

Carbon Sequestration Leadership Forum

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Highlights from CSLF Technical Group Meeting

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Technical Group Chairman



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SHAANXI YANCHANG PETROLEUM(GROUP)CO.,LTD.

Jingbian CCS Project



Shaanxi Yanchang Petroleum (Group) Co., Ltd., China

June 16, 2015

Highlights from Technical Group Meeting



Reviewed and Endorsed Jingbian CCS Project

- Nominated by China and Australia
- Integrated project including capture, transport, storage and MMV
- Pilot-scale project located in Shaanxi Province, China
- Captures CO₂ from flue gas slipstream of a coal-to-chemicals facility (50,000 tonnes per year, increase to 370,000 t/y)
- Transport by tankers and pipeline later on

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- CO₂ being utilized for EOR at Jingbian Oil Field in Ordos Basin (multiple injection sites)
 - Future possibility for Deep Saline Formation storage
- Project includes integrated MMV system
- Environmental monitoring program included

- Started in 2012
- Now is a suitable time for CSLF recognition
- Supportive R&D going on
- Funding from MOST, NDRC, GCCSI

Highlights from Technical Group Meeting



The Technical Group
recommends that the Policy
Group provide CSLF
recognition to the Jingbian CCS
Project

Highlights from Technical Group Meeting



Reviewed initial draft of Technology Roadmap (TRM)
Interim Report.

Final version will be a deliverable for 2015 CSLF
Ministerial Meeting

Highlights from Technical Group Meeting



TRM Interim 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 Interim Report

10 Technology Needs Areas identified in TRM:

- 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 Interim Report

- Template was developed for gathering information about the progress for the ten technology needs areas identified in 2013 TRM.
- Template was sent to representatives of many different research organizations working on various aspects of CCS.
- 24 responses received 1Q15. Total return on Survey represents viewpoints from 12 countries, 4 continents
- Survey information fed into the draft TRM Interim Report prepared in time for this meeting.
- Technology sections written by PIRT members.
- Final version of this report will be deliverable at 6th CSLF Ministerial in November.

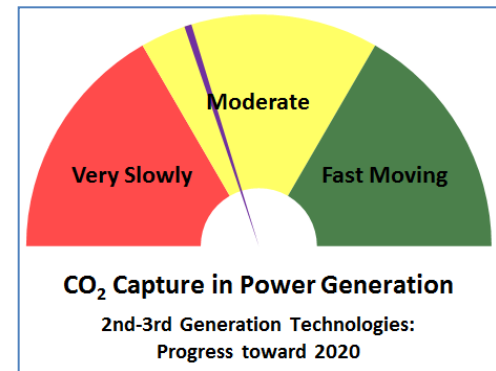
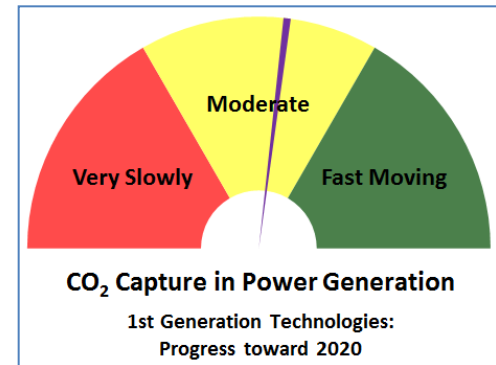
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TRM Interim Report

A) CO₂ Capture Technology from Power Industry

- First generation capture implementation is showing moderate progress.
- Emerging (2nd and 3rd generation) capture implementation is showing moderate to slow progress.
- Most commonly cited barriers are economics and policy. High cost, moderate public funding and limited regulations and incentives were cited.



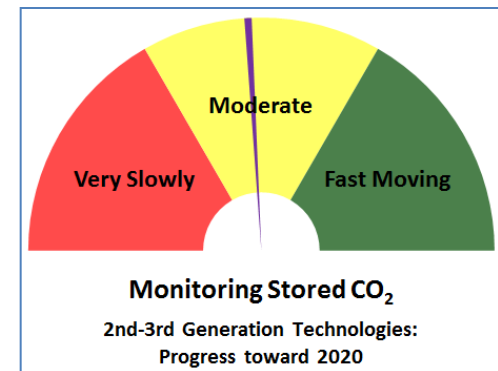
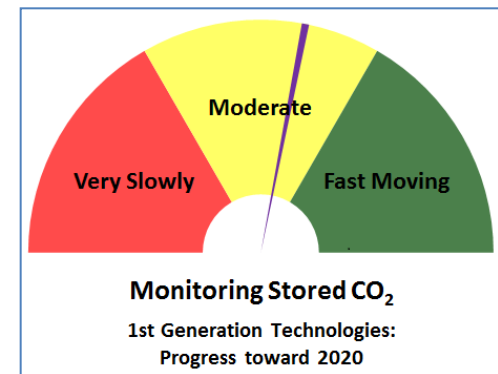
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TRM Interim Report

E) Monitoring Technologies for CO₂ Storage

- First generation monitoring technologies for CO₂ storage are showing moderate progress.
- Emerging (2nd and 3rd generation) monitoring technologies for CO₂ storage are showing moderate progress.
- Most commonly cited barriers are economics and policy. Lack of large-scale test sites and the fact that most technology development and field tests are government-funded were commonly cited issues.



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TRM Interim Report

Outcome of discussion in the TG:

- Based on discussion in TG, document will be redrafted to emphasize current technology status
- 2nd and 3rd generation has no meaning for several of these topics. Remove 2nd and 3rd generation figures.
- Add new figures giving the status of the technologies, based on expert assessment
- Secretariat will do initial rewrite and send to PIRT for comments.

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TRM Interim Report

Conclusions:

- Except for a very few niche industrial sector applications, for 1st generation technologies, none of the ten technology needs areas perceived as progress being 'fast moving'.
- Progress for 2nd and 3rd generation technologies perceived as proceeding at an even slower rate.
- Major barriers for progress are economic, policy, and to a lower degree technology

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TRM Interim Report

Conclusions:

- The 2013 TRM established the year 2020 as an achievable timeframe for demonstration of the 1st generation of CCS technologies and 2030 for demonstration of 2nd generation technologies.
- Two years later, barriers are still in place that inhibit the accomplishment of these goals.

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TRM Interim Report

Recommendation #1:

Concerning economic barriers, governments should urgently consider methods to assist stakeholders to significantly drive down the cost of CCS deployment, since it is the stakeholders who will be making the majority of the financial investments.

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TRM Interim Report

Recommendation #2:

Concerning policy barriers, governments should review institutional regulatory policies to identify how these barriers to CCS deployment may be reduced.

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TRM Interim Report

Recommendation #3:

Concerning technology barriers, stakeholders should increase their mechanisms for sharing best practices, particularly regarding communications, regulation and cost reduction, and pledge to engage in public-private partnerships to encourage the development of additional demonstration projects and facilitate the development of CCS projects internationally.

Other Highlights from Technical Group Meeting



- Reviewed progress of the joint Policy-Technical task force on Supporting Development of 2nd and 3rd Generation Carbon Capture Technologies
- Will be presented later today.

Other Highlights from Technical Group Meeting



- Task Force on Sub-Seabed CO₂ Storage will have final report by the CSLF Ministerial Meeting
- Task Force on CO₂ Storage Efficiency in Deep Saline Aquifers has authored a paper for the *Journal of Greenhouse Gas Technologies*
- Formed a working group to develop new activities for the Technical Group's Action Plan
 - Australia, Norway, Saudi-Arabia, UK, US, and Japan (invited). Secretariat will coordinate.

Other Highlights from Technical Group Meeting



Technical Group meeting was very content-rich, and included:

- *Overview of CCS activities in Canada*
- *Coal industry perspectives in a CCS-enabled environment*
- *Review of Phase 3 results from CSLF-recognized CO₂ Capture Project*
- *Report on the ISO and its CCS-related activities*
- *Presentation on the outlook for improved carbon capture technology*
- *Update on the International CO₂ Capture Test Centre Network*
- *Presentation on an enzymatic technology for low-cost CO₂ capture*
- *Presentation on Aquistore Project early experiences*

Highlights from Technical Group Meeting



Comments welcome!