3rd International Workshop on Offshore Geologic CO₂ Storage

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CSLF Technical Group
17 October 2018
3rd Workshop

Hosted by RCN, Oslo, 3-4 May 2018

**Aim:** To address and build-on the recommendations and topics raised at the first two workshops to take offshore storage forward. Continuing theme of ‘how to do’.

**Scope:**
- How to learn from learnings?
- Value Chains for Offshore
- Infrastructure (re-use)
- Monitoring offshore CO2 storage/EOR
- Offshore CO2 storage resource assessment
- Project updates
- Standards and Regulatory Frameworks
- Brainstorming towards an international collaborative project
CSLF Report on Offshore Geologic CO2 Storage

- “There is a growing wealth of research, development and practical experiences that are relevant to CO₂ storage offshore, but this expertise is familiar only to a few specific countries around the world. However there is also significant global potential for offshore CO₂ storage, and countries who are not yet active but may become interested in offshore storage, would benefit from knowledge sharing from these existing experiences and expertise. Such international knowledge sharing would be facilitated by international workshops and by international collaborative projects.”

- (CSLF Ministerial Nov 2015: CSLF-T-2015-06)
Workshop Series

1st Workshop. 19-21 April 2016, at the BEG, University of Texas, Austin. 50+ attendees from 13 countries.
Organised by the Bureau of Economic Geology (BEG) at The University of Texas at Austin in collaboration with the South African Centre for CCS at SANEDI, IEAGHG and with support from CSLF and UNFCCC's CTCN
To facilitate sharing of knowledge and experiences among those who are doing offshore storage and those who may be interested.
-ieaghhg_report_2016-tr2

2nd Workshop. 19-20 June 2017, at Lamar University, Beaumont, Texas. 50+ attendees from 9 countries.
To address and build-on the recommendations and topics raised at the first workshop to take offshore storage forward. Continuing theme of 'how to do'.
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Value Chains

- New interest in EU and Japan from Hydrogen as a fuel has the potential for significant emissions reductions and opportunities for CCS
- In USA the new 45Q is significant to stimulate projects.
Infrastructure

- Re-use not necessarily easy. More likely to be able to reuse pipelines than platforms
- More R&D on legacy abandoned wells (learn to deal with). Different standards in time, region, purpose

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**Platform Aims**
- Safe operations
- Reduce development and operations cost

**Implications**
- Minimal facilities - receive CO₂ & distribute it to wells
- Different operational hazards
- Brown-field modifications project

**Considerations**
- Structural integrity
- Life extension requirements
- Equipment replacement & removal
- Suitability of wells & well bay area

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Steve Murphy Pale Blue Dot
Monitoring

- Permanent Reservoir Monitoring benefits outweigh extra costs, but coverage inflexible
- Different methods informing each other, including trigger methods, so complimentary monitoring crucial
- Marine environment baselines – are learning more
- AUV proving successful for long term surveillance, temporal and spatial, public assurance
- Find anomaly and attribute
- HR4D seismic can be used for characterization of shallow leakage structures and for monitoring the plume during injection
- Microseismic needs background data
Can spend too much time on refining broad static assessments – can leapfrog from regional to more local assessment including dynamic, eg SRMS. Resource qualification and quantification will become more important.
Projects

- Norway is developing a full scale project on industry and the US is developing a robust offshore research and development program. Japan and Brazil have mature projects ongoing.
- 4D seismic very encouraging at Tomakomai – first imaging of CO2 at 60,000t at 1km depth.
Regulations

• Should adapt to learnings
• ISO useful for trust with different actors and stakeholders
• London Protocol scope needs clarification – projects can help test applicability wrt export prohibition

Approach: Leakage detection, localisation and quantification

Aim: better understand fluid and gas flow in operational conditions, leading to efficient and economic monitoring strategies.

• Controlled release experiment (2019): Injection of CO₂ into shallow sediments at Goldeneye – comprehensive monitoring programme based on chemical and acoustic methods for both detection and quantification.

Establishing baselines

Geochemical Field Experiments – August 2017

Baseline lander deployment and geochemical sampling, benthic boundary layer experiments (e.g. gradient flux techniques)

Lander equipped with:

1. Commercial instruments
   • Upward looking ADCP
   • Seabird CTD
   • Hydrophones
   • Deep SeapHOx
2. Lab on chip sensors developed at the National Oceanographic Centre to measure nitrate, phosphate and pH

Maribel Garcia-Ibanez U Bergen
Criteria for International Collaboration

– (the what and the how, not the where)
• Objective is to share learning by doing from the real projects
• Need roadmap to info sources
• Can we learn from the International Space Station or the International Ocean Discovery Program, for CCS
• The ACT initiative could be used for projects, not just R&D
• Develop ACT to operationalise Mission Innovation
• Could OGCI fund a real project?
Funding

- Some major international funders keener on non-fossil fuel technologies
- CCS value needs better advocacy to funders
- Norwegian project seeking international collaboration
- Green Climate Fund will use SDGs as one of 6 criteria – CCS lacking evidence-base to support it in SDGs (IEAGHG addressing this)
Recommendations

- Explore models for international collaboration project
- Eg An ACT good for R&D (US joining), so an ACT for projects
- Joint funding between countries has started and should continue
- Consider how to build knowledge sharing from hands-on operational projects, including international collaboration project
- Provide a roadmap to existing info sources
- Complimentary monitoring to be build into MVA plans - different monitoring methods informing each other, including trigger methods
- To survey which Developing Countries would be attracted to offshore storage
- Getting Developing Countries to these meetings. Identify key persons.
- More advocacy to funders on CCS – future NDCs will need CCS, how to make countries aware of their potential. Research community is ready to inform.
Steering Committee

Tim Dixon, IEAGHG (Chair)
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The report is available at https://ieaghg.org/publications/technical-reports as IEAGHG 2018/TR02