

**Carbon Sequestration Leadership Forum**

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# **Measuring Progress on Recommendations from 2017 CSLF Technology Roadmap**

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# ***Background***



## **Suggestion at PIRT meeting Abu Dhabi 03 December, 2017:**

The PIRT should find ways on how to measure CCUS progress in light of current TRM recommendations. Further, in the longer term the PIRT could utilize expertise and learnings from CSLF-recognized projects as an input to future editions of the TRM.

To that end, a small working group should start to work on this at the spring 2018 PIRT meeting.

Volunteers included Australia (Andrew Barrett), Canada (Mike Monea), Norway (Lars Ingolf Eide), the United Kingdom (Brian Allison), the United States (Mark Ackiewicz), the Technical Group Chair (Åse Slagtern), and the CSLF Secretariat (Richard Lynch).

This note, prepared by L.I. Eide, is the starting point of the discussions.

## ***Our obligations: From the Follow-up plans of the 2017 TRM***

- Through its Projects Interaction and Review Team (PIRT), the CSLF should
  - Monitor the progress in CCS in relation to the Recommended Priority Actions.
  - Report the findings at Ministerial meetings.
  - Suggest adjustments and updates of the TRM.
  - Continue to be a platform for an international coordinated effort to commercialize CCS technology working with, amongst others, the IEA, the GCCSI and the IEAGHG.



# *The objective of monitoring*

Find and implement corrective actions where progress is slow

- CSLF only CCUS initiative at ministerial level.
- The TRM is our main document.
- We must secure it as a living and influential document



# What to monitor (1):

## Priority Recommendations

Governments and industries must collaborate to ensure that CCS contributes its share to the Paris Agreement's aim to keep the global temperature increase from anthropogenic CO<sub>2</sub> emissions to 2°C or below by implementing sufficient large-scale projects in the power and industry sectors to achieve the following:



- **Long-term isolation from the atmosphere of at least 400 megatonnes (Mt) CO<sub>2</sub> per year by 2025 (or have permanently captured and stored of 1,800 Mt CO<sub>2</sub>).**
- **Long-term isolation from the atmosphere of at least 2,400 Mt CO<sub>2</sub> per year by 2035 (or have permanently captured and stored of 16,000 Mt CO<sub>2</sub>).**

# What to monitor (2): Priority Recommendations



## Recommendations under Technical Group (TG)

- Facilitate CCS infrastructure development.
- Leverage existing large-scale projects to promote knowledge-exchange opportunities.
- Drive costs down along the whole CCS chain through RD&D (including more detailed technical recommendations in Annex B).
- Facilitate innovative business models for CCS projects.
- Facilitate implementation of CO<sub>2</sub> utilization

(Note: The TRM emphasizes that not all utilization (CCU) options can be considered climate mitigation; life cycle analysis must be undertaken)

## Recommendations under Policy Group (PG)

- Build trust and engage stakeholders through CCS public outreach and education.
- Accelerate CCS in developing countries by funding storage appraisals and technology readiness assessments.
- Promote the value of CCS in achieving domestic energy goals and global climate goals.
- Incentivize investments in CCS by developing and implementing policy frameworks.
- Implement legal and regulatory frameworks for CCS.

# Possible work mode



- One WG leader/coordinator; topics assigned to one or more WG members (each may have to work on more than one topic)
- Use seven topics:
  - 2015 target
  - One for each of five recommendations under TG
  - One that lumps together five recommendations under PG
- Use *guideline* template for reporting (may differ between topics)
- Approach should include (all activities to be coordinated by leader)
  - Involving CSLF members Cooperation with allied organizations and others (GCCSI, IEAGHG, International CCS Knowledge Center, IEA, CO2GeoNet, Mission Innovation)
  - Leverage from recognized CSLF projects



# Possible work mode

- Reporting on status
  - To the CSLF Technical Group meetings.
    - If WG mandated to implement corrective actions, reporting to annual /fall) meeting is sufficient)
  - Biennially, or as required, to the CSLF Ministerial Meetings.
- Corrective actions may include
  - Joint workshops/projects/task forces/webinars with allied organizations and others (GCCSI, IEAGHG, International CCS Knowledge Center, IEA, CO2GeoNet, Mission Innovation)
  - Communications with governments, industry, other stakeholders to promote CCUS



# We may achieve



- Easier and new approach to identify task forces
- Increased engagement from members
  - E.g. regular reporting on national and regional activities relevant to the recommendations
- Closer cooperation with others
  - Cooperation with GCCSI, IEAGHG, International CCS Knowledge Center, IEA, CO2GeoNet, Mission Innovation, recognized projects, others through joint workshops, task forces, projects
- A living document to which decision makers pay attention



Following slides:

Preliminary thoughts on templates



# Template reporting progress (very first draft)

## Summary table + 1-pagers



Priority recommendation	Status progress			Recommended corrective actions	Reported by (working group member)
	Good	Neutral	Poor		
Target					
Facilitate CCS infrastructure development.					
Leverage existing large-scale projects					
Drive costs down along the whole CCS chain through RD&D.					
Facilitate implementation of CO <sub>2</sub> utilization					
Facilitate innovative business models for CCS projects					
Recommenadtions related to Policy Grouo					



# 1-pager monitoring targets

- **Long-term isolation from the atmosphere of at least 400 megatonnes (Mt) CO<sub>2</sub> per year by 2025 (or have permanently captured and stored of 1,800 Mt CO<sub>2</sub>).**

- Increase in storage since last update
- Projects come on line
- Recommended action to speed up
- Sources:
  - GCCSI and their sources
  - We need to work closely with GCCSI. Can results be made available to the CSLF Annual meeting (usually before release of GCCSI status report)
- Reported by:

# 1-pager infrastructure



- **Facilitate CCS infrastructure development.**

- Infrastructure projects come on line
  - CO<sub>2</sub> sources, transportation means, storage sites, business model
- New infrastructure projects come into planning
  - CO<sub>2</sub> sources, transportation means, storage sites, business model
- Corrective actions, if any, by CSLF to facilitate exchange of experiences between infrastructure projects
  - For example, workshops in cooperation with GCCSI, IEAGHG, International CCS Knowledge Center, CO2GeoNet, MI, others
- Identified common bottlenecks
- New corrective actions to speed up progress
- Sources:
- Impact on TRM
- Reported by:

# 1-pager leveraging large scale projects



- **Leverage existing large-scale projects to promote knowledge-exchange opportunities.**

- Large scale projects approached for exchange of knowledge
  - Name and type of project
  - Kind of knowledge willing to share
- Corrective actions, if any, by CSLF to facilitate exchange of experiences between large scale projects
  - For example, workshops in cooperation with GCCSI, IEAGHG, International CCS Knowledge Center, CO2GeoNet, MI, others
- Identified bottlenecks for knowledge exchange
- Examples of knowledge shared or transferred, impacts
- New corrective actions to speed up progress.
- Impact on TRM
- Reported by:

# 1-pager RD&D

- Drive costs down along the whole CCS chain through RD&D.



- RD&D achievements/status/progress in relation to specific technical recommendations of TRM (Annex B)
- Update on major RD&D programmes
- Areas in need of special attention
- Corrective actions, if any, by CSLF to facilitate exchange of RD&D results
  - For example, workshops in cooperation with GCCSI, IEAGHG, International CCS Knowledge Center, CO2GeoNet, MI, others
- New corrective actions to speed up progress
- Sources:
- Impact on TRM
- Reported by:

# 1-pager utilization



- **Facilitate implementation of CO<sub>2</sub> utilization**

- Utilization projects come on stream last year
- RD&D achievements/status/progress in relation to specific technical recommendations on utilization in TRM (Annex B)
- Areas in need of special attention
- Corrective actions, if any, by CSLF to facilitate implementation of CCUS
  - For example, workshops in cooperation with GCCSI, IEAGHG, International CCS Knowledge Center, CO2GeoNet, MI, others
- New corrective actions to speed up progress
- Sources:
- Impact on TRM
- Reported by:



# 1-pager business models

- **Facilitate innovative business models for CCS projects.**



- Summary of recent implemented or suggested business models
- Corrective actions, if any, by CSLF to facilitate innovative business models
  - For example, workshops in cooperation with GCCSI, IEAGHG, International CCS Knowledge Center, CO2GeoNet, MI, others
- New corrective actions to speed up progress
- Sources:
- Impact on TRM
- Reported by:

# 1-pager recommenadtion related to Policy Group



- **Promote the value of CCS in achieving domestic energy goals and global climate goals.**
- **Incentivize investments in CCS by developing and implementing policy frameworks.**
- **Implement legal and regulatory frameworks for CCS.**
- **Build trust and engage stakeholders through CCS public outreach and education.**
- **Accelerate CCS in developing countries by funding storage appraisals and technology readiness assessments.**

- Summary of input provided to PG, with emphasis on presenting CCUS technical aspects in popular rather than engineering/scientific language
- Recommended actions to speed up progress
- Sources:
- Impact on TRM
- Reported by: