as Scottish grid network in the UK.

Although National Grid ESO's recent guidance “System Oscillation Assessment of Inverter Based Resources (IBRs)” provides details on methodologies for a set of small signal studies that can be carried out to aid the connection compliance process, several critical gaps remain. Firstly, there is a lack of clear understanding of what triggers SSOs and how to plan for and mitigate the risk of occurrence during the development and design stages of OWFs. Secondly, the availability and transparency of both TSO network models and wind turbine OEM control models are limited, further impeding the development of comprehensive mitigation strategies. This project aims to address these gaps by opening a channel of collaboration between industry stakeholders, investigating common SSO triggers, and identifying best practices for integrating offshore wind while ensuring grid code compliance and optimal generation.

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). 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 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 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 Tender 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 SSOT Project, any assumptions will be discussed with the TWG prior to the start of each Work Package.
- 4.9 The Scope of Work includes two Optional Work Packages. These are Work Packages that 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.

WORK PACKAGES

Work Package	Description of work
WP1: SSO Guidance Review	<p>In preparation for the stakeholder engagement workshop, the contractor should review guidance relating to SSO from the ESO or relevant sources such as ENTSO-E to help inform the discussion including UK & European markets. If known guidance outside of these markets is available this should also be included.</p> <p>Sources that should be reviewed should include ‘System Oscillation Assessment of Inverter Based Resources’ which has been published by National Grid ESO, the paper “Real-World Sub-synchronous Oscillation Events in Power Grids with High Penetrations of Inverter-Based Resources”, and CIGRE TB 909 “Guidelines for Sub-synchronous Oscillation Studies in Power Electronics Dominated Power Systems”. The review can extend beyond these publications and should include a gap analysis of areas that remain ambiguous and can be improved to provide clarity for OSW developers.</p> <p>The review should also include a breakdown of costs that the developer is likely to incur when following this guidance from a time/resource perspective.</p> <p>The contractor should also propose realistic improvements in the test parameters such as but not limited to informing the range of frequencies to be injected during small signal Voltage oscillation injection testing.</p> <p>This review should be compared with other markets where similar guidance is available to ensure a more holistic overview.</p> <p>After reviewing the relevant and available guidance, the Contractor shall propose preliminary best practice guidelines for offshore windfarms.</p> <p>A plan for the stakeholder engagement workshop in WP2 should be delivered as part of WP1. This should include an agenda and specific questions to be asked during the workshop.</p>
Project Deliverables:	<ul style="list-style-type: none"> - D01: SSO Guidance Review Report, including preliminary best practice guidelines. - D02: Presentation to TWG-E - D03- Stakeholder Engagement Workshop Plan.
WP2: Stakeholder Engagement/Workshop	<p>The contractor should organise and perform a stakeholder engagement workshop, inviting relevant industry partners and institutions, notably, National Grid ESO and relevant TSOs to discuss the SSO topic and reach a consensus on a standardised model and data requirement from OSW developers during the design and development phase of a project. The</p>

	<p>Contractor shall discuss developed preliminary best practice guidelines for comment and further improvements.</p> <p>A standard set of requirements/criteria for what developers should provide during the design/development stage should be proposed by the contractor, informed by, and agreed with all parties.</p> <p>An understanding should be reached with the TSO/ESO concerning provision of their onshore model, whether this is on a project-by-project basis or an agreement to conduct studies themselves with standardised model/data from OSW developer.</p> <p>During the workshop, SSO case studies to be chosen for this project should be discussed and agreed with the TSO to ensure the work is relevant for all parties.</p> <p>Discussion concerning who would be best placed to undertake what activities during an investigation after an SSO event should be established and proposed.</p> <p>The workshop should also address inconsistent software version control (e.g., PSCAD versions, Intel Fortran compiler and Visual Studio versions) across the industry, as it can significantly hinder project progress. Establishing a standardised approach is crucial for smoother collaboration and efficient project execution.</p>
<p>Project Deliverables:</p> <ul style="list-style-type: none"> - D03: Workshop with TSO to agree SSO case study on this project - D04: Defined model requirements from a Developer & TSO perspective - D05: Presentation to TWG-E 	
<p>WP3: Case analysis and model/scenario development (Stage Gate)</p>	<p>The contractor should review the provided case studies and put together/input the relevant data into an offshore wind farm, transmission, and onshore network model. The contractor should have historical data/demonstrate how they intend to approach this and note that the OWA parties may provide additional information to the case studies already shared that are 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 level of granularity to assist with this work package.</p> <p>Scenarios should be developed by the contractor which specify system behaviour and the conditions that could potentially lead to Sub-Synchronous Oscillations (SSO). The scenarios produced must have real-life applicability and all parameters and derivations to realise these</p>

	<p>should be fully documented. The contractor is responsible for creating these scenarios, leveraging their expertise in power systems and SSO phenomena. The scenarios should be built with consideration to be validated via simulation in the next work package.</p> <p>Contractors who demonstrate their understanding in the bid phase will be scored favourably.</p> <p>The scenarios should also be built to consider and provide an understanding of wind availability during and when under conditions that produce SSO.</p> <p>These scenarios should then be proposed to TWG-E and agreed prior to the commencement of WP4.</p>
<p>Project Deliverables:</p> <ul style="list-style-type: none"> - D06: Model - D07: Scenario Specification Report - D08: Presentation to TWG-E 	
<p>WP4: Simulation and results (Optional)</p>	<p>The contractor should perform simulations, employing small signal techniques to evaluate and validate the various scenarios defined in the previous work package. The contractor must evaluate the conditions proposed and suggest their impact on oscillations and conclude what system conditions or events trigger SSO.</p> <p>Following the development of scenarios in the previous work package, the contractor should perform simulations, employing small signal techniques to evaluate and validate the various scenarios defined in the previous work packages.</p> <p>This should include:</p> <ul style="list-style-type: none"> • Utilisation of small signal techniques to model the system's dynamic behaviour in PSCAD. • Clearly document the model parameters and any assumptions made during the simulation setup. All calculations and derivations should be made available to the TWG-E. • Analysis of the impact of the specified conditions on the system's dynamic response and its susceptibility to SSO. This may involve examining various system parameters, such as load characteristics or the effect under fault conditions, etc. • Quantification of key metrics relating to the system's oscillatory response. • Identification of the specific system conditions or events that trigger SSO in each scenario. This may involve identifying combinations of operating conditions, parameter values, or external disturbances that contribute to the initiation and persistence of SSO.
<p>Project Deliverables:</p> <ul style="list-style-type: none"> - D07: Simulation and Results Report 	

<ul style="list-style-type: none"> - D08: PSCAD Model - D09: Presentation to TWG-E 	
<p>WP5: Developer Guidelines (Optional)</p>	<p>The contractor should provide a guidance document based on previous work packages to improve OSW developers' understanding of studies relating to SSO to be conducted for grid code compliance during:</p> <ul style="list-style-type: none"> - The design and development stage of an offshore wind farm project. - Project execution to confirm grid code compliance. <p>The guidance should identify the studies to be done at each stage of the project, the software/techniques appropriate, detail of the content and results.</p> <p>The document should also discuss and agree on a methodology, simulation requirements, and an acceptance criteria for SSO related grid code compliance.</p> <p>Recommendations should be made concerning availability, and guidance on what scenarios an offshore wind farm is more vulnerable to SSO-related issues and what measures can be taken to mitigate them.</p> <p>Guidance on protocols concerning what should be done and who should be responsible for those actions during an investigation after an SSO event should be established and proposed.</p> <p>Any changes required to the existing Grid Code related to SSO should also be recommended.</p> <p>Subject to approval of the OWA Steerco, the contractor should review the OWA's previous work relating to sub synchronous oscillation protection and mitigation methods and provide an understanding on whether the triggers of SSO can be linked with the previously studied solutions, and if not, a high level indication on potential protection or mitigation strategies should be proposed.</p>
<p>Project Deliverables:</p> <ul style="list-style-type: none"> - D10: Developer Guideline - D11: Grid Code Roadmap - D12: Presentation to TWG-E 	
<p>WPA. Project Management</p>	<p>The Bidder should stipulate how it will manage the Project efficiently and effectively.</p> <p>In particular, the following activities should be included (and hence budgeted for)</p> <ul style="list-style-type: none"> • project management time (including sufficient time for review processes); • regular update calls with the Carbon Trust Project Manager and/or Technical Working Group as required;

	<ul style="list-style-type: none"> • the preparation of monthly flash reports (Carbon Trust template) containing key financial data and information of the delivery status of the Project; and • towards the end of the Project <ul style="list-style-type: none"> ○ 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; ○ the preparation of a final presentation to the TWG; ○ 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 <p>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.</p>
<p>Project Deliverables:</p> <ul style="list-style-type: none"> - D13: Monthly flash reports - D14: Executive Summary Report - D15: Final presentation - D16: Delivery of webinar - D17: Project Closeout Form - D18: Input sheet for OWA Cost Model 	
<p>Expenses</p>	<p>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.</p>

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. One or more SSO case studies from offshore wind farm owner(s) subject to NDA.

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.

7. Tender Evaluation Criteria

7.1. Technical & Financial Evaluation

Bidders should take the following evaluation criteria into account when preparing and submitting their tenders. In the event of equivalent scores of two or more received Tenders, suppliers and sub-contractors who have committed to decarbonisation targets (see end of this section) will be preferred.

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

Description	Information required from Bidders
Proposed Approach	<p>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.</p> <p>The description should include an initial overview on the approach followed by a description on how each Work Package and task will be delivered.</p> <p>Also, Bidders need to justify how their proposed approach meets the objectives of the Project.</p>
Additional Work	<p>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.</p>
Project management	<p>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.</p>

CRITERION 2: EXPERIENCE (WEIGHTING: 30%)

Description	Information required from Bidders
Experience in PSCAD Simulation/Power System modelling	<p>In the Main Bid Document, Bidders should elaborate on experience of the criteria described to the left and explain how these past experiences are relevant for this Tender.</p>
Experience in SSO related issues	<p>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).</p>
Experience in and expert knowledge of SSO related grid codes	<p>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.</p>

CRITERION 3: STAFF SKILLS (WEIGHTING: 15%)

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 NGENSO, TSO's and OEM's, 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
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	<p>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.</p> <p>Bidders are required to specify expected expenses separate from the estimated budget for each Work Package.</p> <p>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).</p> <p>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.</p> <p>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.</p> <p>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.</p>

7.2. Contractual Evaluation

Bidders are required to state any requested amendments to the OWA Stage IV Contractors' Conditions in their Tender Certificate. Any requests for amendments made after submission of the offer (i.e. not included in the Tender Certificate) shall not be considered by the Carbon Trust. On the basis of any changes requested in the Tender Certificate, the Carbon Trust may reject any bids where they consider there to be a high risk of not agreeing a contract in a timely manner.

The Carbon Trust has committed to reaching Net Zero by 2050. Our associated targets have been validated by the Science Based Targets Initiative (SBTi)². To meet the initial targets that we have set for ourselves, we encourage all our suppliers and sub-contractors to have equivalent plans in place by 2026 at the latest. Measuring your emissions, setting targets, and encouraging others to do so will help push the needle on decarbonisation together.

Accordingly, we have included climate change commitment clauses in the OWA Stage IV Contractors' Conditions. Bidders may submit Tenders even if they cannot meet the defined conditions now, but if this is the case this should be clearly flagged in the Tender Certificate as a requested change to the OWA Stage IV Contractors' Conditions. Please reach out if you need more information on this.

² <https://sciencebasedtargets.org/>

8. Glossary

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 the delivery of 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.
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 ³).
Main Bid Document	Has the meaning given in section 3.1. No template is provided.
Project	The Triggers of Sub-Synchronous Oscillation (SSO) Events or SSOT 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

³ A Clarification Document will not be published if no clarification questions are received in relation to this ITT.

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	Bidder's response to this ITT consisting of the following elements: <ul style="list-style-type: none"> - Main Bid Document (proposal); - signed Tender Certificate; and - Bid Price Calculation Sheet
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.