



# 3rd International Workshop on Offshore Geologic CO<sub>2</sub> Storage

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## Basis For Need

*"There is a growing wealth of research, development and practical experiences that are relevant to CO<sub>2</sub> 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 CO<sub>2</sub> 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

- 1<sup>st</sup> 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.
- IEAGHG Report 2016-TR2
- 2<sup>nd</sup> 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'
- IEAGHG Report 2017-TR1

## 3rd Offshore Workshop

**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 CO<sub>2</sub> storage/EOR
- Offshore CO<sub>2</sub> storage resource assessment
- Project updates
- Standards and Regulatory Frameworks
- Brainstorming towards an international collaborative project

## 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.

**The Concept of CO<sub>2</sub>-free Hydrogen Chains**

Steinar Eikaas Equinor, Ryozo Tanaka RITE

## Infrastructure

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

**Infrastructure Platforms**

- Alma
  - Safety operations
  - Module development and operations cost
- Empirical data
  - Monitor facilities - receive CO<sub>2</sub> & distribute it to wells
  - Different operational modes
  - Brown-field modifications project
- Considerations
  - Structural integrity
  - Lifts and/or requirements
  - Equipment maintenance & removal
  - Sustainability of wells & well bay area

Steve Murphy, Pale Blue Dot, Palle 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

## Resource Assessment

- 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

**Storage resource assessment for offshore CO<sub>2</sub>-EOR in Norway**

Eva Halland NPD, Tip Meckel BEG

## 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 CO<sub>2</sub> at 60,000t at 1km depth.

**4D seismic survey - Preliminary result of the first monitor survey**

Jiro Tanaka JCCS, Tip Meckel BEG

## 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**

**Establishing baselines**

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 for R&D.
- Develop ACT to be the operationalisation of 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 Sustainable Development Goals (SDGs) as one of 6 criteria – CCS is lacking evidence-base for support in SDGs [note IEAGHG will be addressing this].

**Green Climate Fund (GCF) - A catalyst for paradigm shift**

Hans Olav Ibrekk MFA

## Recommendations

- Explore models for international collaboration project
- Eg EU's ERA-NET 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

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The presentations are available at  
<http://www.beg.utexas.edu/gccc/research/goi>

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