

PIRT Meeting

27 October 2014

Warsaw, Poland



Report from Secretariat

Richard Lynch

CSLF Secretariat

Secretariat Report to PIRT



Action Items from Seoul Meeting

TRM Progress Report

Outcomes from March 2014 Technology Workshop

Update on CSLF Recognized Projects

Secretariat Report to PIRT



Action Items from Seoul Meeting

1. **Secretariat**: Finalize Nov. 2013 PIRT Summary, incorporating modifications agreed to during the meeting. **Status**: **Completed**.
2. **Secretariat**: Add a link from CSLF website to the GCCSI's **decarboni.se** website. **Status**: **Completed**. (located on "Publications / Links" page)

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Action Items from Seoul Meeting

- 3. Secretariat:** Develop template to gather information on technology needs areas for use in gathering information for TRM Progress Report. Status: **Completed.**
- 4. Secretariat:** Send template to representatives of organizations which are working on CCS. Status: **Completed.** (actually sent out by the CSLF Technical Group delegates)

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Action Items from Seoul Meeting

5. **PIRT Active Members**: Analyze information from completed templates. Status: **Completed**. (actually done by Secretariat)
6. **PIRT**: Produce a 2014 Progress Report Addendum for the 2013 TRM. Status: **Completed**. (actually done by Secretariat, included in meeting's electronic documents book)

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TRM Progress Report

- 2013 CSLF Technology Roadmap (TRM) was launched at 5th CSLF Ministerial Meeting in November 2013.
- An objective of 2013 TRM was to answer three key questions:
 - What is the current status of CCS technology and deployment, particularly in CSLF member countries?
 - Where should CCS be by 2020 and beyond?
 - What is needed to get from point a) to point b), while also addressing the different circumstances of developed and developing countries?

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TRM Progress Report

- At 2014 Technical Group Meeting (in Seoul), PIRT began the process for producing a Progress Report on the 2013 TRM.
- Template was developed by Secretariat, approved by PIRT Chair, for gathering information about ten technology needs areas identified in 2013 TRM.

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TRM Progress Report

Technology Needs Areas:

- a) CO₂ capture in power generation
- b) CO₂ capture in the industrial sector
- c) CO₂ transport
- d) Large-scale CO₂ storage
- e) Monitoring stored CO₂
- f) Mitigation / remediation procedures
- g) Understanding storage reservoirs
- h) Infrastructure and the integrated CCS chain (capture to storage)
- i) CO₂ utilization, non-EOR
- j) CO₂ utilization, EOR

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TRM Progress Report

- Technical Group delegates sent template to representatives of organizations within their countries which are working on CCS.
- As of September 29, total of 12 completed templates have been returned.
 - Norway (4)
 - USA (3)
 - Canada, China, EC, Japan, Saudi Arabia (1 each)

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TRM Progress Report

- TRM Progress Report includes responses received as of September 29.
- Additional completed templates were received after September 29 and will be included in next version of Progress Report.

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TRM Progress Report – Global Trends

Technology Needs Area	1 st Generation Technologies – Progress toward 2020	2 nd – 3 rd Gen. Technologies – Progress toward 2020	What kinds of barriers exist?		
			Economic	Policy	Technology
a) CO ₂ Capture in Power Generation	Moderate	Very Slowly to Moderate	Yes	Yes	Yes
b) CO ₂ Capture in Industrial Sector	Very Slowly to Moderate	Very Slowly	Yes	Yes	Yes
c) CO ₂ Transport	Very Slowly to Moderate	Very Slowly to Moderate	Yes	Yes	
d) Large-Scale CO ₂ Storage	Very Slowly to Moderate	Very Slowly to Moderate	Yes	Yes	
e) Monitoring Stored CO ₂	Moderate	Very Slowly to Moderate	Yes	Yes	Yes
f) Mitigation / Remediation Procedures	Moderate	Very Slowly to Moderate	Yes	Yes	Yes
g) Understanding Storage Reservoirs	Very Slowly to Moderate	Very Slowly to Moderate	Yes	Yes	Yes
h) Infrastructure and the Integrated CCS Chain (capture to storage)	Very Slowly	Very Slowly	Yes	Yes	
i) CO ₂ Utilization, non-EOR	Very Slowly	Very Slowly	Yes	Yes	Yes
j) CO ₂ Utilization, EOR	Moderate	Very Slowly	Yes	Yes	Yes

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TRM Progress Report

PRELIMINARY RESULTS:

- Not enough information yet to definitively describe global status of CCS. Some trends are evident.
- For 1st generation technologies, **none** of the 10 technology needs areas were perceived as “fast moving”.

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TRM Progress Report

PRELIMINARY RESULTS:

- Progress in most areas perceived as mixed opinion of “very slow” and “moderate”.
- Geographic bias in responses received: North American responders were, in general, more pessimistic.
- Results for 2nd & 3rd generation technologies were similar, but many more “no opinion” responses were received.

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TRM Progress Report

PRELIMINARY RESULTS:

- No clear-cut singling-out of specific barriers (or drivers). All types of barriers (economic, policy, technology) perceived to exist for most technology needs areas.
- Individual country results gave wide range of responses. Issues surrounding CCS are viewed in different ways in different countries.

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TRM Progress Report

CONCLUSIONS AND RECOMMENDATIONS:

- 2013 TRM is still reasonably accurate in its depiction and portrayal of the status and barriers/drivers for development and deployment of CCS technologies.
- There is still a need for progress in **all** of the technology needs areas, some more than others.

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TRM Progress Report

CONCLUSIONS AND RECOMMENDATIONS:

- Results confirm that worldwide, CCS is not a “one size fits all” collection of technologies.
- There is a great need for individualized country-specific technology roadmaps.
- **This is only an interim progress report.** An updated version is recommended for the next CSLF meeting.

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2014 Technology Workshop

- Two sessions
 - Cost Reduction Strategies for CO₂ Capture
 - Examining Technology Pathways and Business Models for Scaling up CCS
- http://www.cslforum.org/meetings/workshops/technical_seoul2014.html

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2014 Technology Workshop

Main Takeaways

Cost Reduction Strategies for CO₂ Capture Session

- Technological innovation in the field of carbon capture is important and critical to the commercial deployment of CCS.
 - Wide range of technology options under development is appropriate at this time.
 - Consolidation of these options will occur at some point in the future.

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2014 Technology Workshop

Main Takeaways

Cost Reduction Strategies for CO₂ Capture Session

- Technology scale-up a critical step to cost reductions and technology validation, especially for 2nd and 3rd generation technologies.
 - Scale-up is one of the most challenging aspects of technology development.
 - Simulations and modeling are important, but there is no substitute for experience and knowledge from real-world pilot- and large-scale testing.

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2014 Technology Workshop

Main Takeaways

Cost Reduction Strategies for CO₂ Capture Session

- Technological development and innovation must be rooted in clearly-defined targets and metrics.
 - This will help drive sound RD&D investments.
 - Best practices and knowledge sharing is valuable to technology development and scale-up.

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2014 Technology Workshop

Main Takeaways

Cost Reduction Strategies for CO₂ Capture Session

- Understanding the role of CO₂ capture in CCS value chain is essential.
 - End use of CO₂ will enter into any cost reduction strategy.
 - Viable business model is crucial for cost effective deployment of CO₂ capture.
 - “Market pull” mechanisms are just as important as “technology push” efforts.

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2014 Technology Workshop

Main Takeaways

Cost Reduction Strategies for CO₂ Capture Session

- Collaboration is essential.
 - Interdisciplinary (e.g., chemistry, process engineering, equipment design).
 - Along the value chain (i.e., balancing flow rates and capture rates to ensure system optimization).
 - International (e.g., knowledge transfer, capacity building, communicating lessons learned).

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2014 Technology Workshop

Main Takeaways

Examining Technology Pathways and Business Models for Scale-Up Session

- Private entities will not move to develop and scale-up CCS technologies without either a technology “push” (e.g., grants, government cost share) or a technology “pull” (e.g., policy incentives and drivers).

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2014 Technology Workshop

Main Takeaways

Examining Technology Pathways and Business Models for Scale-Up Session

- Issues for Governments:
 - Matching potential sinks to sources of CO₂ is a key backdrop to any proposed project.
 - There is a need for infrastructure such as pipelines if wide-scale CCS is to succeed.
 - Stimulation of skills development is as important as maturity of technologies.

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2014 Technology Workshop

Main Takeaways

Examining Technology Pathways and Business Models for Scale-Up Session

- Issues for Industry and Project Sponsors:
 - Risk of Integration: OEMs must show they can scale-up their technologies in integrated project setting.
 - FOAK projects must succeed: “Learning by doing” will result in substantially lower costs for subsequent projects.
 - Cannot rest on laurels: 2nd and 3rd generation technologies must expeditiously advance to pilot scale testing.

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2014 Technology Workshop

Main Takeaways

Examining Technology Pathways and Business Models for Scale-Up Session

- Issues concerning Finance:
 - Removal of barriers to CCS demonstrations will result in lower risk to equity holders and lower financing cost.
 - Financial mechanisms to assist demonstration projects are important and necessary (i.e., VAT exemption, concessional financing, grants).

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Update on CSLF Recognized
Projects

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CSLF Recognized Projects

- As of mid-September: 43 recognized projects
 - 31 were active; 12 have been completed
 - Wide geographical distribution: projects are located on five different continents
 - <http://www.cslforum.org/projects/>
- End of September: Porto Tolle Project has been cancelled.
- This meeting: Norcem CO₂ Capture Project proposed for CSLF recognition.