| Project Name | OFFSHORE WIND & CCUS CO-LOCATION FORUM PLENARY MEETING |
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| Meeting Venue | Held online via Microsoft Teams |
| Date & Time of Meeting | 09:30 – 12:00 on Tuesday 19 th August 2021 |

| Chair of the Meeting | Adrian Topham (The Crown Estate) |
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| Names of the Attendees | Sam Robertson (OREC) Secretary Chris Gent (CCSA) – Member Juliette Webb (Renewable UK) – Member Benj Sykes (OWIC) – Member Andrew Russell (BEIS) – Member Andrew Russell (BEIS) – Member Amar Khuttan (BEIS) – Member Iain Harris (OGA) – Member standing in for Kristian Dahlstrom Alana Finlayson (OGA) – Member standing in for Nick Richardson Bronagh Byrne (The Crown Estate) – Member Sian Wilson (CES) – Member |

| ltem | Notes | 5 |
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| 1.0 | WELCOME AND INTRODUCTION | |
| | The C Each offsho | Chair opened the plenary meeting by welcoming everyone through a round of introductions. attendee introduced themselves and gave a short explanation of their role in relation to bre carbon storage and wind energy generation. |
| 2.0 | REVIEWING PREVIOUS MEETINGS ACTIONS | |
| | The C the fo Feed | Chair confirmed actions from the previous kick-off meeting had all been completed and that rum now has a stronger OW representation with Offshore Wind Industry Council (OWIC). Dack on the Communications Policy from members is listed below. |
| | a. | The Department for Business, Energy and Industrial Strategy (BEIS) agreed and approved the policy. Referring to discussions from the kick-off meeting on correct government representation in the forum, BEIS stated that information reported to Andrew Russell (AR) and Amar Khuttan (AK) will be disseminated through BEIS to appropriate government bodies and if necessary, could be reviewed further at a later stage. |
| | b. | CES communicated that in the prior discussion around the involvement of Marine Scotland (MS) within the forum, it was agreed that it would be difficult for MS to contribute to all the forum workstreams and increasing the plenary membership could make the forum unmanageable due to its growing size. MS will be included as a subgroup in Workstream #11. |
| | C. | The Chair, as workstream lead, will manage applicable workstreams and report back to the forum and at each plenary session, this will be reflected in the Communications Policy. |
| | d. | The Oil and Gas Authority (OGA) had no comments as both parties are here on behalf of OGA members they would like them to review the Communications Policy along with OGA communications team. |
| | e. | The Chair discussed the opportunity to create a specific Colocation Forum logo and asked how they could use all six members of the Forum's individual logos. |



| | f. | Renewable UK (RUK) requested more clarity on how communications are shared with wider trade body members. The wording is to be clarified within the Communication Policy. |
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| | g. | OWIC suggested that the Offshore Consents & Licencing Group (OCLG) be engaged within RUK/OWIC. Documentation will be marked as confidential so that it is maintained within that group & permission sought from the forum to share more widely. |
| | h. | The CCSA (Carbon Capture & Storage Association) wanted to echo the point above on disseminating information to working groups and members within organisations. |
| | i. | The Chair removed the word "guidelines" in the last table referring to presentation materials as they are not referenced within the policy, and it refers to the whole document. |
| 3.0 | UPD | ATE ON ONGOING WORKSTREAMS |
| | This i workl The c | s ongoing as the Co-Location Forum 'CLF'. The Chair led a conversation through the draft ist items marked 'OLD' (Attachment 2), these resulted in the shorter worklist marked 'NEW'. liscussion for each of the resulting workstreams is covered below. |
| 3.1 | Work | stream 1: Common OW/CCUS co-location oversight body |
| | The C (HSE coloc | Chair also raised that the impact column was originally around Health and Safety Executive), however going forward it will relate to the impact of the workstream on OW/CCUS ation problems. |
| | Action worki expec | ns will fall to the Workstream Leads. Forum members to revert if they wish to be added to ng group membership in 'NEW' column F. (NB: The aim of workstreams is for sub-groups to dite actions drawing from forum member experience and report back to the full plenary.) |
| 3.2 | Workstream 2: Cross industry operational alignment | |
| | A diso split t | cussion concerning cross industry alignment between OWIC & OGA resulted in agreement to he OLD line 6 into NEW item 2 & 3. |
| | Cross exam locati asset part is | s industry liabilities in terms of existing assets such as pipelines, turbines, cables etc. Another ple would be the costs associated with being unable to position a drilling rig in preferred on for potential leaking wells and subsequently being unable to fix an issue due to wind s being in location. This forms item 2 here but cannot be progressed currently. The second s split out as item 3 below. |
| 3.3 | Work | sstream 3: Cross industry development liability |
| | This o resou | concerns dispute mediation where projects are unable to progress further but where DEVEX irces have been spent on a project. |
| 3.4 | Work | stream 4: Spatial characterisation of high value CCUS and OW sites |
| | TCE a poten furthe the pi | and the OGA were tasked by BEIS with creating a map of the overlap of both existing and itial OW and CCUS projects. The work to date includes different levels of analysis and needs er spatial characterisation work to make a useful tool for decision makers. CES have joined rocess too, noting that the Scottish areas will need MS involvement. |
| | OWIC proble the to overla the w and w framin | C questioned whether the resulting map would be used to frame the OW/CCS overlap em. All agreed that this work should be the first part of a two-stage process. Firstly to create ool (in this case a map or series of maps), and secondly to be used to frame the OW/CCUS ap problem. It was agreed that a fuller explanation of the planned activities and duration of ork should be presented to the forum. TCE stated that the mapping will cover CCUS and OW vill also consider all other seabed uses which impact developments and include details of ng how the map can be used and what is to be included. |
| | The C enviro locati possi | DGA highlighted that carbon storage licenses are only issued after external consultation with onmental and MoD areas, these areas should be excluded from the map, and mapping well ons would also be a high priority. CES noted that the timescale would need to be as short as ble. |

| Item | Notes |
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| 3.5 | Workstream 5: OW/CCUS planning using spatial characterisation |
| | The Chair explained that this line item was created so that once the mapping is complete, albeit with explanation of limitations, a working group would be set-up to suggest how the information may be used by decision makers – either in safeguarding prime locations or to inform future leasing and licencing rounds, potentially based on storage volumes (MtCO2e) and/or generation capacities (GW). |
| 3.6 | Workstream 6: <i>Minimum requirements and technology development for MMV (Measurement, Monitoring, and Verification)</i> |
| | The Chair stated this relates to measurements taken to confirm containment of CO2 in the intended storage reservoir by visualising the C02 plume, currently using seismic methods. |
| | CES made a request to explain exactly what is meant by MMV. The OGA plan to publish CCUS good practice guidelines. The CCSA noted that these should not seek to make MMV too prescriptive. |
| | OWIC asked if these standards will account for the impact on wind and other sea users or if it will be focusing on the technical monitoring of the flood front and impact of MMV. OGA noted two aspects: |
| | Proving that there are no significant forms of leakage from the reservoir. |
| | Looking at any issues in the surrounding areas, considering fishing vessels, colocation issues, to show that they have a good plan for both. |
| | The OGA presented two slides (Attachment 1) proposing a full evaluation of Ocean Bottom Node (OBN) technology as an alternative to towed seismic acquisition to mitigate against overlap issues with wind farms. The OGA are looking at three different objectives: |
| | Understanding the current state of OBN & its portability to CCUS. |
| | Qualifying the operational benefits and limitations of OBN deployment within wind turbine arrays via desktop simulation and field trials. |
| | Understand the potential for future OBN technology development which will improve equipment portability and reduce acquisition costs. |
| | OWIC asked if the field trial was planned for next year, to which the OGA responded that no OW Operator had been approached but they believe that it can be done quickly, with the aim of next summer. |
| | The CCSA said this issue is not specific to the UK only, the Norwegian and Dutch governments will be looking at the same issues, presenting an opportunity to reach out and discuss this with them and possibly share the cost. The OGA said they are trying to learn from such international studies. |
| | OWIC highlighted that with OBN currently five times more expensive than traditional streamers, both technical and commercial decisions will have different impacts on both OW and CCUS developers. |
| | The CCSA asked if this cost related only to the cost for one OBN survey. The OGA replied that the cost difference was for a single survey, but it is possible to install permanent arrays, which while having a huge upfront cost, might be cost effective in the long run as sites are predicted to be monitored for $40 - 50$ years. They added however that this might also limit the field development and deployment if the operator wanted to expand. |
| | The Secretary (OREC) asked what the time frame of repeat seismic studies on CCUS reservoirs is. The OGA replied that it will depend on many variables, but the site will start off with a high-quality base study and then following on every 5 years or so depending on the geology. |
| | On the benefits and limitation side of the study, TCE asked if OGA would expand this to measure environmental impact (e.g. in terms of poise generated as well as impact to fishing), as well as the |

| | benefits and trade-offs that might result in license to operation issues. OGA stated the need to understand noise generated by wind and seismic in combination, to assess environmental issues. The Chair suggested this be considered in item 6. |
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| | The OGA highlighted that both OBN and towed seismic require sound sources to generate a seismic reflection. The level of source sound depends on the subsurface strata being surveyed, not the type of acquisition. |
| | The OGA said they were soon to publish work on the types of streamers (traditional and short) that could be deployed within a conventional array. OWIC asked whether this included multivessel towed arrays. OGA stated that it had only looked at varies types from a single vessel and various lengths. |
| | The Chair asked if there is an example of a towed streamer being towed through a wind farm and suggested that it might be worth documenting, a single streamer and single 2D line. |
| | The Chair said the OGA's proposal covered OLD lines 8, 9 & 11, so agreed to combine in this workstream. |
| 3.7 | Workstream 7: CCUS and OW separation distances and additional traffic modelling |
| | The Chair combined OLD lines 10, 12, 13 & 14 and learning from Workstream 5. |
| | OREC noted Project Vulcan's findings were not limited to assets being side by side (colocation), but also where both projects overlap (cohabitation). Restrictions to access for operational drilling of relief wells due to existing infrastructure, provide another example where consideration of simultaneous operations ('SIMOPS') may impact on CCUS developments, in addition to MMV concerns. |
| | OWIC noted that developers had significant experience collocating O&G and OW facilities, wells, pipelines, search and rescue, which should be learned from, noting project specifics. |
| | CES reflected on Project Vulcan, that suggested the main issue from this workstream would be determining the minimum separation distance of turbines to allow the towing and turning of traditional towed streamers through offshore wind infrastructure to assess the impact to the OW design. |
| | OGA saw the primary issue being access to the infrastructure, with the MMV being the secondary issue. |
| | The Chair said the first part of this worklist should be to bring forward a number of examples and see how they have been solved and how they have dealt with the issues. The Secretary confirmed this had not been done during Project Vulcan. |
| | RUK said they were happy to bring a few actions to the Offshore Consents and Licensing Group (OCLG) on behalf of the forum. In terms of modelling traffic congestion within sites, RUK internally work with a number of safety and operations activities and said they would be happy to lead that part too. |
| 3.8 | Workstream 8: Co-location opportunities for shared resources |
| | BEIS said they need to look at huge opportunities for shared infrastructure such as platforms, cables, pipelines, power generations etc. |
| | The Secretary agreed and said it can be looked at, but it was difficult to do when both sites are not planned together. They added it might be an output of the mapping tool that highlights where key overlaps will be, so that wind farms might be considered to power CCUS assets as well as shared infrastructure. |
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Unclassified

Meeting Notes

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| 3.9 | Workstream 9: Surface deformation & brine release corrosion modelling It was agreed that OLD item 15 could be expanded to look at brine corrosion, subsurface deformation in terms of injection, and other environmental issues associated with this, such as sediment build up. |
| 3.10 | Workstream 10: <i>Wider marine engagement in co-location impacts</i> Please refer to 2.0 c) above. The group agreed the aim is to engage wider Marine regulators, possibly regarding Workstreams 4 & 8 above. |
| 4.0 | CONFIRM ACTIONS ON PRIORITISED WORKSTREAMS The allocated time finished so the Chair brought an end to the meeting. The minutes would be issued along with the slides allowing for the Forum to provide comments once they had seen them. |
| 5.0 | NEXT MEETING DATES (WORKSTREAMS, NEXT PLENARY, ETC.) Meetings to be arranged to move workstreams forward before the next plenary session. Secretary to issue dates for next plenary meeting to be held in November. |

MEETING END

| Owner | Action List |
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| Chair | 1. Contact each Workstream Lead to ensure progress before next plenary. |
| | Clarify how plenary and subgroups will communicate in communication policy. Define what information can be shared with any subgroup members that are not plenary members. Remove word "guidelines" in policy table as it refers to the whole document. |
| | Investigate opportunity for a single collocation forum logo or use forum member logos. |
| | 4. Include OBN presentation from OGA with the minutes (Attachment 1). |
| Secretary | 5. Issue 'NEW' worklist to reflect discussion (attachment 2). |
| | Suggest dates for next plenary meeting to be held in November, agree and send invite. |
| TCE | Present work schedule for Workstream 4 'Co-location map' to forum in ad-hoc meeting to be arranged and seek forum agreement to start prior to next plenary. |
| Workstream Leads | Plan work schedules and any budget requests for forum if not covered by sub-group, send to Chair for Secretary to distribute for comment by all forum members. |



| OGA | 7. Workstream 6 to seek forum agreement to start prior to next plenary. |
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| | 8. KD & NR to confirm acceptance of communications policy, subject to above changes. |
| | 9. Present work on types of seismic streamer (traditional and short) for monitoring. |