17 May 2021

Dear Sir/Madam,

Invitation to Tender for the HVDC-connected OWFs: controller interaction and grid stability study project for the Carbon Trust's OWA Programme

You are invited to submit a tender for the HVDC-connected OWFs: controller interaction and grid stability study project (the "HVDC-CI project" or "Project") which is part of the Offshore Wind Accelerator (OWA) programme. The key objective of the Project is to develop a framework to better understand the key factors that contribute to control interactions and Sub Synchronous Torsional interactions (SSTI) and establish a study methodology (both screening level and detailed time domain) to identify potential concerns, derive mitigation options and verify safe operation of 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 28 June 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	13:00 BST 27 May 2021
Clarification Document published[1]	31 May 2021
Submission of full tender	13:00 BST 28 June 2021
Bidder interviews	July 2021
Successful Contractor announcement	July 2021
Envisaged Contract award date	August 2021

Please e-mail any clarification questions, including questions about the timing of this ITT, to David.Plunkett@carbontrust.com any time before 13:00 BST 27 May 2021. The complete set of clarification questions and all answers to clarification questions will be published in the Clarification Document on our website by 31 May 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

[1] A Clarification Document will not be published if no clarification questions are received in relation to this ITT.

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We look forward to receiving Your tender.

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 "HVDC-connected OWFs: controller interaction and grid stability study" Project

Description of Tender

Contents

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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 6. 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 HVDC-connected OWFs: controller interaction and grid stability study 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;

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- 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 HVDC-CI project

2.1. The OWA TWG E would like to investigate controller interaction, sub synchronous torsional interactions and grid stability of HVDC-connected offshore wind farms.

2.2. This project seeks for further understand the key factors that contribute to control interactions and establish study methodology (both screening level and detailed time domain) to identify potential concerns, derive mitigation options and verify safe operation of equipment.

2.3. The main objectives of this work are to identify controller interaction issues with converters and other FACTS devices; develop a scope of studies to be executed to perform interaction studies; perform typical interaction studies using multi-vendor HVDC controllers; and understand potential mitigation actions and their cost.

2.4. The expected benefits of this work are to understand the potential interaction issues for HVDC-connected windfarms, and reduce the risk of non-compliance to allow the increase of HVDC-connected offshore wind connected to the grid without stability issues.

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 work packages described in 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 10-12 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 HVDC-CI 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	Large integration of renewable sources and HVDC converters in power system have resulted in displacement of conventional power generation, lower system inertia and lower short circuit capacity of AC system. The AC grids integrated multiple converters in the close vicinity that potentially influence each other. The interoperability and stability of the system with large number of converters is regarded as a key issue in the future power system planning development. The design of power electronic interfaced devices under low SCR interconnections is technically challenging. The specific control strategies and settings must be carefully selected considering the system characteristics at the point of connection, expected credible N-1 and other contingencies as well as the interaction with other dynamic devices in the vicinity. If there is thermal generation in close proximity, it is also prudent to verify that the influx of power electronic based devices does not adversely affect the torsional oscillations of generator shafts. The main concerns from stability and dynamic response point of view are as listed below: • Ride through response of wind, HVDC and FACTS devices following faults and other system disturbances • Undesirable interaction (commonly termed control interactions (CI)) between two or more dynamic devices in close proximity, leading to unstable or poorly damped oscillations • Sub Synchronous Torsional interactions (SSTI) – Impact on thermal generator shafts Note that the contractor is expected to provide a review; however, is not expected to conduct further studies of fault ride through response of wind, HVDC and FACTS devices following faults and other system disturbances following market and literature review. The main objective of the proposed project is to develop a framework to better understand the key factors that contribute to control interactions and establish study methodology (both screening level and detailed time domain) to identify potential concerns, derive mitigation options and verify safe operation of equipment. In addition to CI, the study will also investigate other common concerns when high capacity renewables and HVDC links are added to power systems. The successful contractor should conduct a detailed investigation of the offshore wind and related industries, summarising all literature detailing grid stability issues; CI & SSTI identified within; and lessons learned to date for HVDC-connected OWFs. The contractor should engage with relevant stakeholders involved in grid stability for HVDC connections to onshore grid, and in doing so the contractor should propose a stakeholder engagement plan detailing all relevant stakeholders, and information that the contractor aims to obtain.

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	The contractor shall identify the study requirement related to CI & SSTI requirement in the different Grid Codes (mainly in the UK and EU countries). 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 OWA members is not at the level of granularity required to conduct this market and literature review. Within the proposal, the successful contractor should identify particular data sources that they will aim to obtain and/or use for the purpose of the project. The focus of the analysis should be on HVDC and offshore wind issues regarding grid stability and should include studies from a variety of sources such as desk-based studies, computer simulation studies, and any technology demonstrations (if applicable). The content of the market and literature review may include: • A summary of context and other key drivers for the project; • A description of the methodology in identifying grid stability issues, CI & SSTI; • A summary and description of the results found in literature; • The implications of the issues or interactions identified (such as effect to onshore grid, safety, costs, etc.); • Any limiting factors to the analysis; • All relevant conclusions; • Lessons learned. In addition, the contractor should identify all the data requirements and any data sharing issues for the CI, TI and stability studies to be performed in future work packages.
Project Deliverables: - **D01: WP1 Report** o Market and literature review, investigating current work conducted by industry and academia for grid stability issues and controller interactions for HVDC-connected OWFs. - **D02: Presentation to TWG-E**	
WP2: Controller Interaction & Sub synchronous torsional interaction study scope	Control systems of dynamic devices can interact in an undesirable manner resulting in unstable or poorly damped oscillations following system disturbances such as fault recovery. Integration of large-scale power electronic based devices to the power systems has elevated the need to analyse the potential CI risks; especially when two or more dynamic devices are operating in parallel at relatively weak grid locations. The fast-acting reactive power controllers are identified as a primary contributor to CI issues. Generally, if CI issues are identified at design stages, these issues can be mitigated through careful tuning of control parameters. The successful contractor is expected to propose definitions of grid strength and this is to be agreed with the TWG prior to the commencement of WP2. The successful contractor should develop a scope to provide to the TWG-E that will identify the methodology to study CI & SSTI for HVDC-connected OWFs. The successful contractor should identify data/sources of data for synchronous generation operation. The TWG may provide information to assist with this; however, it should be assumed that the information

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	provided is not at the level of granularity required for synchronous generation data. The successful contractor should identify their own additional sources of data and detail these in the proposal. The Contractor will be provided with already developed multi-vendor PSCAD HVDC models and WTG models from previous work conducted by the TWG-E, and the controller interaction study scope should include or aim to use these models. The Contractor shall identify and propose a suitable grid model for the studies. Minimum 3 HVDC converters and 1 STATCOM model shall be included in the study model and two of these HVDC converters shall be connected to the same node. The scope of works should include: • A summary of understanding of existing models; • Any data requirement for the studies; • A description of how the successful Contractor will build on these models to study CI & SSTI; • How the successful Contractor will perform simulations to study CI & SSTI; • How the results will inform conclusions. • Any limitations to the study identified prior to analysis. The successful Contractor should identify the challenges and issues that the grid may experience under all scenarios, and mitigating actions to ensure that the controller interaction meets grid code requirements. As the scope of works completed within this work package will inform the study conducted in WP3, the contractor should expect to have discussions with the TWG-E on the scope provided. WP3 should not commence until an agreement has been made between the successful Contractor and the TWG-E.
Project Deliverables: - **D03: WP2 Report** o A scope of works dealing how the contractor will perform analysis on existing PSCAD models to perform controller interaction study for HVDC-connected OWFs. - **D04: Presentation to TWG-E**	
WP3: Controller Interaction Study	*The study conducted in WP3 will not commence until the scope of works completed in WP2 has been agreed between the successful Contractor and the TWG-E.* The Contractor should perform simulation analysis following the guidance from the scope of studies developed in WP2. The contractor should make specific use of the already developed multi-vendor HVDC models and WTG models from previous work conducted by the TWG-E. The Contractor should develop a generic STATCOM model suitable for the studies. The simulations conducted within WP3 must include but are not limited to: • Interaction of transient stability; • Possible interaction of power oscillation damping control; • Interaction of frequency control; • Impact of fault recovery including power and voltage recovery; • Transformer saturation during energization;

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	• Interaction of overvoltage in the network & AC voltage control; • Harmonic resonance in AC voltages; • Harmonic interaction studies between HVDC converters. • SSTI study with presence of HVDC converters and nearby generators; • Any other relevant interaction studies. In addition, the successful contractor should provide guidelines to explain the study and details on how the TWG-E can use the models produced within the study. Note that the contractor may suggest other simulations and studies to be conducted as part of this Work Package both at the proposal stage and during project delivery. This is highly valued by the TWG.
Project Deliverables: - **D05: Controller Interaction Study Simulation Models** - **D06: Guidelines for controller interaction study** - **D07: Presentation to TWG-E**	
WP4 (Optional): GC141 Review	*The review conducted in WP4 will commence only if and when the outcome of GC141 is published by National Grid. The bidder should provide an overview of how they would conduct this review. Commencement of this work package will be agreed with the TWG. Within bid submissions, WP4 should be detailed like any of the other work packages with approach to work, specified staff, total hours, budget etc. provided.* Grid Code Modification Proposal GC141 has been raised by National Grid to review and improve the compliance testing and modelling for new and modified generation connections, particularly for complex systems. More information and published documents can be found on the web page. *https://www.nationalgrideso.com/industry-information/codes/grid-code-old/modifications/gc0141-compliance-processes-and-modelling* The successful Contractor shall provide a review of the outcomes of GC141 having an impact on new and modified HVDC connected offshore wind farms connections. Any recommendations on compliance testing and modelling following the Contractor's review of GC141 shall be highlighted to the TWG-E in the form a report and a presentation. The contractor should make specific reference to the relevant parties involved, data sharing between parties, and who is responsible for conducting studies and other relevant considerations including risks, models required, timescales, and mitigations. In addition, a process for assessing and modelling the risk of negative control interactions with 3rd parties from a user connection should be developed in the form of a guidance note.
Project Deliverables: - **D08: WP4 Report** o A review of GC141 including recommendations for new and modified HVDC connected offshore wind farm connections. - **D09: Presentation to TWG-E**	
WP5 (Optional): Summary and Future Work Requirements	*WP5 is an optional work package and the OWA TWG-E will decide after WP3 whether or not to proceed with WP5. Within bid submissions, WP5*

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	should be detailed like any of the other work packages with approach to work, specified staff, total hours, budget etc. provided. The successful contractor should produce a report, summarising the work conducted in all Work Packages, making specific reference to key tasks conducted and conclusions made by the Contractor. The successful contractor should also produce a strategy and/or next steps to develop next steps and/or follow up works to advise the TWG on how to proceed with using the results of this study in a real-world environment. This may involve either further desk-based studies, or may include a pilot project, describing the strategy which should take place to confirm the results of the simulations and mitigating actions to ensure grid code conditions are met in a real-time scenario.
Project Deliverables: - **D10: WP5 Report** - **D11: Presentation to TWG-E**	
WPA. Project Management	The Bidder should stipulate how it will manage the Project efficiently and effectively. In particular, the following activities should be included (and hence budgeted for) • 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; • 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 o the production of a 3-10 pages Executive Summary Report for the entire Project (for dissemination within the OWA); 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; o the preparation of a final presentation to the TWG; 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 o the provision of inputs for the OWA Cost Model by completing the OWA Cost Model Input Sheet (Carbon Trust template). 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: - **D12: Monthly flash reports** - **D13: Executive Summary Report** - **D14: Final presentation** - **D15: Delivery of webinar**	

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- **D16: Project Closeout Form** - **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.

Intellectual Property and Knowledge

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

5. Bid Pricing

5.1. 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.

5.2. 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.

5.3. 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.

5.4. 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.

5.5. Any expenses must be separately included under Expenses.

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6. Tender Evaluation Criteria

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

Criterion 1: Approach to Work (Weighting: 30%)

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

Criterion 2: Experience (Weighting: 30%)

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

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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 those involved in grid stability for HVDC connections to onshore grid, 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 0. Bidders are required to specify expected expenses separate from the estimated budget for each Work Package. The Bid Price will be assessed on the price for the Approach to Work (which includes the price of the Work Packages in the Scope of Work and any Alternative Work proposed by the Bidder). If there is any Additional Work proposed by the Bidder, this will be evaluated separately. The suggestion of Additional Work by the Bidder will not have a negative impact on the evaluation of the tender. Carbon Trust will reimburse reasonable expenses at cost and receipts may be requested. Pre-approval will be required for travel costs over £150 per return journey and combined hotels & subsistence cost exceeding £200 per day. Bidders will be required to confirm or comment on their ability to carry out the activities detailed in the Scope of Work within the initial term of the Contract and provide an outline plan of work.

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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 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 HVDC-connected OWFs: controller interaction and grid stability study or HVDC-CI 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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