DPS FRAMEWORK SCHEDULE 4: LETTER OF APPOINTMENT AND CONTRACT TERMS

Part 1: Letter of Appointment

Dear Sirs

Letter of Appointment

This letter of Appointment dated Friday 5th February 2021, is issued in accordance with the provisions of the DPS Agreement (RM6018) between CCS and the Supplier.

Capitalised terms and expressions used in this letter have the same meanings as in the Contract Terms unless the context otherwise requires.

Order Number:	CR20109
From:	The Department for Business, Energy and Industrial Strategy (BEIS), 1 Victoria Street, London, SW1H 0ET ("Customer")
To:	Ove Arup & Partners Ltd, 13 Fitzroy Street, London W1T 4BQ ("Supplier")

Effective Date:	Wednesday 10th February 2021
Expiry Date:	Tuesday 7th September 2021

Services required:	Set out in Section 2, Part B (Specification) of the DPS Agreement and refined by: The Customer's Project Specification attached at Annex A and the Supplier's Proposal attached at Annex B; and statement of works attached at annex C.

Key Individuals:	[redacted]
[Guarantor(s)]	N/A

Contract Charges (including any applicable discount(s), but excluding VAT):	£216,220.00 ex VAT in alignment with Schedule 2 and Annex 1 of the CR20109 Contract terms. [redacted]
Insurance Requirements	Additional public liability insurance to cover all risks in the performance of the Contract, with a minimum limit of £5 million for each individual claim Additional employers' liability insurance with a minimum limit of £5 million indemnity Additional professional indemnity insurance adequate to cover all risks in the performance of the Contract with a minimum limit of indemnity of £2 million for each individual claim. Product liability insurance cover all risks in the provision of Deliverables under the Contract, with a minimum limit of £5 million for each individual claim.
Liability Requirements	**Suppliers limitation of Liability** (Clause 18.2 of the Contract Terms);
Customer billing address for invoicing:	finance@services.uksbs.co.uk or Billingham (UKSBS Queensway House, West Precinct, Billingham, TS23 2NF).

FORMATION OF CONTRACT

BY SIGNING AND RETURNING THIS LETTER OF APPOINTMENT (which may be done by electronic means) the Supplier agrees to enter a Contract with the Customer to provide the Services in accordance with the terms of this letter and the Contract Terms.

The Parties hereby acknowledge and agree that they have read this letter and the Contract Terms.

The Parties hereby acknowledge and agree that this Contract shall be formed when the Customer acknowledges (which may be done by electronic means) the receipt of the signed copy of this letter from the Supplier within two (2) Working Days from such receipt

For and on behalf of the Supplier:

Name and Title: [redacted]

[redacted]

For and on behalf of the Customer:

Name and Title:

[redacted]

[redacted]

Date: 9th February 2021

Signature:

[redacted]

Date: 10th February 2021

ANNEX A

Customer Project Specification

1. Background

Context:

In 2019, the UK committed to a legally binding target to bring all greenhouse gas emissions to net zero by 2050. Offshore wind will be a key renewable electricity generating technology in delivering this target. The Committee on Climate Change set out in their 2019 *net zero* report[1] a higher ambition scenario of 75GW of offshore wind capacity in operation in order to contribute to net-zero targets by 2050.

The Offshore Wind Sector Deal[2] published in March 2019 set out an ambition of the UK deploying up to 30GW by 2030. The Government is now working with the sector to accelerate deployment.

Research Collaboration:

This research will be jointly led by BEIS, The Crown Estate (TCE) and Crown Estate Scotland (CES) due to the overarching alignment of objectives and our expectation that this research will build on existing analysis conducted by The Crown Estate, as well as Marine Scotland's Sectoral Marine Plan.

The Crown Estate is a £14 billion UK real estate business, with a portfolio unlike any other, including management of the seabed around England, Wales and Northern Ireland, playing an active role in a range of industries including offshore energy, cables, pipelines and marine aggregates.

Crown Estate Scotland is a public corporation set up following the Scotland Act 2016 to manage land and property in Scotland owned by the Monarch in right of the Crown. Crown Estate Scotland manages most of the seabed around Scotland and is leading on the Scotwind leasing process for new offshore wind farms.

Research Drivers:

The research will set out a number of potential offshore wind spatial deployment scenarios out to 2050, across the UK seabed. The research will also provide an indication of the relative costs associated with offshore wind locations under different scenarios. This is reflected in the long-term research questions within the BEIS Areas of Research Interest[3], which outlines the following long-term research questions amongst the priorities for the department:

- What is the most cost-effective way to deploy renewables into the electricity system?
- At what level of deployment do the additional costs of deploying further intermittent renewables lead to significantly higher overall costs?

Floating offshore wind is an emerging technology with only a small number of demonstration projects deployed to date, and costs remain higher than those for fixed bottom turbines.

[1] Net Zero – The UK's contribution to stopping global warming
[2] https://www.gov.uk/government/publications/offshore-wind-sector-deal
[3] BEIS Areas of Research Interest (2020 Update)

However, it offers the potential to open up new areas of seabed in deeper waters. In the context of the additional levels of ambition likely to be necessary to deliver our net zero target, the government is considering the role of floating offshore wind in the future low carbon electricity mix and how to reduce its costs.

Research Outputs:

Given the above outlined research interests, the outputs of this research will allow a much greater understanding of the spatial scenarios for deploying high levels of offshore wind (current assumptions are largely based on current build limits only), and how relative costs may change as deployment increases – for example, as we move into deeper waters and how this relates to the role of (currently pre-commercial) floating offshore wind.

The outputs of this research will be used in a number of ways and are described in more detail below.

We expect the research to primarily inform policy development, the strategic direction and decisions made within BEIS on future support policies for offshore wind, including through the contracts for difference scheme. This is in the context of the overall electricity strategy to deliver net zero, where offshore wind plays a major role in the vast majority of scenarios. The research will also help inform the work of TCE and CES and others on the Project Advisory Group (see later reference).

The outputs of the research would also be able to help to further stimulate stakeholder engagement and public discussion on the challenges of offshore wind deployment to meet net zero.

2. Aims and Objectives of the Project

Overview:

We are seeking to appoint a consultant to undertake research to define a range of plausible spatial scenarios for offshore wind development to 2050 in UK waters, and assess the extent to which deployment levels are constrained by technical, economic, environmental and system factors. The research will examine the key drivers of costs and how these relate to increased offshore wind deployment under different scenarios, as well as the role of floating offshore wind in overcoming spatial limitations and at what cost.

There has been little research undertaken to date to map spatial deployment scenarios for offshore wind across all of UK waters, and to understand how the costs of offshore wind are expected to vary as deployment increases.

At present, the evidence and modelling underpinning BEIS' electricity strategy assumes limited cost variation between different deployment levels of offshore wind. Further, the only constraint applied is a 'build limit' which is based on what the supply chain can deliver at present. In practice we know that offshore wind needs to co-exist alongside a range of environmental, logistical, social and economic factors (e.g. radar, shipping lanes, and presence of protected species) and that moving to less technically desirable sites may have cost implications.

We are therefore looking to appoint a consultant to expand the evidence base to identify potential spatial deployment scenarios, and to understand how the different scenarios relate to technical, economic, environmental and system factors, on and offshore. Further to this,

the research should also build on the expected future development of turbine technology and the potential of floating offshore wind in overcoming such limitations and at what cost.

High Level Research Objectives:

a) As the deployment of fixed bottom and floating offshore increases, what are the potential future trade-offs for the UK to meet a net zero consistent level of offshore wind deployment?
b) Which further regions/areas could be suitable for future deployment of fixed and floating offshore wind if interventions were made with respect to other interests, users and sensitivities?
c) How do relative costs of deployment vary as deployment levels increase – (i.e. as the most technically / economically feasible sites are utilised);
d) What role does floating offshore wind have in overcoming these constraints and rising costs?

This research will develop and present a variety of spatial scenarios, to graphically illustrate where deployment of offshore wind could be located in the UK by 2050. We expect the majority of these scenarios to use the Committee on Climate Change deployment figure of approximately 75GW by 2050 as a starting assumption. The study should also include a small number of spatial scenarios for higher levels of deployment anchoring around credible external sources.

One of the objectives of identifying these scenarios is to illustrate the trade-offs that begin to occur as offshore wind deployment increases and to aid further understanding of the potential spatial limitations of offshore wind deployment. The identification of these areas and the presentation of potential scenarios is not intended to be a pre cursor for an offshore wind plan. The deployment scenarios will be purely illustrative and used to understand the potential spatial constraints of offshore wind in UK waters. This research is not intended to reflect current or future policy, but rather to help inform decisions and strategic thinking on future support policies within renewable electricity strategy to deliver net zero.

A list of specific research questions that submissions should answer are outlined below:

RQ1. Development of a set of plausible **future spatial deployment scenarios** of fixed bottom and floating offshore wind

- Which regions/areas are technically suitable for future deployment of fixed bottom and floating offshore wind?
- How do wider constraints impact and/or limit potential offshore wind deployment (e.g. radar requirements; possible network constraints in future; environmental considerations; transport requirements (e.g. shipping))?
- Which further regions/areas could be suitable for future deployment of fixed and floating if actions were taken with respect to environmental designations and prioritisation given above other sectors?
- What are the potential future trade-offs amongst these constraints as we approach a net zero consistent level of offshore wind deployment?

RQ 2: How do the **components of LCOE change under different spatial deployment scenarios?**

- What are the key drivers of LCOE for fixed bottom and floating offshore wind?
- How do the relative costs of viable sites evolve as we move from current levels of deployment towards increased levels of deployment in 2050? As the most viable sites are exhausted, how do relative costs change under different scenarios, and what are the key drivers?
- How do relative costs vary as different technical, economic and environmental constraints are taken into account for specific sites?
- How do limiting factors and constraints impact on the expected aggregate cost trajectory?
- Are there tipping points beyond which the relative costs begin to rapidly escalate?
- How do transmission costs vary under different scenarios? This should consider different potential configurations to offshore transmission; different routes for delivering offshore transmission; and potential for reinforcement on the onshore transmission network.?

RQ 3: **What role does floating offshore wind play** in overcoming the constraints to deploying fixed-bottom offshore wind?

- To what extent can floating offshore wind overcome the constraints that apply to fixed-bottom offshore wind in meeting net zero? When does the switch to large amounts of floating need to occur to meet net zero?
- Which regions/areas are most suitable for future deployment of floating offshore wind?
- Which further regions/areas could be suitable for future deployment of floating if actions were taken with respect to environmental designations and prioritisation over other sectors?
- In what scenarios could floating offshore wind be more cost-effective than fixed-bottom offshore wind? (e.g. Considering the wind climate and at what water depth/distance from shore?)
- What are the current restrictions to the future potential of floating offshore wind deployment? What technological developments are required for floating to play a cost-effective role in the offshore generation mix? What technological innovation is necessary to meet this potential and what are the current barriers in place to develop this innovation?

This research will provide greater insight into the challenges facing future deployment targets of the offshore wind sector, enabling the development of better informed policies to support and incentivise efficient deployment, with knowledge of the constraints – technical, economic and on the grid system – that might hamper sector growth.

3. Suggested Methodology

The proposal should include a description of the methodology and approach to the research specification, including details of any software that will be used.

The Crown Estate has recently concluded a study looking at the constraints which define Key Resource Areas (KRA) for fixed and floating foundation offshore wind, out to 2040 (the "**KRA Study**"). A KRA defines the area of seabed that is suitable for offshore wind development based on technology availability over a given timeframe. The outputs from the KRA Study include both a technology landscape review, and a set of parameters in terms of site characteristics that define key resource from a technical perspective. The outputs of the KRA Study can be found in Appendix A – Characterisation of Key Resource Areas for Offshore Wind: A Report for The Crown Estate and should be drawn upon in devising the methodology for this study. It should be noted that the KRA Study focussed on the physical site characteristics – these form a subset of LCOE drivers, but there are other drivers which were out of scope of the KRA Study but which will need to be considered in this Future UK Offshore Wind Deployment Scenarios study.

We suggest a beneficial starting point for the methodology to consider consenting constraint could be that used by The Crown Estate to feed into their Round Four[4] leasing. This methodology focusses on progressively smaller, less constrained and technically attractive areas of seabed. The contractor is encouraged to propose alternatives to this methodology where suitable. Where contractors expect to deviate from the proposed methodology, we ask that this is clearly explained in detail.

The research should also draw from the Scottish Government's Sectoral Marine Plan[5], which aims to identify the most sustainable options for the future development of commercial-scale offshore wind energy in Scotland. The consenting constraint methodology that is used should be validated against the Sectoral Marine Plan and should avoid findings that are at odds with the options identified in the Sectoral Marine Plan.

An indicative, high-level outline of each of the key stages of the methodology is provided below. This should not be considered prescriptive. Submissions should clearly identify how they will address each of the key objectives and research questions outlined in "*Aims and Objectives of the Project".*

Stage 1 – Desk-based data gathering and identification of constraints: this should include a high level literature review of similar feasibility studies. No new data collection will be required. We expect that the literature review would include a comprehensive review of the list of factors that would affect the viability and relative costs of deployment for fixed bottom and floating offshore wind. The Crown Estate's KRA Study, and its Resource & Constraints Methodology, lay out a clear starting point for this stage, but will need to be reviewed and expanded upon with regards to other factors, and to other potential offshore wind sites. The

[4] Crown Estate Resource and Constraints Methodology Report
[5] https://consult.gov.scot/marine-scotland/draft-sectoral-marine-plan-for-offshore-wind/

work undertaken to inform the Scottish Government Sectoral Marine Plan should also be reviewed and considered.

Example resources which include modelling methods: The Crown Estate GIS database; *RPSB 2050 Energy Vision*[6]; Carbon Trust *Maximum environmental, economic and security benefits of offshore wind*[7]*; National Grid ESO reports on Offshore Coordination*[8] and European Environment Agency *Europe's onshore and offshore wind energy potential*[9]

Stage 2 – Identify the key cost (LCOE) drivers for both fixed and floating offshore wind, and asses how the constraints and restrictions identified in Stage 1 may impact these. Model how these may change over time, given existing policy constraints (planning, regulation etc.), expected supply chain development and technical improvements.

One approach could be to use BEIS generation costs as a baseline and consider how specific parameters would impact this cost trajectory. For example, as deployment increases over time and increasing constraint considerations are taken into account.

We do not expect detailed LCOE modelling to form a part of this research, but rather wish to understand how the key drivers of the LCOE will likely change as the deployment of fixed bottom and floating offshore wind increases. We envisage that scenarios could be framed as high/medium/low cost to reflect the extent in which costs increase relative to an agreed cost baseline trajectory. The research should allow BEIS, The Crown Estate and Crown Estate Scotland to have the functionality to amend the modelling and the baseline cost trajectory to assess the impact on the relative LCOE.

A full breakdown of costs for this study should be provided, such that BEIS, The Crown Estate and Crown Estate Scotland can easily identify the costs for this stage of work.

Stage 3 – develop scenarios – In consultation with BEIS, The Crown Estate and Crown Estate Scotland and through engagement with key stakeholders, a number of high level spatial scenarios should be developed that will reflect different potential pathways for meeting the proposed 2050 deployment levels. The consultant should put forward their proposed methodology for developing such scenarios in their ITT response, including proposals on what the key variables should or could be (eg proportionate mix of fixed and floating wind; high or low levels of offshore grid development; differing assumptions on the impact of existing constraints such as shipping, radar, environmental designations). A balance should be struck in terms of the number of scenarios, balancing sufficient granularity with simplicity; we envisage circa 3-6 scenarios, but the consultant should put forward their proposal with justifications. The final number of scenarios will be agreed during the course of the work with BEIS, The Crown Estate and Crown Estate Scotland.

[6] http://ww2.rspb.org.uk/Images/energy_vision_summary_report_tcm9-419580.pdf
[7] https://www.carbontrust.com/media/42162/ctc743-offshore-wind-power.pdf
[8] https://www.nationalgrideso.com/future-energy/projects/offshore-coordination-project/documents
[9] https://www.energy.eu/publications/a07.pdf

Stage 4 – Geospatial analysis – This should use spatial data and analysis to illustrate/visualise the agreed deployment scenarios through geospatial mapping. To note that data will be required from several external organisations and may require cleaning and/or conversion.

We would expect the consultant to come up with sources of geospatial data, but Marine Scotland and The Crown Estate can direct and supply with data available in hand.

This mapping will be conducted across all UK waters. However, due to the interaction with existing work conducted by the Scottish Government through their Sectoral Marine Plan (outlined in the existing literature above), published scenarios from this research will not lie outside of the Plan Option Areas identified in the Sectoral Marine Plan. The final adopted Sectoral Marine Plan is expected later in 2020. The draft plan identified areas which it is estimated could deliver multiple tens of GW of offshore wind in Scottish waters, so we do not anticipate that this restriction would severely limit the potential deployment scenarios published by the research. However, the consultant should set out how they intend to manage this restriction on the published outputs, which should include discussion with Marine Scotland.

BEIS, The Crown Estate, and Crown Estate Scotland will have internal access to the outputs and data from the geospatial analysis which will allow for further interrogation of the deployment scenarios and will enable us to flex the data and evidence supplied to further test capacity limits.

To note that at each of the above stages, we expect the role of floating offshore wind to also be assessed.

Stage 5 – Development of an Interactive Tool -The successful bid should also consider options for development of user-friendly tool(s) that could support dialogue with stakeholders and the public in relation to the constraints on fixed bottom and floating offshore wind to illustrate the impact on aggregate deployment levels. Tender responses should also include an option for the delivery of such a tool which would be subject to agreementd with BEIS, The Crown Estate and Crown Estate Scotland. We would also expect an interim report to be provided. BEIS may provide a template for the final report to help ensure outputs are presented in a user-friendly way.

Stage 6 – **Reporting** - A final written report should provide a descriptive accompaniment to the spatial analysis, outlining the methodology used, findings, and an assessment of the potential deployment scenarios for offshore wind deployment out to 2050.The underlying data and geospatial analysis will be made available to BEIS, The Crown Estate and Crown Estate Scotland to inform policy development and strategic planning. This research will enable further interrogation and testing of bespoke offshore wind deployment scenarios.

Engagement with project Advisory Group:

An advisory group consisting of representatives from the Devolved Administrations (DA's), grid operators and marine planning authorities has been established to provide specialist

expertise on the assumptions feeding into the research and to serve as a forum for the discussion of cross-cutting issues related to research deliverables.

The successfully appointed consultant will be expected to meet with members of the established advisory group as a group, and (if required) on a 1-to-1 basis for discussion and for the review of assumptions that feed into the identification of spatial scenarios. BEIS, The Crown Estate and Crown Estate Scotland will have the option to join these discussions if they wish.

The consultant appointed will hold at least two workshops with each of the Project Advisory Group, and the wider Offshore Wind Evidence and Change (OWEC) Programme Steering Group. In each case, one of the workshops is expected to validate the scenarios identified, whilst the secondary workshop will be a forum for discussion to feed into the final report and project outputs ahead of sign-off and final publication.

Geographical Scope:

We expect that this research will cover all UK waters; the research will therefore include Northern Ireland. If possible, we would also like this to include the Crown Dependencies, (Jersey, Guernsey and the Isle of Man), but this will ultimately depend on the contractor and is considered desirable rather than essential to the research.

The appointed contractor is expected to understand the extent of devolved matters related to marine planning and consider how different net zero targets in DA's relate.

4. Deliverables

Research outputs must include:

- Spatial analysis on the constraints to offshore wind deployment in UK waters.
- A series of geographical maps to visually illustrate a variety of potential deployment scenarios for offshore wind in 2050. This should illustrate areas that are suitable for either fixed bottom and floating offshore wind, as well as highlighting potential trade-offs that come into play as offshore wind deployment increases (shipping lanes, fishing areas etc.).
- An indication of relative costs for the different scenarios identified.
- A qualitative accompaniment to this analysis should be provided, giving a comprehensive overview of the factors that are likely to impact the deployment of offshore wind for each of the area's outlined. We would expect these factors to also consider the likelihood and magnitude of their impact. The accompaniment should provide a snapshot summary of likely deployment and constraints at 2050.
- An interim report should be provided to outline progress on the project and the initial findings.
- A minimum of workshops comprising at least:
  - A workshop with the Project Advisory Group to validate the scenarios identified through research
  - A discussion with the Project Advisory Group to feed into the final project findings and outputs ahead of sign-off and final publication.
- The final report that accompanies the spatial analysis will outline the methodology used, key assumptions and findings. It should include an assessment on each of the research

questions and final conclusions. BEIS may provide a template for the presentation of this report.

- An optional user-friendly stakeholder engagement tool or app that allows users to interactively overlay different potential constraints to offshore wind development. The tool would also dynamically present how scenarios can impact offshore wind deployment and how the mix of fixed and floating offshore wind changes for each scenario.
- A webinar presenting the methodology alongside final report findings and optional interactive tool to enable wider stakeholder dissemination.

The contractor will provide regular updates to BEIS, The Crown Estate and Crown Estate Scotland as the research develops in order to outline findings as they emerge, detail the progress of the project and evaluate progress against key research milestones.

All outputs must be quality assured in line with BEIS guidance[10]

Ownership of Outputs:

BEIS will hold ownership, alongside The Crown Estate and Crown Estate Scotland as joint project funders, of the underlying data that is used to feed into the deployment scenarios published in the research. By holding ownership of the underlying spatial analysis, the project funders (BEIS/TCE/CES) will be able to further interrogate the evidence and research outputs upon completion, to analyse additional offshore wind deployment scenarios. This will provide an additional resource to inform and feed into offshore wind policy development.

BEIS, The Crown Estate and Crown Estate Scotland expect to publish a final report setting out the findings of the study.

Skills and experience

BEIS would like you to demonstrate that you have the experience and capabilities to undertake the project. Your tender response should include a summary of each proposed team member's experience and capabilities, as well as relevant project experience of the orgnaisation as a whole.

Contractors should propose named members of the project team, and include the tasks and responsibilities of each team member. This should be clearly linked to the work programme, indicating the grade/ seniority of staff and number of days allocated to specific tasks.

Contractors should identify the individual(s) who will be responsible for managing the project.

Budget and Payment terms

The budget for this study is up to £240,000 excluding VAT. Contractors should provide a full and detailed breakdown of costs (including options where appropriate).

Price will be a criterion against which bids will be assessed.

[10] BEIS Aqua Book

Payments will be based on milestone delivery. The anticipated milestone delivery dates will be discussed and agreed with the appointed contractor. The contractors are requested to provide their proposed milestones, pricing and payment schedule.

ANNEX B

Supplier Proposal

Part 2: Contract Terms