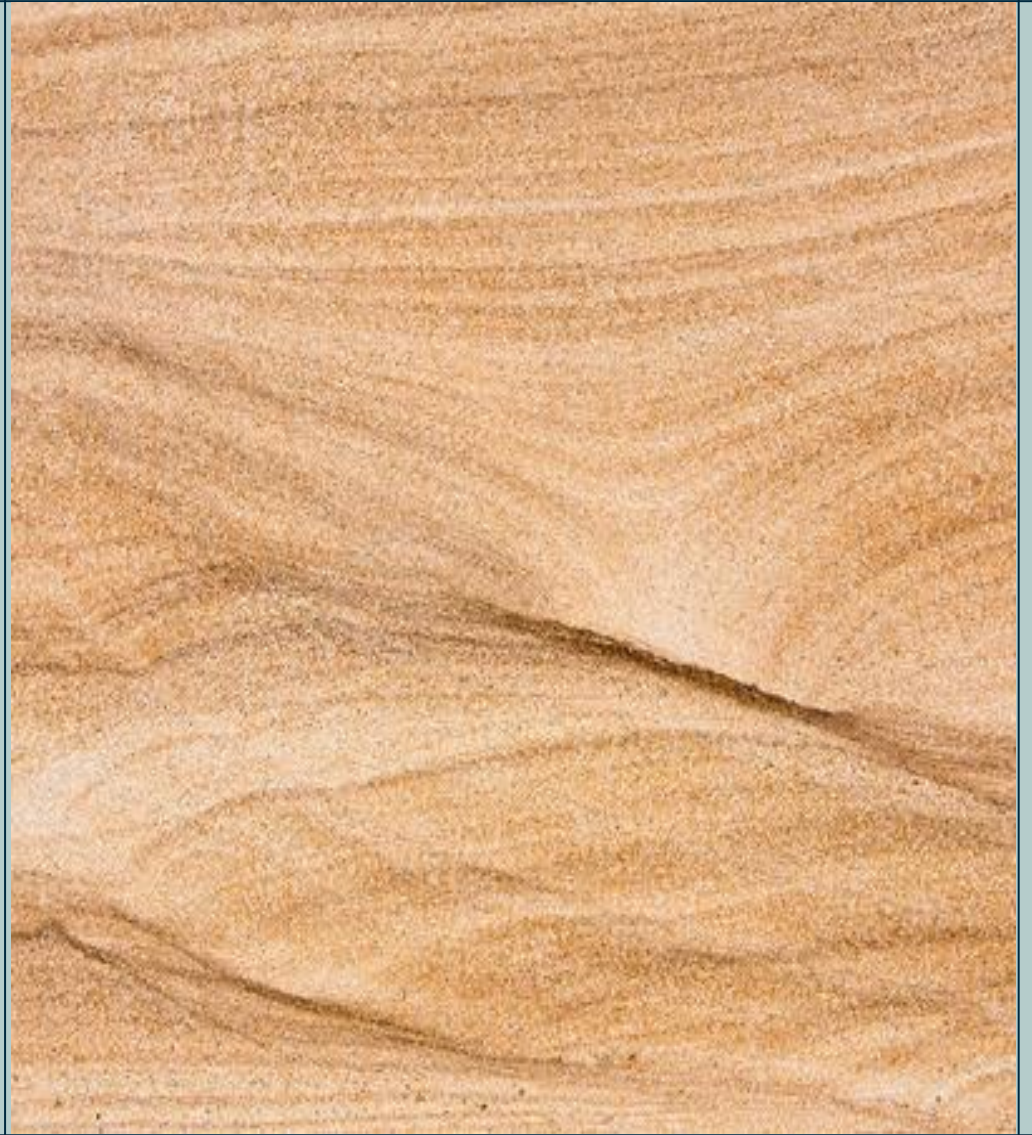


# Offshore Wind and CCUS Co- Location Forum

4<sup>th</sup> plenary meeting

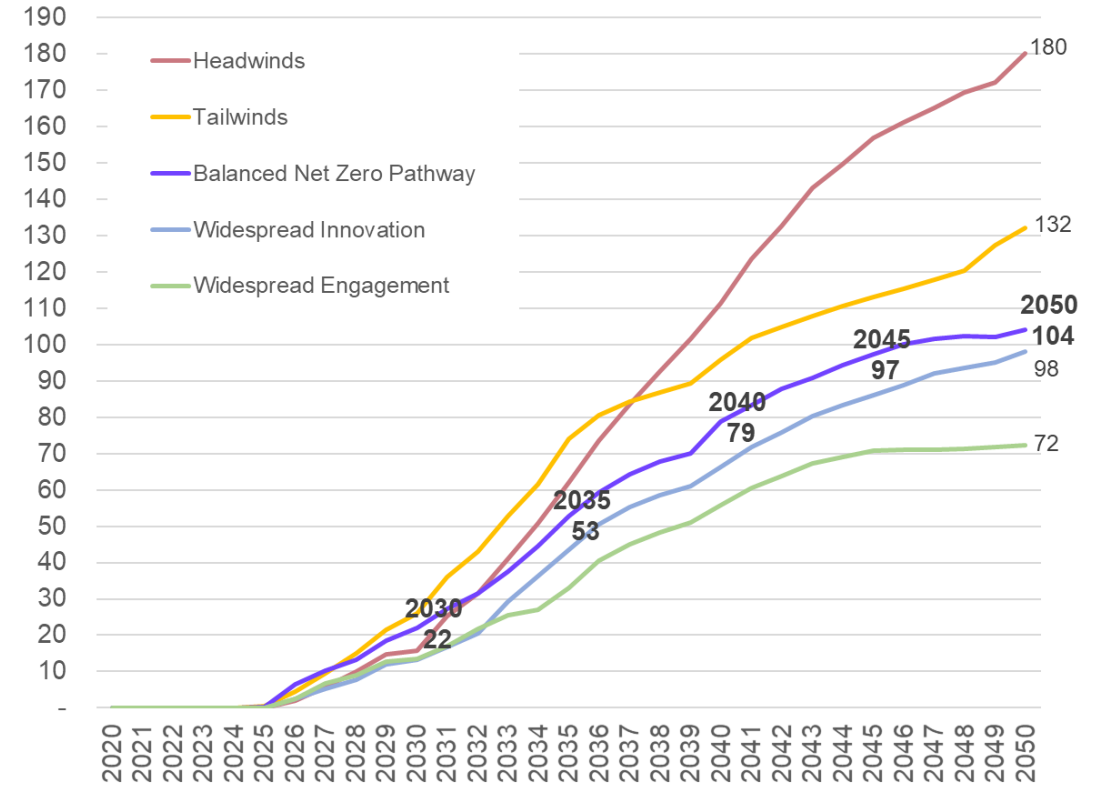
15<sup>th</sup> June 2022



# Agenda

1. Introductions
2. Review actions / minutes from last meeting
3. Updates from active workstreams
4. Areas of focus / workstream actions
5. Next plenary & workstream meeting dates

UK CO2 Store Demand Scenarios (mTpa)  
From CCC 6th Carbon Budget Dataset



# Actions from plenary #3

Item	List of Actions from Last Meeting	Action
1.	Pre-reading to be circulated ahead of next plenary session.	Chair
2.	Circulate ETA proposal for PM & support on Workstreams 7 – 10	
3.	Set up interim meetings with relevant parties surrounding WP4 before the next plenary session.	
4.	Agree date for sharing and communicating approach with Developers in May / June	
5.	Suggest dates for next plenary meeting to be held in June, agree and send invite.	Secretary
6.	Updated Communication Policy (6) to be circulated with the minutes for review.	
7.	TCE to update the Communications Plan to state that working groups should meet and update the forum before plenary sessions.	TCE
8.	Offshore Wind farm to host a trial to gathering seismic data, BS, RP and NR to speak and develop plans offline.	NSTA

# Spatial characterisation #4...

# A busy space ...

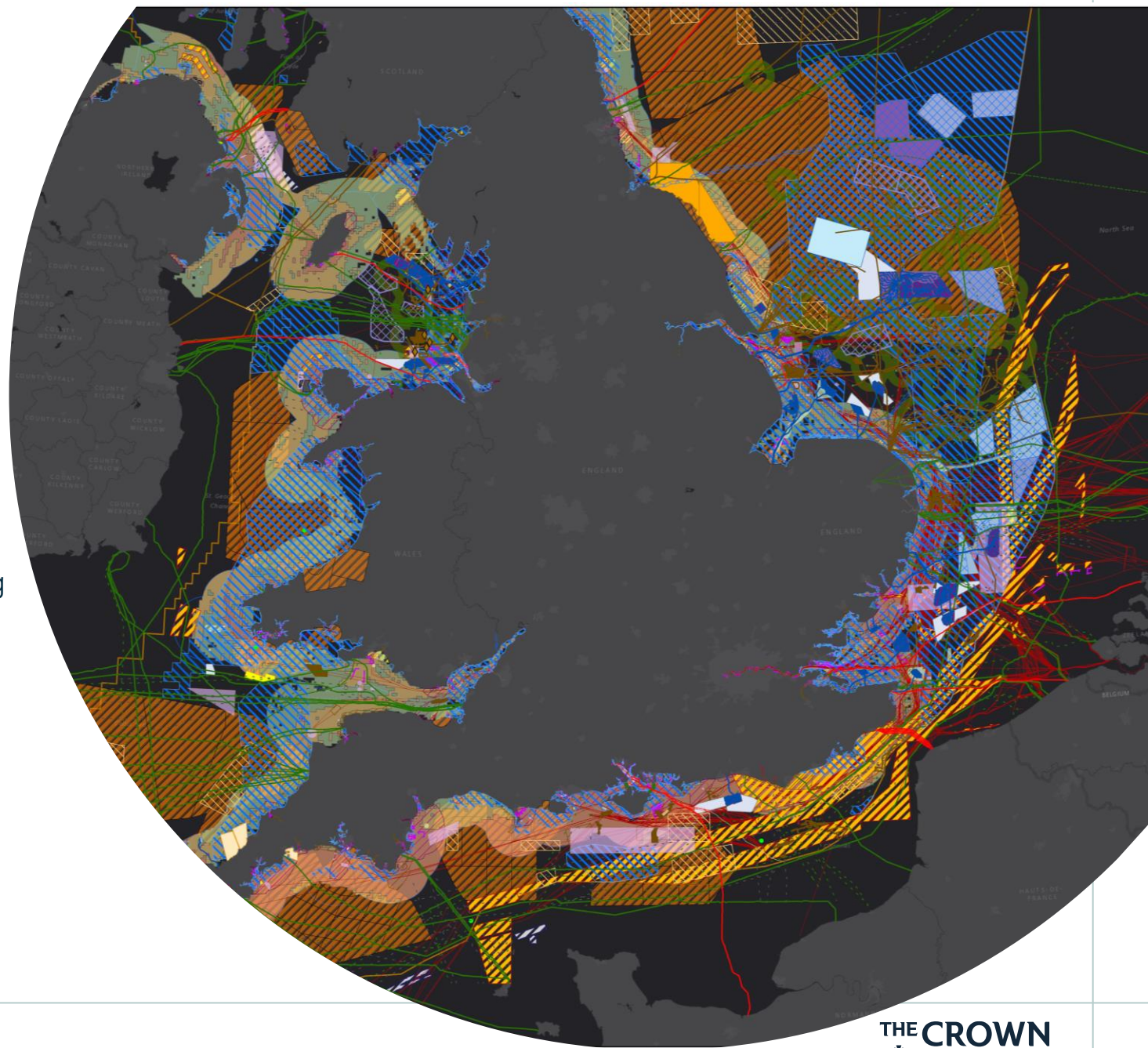
UK Marine Strategy seeks to achieve Good Environmental Status (GES) - 'ecologically diverse and dynamic seas which are clean, healthy and productive'

75% of the offshore wind key resource area already 'used' - additional offshore wind and CCUS alone extends utilisation to 95%

These demands must be balanced against other competing uses:

- Telecommunications and digital infrastructure
- Minerals extraction, oil and gas infrastructure, inc. pipelines
- Nationally important sectors such as fishing and shipping
- Environmental and ecological uses and natural habitats

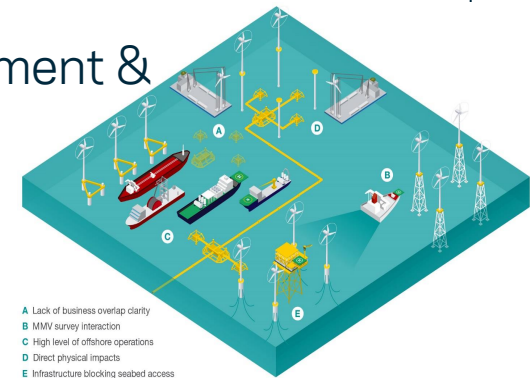
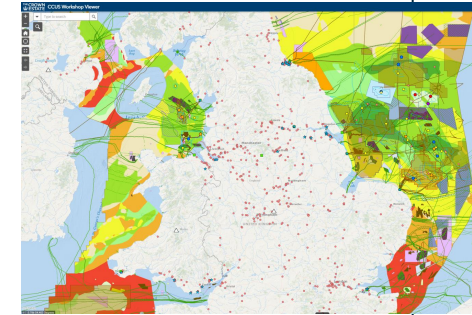
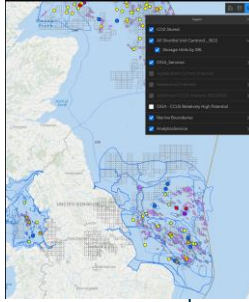
**Strategies for coordination, co-location and coexistence will be critical to navigating the spatial challenge ahead**



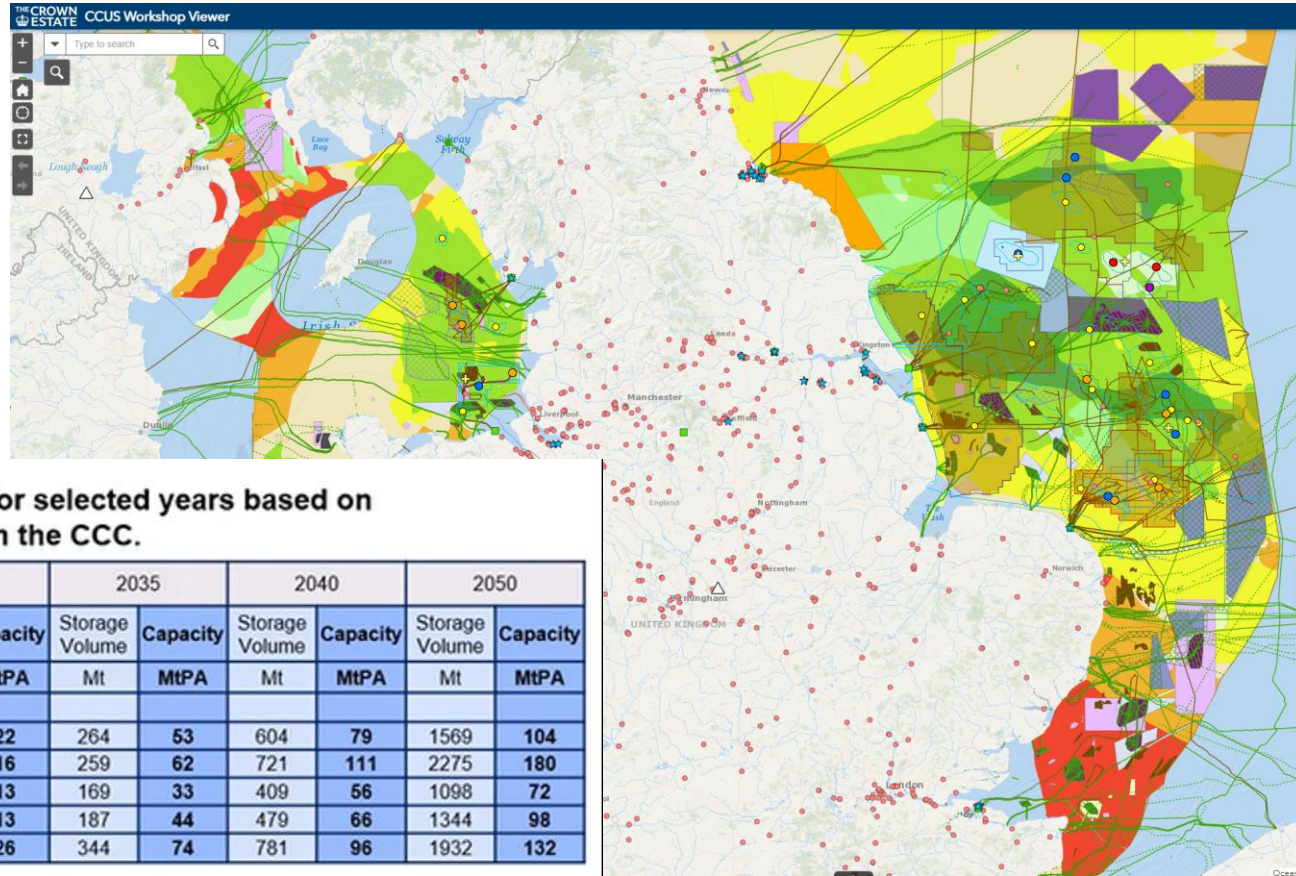
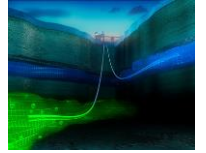
# Ongoing Spatial Characterisation & Planning Work

- Key Resource Assessment
  - What – further evidence projects on Capture, Transport & Storage Readiness Levels
  - When – 3Q22 added to GIS viewers
  - So what – provide developer independent assessment of storage locations & timings
- Project BOOST
  - What – how many stores needed to meet targets, where & when
  - When – end 4Q22 added to GIS viewer in collaboration with NSTA, CES, BEIS
  - So what – prevent conflict with OW sector by identifying key stores to safeguard
- Colocation Forum
  - What – multi-stakeholder\* forum identifying methods for simultaneous measurement & development
  - When – 2 year programme started July'21
  - So what – identify technical means to enable coexistence

\*as BOOST + CCSA, RUK



# Further Evidence - Project BOOST



**Demand for CO2 Storage for selected years based on the 6<sup>th</sup> Carbon Budget from the CCC.**

Year >	2030		2035		2040		2050	
Attribute >	Storage Volume	Capacity	Storage Volume	Capacity	Storage Volume	Capacity	Storage Volume	Capacity
Unit >	Mt	MtPA	Mt	MtPA	Mt	MtPA	Mt	MtPA
<b>CB6 - pathway</b>								
Balanced Net Zero	71	22	264	53	604	79	1569	104
Headwinds	48	16	259	62	721	111	2275	180
Widespread Engagement	44	13	169	33	409	56	1098	72
Widespread Innovation	41	13	187	44	479	66	1344	98
Tailwinds	77	26	344	74	781	96	1932	132

The objective is to identify what storage is needed, where to safeguard against co-location with offshore wind.

*MMV seismic #6...*



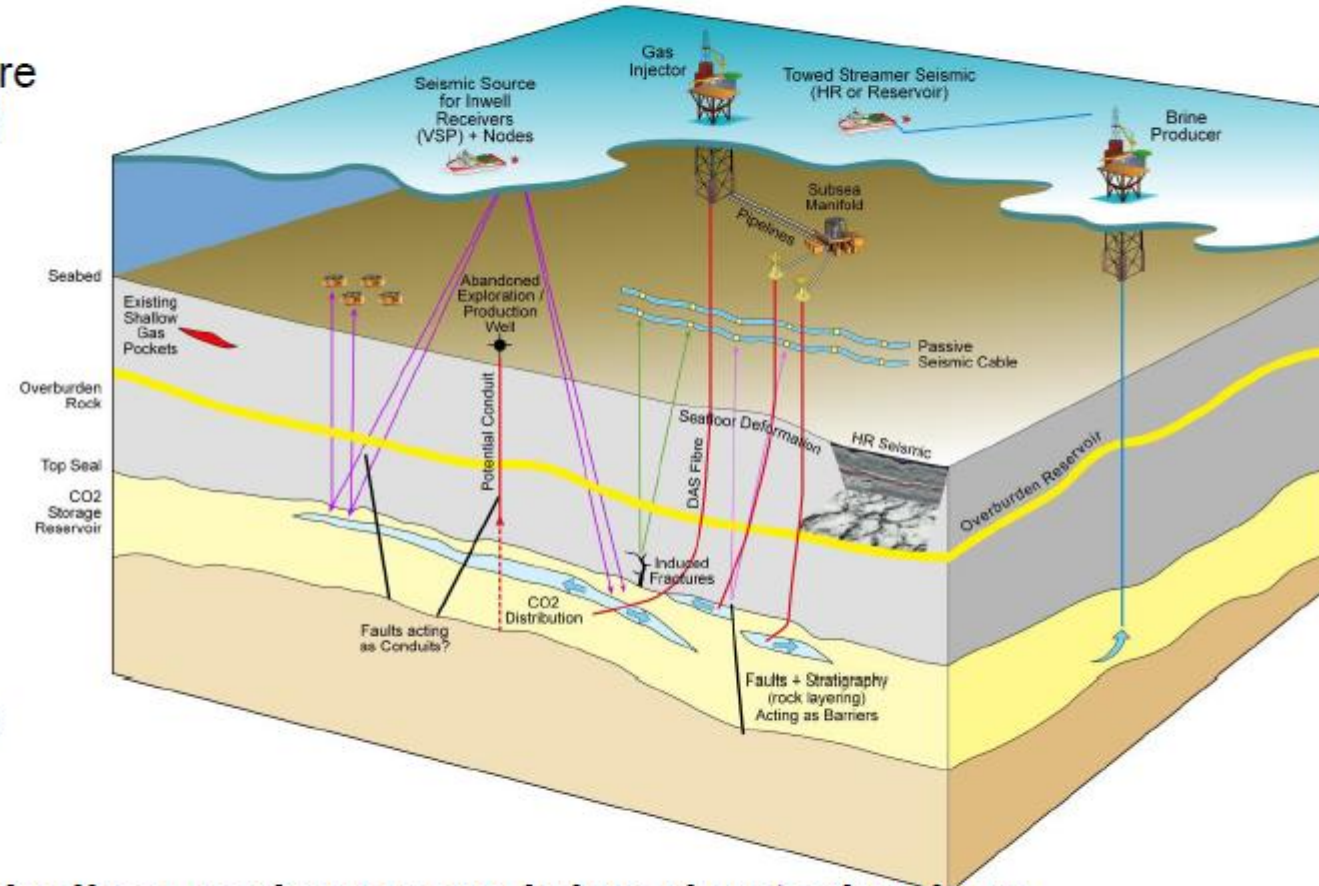
# 4D seismic monitoring context

Seismic is expected to be an important component of the broader MMV (measurement, monitor, verification) technology portfolio.

Actual MMV approach needs to be customised for specific store (seismic streamer, OBN, gravity, well surveillance, traces, geochemical, benthic,..)  
A CCS complex operator may identify a number of risks & uncertainties that could be mitigated by repeated seismic observations of the rock and fluid response to CO<sub>2</sub> injection.



## Important considerations:

- 1) Magnitude of reservoir **signal** generated by production/injection between the baseline & monitor surveys (*this NSTA study*)
- 2) Sufficiently low level **noise** (non- production) differences between the seismic surveys (*NSTA study in prep*)
- 3) There are clear plans to use the monitoring data to mitigate specific risk and uncertainties (*NSTA MMV study 2022 in press*)



**OBN (Ocean Bottom Node) seismic is a geophysically superior reservoir imaging technology especially for complex imaging targets or within a constrained/ co-location environment. However the cost of each OBN 4D survey (baseline & every monitor) is 2 to 5 times more expensive than its streamer equivalent. This remains a major drawback and cannot justify the cost in most CCS situations.**

# Project Status

- **MMV (Monitoring Measurement Verification):-** NSTA report Publication summer 2022
- **OBN project (Graham Lilley/ Ronnie Parr)** Publication ~ end 2022 
  - Seismic acquisition review complete
    - Status of Nodes technology & near obstruction acquisition
    - OBN vs Streamer Cost Comparison
  - Processing, Case studies & Assimilation underway
    - Baseline & Monitor Parallel Processing (Streamer or OBN) can improve reliability
    - Many successful hydrocarbon (Streamer & some OBN) 4D case studies
    - Very few CO<sub>2</sub> studies
- **Seismic Signal/ CO<sub>2</sub> Detection Project (IKON & Ronnie Parr)/** Publication ~ end 2022 
  - 5 Wells: Petrophysics & Fluid (Brine, Methane and CO<sub>2</sub>) Substitution complete
    - IKON finishing individual well documentation & presentation at EAGE Madrid June 2022
    - Completed Reviews with individual operators
    - Results ~ in line with expectations
- **Windfarm noise (Heriot Watt/ Colin Macbeth)** Report expected mid June for review
  - Literature review underway
  - 2D seismic shot data analysis: Delayed due to data reading

RP slides...

# Stakeholder engagement #11...

# OW/CCUS Co-location industry feedback

Purpose is to engage both developer communities in the colocation work and seek their inputs (in a structured way). Attendees – OW: R4, SW developers, plus someone from P2G and OCLG; CCUS: licensees, nominators of T&SCos; lists to be agreed with RUK/CCSA.

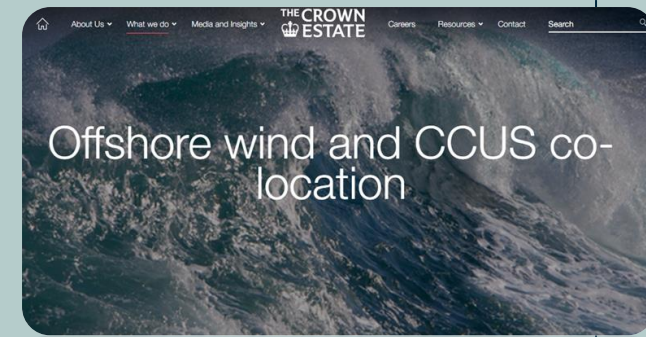
## Agenda:

1. Brief introductions, terms of reference for Forum [10 min]
2. Proposals for monitoring/colocation – each Developer to give a 3 min\* summary of their proposed approach [60 min]
3. Explanation of Operations in each sector [20min – optional]
4. Summary of forum work & planned delivery dates – Workstream Leads [20 min]
5. Discussion of areas for Developer engagement – All [60 min]
6. Agree actions & how the Forum will continue to communicate with Developers [10 min]

This meeting is not to discuss the licensing/leasing process as that is not the remit of the Forum, but statements between now and this meeting should help to address that need.

# Co-location issues

- Spatial characterisation and planning (#4)
- Conformance and seismic data gathering (#6)
- Wider Marine planning stakeholder engagement (#11)
- Best practice for simultaneous operations
- Opportunities for sharing resources
- Corrosion and geomechanical modelling
- Development and operational alignment



- A Lack of business overlap clarity
- B MMV survey interaction
- C High level of offshore operations
- D Direct physical impacts
- E Infrastructure blocking seabed access

# Forum future ideas

- More regular workstream meetings
- Engage a wider range of parties
- Commission further evidence projects, field trials
- Other