

Carbon Sequestration leadership forum

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Report from CSLF Technical Group

Åse Slagtern

Technical Group Chair

Report from CSLF Technical Group



Overall Message: Technical Group is making progress toward key CSLF goals. *Our methodology:*

- Developing a forward-looking vision and how to get there (*CSLF Technology Roadmap*)
- Facilitating knowledge sharing among CCUS technology developers and users (*Project Engagement Strategy*)
- Encouraging collaborative activities among CSLF members (*CSLF-recognized Projects*)
- Developing messages and recommendations in specific CCUS technology areas (*Task Forces*)

Report from CSLF Technical Group



Three part presentation

- Highlights / Outcomes of meeting
- Review of project recommended for CSLF recognition
- Recommended revisions to CSLF Terms of Reference

Highlights /Outcomes from Technical Group Meeting



2017 CSLF Technology Roadmap (TRM)

- TRM Working Group chaired by Australia
- Update started in 2016; approach taken “refreshes” existing TRM
- New TRM was completed on schedule, in time for the 2017 CSLF Ministerial Meeting
- TRM presentation to be given later on in this meeting

Highlights / Outcomes from Technical Group Meeting



Updates on CSLF Activities

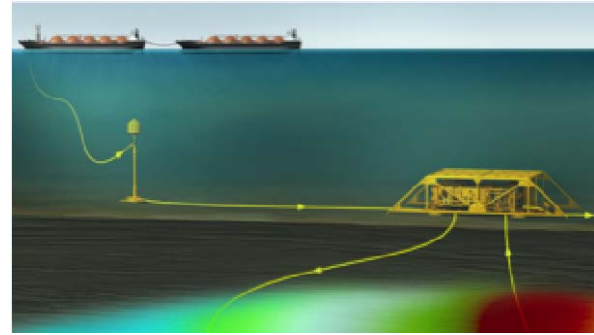
- Updates from 4 Technical Group Task Forces
 - Off-Shore CO₂-EOR
 - Bioenergy with CCS (Bio-CCS and BECCS)
 - Improved Pore Space Utilisation
 - Industrial CCS

Offshore CO₂-EOR Task Force

Purpose of Task Force

The main purposes of the Task Force were to highlight

- Main differences between offshore and onshore CO₂-EOR
- Issues that are different between offshore CO₂-EOR and pure offshore CO₂ storage
- Technical solutions that will benefit both pure offshore CO₂ storage and offshore CO₂-EOR



Courtesy: AkerSolutions

Task force members from Norway, Brazil, Canada, IEAGHG, Mexico, USA

All based on existing, although not necessarily published, information

Offshore CO₂-EOR Task Force

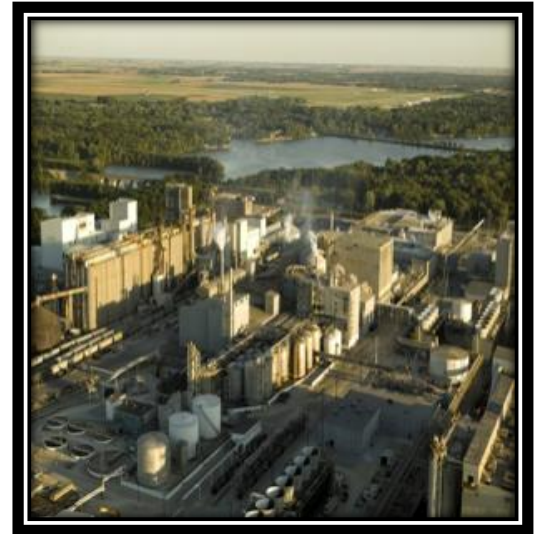
Summary of barriers and recommendations

Barrier	Recommendation
Access to sufficient and timely supply of CO ₂	Increase the pace in deployment of CCS.
	Start planning regional hubs and transportation infrastructures for CO ₂
Lack of business models, also for offshore CO ₂ -EOR	Develop business models for offshore CO ₂ -EOR
High investment costs, CAPEX and additional operational costs, OPEX; needs for modifications	Support RD&D to develop new technologies
Lack of regulatory requirements in many jurisdictions, e.g. on monitoring the CO ₂ in the underground	Continue to develop regulations specific to offshore CO ₂ -EOR

Bioenergy with CCS (Bio-CCS and BECCS) Task Force



- Purpose was to identify:
 - Commercial status
 - Technology options and pathways
 - Resource assessments and emissions profiles
 - Economic analyses
 - Findings from study and develop recommendations
- Members/Input from: United States, Norway, United Kingdom, IEAGHG



Archer Daniels Midland Company ICCS Project
CO₂ Capture from a Biofuel Plant

Bio-CCS and BECCS Task Force Recommendations

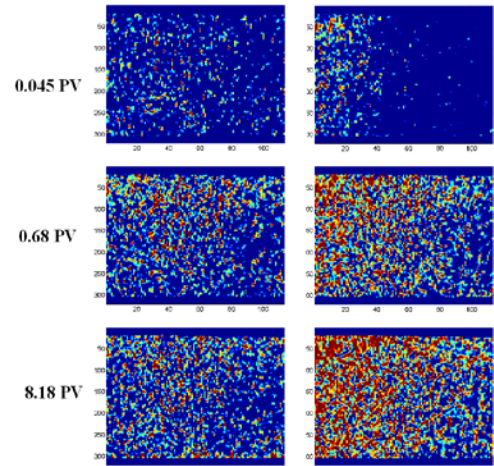


Topic	Recommendation
Biomass Feedstocks	R&D to develop and identify feedstocks that require limited processing Optimize water use and carbon footprint Monitor feedstock availability on regional basis
Technology	Improve pre-treatment processes (densification, dehydration, pelletization) Develop and identify technologies with lower costs and energy penalty
Analyses	Develop a common framework for lifecycle assessment to facilitate accurate accounting of BECCS carbon footprint
Outreach and Communications	Inform policy makers with respect to the benefits of BECCS market opportunities Build trust with public and local communities Stronger collaboration between stakeholders of the CCUS, bioenergy, and BECCS industries
Financing	Incentivising the double benefit of BECCS

Improved Pore Space Utilisation Task Force



- Purpose is to:
 - Discuss concept of improved utilisation of geological storage space resource to increase CO₂ storage capacity
 - Review the current state of processes and technologies that enhance the utilisation of the storage space
 - Highlight key techniques recently emerged internationally
 - Provide a (possibly ranked) set of options for stakeholders to develop into their storage projects
- Members/Input from:
 - Australia, UK, IEAGHG,
 - France, Japan, Norway, UAE



X-ray CT images of Brine-Saturated Cores:
Right: Microbubble CO₂ Injection
Left: Normal-size Bubble CO₂ Injection

Improved Pore Space Utilisation Task Force



Topics

Topic	Review Status	Main Contributor
Regulatory considerations	Complete	IEAGHG
Technology & process review	In progress	Australia/UK
Microbubble injection	Complete	Japan
Saturated water & geothermal energy production	Complete	France
Compositional & temperature swing injection	Complete	Norway
Ranked technique effectiveness	In progress	Australia/UK

Route to Completion: Target Mid Year CSLF 2018

1. Current draft version is in track changes; work required to clean up Jan 18
2. Sent to Task Force Members for review/checking of their inputs Mar 18
3. In progress work completed and circulated to all CSLF Technical Group Apr 18

CCS for Industries Task Force Topics



Topic	Review Status	Main Contributor
Contribution from the different sectors	In progress	Different sectors
Introduction	In progress	Norway/France
CO2 emission characterisation	In progress	Norway
Role of industry in economies	To be started	France
Alternatives to CCS	In progress	UAE/France
Project Status	In progress	Canada
Conclusions/Recommendations	To be started	All

Target Mid Year CSLF 2018

1. Contributions from the different sectors mid jan 18
2. Task force members reviewing the contributions end jan 18
3. Writing the first draft report mid march 18
4. Last draft report april 18
5. Publishing process june 18

Highlights / Outcomes from Technical Group Meeting



Updates from Allied Organizations

- IEAGHG
- GCCSI
- ISO/TC265
- CO₂ GeoNet
- Mission Innovation experts workshop



Highlights /Outcomes from Technical Group Meeting

Invited presentations:

- Regional Evaluation of Complete CCS Value Chain
- Reports from Global CCS Symposium (Regina, Canada) and International Workshop on Offshore CO₂ Storage
- Results from CSLF-recognized Project
 - Plant Barry Integrated CCS Project
 - Lacq Integrated CCS Project
 - Uthmaniyah CO₂-EOR Project
 - ROAD Project
- Updates on Carbon Storage Data Consortium and International Test Center Network

Highlights /Outcomes from Technical Group Meeting



Meeting Outcomes

- 2017 TRM launched
- One new project recommended for CSLF recognition
- Offshore EOR Task Force submitted final report
- New activities:
 - Task Force formed on CCS and Hydrogen
 - Task force on Mineralization may start at next meeting

Project Proposed for CSLF Recognition



CO2CRC Otway Project Stage 3





Project Proposed for CSLF Recognition

CO2CRC Otway Project Stage 3

- Nominated by Australia, Canada, Norway, France, Mexico, Saudi-Arabia, The Netherlands and the United Kingdom
- Main project sponsor is CO2CRC
- Overall goal is to validate cost and operationally effective subsurface monitoring technologies which will accelerate implementation of commercial CCS projects



Project Proposed for CSLF Recognition

Otway Project Stage 3 Objectives

- Installation of subsurface monitoring system for up to five wells at Otway project site
- Injection of up to 40,000 tonnes of CO₂ to generate plume analogous to leakage vent and appraise behavior of injected CO₂
- Benchmark performance of in-well monitoring tools, establish minimum detection thresholds, and validate models of plume storage security
- Open the Otway Stage 3 operation for wider national and international collaboration



Project Proposed for CSLF Recognition

Otway Project Stage 3

- Builds on Otway project Stages 1 & 2 (both CSLF recognized projects)
- Project start Q1 2017
- Planned to run at least through 2020
- Satisfies PIRT criteria for demonstration of safe storage

Project Proposed for CSLF Recognition



The Technical Group
recommends that the Policy
Group provide CSLF recognition
to the CO2CRC Otway Project
Stage 3

Recommended Revisions to CSLF Terms of Reference



Working Group formed after
2017 Mid-Year Meeting

Issue:

- *Project recognition is described in both the CSLF Terms of Reference (ToR) and the Projects Interaction and Review Team (PIRT) ToR*
- *Language in these documents did not agree with each other*

Recommended Revisions to CSLF Terms of Reference



Working Group formed after
2017 Mid-Year Meeting

Members:

- *Technical Group Chair and ExCo Members*
- *PIRT Chair*
- *Communications Task Force Chair*
- *CSLF Secretariat*

Recommended Revisions to CSLF Terms of Reference



Working Group outcomes

- *Working group extensively reviewed both ToR documents and recommended many changes*
- *Discovered that other parts of both ToRs needed updating besides just the project recognition sections*
- *Changes to PIRT ToR were approved at the Dec. 3rd PIRT meeting*

Recommended Revisions to CSLF Terms of Reference



*Recommended changes to CSLF ToR
fall into 3 categories:*

- *Updating project recognition procedures*
- *Consistency with CSLF Charter*
- *Other misc. corrections and updates*

*Document summarizing proposed changes
is in Meeting Documents Book*



Recommended Revisions to CSLF Terms of Reference

*Changes to project recognition procedures
(ToR Section 4):*

- *Brings both ToRs into agreement with each other*
- *PIRT becomes the only CSLF group which determines what kinds of projects are eligible for CSLF recognition*
- *More precisely specifies what constitutes a collaborative project*
- *Updates the description of the overall project approval process*



Recommended Revisions to CSLF Terms of Reference

*Changes for consistency with CSLF
Charter (ToR Section 2):*

- *Change from “CCS” to “CCUS” makes ToR consistent with CSLF Charter, where “CCUS” is used*

Project Proposed for CSLF Recognition



The Technical Group
recommends that the Policy
Group approve these
recommended changes to CSLF
ToR

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