

# Spatial Characterisation Workstream Summary & Analysis

Offshore Wind & Carbon Capture Utilisation and Storage Colocation Forum

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This report has been commissioned by the [Offshore Wind and Carbon Capture Utilisation and Storage Co-Location Forum](#) as part of the spatial characterisation and planning workstream. This report provides a summary of the analysis carried out through this workstream so far. Going forward, this report and its conclusions will be used to inform future workstreams which provide research and analysis which support the UK's shared Net Zero ambitions and CCUS as a key enabler for these.

The Climate Change Committee has advised that both Offshore Wind (OW) and Carbon Capture and Usage and Storage (CCUS) have a significant role to play in helping the UK achieve its obligation to be net zero by 2050.

To meet this obligation, the UK's OW and CCUS capacities will need to significantly increase. However, there are areas of the seabed which have potential for both OW and carbon dioxide (CO<sub>2</sub>) storage development. Consequently, we anticipate there will be several areas of seabed where collocation of OW and CCUS infrastructure will be required to enable necessary expansion.

In 2020, The Crown Estate commissioned a detailed review into how OW and CCUS technologies could both grow and co-exist to maximise their contribution to net zero. In April 2021, The Crown Estate published the [CCUS & Offshore Wind Overlap Study Report](#)<sup>1</sup> – in association with Crown Estate Scotland and the Oil & Gas Authority<sup>2</sup> - which summarised the findings of the review and made recommendations for enabling collocation of OW and CCUS technologies, including the need for a body to analyse key collocation challenges and identify solutions.

Responding to the report, and the Net Zero agenda in July 2021, The Crown Estate announced the formation of the [Offshore Wind and CCUS Co-location Forum](#), which brought together the North Sea Transition Authority (NSTA), the Carbon Capture and Storage Association (CCSA), RenewableUK (RUK), HM Government and Crown Estate Scotland (CES)<sup>3</sup> to provide strategic coordination of collocation research and activity to help maximise the potential of the seabed.

Several workstreams were established at the initial plenary session, including on Spatial Characterisation. The aim of this was to “pro-actively review where Offshore Wind and CCUS projects could potentially overlap (i.e., where are the good CCUS stores versus the high potential Offshore Wind sites) and ensure a combined approach to planning in those areas. Consider

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<sup>1</sup> Written by the Energy Transition Alliance (ETA), a collaboration between the Offshore Renewable Energy (ORE) Catapult and the Net Zero Technology Centre

<sup>2</sup> Renamed the North Sea Transition Authority in 2022

<sup>3</sup> During 2022 the 3 Marine statutory bodies were invited to join the forum: Marine Maritime Organisation, Marine Scotland, Welsh Government

performing site characterisation activities in these areas prior to any Offshore Wind or CCUS project development.”

The Spatial Characterisation work began by establishing what the UK’s target for new CCUS projects needed to be to meet the 2050 net zero commitment. The demand for CO2 stores required to meet net zero emissions for the UK by 2050 has been estimated to be up to 175 Mtpa<sup>4</sup>.

As per the Exploration Task Force Report<sup>5</sup>, allowing for the risk of failure during appraisal of carbon stores, future potential storage options were considered the development of which would enable net zero to be met. The Forum’s work concluded that considerably more carbon stores need to be appraised in the UK Continental Shelf (UKCS) to enable CO2 storage targets to be met.

The Forum also considered evidence from NSTA and BGS databases<sup>6</sup> to assess potential locations that would best enable colocation of OW and CCUS technologies, where colocation may mean full or partial overlap or adjacency of projects.

The Forum’s findings have been shared with HM Government and may support accelerated appraisals of more carbon stores while accounting for future OW targets. We have produced maps demonstrating the existing opportunities and constraints in the UKCS – for both CCUS and OW – and showing options for new carbon stores.

**Figure 1** shows for The Crown Estate areas of interest (Northern Ireland, Wales, England) the CO2 emissions heat map,<sup>7</sup> which indicates the proximity to current onshore emissions centres with the Possible Terminals demonstrating potential locations for CO2 transportation to offshore stores.

Figure 1 focusses on the Southern North Sea and shows the areas offered in the NSTA Carbon Storage (CS) 1st Round bids, as well as existing OW agreements and CS licences. Mineral agreements (Aggregates & Evaporites) are not included, nor Tidal Agreements or any Linear Assets (Pipelines & Cables), to enable a clear picture of the two sectors in question (OW & CCUS) but this does not illustrate the full complexity of additional offshore energy projects and other marine users in the Southern North Sea.

Our research and analysis suggest that existing mineral and tidal agreements are easier to accommodate with OW and CCUS, assuming careful planning.

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<sup>4</sup> Net Zero: The UK's contribution to stopping global warming, Committee on Climate Change, May 2019

<sup>5</sup> Exploration & Appraisal for CO2 Storage Sites in the United Kingdom, Exploration Task Force, September 2021, Figures 2 & 3

<sup>6</sup> British Geological Survey, CO2Stored database originally developed in the UK Storage Appraisal Project, sponsored by The Crown Estate

<sup>7</sup> 2019 Emission Data is taken from the "Emissions from NAEI large point sources" section of the National Atmospheric Emissions Inventory (NAEI) database, interpreted as part of Capture Readiness Levels by Olsights for The Crown Estate

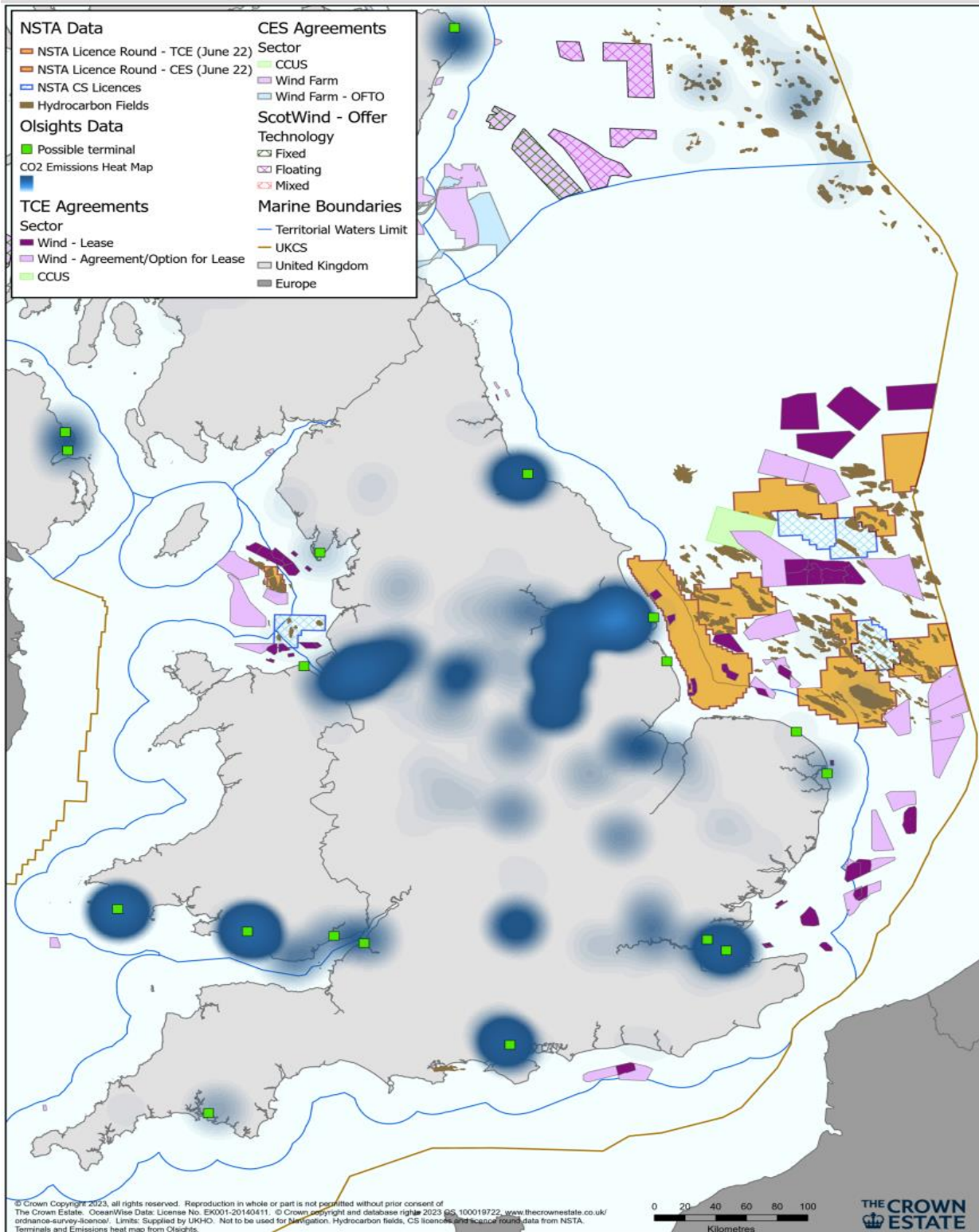
**Figure 2** shows a similar set of information for the Crown Estate Scotland area of interest, including Central North Sea and Northern North Sea. As with Figure 1, CO2 emissions heat map indicate current onshore emissions centres with the Possible Terminals demonstrating potential locations for CO2 transportation to offshore stores.

Figure 2 includes the areas offered in the NSTA CS 1st Round bids, existing Hydrocarbon Fields and existing OW agreements. The floating technology shows the planned ScotWind areas.

From the publicly available information alone, the main conclusion we draw is the need to appraise a larger and more geologically and geographically diverse set of carbon dioxide stores. Early appraisal may allow for storage geology that is identified as unsuitable to be released for use for OW and other Marine activities.

Prioritisation of resource could also help to avoid delaying projects due to potential collocation of OW and Carbon Storage development issues. The parties involved in the work are continuing to engage widely with all Stakeholders in the Marine sector as well as the developer community to enable considered spatial planning to take place.

**Figure 1 - Map of public domain information for Existing & Potential Offshore Energy Agreements – Northern Ireland, Wales, England**





*Figure 2 – Map of public domain information for Existing and Potential Offshore Energy Agreements – Scotland*

