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TECHNICAL GROUP

DRAFT
CARBON SEQUESTRATION LEADERSHIP FORUM
MINUTES OF THE TECHNICAL GROUP MEETING OF 25 JUNE 2003

Note by the Secretariat

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CARBON SEQUESTRATION LEADERSHIP FORUM
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Note by the Secretariat

Background

The Carbon Sequestration Leadership Forum was established with the signing of the Charter on the morning of 25 June 2003. Immediately afterwards, the Technical Group conducted its inaugural meeting. The draft minutes of the Technical Group Meeting on 25 June 2003 were prepared to reflect the meeting events and conclusions.

Action Requested

The Technical Group is requested to approve the Draft Carbon Sequestration Leadership Forum (CSLF) Minutes of the Technical Group Meeting of 25 June 2003.

Conclusions

The Technical Group is invited to note in the Minutes of its meeting of 20 January 2004 that:

> "The Technical Group approves as Final the Draft Carbon Sequestration Leadership Forum (CSLF) Minutes of the Technical Group Meeting of 25 June 2003."

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Carbon Sequestration Leadership Forum Inaugural Meeting
Minutes of the Technical Group

Ritz Carlton Hotel, Tyson's Corner, Virginia
25 June 2003

Present:

Australia	Peter Cook
Australia	John Wright
Brazil	Paulo Cunha
Canada	Kailai (Kelly) Thambimuthu
China	Wu Zongxin
China	Lu Xuedu
European Commission	Lars Stromberg
European Commission	Denis O'Brien
Italy	Giuseppe Girardi
Italy	Eugenio D'Ercole
Japan	Takashi Ohsumi
Japan	Yukihiro Nojiri
Mexico	Jose L. Fernandez
Mexico	Saul Feder
Norway	Hanne Lekva
Norway	Arne Raheim
Norway	Jostein Dahl Karlsen
Russia	Gurgen Olkhovsky
Russia	Boris Reutor
United Kingdom	Philip Sharman
United Kingdom	Nicolas Otter
United States	Robert Kane
United States	Howard Herzog

Observers:

South Africa	Roger Wicks
South Africa	Mark Van der Riet

CSLF Secretariat:

Peter Rozelle
George Lynch
Avanalist Jackson

1. **Convene Meeting and Welcome Delegates**

   The Group was greeted and welcomed by Robert Kane, U.S. Department of Energy. Annex A presents the Agenda for the meeting. Mr. Kane thanked all for attending and began his presentation of the objectives and outcomes expected from the meeting.

2. **Objectives and Expected Outcomes of this Meeting**
   Mr. Kane discussed the objectives and outcomes that were expected from the Technical Group meeting, including a set of near-term actions that could be accomplished by the Technical Group prior to the next CSLF meeting.

3. **Review of Technical Group Functions**
   Mr. Kane highlighted the functions of the CSLF Technical Group, which include the identification of key technical obstacles to the commercialization of sequestration technologies, establishment of an inventory of potential areas of research, and identification of potential areas of multilateral collaboration. Toward these ends, the Technical Group will also foster collaborative research, development, and demonstration projects reflecting members' consensus priorities. Ultimately, the Technical Group will report to the Policy Group, and make recommendations to the Policy Group on needed actions

4. **Selection of Chair and Vice Chair**
   Canada and Norway were selected as Vice-Chairs. Canada was nominated by Italy, seconded by Australia; Norway was nominated by the U.S., seconded by the European Commission. The U.S. was selected as Chair, following a nomination by Canada.

5. **Date and Venue of Next Meeting**
   The Group decided that the next meeting would be held in January, 2004; Italy has offered to host this meeting. As soon as the venue and exact dates are available, they will be provided to the Technical Group.

6. **Review of Issues Emerging from Forum**

The following issues were reviewed:

- Cost Reduction for Sequestration Technologies
  - CO_2 capture technologies
    - Relative costs and benefits of retrofit technologies vs. application to new power cycles (IGCC, oxy-fuel, co-production)
    - Consensus on capture technologies currently available or under development
    - Generic cost reduction goals for power plants and low-purity CO_2 streams
    - Examination of specific project-based costs vs. generic costs

    - Dealing with impurities (and synergies with clean air goals)
    - Integration with new power cycles (pre-combustion, post-combustion, oxy-fuel)
  - CO_2 storage technologies
    - The effect of monitoring and verification requirements on cost
    - Public outreach and public confidence
  - High-level economic modeling that can incorporate future technologies

- Understanding Global Geologic Storage Potential
  - Storage potential of sedimentary and other strata
  - Expansion of survey base (few regional or national studies have been completed)
  - Preliminary conclusion: capacity is sufficient to store hundreds of years of CO_2
  - Evaluation of possible economic and environmental co-benefits (i.e. enhanced oil recovery, coal bed methane extraction, reduction in environmental degradation/unit economic output)

- Matching of Sources with Potential Sinks
  - Proximity of large CO_2 sources to potential sinks
  - Industrial Ecology approach (siting industrial ecosystems within economic distances of potential large CO_2 storage sites)
  - Potential infrastructure for large carbon emissions-free hydrogen production facilities (i.e. location of these facilities with respect to potential hydrogen markets and distribution networks)

- Effectiveness of Geologic CO_2 Storage
  - Verification of modeling with measured results
  - Internationally agreed methodologies for measurement, monitoring, and verification
  - Understanding and managing risks
    - Containment
    - Effectiveness (maximization of storage resource)
    - Stakeholder response
  - Time frame for storage

- Multiple Demonstrations Needed
  - Technical effectiveness (integrate capture, transport, storage, and use of CO_2)
  - Capacity to effectively model, monitor, and verify
  - Environmental safety and health
  - Sustainability
  - Assessment of impact on community and biological diversity
  - Technical requirements for demonstration projects in Emerging Market Economies are similar to those in developed countries
  - Host countries with different technology needs
  - Identification of opportunities

- Produce a Technology Roadmap that incorporates the above points.

7. Delegate Perspectives

Australia

Collaborations among Technical, Policy, and Stakeholders' Groups are essential. A focus on large-scale demonstrations is needed. This will allow examinations of synergies and gaps among large-scale demonstrations. Increased collaboration in the fields of carbon capture and separation should be addressed. A Technology Roadmap is needed.

Canada

Canada endorsed the general direction of CSLF for raising the issue to ministerial level.

China

A long-term development effort is needed, and this should result in a Technology Roadmap. Means to cooperate and communicate effectively are essential, and there needs to be sharing of information on costs and storage capacities among the group.

European Commission

CSLF projects should go beyond existing international collaboration and add value. Collaborative activities should avoid duplication of efforts and involve the power industry. Existing CO_2 trading mechanisms should be taken into account. How will additional collaboration be fostered and by what mechanisms?

Italy

Collaboration is very important in this field but needs to be preceded by information exchange. The Technical Group needs frequent exchange of information (more frequent than technical meeting), and a comprehensive inventory of research activities is needed. A "vision" of what countries are interested in is needed – this will form the basis of a roadmap. CO_2 separation should be a focal point.

Japan

Capture technology should be a focal point. A good inventory of emissions and projects is needed. An international protocol should be developed to enhance public acceptance of land-based storage.

Mexico

The technical scope of the CSLF should be expanded, and funding needs to be addressed early on. Research should be ultimately oriented toward private investment.

Norway

Ambitious goals are required, and these must attract technology providers. Strong cooperation with the Policy Group is required, and CSLF projects must build on existing activities. There is a need to prioritize a combination of research and commercial projects.

Improvements are needed in CO_2 capture technologies, and multiple storage options should be addressed.

Russia

An extension of separation and capture technologies to other industries would be beneficial, and advanced capture processes should be investigated, including novel concepts. Testing of technologies in Russia would be desirable.

South Africa

Emerging economies are critical long-term targets for this technology: Their engagement will help address financial and technical commitments, "sell" benefits of sequestration and link to arguments concerning success. Such countries may also provide suitable locations for demonstrations—the link to power industry is important but sink options need evaluating. CO_2 storage needs to be viewed as complementary to renewable energy technologies and energy efficiency measures.

United Kingdom

The focus should be on capture, transportation, storage, and use of CO_2. The value of carbon should be considered in the development of sequestration activities. Close links with the Policy Group and a wider stakeholder base is important. The CSLF should develop a meaningful, complementary portfolio of projects. Technology cost reductions are essential, and a thorough exchange of ideas is required. Additionally, CSLF activities should address novel areas.

The CSLF should develop a comprehensive, robust technology roadmap involving capture, storage, possible reuse, and other considerations.

8. Technical Group Consensus and Summary

The near-term objective of the Technical Group is the development of a robust, comprehensive, global carbon sequestration technology roadmap. Toward this end, a set of actions were defined, which will be conducted by the members and the Secretariat prior to the next CSLF meeting. These activities are as follows:

- Australia will share roadmapping methodology and results.
- An existing baseline of information (for database creation) will be compiled by the Secretariat (costs, storage capacity, technology gaps) - including activities ongoing in each country. These data will be submitted to the Secretariat by the Technical Group members from each country.
- To facilitate the development of this database, the Secretariat will develop a template for this baseline information (including research activity, literature, country-specific technical data, and commercial activities) within two weeks of this CSLF meeting for completion and return by members by 25 August. The Secretariat will compile these data and circulate a draft template to members by the end of September. Members should comment on this draft by the end of October, enabling the Secretariat to produce a revised draft database for the next meeting of the Technical Group in January.
- There will be two sections in the database: members and non-members.
- The Secretariat will maintain a Web site to provide access to this database.
- The Secretariat will circulate:
  - IPCC Report from Regina Workshop
  - IEA Zero-Emissions Technology Report
  - IEA Greenhouse Program Web Site
  - Other existing information
- Members will prioritize issues presented at the Forum and submit to Secretariat prior to the next CSLF meeting.
- A strategy for education, training and technology transfer will be developed.
- Develop a “mandate” for the Technical Group.

Annex A. Agenda

CARBON SEQUESTRATION LEADERSHIP FORUM
Technical Group Agenda
June 25, 2003

Time	Technical Group
11.30	Convene and Welcome *Robert Kane*
11.35	Objectives of this Session and Expected Outcomes *Robert Kane*
11:40	Introductions and Delegate Perspectives *Technical Group Delegates*
12.20	Review of Technical Group Functions and Discussion of Ground Rules *Robert Kane*
	Working Lunch/Discussion • Selection of Vice Chair • Review of Issues Emerging from Forum • Discussion of any Issues not Covered in the Forum • Consensus on Issues • Potential Areas for Multilateral Collaboration • Prioritization of Issues *Technical Delegates*
14.00	Date and Venue of Next Meeting *Technical Delegates*
14.15	Consensus Summary/Next Steps *Technical Delegates*

14:30	Adjourn *Robert Kane*