



# Report from the Technical Group Chair

**Trygve Riis**

CSLF Policy Group Meeting  
November 6, 2013

# TG meeting November 5, 2013



- Extensive reports from
  - 3 new projects for recognition
  - 4 Task Forces
  - UK report on cost reduction
  - CCS in USA
- Discussed future activities in the TG:
  - Established a project team for evaluating outstanding action items from our list
  - Project will be lead by TG Executive Comittee
    - One responsible country for each action

# TG meeting November 5, 2013



- Action Plan items to cover:
  - Energy penalty reduction
    - UK wil consult with Ministry to possible take lead
  - CCS with industrial sources
    - South Africa will take lead, support from USA and GHG
  - CO<sub>2</sub> compression and transport
    - Japan will consult with Ministry
  - Competition of CCS with other Resources
    - France will take lead
  - Life Cycle Assessment
    - Norway will take lead, support from US, UK, GHG
  - Carbon-neutral and Carbon-negative
    - UK and Netherlands will consult with Ministries

# Key Messages and Recommendations



- Key recommendations from the 2013 CSLF Technology Roadmap
- Technology Opportunities and Gaps Task Force
- Technical Challenges for Conversion of CO<sub>2</sub>-EOR to CCS Task Force
- CO<sub>2</sub> Utilization Options Task Force

# Key Recommendations from the 2013 Technology Roadmap



Lead author: Lars Ingolf Eide, Norway

## *Recommendations towards 2020:* International Collaboration

- Establish international collaboration
  - networks of laboratories
  - test centres
  - comprehensive RD&D programmes.
- International collaborative R&D programmes to demonstrate safe long term CO<sub>2</sub> storage
- Address the different priorities, technical developments and needs of developed and developing countries.

## Demonstration Projects

- Large-scale demonstration projects in power generation to gain experience with 1st generation CO<sub>2</sub> capture
- First demonstration plants for CO<sub>2</sub> capture in other industries, particularly in the cement and iron and steel.
- Demo projects for CO<sub>2</sub> storage that can provide
  - greater understanding of the storage medium,
  - establish networks of such projects
  - including monitoring programmes.

# Standards, Specifications and Best Practices

- Agree on common standards or best practices for CO<sub>2</sub> storage capacity
- Common specifications for impurities in CO<sub>2</sub> for transport and storage
- Develop international common standards for screening, and selection of CO<sub>2</sub> storage sites
  - to have the sites ready for permitting between 2020 and 2025
  - including CO<sub>2</sub>-enhanced oil recovery (CO<sub>2</sub>-EOR) sites.

# Regional networks and opportunities for CCS

- Large-scale CO<sub>2</sub> transport networks and infrastructure to integrate
  - CO<sub>2</sub> capture from power generation
  - CO<sub>2</sub> capture from other industries
  - CO<sub>2</sub> transport and storage
- Conduct regional impact assessments of large-scale CCS in an energy mix with renewables and fossil fuels.
- Map regional opportunities for CO<sub>2</sub> utilization and start implementing projects.

# CO<sub>2</sub> Utilization Options

- Continue R&D and small-scale testing of promising non-EOR CO<sub>2</sub> utilization options

# CCS Technology Opportunities and Gaps



## Task Force led by Richard Aldous, Australia

- Technology for large-scale CCS deployment is available and can be effectively deployed.
- Technology development focus is on driving down costs, improving operation and monitoring
- More attention is needed on next generation capture technology. Much lower cost is needed for 2030

# CCS Technology Opportunities and Gaps - 2



- Capturing CO<sub>2</sub> from natural gas combustion should be a priority (shale gas: more gas power)
- Based on long experience: Safe CO<sub>2</sub> storage is possible today.
- Strongly recommended to start more exploration for storage
- Monitoring, measurement and verification (MMV) for stored CO<sub>2</sub> is progressing well

# Converting CO<sub>2</sub>-EOR to CCS - Key Findings 1



## Task Force led by Stephan Bachu, Canada

- There is sufficient operational and regulatory experience for this technology to be considered as being mature.
- CO<sub>2</sub>-EOR is not applied on a large scale outside the United States:
  - unavailability of high-purity CO<sub>2</sub>
  - cost.
  - Lack of infrastructure

# Key Findings 2



- There is a good basis for transitioning from CO<sub>2</sub>-EOR to CO<sub>2</sub> storage in oil fields.
- There are no specific technological barriers or challenges *per se* in transitioning and converting a pure CO<sub>2</sub>-EOR operation into a CO<sub>2</sub> storage operation.
- The difference between the two types of operations stem from legal, regulatory and economic differences between the two.

- The Technical Group Task Force has accomplished its mandate and, therefore, will cease to exist as of the end of this meeting
- It is suggested that the Policy Group establish a Task Force to examine and address the issues identified by this Task Force, namely:

## **“Policy, Legal and Regulatory Challenges in the Transitioning from CO<sub>2</sub>-EOR to CCS”**

- Some members of this Task Force may/should participate in the Policy Task Force, if established

# CO<sub>2</sub> Utilization Options



## Task Force lead by Mark Ackiewicz, USA

- There is a wide range of CO<sub>2</sub> utilization options available in addition to CO<sub>2</sub>-EOR
  - These can provide economic return for the capture of CO<sub>2</sub>.
  - They can serve as a mechanism for early deployment of CCS
  - Non-CO<sub>2</sub>-EOR options are at varying degree of technical maturity and commercial readiness

# CO<sub>2</sub> Utilization Options- 2



- For commercially and technologically mature options other than CO<sub>2</sub>-EOR efforts should focus on demonstration projects, e.g.
  - Urea production from coal etc. and 'polygeneration' concepts based on IGCC or similar
  - Utilization in greenhouses – concepts that couple surplus and demand for CO<sub>2</sub>
- CO<sub>2</sub> for enhanced gas recovery or CO<sub>2</sub> as a fracturing fluid - focus on:
  - field tests for validation
  - understanding the dynamics of CO<sub>2</sub> interactions in the reservoir

# CO<sub>2</sub> Utilization Options - 3



- Other, early R&D options should be looked at in different ways:
  - Algal routes to fuels
  - Aggregate/secondary construction materials (SCM)
  - Enhanced geothermal systems
- Generally, more detailed technical, economic, and environmental analyses should be conducted to
  - better quantify the potential impacts and economic potential of CO<sub>2</sub> utilization technologies
  - clarify how R&D could potentially expand the market for these utilization options
- A holistic approach is needed

# in Mitigation Strategies



**Brief report from UNFCCC workshop in Bonn,  
June 2013**

**Presented by Trygve U. Riis, Chairman Technical Group,  
CSLF**

The CSLF was invited by the UNFCCC Secretariat to give a presentation on CCS on the workshop in connection with ADP Workstream 2 (Ad hoc working group on the Durban Platform for enhanced action).