MOET online meeting – Technical – 17th October 2024

MOET online stakeholder meeting - Session 2 – 17th October 2024 14:00-15:30

MS Teams

MOET attendees: Jim White (BGS), Maxine Akhurst (BGS), Ed Hough (BGS), Hazel Napier (BGS), Angus Best (NOC), Gaye Bayrakci (NOC), Ismael Falcon Suarez (NOC), Jerry Blackford (PML), Lizzi Gabe-Thomas (PML), Stephen Watson (PML), Muchamad Al Azhar (PML)

Stakeholder attendees: BP, Centrica, DEFRA, DESNZ, Environment Agency, Equinor, IEAGHG, JNCC, NECCUS, NSTA, Scottish Government, Storegga

Session 2 - Technical aspects of low-carbon technologies

Stated objectives - This session will explore the increased understanding, gained from research with the MOET project, on the variability of UK subsurface strata and capacity for hydrogen and carbon dioxide storage. Additionally, the workshop will report on the geo-spatial distribution of different geological storage technologies, the key subsurface processes and parameters, the constraints and opportunities for co-location and the requirements for co-existence of offshore technologies.

Item	Time	Description	Lead
1	14:00-14:15	Welcome and introductions Aim of meeting Points of interest raised during previous engagement Progress overview linked to questions raised	Hazel Napier Jim White
2	14:15-14:45	Presentations – technical studies undertaken as part of MOET - Hydrogen storage - Carbon dioxide storage	 Ed Hough Maxine Akhurst
3	14:45-14:55	Plenary Q&A	
4	14.55-15.15	Breakout sessions (two groups) - Key challenges linked to technology development and operation - How to tailor key outputs for stakeholders - Stakeholder priorities	All
5	15:15-15:25	Plenary feedback	Groups chairs
6	15:25-15:30	Next steps and meeting close	

Aims of session

To address topics raised by stakeholders in previous engagement sessions that would benefit from further exploration.

To support the development of MOET's future work plans and dissemination activities.

Overview and presentations

Jim White (Principal Investigator) presented an overview of the MOET project and a brief update on progress (see attached slides). He encouraged participants to continue to engage with the project to ensure it remains relevant and useful, and that stakeholders have the opportunity to shape the research and benefit from the project results and outputs.

Ed Hough and Maxine Akhurst of BGS gave an overview of progress of relevant H_2 and CO_2 storage workstreams for MOET (see attached slides).

Plenary questions

Regarding seabed uplift and changes in the overburden of CO_2 storage projects, is 10 cm seabed displacement in typical range.

- Yes, some hydrocarbon fields are known to have greater displacement. So not unusual.

Have you considered the orientation of the Bunter structures relative to the prevailing structures and their permeability?

- Not in MOET although work on regional orientation of stress fields has been completed on the Bunter Sandstone.
- Published work on the stress regime has been at site and regional scales and feeds into World Stress Map.

Breakout sessions

Participants were then split into 2 groups focused on either H_2 or CO_2 storage and were posed the following questions:

What are the key challenges linked to technology development and operation?

How should we tailor key outputs for stakeholders?

What are the stakeholder priorities for the remaining 2.5 years of the MOET project?

Group 1 – Chaired by Jim White (BGS)

- There is potential for pressure communication between sandstone bodies of interest for CO_2 storage in Central North Sea. It is also distant from CO_2 sources. Is this a good area for MOET to focus?
  - MOET's work in the Central North Sea hopes to understand the regional challenges for delivery of storage potential in the area. This includes a widening of the focus beyond current commercial appraisal projects. MOET is looking ahead as the UK needs a 'pipeline' of project development which takes time. Pre-appraisal by MOET research will inform future wider development of CO_2 storage sites.
  - MOET areas are focused around industrial decarbonisation clusters and this area is of interest to the Scottish Cluster. The Scottish Cluster Acorn second store is in the vicinity, the Mey Sandstone member. Acorn eventually plan to import CO_2 with shipping transport of European CO_2 for UK storage. The UK government vision for CCUS is to provide a storage service. The EU and UK plans are for closer integration and assumes shipped transport from Europe. This was discussed widely at the CCSA conference this week (15-16 October 2024).
  - It is important to look at different areas outside current projects as current industry projects are very detailed. It is also good to investigate the strata that link with Norway, and address cross-border challenges

- Regarding Southern North Sea brine extraction, are there areas of less aggressive brine that would be released during pressure management?
  - Brine volumes disperse. Results from previous work show concern is more likely from heavy metals (https://www.sciencedirect.com/science/article/pii/S1750583621003108).

    - Recommend taking a risk-based perspective, as Southern North Sea sites are potentially restricted by risk of contamination.
- Study area includes extensive and thick saline aquifers, what about seal rocks? What is the sealing ability of these thin separating units between Central North Sea sandstones?
    - It is difficult to isolate sealing properties as the seal rocks are poorly known. MOET work will begin the characterisation of these units
- Legacy wells are an issue too and MOET should use this information to characterise the subsurface volume and consider leakage potential.
- There is significant work ongoing related to commercial project interest in licensed areas, so storage research in under-explored areas is good.

Group 2 – Chaired by Angus Best (NOC)

- For operators looking to develop hydrogen storage capability in depleted reservoirs, the main challenges are safety and economics related to performance of store and loss of hydrogen. Geochemical changes in the rock and microbial activity could impact economic feasibility. Consideration of public perception is crucial, with porous rock integrity being the most important issue.
- NOC is conducting work on tracking geomechanical changes using geophysics experimental results to inform interpretation of seismic data. Hydrogen storage experiments could help determine if these changes can be detected remotely in the field. NOC's work includes rock physics experiments to further understand these processes; to try and detect physical changes and variations.
- For regulators, the impact of microbial activity, CO_2, and pressure are key factors.
- Outputs need to be clear and easily translatable for regulatory applications, ensuring proper communication and understanding. Short reports are ideal. Perhaps two-page summaries with links to detailed scientific results/peer reviews papers. Also more concise one-page "flyer-style" reports.
- Interest in understanding the actual risk to the seabed and ecosystem services. Does this risk increase with activity? What is the ambition for hydrogen storage technology?
    - MOET is quantifying what would happen if hydrogen leaks from the seafloor and what effects tides and the ecosystem might face (with PML's input), noting that environmental concerns are central to the project.
- Risk assessments for offshore wind, CCS, and hydrogen storage are critical, particularly regarding the impact on ecosystem services.
- Psychological factors and societal values are important when assessing public acceptance.
- Concerns raised about subsurface ecology, particularly what happens if microbes within the reservoir leak. Could this have a knock-on effect? Is this within the scope of the project?
    - MOET can map fluid flow to determine if it reaches the seafloor and track its path through the subsurface. The broader question was posed: Is hydrogen storage a good idea to pursue in the first place?

Close

Many thanks to all who participated.

More online sessions will be planned later in the project to explore other subjects in more depth.

Next in person meeting likely to be some time in the autumn of 2025. Date TBC