



Task Force to Assess Progress on Advancing Technical Issues for CCS

(formerly Task Force to Assess Progress on Closing the Gaps)

PIRT Meeting, Al Khobar, Saudi Arabia

Agenda 9



Background

Canberra meeting [Feb 1-3, 2010]

- Form a Task Force (TF) to assess the gaps in technical requirements for CCS: it was then known as Task Force to Assess Progress on Closing the Gaps: Canberra [February 1-3, 2010]
 - Confirmed in Pau [March 15, 2010]
 - Purpose: assess whether all the technical issues affecting CCS were being addressed– either within the CSLF projects and or by other CCS projects.
 - This activity linked logically to assessment of CCS Technological readiness
1. Four working groups (WGs) formed:
 - Capture Technologies (US)
 - Storage and Monitoring (Canada)
 - Transport and Infrastructure (Netherlands)
 - Integration (GCCSI)
 - TF Chair (Australia)
 2. Membership of the WGs was opened to the CSLF membership, with a resulting enthusiastic response
 3. Governance was restricted to reporting requirements
 4. Initial approach was an assessment of both the listed gaps in the CSLF Roadmap and the CSLF Project Submission form



Background

Warsaw meeting

- Proposed and agreed that the name of the TF be changed to *Task Force to Assess Progress on Technical Issues Affecting CCS*

http://www.cslforum.org/publications/documents/Warsaw2010/tg_DraftMinutesWarsaw1010.pdf

- Move away from the concept of gaps *per se*
- To communicate, *inter alia*, progress to policy makers



Adobe Acrobat 7.0
Document



Purpose of Task Force

1. Assist in the identification of issues affecting CCS and issues being addressed by Projects
 - Identifies what technical aspects are being addressed
2. Ongoing checklist and communications to assess the CSLF Projects progress
 - Involves the community of Projects to what is being addressed
3. Assess other global projects addressing technical issues and their scope
 - Addresses the issue of technology: Is this issue being done at all?
 - No, alert to identify projects which do, or initiate programs
 - Yes, CCS-ready scale.



Outcomes: Assessment of the gaps

- Good progress made by Storage and Monitoring WG
- Progress has been limited in the remaining three WG
 - Reason: insufficient planning was undertaken to provide guidance for the WG:
 - limited outcomes, or
 - Inaction, or
 - confusion as to the purpose of the TF and WG
- The initial appraisal of gaps listed in the CSLF Road Map, and the CSLF Project Submission Form was useful, but raised the questions of:
 - Level of granularity of the attributes reported
 - Should every specific case be included, or more generic attributes only?



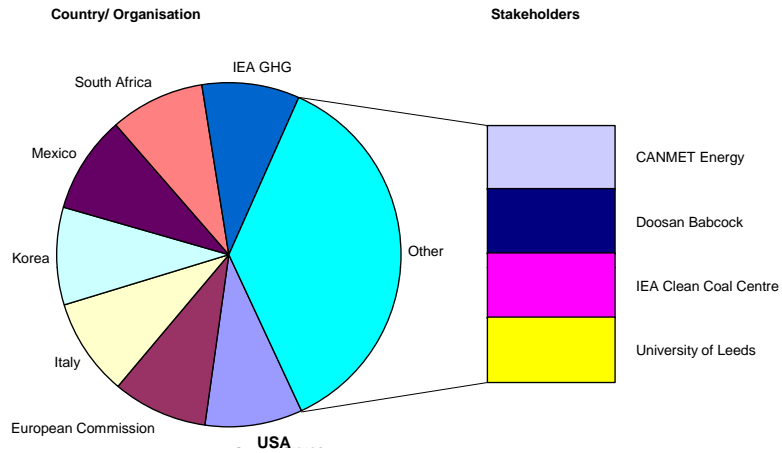
Discussion: Where to next?

- Analysis of the CSLF projects – **CSLF Gaps Checklist (papers)**
 - Should WGs try to determine if “gaps” identified in the Technical Road Map (TRM) are being addressed by other CCS projects world-wide
- Purpose of this TF
 - Report on progress to inform policy makers that issues are being addressed, and in that context show progress in CCS Technology readiness; or
 - communicate and share knowledge with other projects on lessons learned; or
 - all of the above?
- Synchronize TRM and the Checklist (**Agenda Item 10**)
- Linkages with other programs – 4 Kingdoms/ GCCSI/

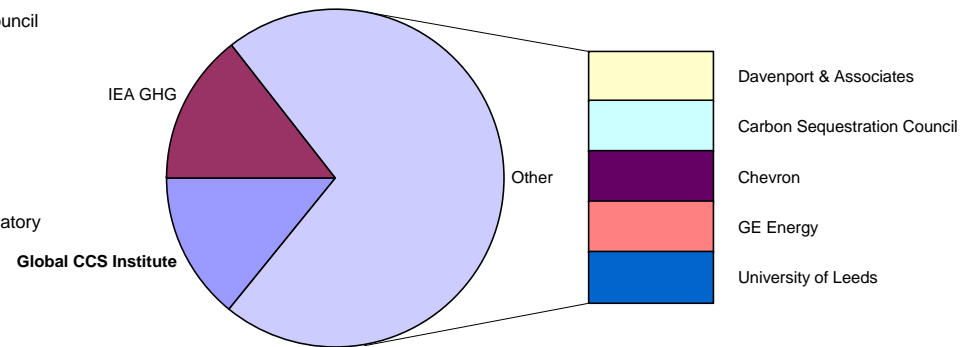
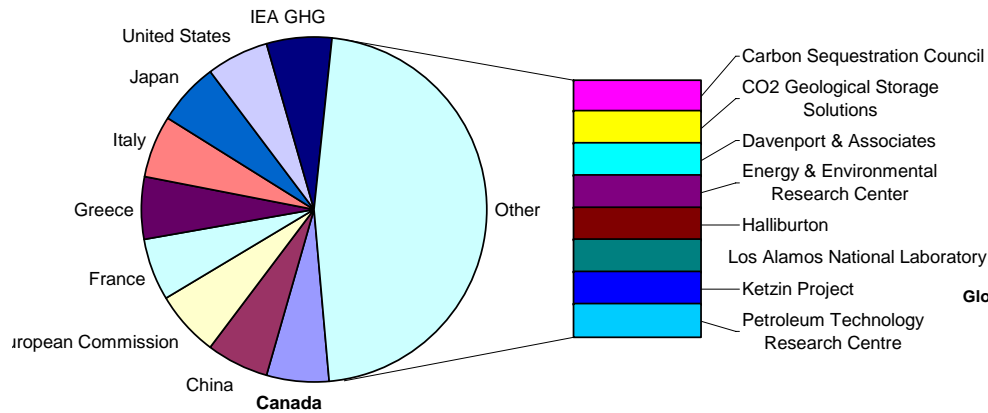
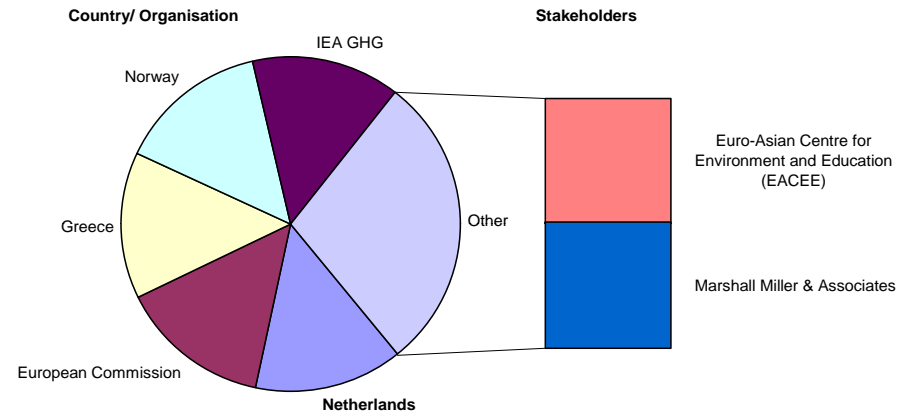


Taskforce and Working Group Members

CAPTURE



TRANSPORT AND INFRASTRUCTURE



STORAGE AND MONITORING

CSLF PIRT Meeting, 03 March 2011, Al Khobar, Saudi Arabia; Chair

INTEGRATION



Capture Technologies Working Group

Members:

- **George Guthrie (US) (Lead)**
- Jeroen Schuppers (EuC)
- Giuseppe Girardi (Italy)
- Chang-Keun Yi (Korea)
- José Miguel González Santaló (Mexico)
- Arno Neveling (for Fred Goede) (South Africa)
- Mohammad AbuZahra (IEA GHG)

CSLF Stakeholders:

- Kourosh Zanganeh (CANMET Energy)
- Peter Holland-Lloyd (Doosan Babcock)
- John Topper (IEA Clean Coal Centre)
- Mohamed Pourkashanian (University of Leeds)

Current Position:

- Assess the current listing of capture-related technology gaps and update
- Assess CSLF-Recognised projects against revised checklist

Issues not currently addressed:

- **Post-Combustion Capture:**
 - Identify advantages and limitations of precipitating systems (e.g., carbonates)



Transport and Infrastructure Working Group

Members:

- Harry Schreurs (Lead) (Netherlands)
- Esthios Peteves (EuC)
- Nikolaos Koukouzas (Greece)
- Trygve Riis (Norway)
- Mike Haines (IEA GHG)

CSLF Stakeholders:

- Yannan Wu (EACEE)
- Steve Carpenter (Marshall Miller & Associates)

Current Position:

- Comparable to Capture
- Require more interaction with CSLF-recognized projects
- Problematical to assess
 - Difficult to asses if addressing gaps due to uncertainty in a projects progress/ gaps addressed

New Technical Issues:

- Acquire experimental thermodynamic data for CO₂ with impurities
- Understand effects of impurities on compression, transport, corrosion
- Understand the effects of supercritical CO₂ on sealing materials
- Develop flow models for dense CO₂ streams in pipelines
- Understand effects and impacts of pipeline leaks



Storage and Monitoring Working Group

Members:

- **Stefan Bachu (Lead)** (Canada)
- Xiaochun Li (China)
- Jeroen Schuppers (EuC)
- Didier Bonijoly (France)
- Nikolaos Koukouzas (Greece)
- Sergio Persoglia (Italy)
- Shinichi Terada (Japan)
- George Guthrie (United States)
- Neil Wildgust (IEA GHG)

CSLF Stakeholders:

- Robert F. Van Voorhees (Carbon Sequestration Council)
- John Bradshaw (CO2 Geological Storage Solutions)
- Olandan Davenport (Davenport & Associates)
- Ed Steadman (Energy & Environmental Research Center)
- Ronald Sweatman (Halliburton)
- Rajesh Pawar (Los Alamos National Laboratory)
- Axel Liebscher (Ketzin Project)
- Steve Whittaker (Petroleum Technology Research Centre)

Current Position:

- Completed Project submission checklist- Shortened, practical version
- Completed CSLF-Gaps Analysis Checklist
- The gaps listed in the CSLF Project Submission Form needed more granularity and proposed addition of specific items.
 - Not accepted at Warsaw meeting
 - Importantly, it raised the issue of what was this TF trying to do?



Storage and Monitoring Working Group

Not currently addressed:

- **Storage Options**

- Ultra-low permeability rocks (e.g., organic rich shales, non-conventional reservoirs) – proof of concept
- A world-wide digital CO₂ storage atlas

- **Unmineable Coal Seams**

- Worldwide storage capacity in unmineable coal seams

- **Mineral Carbonation**

- Techno-economic viability of mineral storage of CO₂

- **Software**

- Integration in single software system of geological, reservoir engineering and hydrodynamic aspects



Integration Working Group

Members:

- **Bill Koppe (Lead) (GCCSI)**
- John Davison (IEA GHG)
- Joseph Giove (US)
- Pierre Le Thiez (France)
- Harry Schreurs (Netherlands)

CSLF Stakeholders:

- Olandan Davenport (Davenport & Assoc.)
- Robert F. Van Voorhees (Carbon Sequestration Council)
- Arthur Lee (Chevron)
- Norman Shilling (GE Energy)
- Mohamed Pourkashanian (Uni. of Leeds)

Current Position:

- More broadly focused on project development issues of integration
- Develop example project schedules
- Economic models and project development checklists and challenges
- WG to operate as reviewers and sources of data
- Center on industry experience
- Objective of producing concrete deliverables <12 months

Issues not currently addressed:—from Warsaw TG minutes

- Water-related issues due to power plants use