



CARBON SEQUESTRATION LEADERSHIP FORUM

Carbon Sequestration Leadership Forum Minutes of the Technical Group Meeting ENEL Conference Center, Rome, Italy 20-21 January 2004

LIST OF ATTENDEES

Official Delegates

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| Australia: | John Bradshaw, Peter Cook |
| Brazil: | Paolo Cunha, Paolo Rocha |
| Canada: | Kailai Thambimuthu (Acting Chair), Bill Reynen |
| China: | Lu Xuedu |
| European Commission: | Pierre Dechamps, Denis O'Brien |
| Germany: | Helmut Geipel, Hubert Höwener |
| India: | A.K. Mathur, M.C. Nebhnani |
| Italy: | Giuseppe Girardi, Claudio Zeppi |
| Japan: | Takashi Ohsumi |
| Norway: | Tore A. Torp (Vice Chair), Jostein Dahl Karlsen, Hans-Roar Sorheim |
| Russia: | Boris Reutov |
| South Africa: | Stan Pillay, Chris Reinecke |
| United Kingdom: | Nicolas Otter, Philip Sharman |
| United States: | Howard Herzog |

Invited Speaker

John Gale, Senior Consultant, IEA Greenhouse Gas R&D Programme

Secretariat

Barbara McKee
George Lynch
Robert Donovan
Richard Lynch
Scott Miles
Kathy Paulsgrove
Jeffrey Price
Peter Rozelle

Observers Present

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| Australia: | Richard Aldous, Mark Bonner, Tania Constable, Barry Jones, Paula Matthewson, Fiona Nicholls, Karen Schneider, Stuart Smith |
| China: | Andrea DeAngelis |
| Denmark: | Niels Peter Christensen |

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| France: | Christian Fouillac, Pierre LeThiez |
| Germany: | Guenther Haupt |
| Italy: | Roberto Bencini, Ernesto Bonomi, Antonio Calabrò, Marcello Capra, Vito Caruso, Bruno D'aguanno, Francesca DeGasperi, Gennaro DeMichele, Eugenio D'ercole, Marco Franza, Franco Gasparini, Aldo Giove, Giuseppe Iorio, Vito Marraffa, Grayson Nash, Sauro Pasini, Sergio Persoglia, Monia Politi, Eliano Russo, Domenico Santino, Rinaldo Sorgenti, Francesco Zarlenga |
| Japan: | Shigetaka Seki |
| Netherlands: | Bert Stuij |
| Norway: | Andreas Eriksen |
| South Africa: | Wendy Poulton, Tony Surridge |
| Spain: | Silvia Burgos Rodriguez, Ignacio Mendez Vigo |
| United Kingdom: | George Marsh, Bill Senior, John Topper |
| United States: | Barbara DeRosa-Joynt, Stephen Eule, Robert Gentile, Kenneth Nemeth, Daniel Reifsnyder, Federica Signoretti, Harlan Watson |

SUMMARY OF PROCEEDINGS

1. Convene Meeting and Welcome Delegates

The Chair of the Technical Group, Robert Kane, was unable to attend the meeting. In his absence, the meeting was chaired by Vice Chair Kailai Thambimuthu of Canada. Dr. Thambimuthu convened the meeting on Tuesday, January 20, 2004, and thanked all for attending. He then welcomed South Africa and Germany who joined the CSLF subsequent to the initial meeting. Dr. Thambimuthu then initiated a discussion of the agenda proposed for the Technical Group meeting.

All CSLF members were represented at the Technical Group meeting with the exceptions of Colombia and Mexico, who were absent.

2. Host Country Remarks/Welcome

Mr. Sandro Fontichedro, Director of Generation and Energy Management at Enel, expressed Enel's great pleasure in hosting the CSLF Meeting and provided a brief overview of Enel's carbon dioxide emissions reduction activities. Prof. Sergio Garriba, Director General of Italy's Ministry of Productive Activities, welcomed the Technical Group to Italy and thanked them for attending the meeting.

3. Adoption of the Agenda

The Technical Group discussed the draft Agenda for the meeting which had been submitted by the Secretariat to the Group in December 2003. The inclusion of two items, the Review of Terms of Reference and Procedures (Item 9) and the Development of the Vision Statement (Item 15) were of specific interest. Canada made a motion to delete the Terms of Reference and Procedures and the Vision

Statement from the draft Agenda in the interest of time, and as it was believed these items should be deferred to the Policy Group. Japan and the European Commission thought that the Vision Statement should be retained.

The Chair suggested retaining the discussion of the Vision Statement and dropping the discussion of Terms of Reference and Procedures from the draft Agenda, with the recommendation that Technical Group Delegates provide their comments on the Terms of Reference and Procedures to their respective Policy Group Delegates. The United States was nominator for the motion to drop the discussion of Terms of Reference and Procedures from the draft Agenda; the United Kingdom and Canada seconded the motion, and the motion carried. The Agenda, as adopted, eliminated Item 9, Review of Terms of Reference and Procedures.

4. Review and Approval of Minutes

The draft Minutes of the June 2003 Technical Group Meeting had been circulated to the Technical Group in December 2003. Minor editorial changes were offered by the United Kingdom and Norway. Australia was nominator for the motion to adopt the draft Minutes, with the suggested changes included. Norway and the United Kingdom seconded, and the motion passed.

5. Presentations by Member Countries - Needs Analysis for Carbon Sequestration

The following Members gave presentations to the Technical Group:

Australia
 Brazil
 Canada
 China
 European Commission
 Germany
 India
 Italy
 Japan
 Norway
 South Africa
 United Kingdom
 United States

6. IEA Greenhouse Gas Programme Presentation - Opportunities for CO₂ Capture and Storage

John Gale, Senior Consultant, IEA Greenhouse Gas R&D Programme, gave this presentation, which was co-authored with Kailai Thambimuthu.

7. CSLF Website Presentation

At the June 2003 CSLF meeting, the Technical Group tasked the Secretariat with the creation of a CSLF website, which came on line at the end of 2003. It is intended to be an information resource about CSLF activities and projects. An explanation and tour of the website was presented to the Technical Group by Richard Lynch of the Secretariat, and the Technical Group delegates were asked to provide additional information for the website. Links to other websites are needed, especially those about sequestration activities of other CSLF Members.

8. Discussion of Database Template

At the June 2003 meeting of the Technical Group, the Secretariat had been tasked with the development of a database of carbon capture and storage projects worldwide. A draft template for this database had been submitted to the Technical Group members prior to the meeting. While the discussion of the template itself was the Agenda item, a discussion of the CSLF database itself ensued.

Of specific interest was the need for a separate CSLF database, considering that the IEA database may fit the needs of the CSLF. There were many comments to this effect from the floor. Both the United Kingdom and the Vice Chair pointed out that much of the information required for the proposed CSLF database template is currently contained under corresponding fields in the template used by the IEA database.

The Technical Group reached consensus on the following recommendations regarding the CSLF database:

- Asking CSLF and the IEA Greenhouse Programme (IEA GHG) to work together. The IEA GHG currently has a comprehensive database of projects underway globally on Carbon Sequestration.
- CSLF to derive summary information of projects from the IEA GHG database.
- IEA GHG database, in turn, to specifically identify CSLF-endorsed projects.
- Modifications should be made to the CSLF database template to add “*end dates*”, “*names of project coordinators*” and “*locations*” of projects.
- The CSLF database will include, in addition to data on CSLF endorsed projects, information from major studies on carbon sequestration made available by Members.
- The Technical Group will develop an “information catalogue” that will provide guidance on the type of information to be contained in reports to the CSLF database.

9. Review of Terms of Reference and Procedures

As mentioned in Agenda Item 3 (above), the Technical Group deleted this item from the Agenda.

10. Discussion of Project Recommendation Guidelines

A set of Project Recommendation Guidelines had been drafted by the Secretariat and sent to the Technical Group delegates prior to the meeting. With respect to the first draft Guideline, the Acting Chair recommended that the word “countries” be replaced with “members”. This motion was made by the European Commission, and seconded by Canada and the United Kingdom, and the motion carried. The motion carried with similar motions for Guideline numbers four and five, which were adopted.

For the second draft Guideline, Japan made a motion that the wording be shortened to, “Is the project consistent with the CSLF Charter?” India and Germany seconded and the motion carried.

The fifth and sixth Draft Guidelines describe access to project information by CSLF members. It was noted by several delegates that some forms of access may be intrusive to project operations, and that for CSLF purposes a point of contact other than a project manager may be desirable. Canada suggested that requests for information should be submitted through a Member’s Technical Group delegate, and the Vice Chair suggested that each endorsed project should have a designated point of contact for CSLF information purposes.

The Acting Chair suggested that a footnote be included in the Draft Project Recommendation Guidelines that any request for information or site visits should be coordinated through a contact provided by the host member’s Technical Group delegate.

There was significant discussion on the use of 2013 as a completion date required for projects to be endorsed by the CSLF. The Vice Chair recommended that wording of the seventh Guideline be changed to mandate a project having started and completed major milestones by the expiration of the Charter, rather than having been completed by a specific date. Australia made this motion; the European Commission and Germany seconded and the motion carried with changes as noted below.

11. Consensus on Project Recommendation Guidelines

The Technical Group modified these Guidelines, and adopted the following for recommendation to the Policy Group:

1. Is proposed project supported by at least two CSLF Members?
2. Is project consistent with the CSLF Charter?
3. Are national environmental, safety, and health concerns addressed?

4. Are project sponsors willing to share non-proprietary project information with other CSLF Members?
5. Will visits to the project site be allowed for representatives of CSLF Members?
6. Will the expected information from the project be sufficient to allow others to make improved estimates of the technology's potential technical performance, costs, and benefits for any future applications?
7. Will the project be started and major milestones reported prior to expiration of CSLF Charter (currently 2013)?
8. Will summaries be made available, in English, for the CSLF website?

The Technical Group's Project Recommendation Guidelines were presented to the Policy Group on January 22, 2004.

12. Remarks

The Chair reconvened the meeting on Wednesday, January 21, 2004, and introduced the first presentation, as described next.

13. Intergovernmental Panel on Climate Change (IPCC)

An update on the IPCC Special Report on Carbon Capture and Storage, prepared by Helen Deconinck of the IPCC Working Group III, Technical Support Unit, was delivered by Dr. Kailai Thambimuthu.

14. Australian Roadmap Presentation

At the June 2003 meeting of the CSLF Technical Group, Australia offered to share the results of its sequestration roadmapping exercise with the Technical Group. This exercise was completed prior to this meeting, and the results were presented by Dr. Peter Cook of Australia.

15. Development of Vision Statement

During the June 2003 CSLF Meeting, the Secretariat had been tasked with the development of a draft CSLF Vision Statement. This Draft Statement had been developed and circulated to the Technical Group prior to the meeting. Based on the draft document, the Technical Group made some minor changes and recommended the following Vision Statement to the Policy Group:

The Carbon Sequestration Leadership Forum (CSLF) will facilitate the development and deployment of technologies for the separation, capture, transportation and long-term storage of carbon dioxide. The CSLF will advance technological capacity by collaborative efforts to address key technical, economic, environmental, and social issues. The CSLF will also promote awareness and champion legal, regulatory, financial, and institutional initiatives conducive to such technologies. The CSLF will advance collaborative projects in many regions of the world, demonstrating the sustainability, safety and cost-effectiveness of carbon sequestration.

16. Structuring the CSLF Technology Roadmap

At the June 2003 meeting of the CSLF, the Technical Group tasked the Secretariat to develop a database as a first stage in the development of a CSLF Technology Roadmap. The Secretariat developed a Draft Roadmap and circulated it to the Technical Group delegates in December 2003.

Mr. George Lynch of the Secretariat delivered a presentation on the Draft Roadmap. Following this, the Chair proposed that the Technical Group divide into two discussion groups (rather than the three specified by the Agenda) for discussion of the CSLF Technology Roadmap.

17. Divide into Two Groups to Discuss Technology Roadmap

As previously mentioned, the Technical Group divided into two, rather than three discussion groups as specified in the Agenda. Mr. George Lynch and Mr. Richard Lynch assisted as facilitators for the Secretariat, with Mr. Jostein Dahl Karlsen from Norway and Dr. Peter Cook from Australia serving as Chairs of the respective discussion groups. Results from the discussion jointly presented to the reconvened Technical Group meeting, by Australia and Norway, are summarized as follows:

- The Roadmap needs a more integrated framework that reflects national and CSLF needs.
- The current version of the Roadmap is too project-specific and needs to be more generalized.
- National plans of CSLF Members need to be reflected in the CSLF Technical Roadmap.
- The Roadmap should indicate guiding principles on how collaboration would work and identify core collaborative R&D challenges unique to the CSLF. There is a need to show real added benefit from the CSLF.
- The Roadmap should identify gaps that can be closed by the CSLF complimentary to national and regional efforts.
- Consistency of wording should be improved.
- Mapping of geological storage potential is seen as an essential starting point.
- The current Roadmap is too geographically and geologically specific.
- The Roadmap should identify “low hanging fruit,” which will be country specific.
- Retain 2013, but as a key milestone, not as the end of the Roadmap.

18. Reconvene for Discussion of Results and Consensus on Technology Roadmap

Following the discussions of the Technology Roadmap, the Technical Group reconvened and adopted the following specific actions regarding the roadmap:

- **Modify CSLF Roadmap and timeline for closure**
 - UK to provide framework information based on preceding principles to Secretariat before January 30, 2004.

- Secretariat to send framework information to Technical Group before February 7, 2004.
- Technical Group should provide revisions to Secretariat by February 27, 2004.
- Revised text to be circulated by Secretariat by March 26, 2004, and final comments returned by April 23, 2004.
- “Final Draft” of Roadmap to be circulated by Secretariat by May 28, 2004.
- CSLF Technology Roadmap ad hoc Task Force meeting on August 20, 2004 following the IPCC CO₂ Capture and Storage Report Lead Authors Meeting in Brazil.
- Document to be ready in time for CSLF Ministerial Meeting in Melbourne.

- **National:**
 - Gap/needs analyses needed.
 - Some country roadmaps available by September 2004.
 - Others encouraged to follow.
 - Mapping of geological storage potential.

- **CSLF:**
 - Revised format needed.
 - Information from Applied R&D projects to underpin framework.
 - Information from demonstration (pilot projects) - developed and underway.
 - 2013 milestone (not the end of things).
 - Mechanism for feedback from national programs and vice versa to develop “*a living document*”.

For assisting the coordination of activities related to the development of the Roadmap, it was recommended that Dr. Peter Cook (Australia) and Mr. Jostein Dahl Karlsen (Norway) join a Roadmap Task Force comprising the Chair, Vice Chairs, and the CSLF Secretariat.

19. Presentation and Recommendation of Proposed Projects

CSLF Technical Group delegates proposed a total of thirteen projects for endorsement by the CSLF:

- Canada
 - CETC R & D on Oxyfuel Combustion for CO₂ Capture
 - ITC - CO₂ Capture with Chemical Solvents
 - ARC - Enhanced Coal Bed Methane Recovery Project
 - IEA Weyburn CO₂ Monitoring & Storage Project (*also nominated by the U.S.*)

- European Commission
 - CO₂SINK
 - Castor

- Japan
 - CO₂ Separation from High Pressure Gas Stream

- Estimate of CO₂ Storage Potential in East Asia
- Feasibility Study on CO₂ Storage in a Geothermal Field

- United Kingdom
 - CO₂ Capture Project (Phases I and II)

- United States
 - IEA Weyburn II CO₂ Storage Project (*also nominated by Canada*)
 - Frio Brine Sequestration Project

- Norway
 - CO₂ Store

- Japan
 - Ocean CO₂ Perturbation Experiment

The Technical Group decided that the last project, the Ocean CO₂ Perturbation Experiment, would be submitted separately to the Policy Group for recommendation on whether it should be considered for inclusion with the others.

Of these projects, seven addressed the subjects of CO₂ separation and capture, while nine addressed the subject of geological storage. The projects ranged in scale from feasibility through basic research and pilot studies to demonstration scale and integrated capture and storage programs. Additionally, this portfolio covered a broad range of financial investment and project duration.

For the purpose of project selection, the Technical Group formed an Interim Task Force for review purposes. The following were delegated to this task force:

- Chair
- Vice Chairs
- Australia
- India
- Japan
- Secretariat

This Task Force is requested to screen the proposed projects using the Project Recommendation Guidelines approved by the Policy Group.

The Secretariat was tasked with initiating the process of gathering information on the projects, from the project proponents, after the meeting. The Interim Task Force would then recommend a final list for endorsement to the Technical Group by the end of April. The Technical Group in turn will pass on its recommendations for final approval and adoption of projects to the Policy Group. It was also recognized at the meeting that Australia, India, and the European Commission may propose additional projects for consideration to the Technical Group.

20. Selection of Date/Venue for the Next Meeting

The next Ministerial meeting of the CSLF is currently planned for Melbourne, Australia in September 2004. It is also planned that the Policy and Technical Groups would meet at this time. The exact date has yet to be determined but will most likely be held immediately before or after the World Energy Congress, which is to be held in Sydney on September 5-9, 2004.