



CSLF-T-2008-01

**Carbon Sequestration Leadership Forum (CSLF)  
Minutes of the Technical Group Business Meeting  
Al Khobar, Saudi Arabia  
27-28 January 2008**

**LIST OF ATTENDEES**

**Technical Group Delegates**

Australia:	John Bradshaw, Alfredo Chirinos
Brazil:	Paulo Cunha, Paulo Rocha, Marcelo Ketzer
Canada:	Bill Reynen (Vice Chair), Anne-Marie Thompson
Denmark:	Flemming Ole Rasmussen
European Commission:	Estathios Peteves, Derek Taylor
France:	Christian Fouillac, Pierre Le Thiez, Bernard Frois
Germany:	Jürgen-Friedrich Hake
India:	Malti Goel (Vice Chair), R.R. Sonde
Italy:	Giuseppe Girardi, Giovanni Ciceri
Japan:	Makoto Akai, Chiaki Shinohara
Korea:	Chang-Keun Yi, Chong-Kul Ryu
Netherlands:	Harry Schreurs
Norway:	Trude Sundset (Chair), Jostein Dahl Karlsen, Odd-Magne Mathiassen
Saudi Arabia:	Khalid Abuleif, Mohammed Al Zayer
South Africa:	Bethuel Kgobane
United Kingdom:	Nick Otter, Philip Sharman
United States:	George Guthrie, Joseph Giove

**CSLF Secretariat** John Panek, Richard Lynch, Scott Miles

**Invited Speakers**

Ashok Bhargava, Senior Energy Specialist, Asian Development Bank (ADB)  
Waleed A. Al-Mulhim, Manager, Reservoir Management Department, Saudi Aramco, Saudi Arabia  
Justin Swift, Chair of the CSLF Capacity Building Task Force, United States  
Marcelo Ketzer, Head of the Brazilian Carbon Storage Research Center, Pontifícia Universidade Católica do Rio Grande do Sul, Brazil

**Other Attendees**

Dennis Van Puyvelde, Australia  
Raymond Knudsen, Canada  
Frank Mourits, Canada  
Hubert Fabriol, France  
Bruno Gerard, France  
Ryohji Ohba, Japan  
Craig Micklethwaite, Kuwait  
Adnan Al-Asaly, Saudi Arabia  
Omar Al-Khathlan, Saudi Arabia  
Emad Al-Nahawi, Saudi Arabia  
Saud Al-Resayes, Saudi Arabia  
Abdulkader Al-Sari, Saudi Arabia  
Abdulrahman Alwarthan, Saudi Arabia  
Abu Nasser Khondaker, Saudi Arabia  
Mahmut Sengul, United Arab Emirates  
Michael Moore, United States

**Sunday, 27 January 2008****1. Opening Remarks**

The Chair of the Technical Group, Trude Sundset of Norway, called the meeting to order and thanked Khalid Abuleif and his staff of the host country, Saudi Arabia, for their dedication and hard work in preparing for the meeting. Ms. Sundset welcomed all the observers and recognized the invited speakers: Ashok Bhargava, Senior Energy Specialist, ADB; Justin Swift, Chair of the CSLF Capacity Building Task Force; and Waleed A. Al-Mulhim, Manager, Reservoir Management Department, Saudi Aramco, Saudi Arabia.

Ms. Sundset called on the Vice Chairs, Malti Goel of India and Bill Reynen of Canada, who provided brief opening remarks.

**2. Introduction of Delegates and Observers**

Technical Group delegates and observers present for the session introduced themselves. Seventeen of the twenty-two CSLF Members were represented at this meeting: Australia, Brazil, Canada, Denmark, European Commission, France, Germany, India, Italy, Japan, Korea, Netherlands, Norway, Saudi Arabia, South Africa, United Kingdom, and United States. There were nineteen observers attending the meeting, representing eight countries and the ADB.

**3. Adoption of Agenda**

The Agenda was adopted with no changes.

**4. Review and Approval of Minutes of Paris Meeting**

The Technical Group minutes from the March 2007 CSLF meeting in Paris, France, were approved as final with no changes.

**5. Review of Paris Meeting Action Items**

John Panek of the CSLF Secretariat reviewed the status of action items resulting from the Paris Technical Group meeting.

The following action items have been completed:

- Storage Capacity Estimation Task Force: Finalize Phase II Report.
- Secretariat: Post Phase II Report of the Storage Capacity Estimation Task Force to the CSLF Web site once it is finalized.
- Secretariat: Conduct a survey to determine the preferences and reactions of the people who attended the “Overcoming Barriers to Carbon Capture and Storage (CCS) Deployment” Workshop. (See Item 6 below.)
- Chair: Recommend to the Policy Group the establishment of a joint Policy Group / Technical Group “Geological Storage Co-existence” Task Force which would examine societal issues impacting CCS deployment. (Note: This was done during the Joint Business Meeting in Paris, but there was no consensus to proceed.)

The following action items are ongoing, in progress, or deferred:

- Chair and Secretariat: Issue invitation to the IEA Greenhouse Gas Research and Development Programme (IEA GHG) to make a presentation on their “Capture Ready” study at the next meeting. (Note: The Secretariat, on behalf of the Chair, sent a letter of invitation to the IEA GHG, but a representative was unable to attend.)
- Storage Capacity Estimation Task Force: Proceed to Phase III of planned activities. (See Item 11 below.)
- Projects Interaction and Review Team (PIRT): Continue developing prioritization for implementation of CSLF Action Plan items. (See Item 7 below.)
- PIRT: Develop a mechanism for formalizing a relationship between the IEA GHG and the Technical Group. (See Item 7 below.)
- PIRT: Create a subgroup to examine the CSLF Technology Roadmap and identify sections that need updating. (See Item 7 below.)

The following action items resulted from the Paris Joint Policy and Technical Group meeting and are ongoing:

- Technical Group: Identify policy and legal strategies and instruments needed for research needs. (Note: This is an open issue. The Chair will report on this item to the Policy Group at the Cape Town meeting.)
- Technical Group: Develop mechanisms to involve emerging economies in industrialized country and lighthouse projects. (Note: This is an open issue. The Chair will report on this item to the Policy Group at the Cape Town meeting.)

## 6. Secretariat Report and Updates

John Panek gave a presentation that highlighted the Secretariat’s activities since the Paris meeting. These included:

- CSLF website updates
- Stakeholder registry
- Survey results from the Overcoming Barriers to CCS Deployment Workshop
- Meetings and workshops
- CSLF projects

Mr. Panek stated that the Secretariat has developed a new search tool for the CSLF website that allows users to search the entire site. Presentations and other materials from seven workshops and task force meetings have been posted. The number of CSLF registered stakeholders has risen to 109, an increase of 23 since the Paris meeting.

Mr. Panek presented the findings of the Overcoming Barriers to CCS Deployment Workshop survey. The Workshop was held on 27 March 2007 in Paris, France. The survey’s purpose was to gather feedback on the Workshop’s strengths and weaknesses, and to learn what attendees would like to see in future workshops.

The key findings of the survey were:

- Most attendees found the workshop to be valuable.
- Eighty-five percent of the attendees thought the workshop topics were appropriate.
- Most attendees were interested in technical as well as policy aspects.
- There was unanimous support for more time for panel discussions.
- The majority of attendees would like to see fewer presentations.
- Scheduling the workshop in the middle of a CSLF meeting encourages interaction between the Policy Group and Technical Group and ensures the best possible attendance.

## 7. Report from PIRT

Nick Otter of the United Kingdom, Co-chair of the PIRT, presented a status report on the PIRT's activities. The main activities included:

- Procedural/administrative issues, including a review of membership and the chair role, and proposed modification of the CSLF Terms of Reference and Procedures (TOR).
- A review of one project that has requested CSLF recognition: the Dynamis project (nominated by the European Commission and Norway). This project has met all project recognition criteria. (See Item 13 below.)
- Position of future PIRT actions in the context of the overall CSLF Action Plan for 2008-09. This included the update of the CSLF Technology Road Map (TRM) currently underway and possible linkage with the IEA GHG and utilization of the European Union's Seventh Framework Energy Programme (EC FP7) funding opportunity.

The PIRT recommended a modification to the TOR, so that the TOR would more accurately describe the current procedure on how CSLF projects are proposed, reviewed, and recognized. The Secretariat has drafted language for the recommended revisions on behalf of the PIRT. The proposed modification and the affected sections of the TOR are contained in Attachment 1. There was consensus on the proposed modification and it was approved with no changes. The proposed modification will be sent on to the Policy Group for its consideration at the Cape Town meeting.

Linkage with the IEA GHG generated discussion. This had been agreed in principle at the IEA GHG R&D Executive Committee meeting in South Korea on 26 October 2007. The Chair asked for clarification on the process by which the IEA GHG advances studies. Jürgen-Friedrich Hake of Germany, a member of the IEA GHG, stated the CSLF can propose new studies directly to the operating agent of the IEA GHG. The agent will handle all the details for the Executive Committee. Mr. Hake stated the process within the IEA GHG is to solicit new ideas and then put them before a preliminary vote. It is important for the CSLF to notify any of the Technical Group delegates who are affiliated with the IEA GHG whenever there are ideas to be submitted. After ensuing discussion there was consensus that the Chair should submit some ideas for the 9th International Conference on Greenhouse Gas Technologies (GHGT-9), being held November 2008 in the United States.

The PIRT addressed the issue of the declining number of new projects coming before the CSLF for recognition. Mr. Otter mentioned that ten new projects were recognized at the 2004 Melbourne meeting, seven at the 2005 Berlin meeting, and two at the 2007 Paris meeting. There was only one to recommend at the upcoming Cape Town meeting.

There was considerable discussion regarding the desirability of policy-based projects, e.g., regulatory work in Australia, because these are important vehicles to move technologies forward. All CSLF projects to date have been technical in nature. Mr. Otter expressed the view that the Technical Group needs to address technical and policy issues simultaneously. Philip Sharman of the United Kingdom cautioned the Technical Group not to overreact to the shortage of projects and compromise quality in exchange for a greater number of projects. There are many possible reasons for the declining number of projects, including fewer technology gaps to address. At any rate, there may be more project proposals soon: Joseph Giove of the United States stated that Phase III of the Regional Carbon Sequestration Partnerships may result in as many as seven projects being proposed for CSLF recognition.

There was agreement that the CSLF needs to better promote the benefits of CSLF project recognition and there was consensus to solicit the opinions of CSLF stakeholders on the topic of CSLF projects. The Secretariat, with the assistance of the PIRT, was requested to poll stakeholders about their interest in putting forward projects. Stakeholders would be asked to share their reasons for putting forth projects or reasons against submitting projects for CSLF recognition. There was also agreement that CSLF projects should be described with more technology categories than are currently used in the Project Submission Form. There was consensus that the CSLF Secretariat should develop additional categories under the “capture” element.

There was widespread sentiment that the CSLF should welcome policy initiatives as CSLF projects and that the Technical Group should pass along these views to the Policy Group in Cape Town. Some expressed the view that the topic of policy-related projects rests solely with the Policy Group as the Technical Group’s mandate is to advanced technologies. Following this discussion, it was agreed that the Chair should establish a dialog with the Policy Group on CSLF project recognition at the Cape Town meeting.

It was noted by Mr. Otter that the update of the CSLF TRM was now well underway. A review team has been formed and is currently considering the current TRM (produced in 2004) as to where it should be updated and made consistent with current CCS activities and initiatives worldwide. The years 2006 and 2007 had seen a considerable growth of interest in CCS and a consequent increase in activity, which will be reflected in the TRM update. Also, the CSLF through the PIRT has performed a substantial gap analysis that would help in the identification of areas in which it would be advantageous to have additional CSLF projects and this needed to be related to the TRM review. The review team is being chaired by Pierre Le Thiez of France, with representation by Denmark, the European Commission, France, Italy, the Netherlands, Norway, and the United Kingdom. The review team is expected to have a draft of the updated TRM for review by the PIRT at its meeting in Cape Town prior to it being subsequently considered by the Technical Group.

The EU FP7 Programme has about €13 million available for Specific International Cooperative Actions (SICA). The deadline for proposals is 20 February 2008. This was seen as an excellent opportunity to obtain funds. Failure to submit a proposal

could be seen as a lack of interest in the area, so an ad hoc team consisting of the United Kingdom and the Netherlands was formed to discuss project ideas and participants. This issue was brought up again under New Business.

## 8. Commercial Aspects of CCS Deployment

Ashok Bhargava of the ADB delivered a presentation on the opportunities and challenges for CCS in Asia. The ADB recently became a CSLF stakeholder and its membership includes CSLF members China and India.

Demand for energy will increase by 50% over the next 25 years with continued reliance on fossil fuels. In 2007, coal provided 40% of the world's electricity. Going forward, slightly more than half of the world's US\$22 trillion of investments in energy infrastructure through 2030 will be in developing countries.

CCS is the most promising technology to reconcile continued coal usage with an expected carbon constrained future. The largest amount of additional capacity will take place within the next 20 years. China will double its level of 2005 capacity by 2020.

Urgent needs include:

- Development of a road map with clear destinations and performance targets;
- New coal-based generation stock should seek higher efficiency and CCS readiness such as integrated gasification combined cycle (IGCC);
- Learning by doing – industrial size demonstration plants to check viability of technologies, cost structure, risk assessment, and possible mitigations; and
- Adoption of new technology is time consuming; there is a pressing need to mainstream CCS as a carbon management option.

Key challenges in attracting investments in CCS include:

- In the current pre-demonstration phase, CCS needs support from governments, industry stakeholders; and Development Financial Institutions (DFIs).
- DFIs like ADB can play an important role by providing finances, risk mitigation products, leadership, and knowledge sharing to regional policy makers.
- DFIs can also leverage their capital resources more efficiently to increase private capital flows by absorbing political and policy risks to give greater certainty to investors.
- Policy makers need to send a clear signal about their commitment and vision for low carbon technologies.

## Monday January 27, 2008

### 9. Reconvene Meeting

Trude Sundset reconvened the meeting and thanked Saudi Aramco for hosting the dinner the previous evening at its headquarters in Dhahran. The evening included time in Saudi Aramco's History of Petroleum exhibit hall and the dinner featured an address by His Royal Highness, Prince Abdulaziz bin Salman bin Abdulaziz,

Assistant Minister for Petroleum Affairs, Ministry of Petroleum and Mineral Resources, Saudi Arabia.

#### **10. Host Country Presentation**

Waleed A. Al-Mulhim, Manager, Reservoir Management Department, Saudi Aramco, Saudi Arabia, welcomed the delegates to Al Khobar and gave an overview of Saudi Aramco's operations, Saudi Aramco has a high level of interest in enhanced oil recovery, despite that it may not be needed for several decades. The company is developing expertise and knowledge through a focused plan, including R&D on CO<sub>2</sub>-EOR to understand the science behind it. This includes laboratory studies, capacity building, and collaboration with leading institutions.

#### **11. Task Force to Review and Identify Standards for CO<sub>2</sub> Storage Capacity Estimation**

John Bradshaw of Australia delivered a presentation on the activities of this Task Force on behalf of Task Force Chairman Stefan Bachu of Canada, who was unable to attend.

Task Force activities include:

- a. Coordination of the methodology for CO<sub>2</sub> storage capacity estimation with other national and international groups working on this subject, including the Geologic Working Group of the United States Department of Energy's Regional Carbon Sequestration Partnerships Program. The Geologic Working Group was tasked with developing a methodology for the uniform and consistent assessment of CO<sub>2</sub> storage capacity in the United States, towards the production of a national atlas of CO<sub>2</sub> storage capacity. A draft comparative analysis with CSLF methodology has been written and findings will be presented at the Cape Town meeting.
- b. Compilation of representative case-studies of CO<sub>2</sub> storage capacity estimation at various scales and in different geological settings, including compilation of data on various coefficients that are used in CO<sub>2</sub> storage capacity estimations. There are insufficient case studies to date so this activity remains ongoing. The upcoming GHGT-9 meeting is an obvious opportunity to build this dataset, as Dr. Bradshaw and Dr. Bachu will be chairing a "focused session" on Storage Capacity Estimation. CSLF delegates are invited to submit any existing relevant site specific case studies for inclusion in the Task Force's analysis.

#### **12. Task Force to Examine Risk Assessment Standards and Procedures**

The Task Force Chairman, George Guthrie of the United States, reported on the activities of the Task Force since its initial meeting in Paris in March 2007. The Task Force currently has 16 members from nine countries and the IEA GHG. The Task Force mission is to examine risk-assessment standards and procedures relevant to unique risks associated with the injection and long-term storage of CO<sub>2</sub>. The risks being assessed are: 1) Risks associated with CO<sub>2</sub> near-term (injection) processes (including fracturing, fault re-activation, induced seismicity); and 2) Risk associated with long-term processes related to impacts of CO<sub>2</sub> storage, including:

- Health, safety, and environmental risks;

- Potential impact on natural resources (such as groundwater, mineral resources, etc.); and
- Return of CO<sub>2</sub> to the atmosphere.

Dr. Guthrie stated a task force goal to complete Phase I activities/report by the Cape Town meeting in April 2008. Phase I entails:

- Review of methodologies and existing literature;
- Review of ongoing and emerging efforts;
- Identification of critical issues in the status of risk assessment; and
- Proposed next steps.

Task members are assembling risk assessment activities. These include projects and demonstrations that will address some aspect of risk assessment, and activities related to development of tools/methodologies. Submissions of information from countries not participating in Task Force are also welcome.

### **13. Introduction and Review of Possible Projects**

Nick Otter delivered a presentation prepared by Nils A. Røkke, Coordinator for The Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology (SINTEF), which briefly described the Dynamis project (nominated for CSLF recognition by the European Commission and Norway). Dynamis is the first phase of the €1.3 billion Hypogen program, which will result in construction and operation of an advanced commercial-scale power plant with hydrogen production and CO<sub>2</sub> management, with the goal of operation and validation in the 2012-2015 timeframe. The Dynamis project will assess the various options for large-scale hydrogen production, focusing on the technological, economic and societal issues. The Dynamis consortium has 32 members from 12 countries, and the cost of Dynamis is expected to be €7.5 million over three years.

Four sites, each proposed by an industrial partner, have been recommended for further studies in the second phase of Hypogen:

- Mongstad, Norway, suggested by Statoil. This option would include a natural gas-based power plant with offshore CO<sub>2</sub> geologic storage.
- Hamburg region, Germany, suggested by Vattenfall. This option would feature a bituminous coal-based power plant with onshore or offshore CO<sub>2</sub> geologic storage.
- East Midlands, England, suggested by E.ON UK. This option would feature a bituminous coal-based power plant with offshore CO<sub>2</sub> geologic storage.
- Northeast United Kingdom, suggested by PEL. This option would feature a bituminous coal-based power plant with offshore CO<sub>2</sub> geologic storage.

Further work will involve further development with pre-engineering studies and other preparatory measures. The target is to have developed these cases to be ready for more detailed further consideration by the end of Dynamis; i.e., March 2009.

Following the presentation, Mr. Otter, representing the PIRT, stated that the PIRT had reviewed the completed Project Submission Form submitted by the Dynamis project and recommends approval. Ensuing discussion led to consensus to recommend the

Dynamis project for recognition by the CSLF and pass it on to the Policy Group for its action at the Cape Town meeting.

#### **14. Report on the G8/IEA/CSLF Workshops in Canada and Norway**

Jostein Dahl Karlsen of Norway and Bill Reynen of Canada delivered presentations on recent workshops in their respective countries. Mr. Karlsen covered the 2nd G8/IEA/CSLF workshop, which was held 21-22 June 2007 in Oslo, Norway. Recent G8/IEA/CSLF workshops have been building up to the 34th G8 meeting in Tokyo, Japan, 7-9 June 2008.

The key messages from the 2nd G8/IEA/CSLF Workshop are:

- CCS can make a significant contribution to mitigate CO<sub>2</sub> emissions from energy combustion as part of a portfolio of abatement measures.
- The G8 focus on CCS adds a political imperative to accelerate CCS developments.
- Governments and industry need to cooperate to overcome the cost and regulatory uncertainty hurdles for near-term CCS opportunities.

Global CCS Deployment – Lessons Learned

- Incentives are needed for early action to advance CCS as there is currently no market. Price is the best signal.
- Political will is fundamental to drive the needed legal and regulatory frameworks. However, early developments should be facilitated through existing, complimentary regulations that will help to inform the development of specific CCS procedures.
- There is a need to conduct assessments for source/sink correlation and infrastructure requirements, as well as for core early opportunities.
- Public/private partnerships are key for R&D technology advances and to support a variety of demonstration projects in the coming decade.

The assessment report is available for download from the CSLF Web site.

Mr. Reynen delivered a presentation on the 3rd G8/IEA/CSLF Workshop, which was held 27-28 November 2007 in Calgary, Canada. The Canadian workshop developed five high-level “action oriented” recommendations over two days.

These recommendations are as follows:

- Demonstrating CO<sub>2</sub> Capture and Storage;
- Taking Concerted International Action;
- Addressing the Financial Gap;
- Establishing Legal and Regulatory Frameworks; and
- Raising Public Education & Awareness.

Two products were generated from the workshop:

- IEA to work with a straight text of recommendations (high-level and general) to develop a final product for G8+5 leaders in Tokyo, Japan in July 2008; and

- Canadian Workshop report to participants with workshop outputs as agreed in textual context.

The final Canadian Workshop report is scheduled to be released shortly. (Subsequent to the meeting the report has been released and is available for download from the CSLF website.)

## **15. Review of CSLF Capacity Building Workshops**

Justin Swift of the United States and Marcelo Ketzer of Brazil delivered presentations on the Capacity Building Workshops in Pittsburgh, United States, and Porto Alegre, Brazil in 2007. At the Berlin meeting in 2005, the CSLF authorized the capacity building program with the objectives to:

- Assist emerging economy Members to develop needed expertise and institutions;
- Develop a set of educational resources that all CSLF Members can utilize; and
- Transfer lessons from CSLF Projects and other known CCS initiatives.

Mr. Swift delivered a presentation on the 1st Capacity Building Workshop, hosted by the United States in Pittsburgh to take advantage of the Sixth Annual Conference on Carbon Capture & Storage, which was taking place in Pittsburgh at the same time. Holding these two events at the same time afforded the 50 workshop participants from Brazil, Colombia, China, India, Mexico, and South Africa the opportunity to interact with some of the 700 attendees at CCS conference. The syllabus for the workshop included an overview of issues and the need for carbon management, CO<sub>2</sub> storage capacity and assessment, risk management, carbon capture, measuring, monitoring, and verification, stakeholder involvement, legal/policy/regulation in CCS, and the economics and financing of CCS projects. Participants were given a tour of the U.S. Department of Energy's National Energy Technology Laboratory CCS R&D facilities.

Dr. Ketzer delivered a presentation on the 2nd Capacity Building workshop, which was held 18-19 October 2007 in Porto Alegre, Brazil. This workshop focused on the technical aspects of CCS. The workshop spanned two days of lectures and discussions. There were 14 technical lectures on various CCS issues: from capture to storage, including monitoring, legal and regulatory aspects. The workshop was very well attended with more than 130 participants from universities, the government, and the coal and oil industries. Ten countries were represented. The important outputs that came out of the workshop were the development of the "Student Body" concept – a tool for exchange of information, rising of funds, etc. for students; and the concept of the Advanced Training Center for Emerging Economies within the Chemical Engineering PanAmerican Collaboration (CEPAC). A significant number of companies and students demonstrated interest in CCS issues.

## **16. Discussion of the South Africa Roundtable Dialogue**

Bill Reynen described the concept for a "Roundtable Dialogue" event to be held during the next CSLF meeting in Cape Town. The format of the event will be different than previous workshops in that there will be no presentations in order to allow more time for discussion among panelists and audience interaction. The event would be comprised of a series of individual roundtables addressing key issues of

“Making CCS Work.” John Bradshaw introduced the concept of a carbon trading simulation game, which was seen as interesting and different, and will be included as part of the agenda.

#### **17. Proposal for Graduate Student Discussions on CCS Topics in CSLF Website**

John Bradshaw delivered a presentation on the proposal for a student body section of the CSLF website. The purpose would be to:

- Encourage national and international interaction and networking between students and professionals on CSLF topics of interest;
- Create directory of international CCS research activities;
- Add to CSLF recognised projects; and
- Complement IEA GHG listings.

This activity would be at a student project level and would maximise dissemination and uptake of CSLF outputs and outcomes. The structure would be loosely organized and largely self-managing. The CSLF would not run the student section. Instead, there would be an international CSLF contact point/coordinator. Australia (Geoscience Australia) is willing to assist in the establishment of the section. Each participating country would have a national coordinator based an appropriate research institution.

There was widespread support for the proposal. Giovanni Ciceri of Italy stated that many Italian universities and professors would be interested. Bill Reynen stated that IEA summer schools are very successful. Nick Otter mentioned that the Research Councils in the United Kingdom were currently reviewing how to continue with current CCS initiatives and the proposed student body approach could well be very useful in this context. The need to develop skills in the area of CCS was becoming an increasingly important issue. This project could help build up a good student body and be a good recruiting tool for companies. Jürgen-Friedrich Hake stated that the main objective should be to engage young scientists so they build up relationships. Malti Goel of India mentioned that efforts in this direction have already begun through support to young scientists for participation in the International Workshop held in Hyderabad, India in January 2007, and 30th International School on CCS held in Erice, Italy in November 2007, where six students from India attended through support from the United Kingdom’s Department for Environment, Food and Rural Affairs (DEFRA). Dr. Goel suggested that a professor or chief scientist could be designated to assist the young students. There was consensus that more young scientists are needed to join the field and that a professor would be needed to assist them. This exercise could have a snowball effect.

Estathios Petevs of the European Commission, while supporting the idea, pointed out that in the original proposal, “some initial support from the CSLF would be required implement/host the website.” The Chair, Trude Sundset, noted that while the Secretariat already is capable of supporting a “Graduate Student Discussion” area through the CSLF website, the additional resources called for in the proposal are an issue. Additional discussions on this topic will be needed.

## 18. Technical and Societal Issues for Co-Management of Land Use

John Bradshaw introduced a paper titled “Technical and Societal Issues for Co-Management of Land Use in Developing Storage Sites for Carbon Capture and Storage,” for review and consideration by the Technical Group. This paper resulted from a proposal put forward at the Joint Business Meeting of the Policy and Technical Groups in Paris, for a Joint Policy Group-Technical Group Task Force on Societal Issues. There was no consensus to form the task force, but consensus was reached that Australia would prepare a paper on this topic, written from an Australian perspective, in consultation with any other Task Force that was interested in this issue.

After ensuing discussion, the Secretariat was asked to prepare the report as a room document for the Cape Town meeting.

## 19. New Business

Philip Sharman presented the results of an informal ad hoc group which was convened the previous day to explore ideas for a CSLF response to the EC FP7 funding opportunity. Mr. Sharman provided some details on the funding opportunity. Proposals require the involvement of two or more European Community member states and two or more large emerging economy countries. Six ideas were discussed with two being more fully developed. Those two were:

- a. Developing a Global Atlas of CO<sub>2</sub> Storage Including Large Emerging Economies.

*Initial interest:* Italy, the Netherlands, United Kingdom, Saudi Arabia, South Africa, Australia

*Description:* Several countries have established national geological information systems (GIS) of storage potential. These “atlases” have been assessed at different levels using a variety of parameters and geological layers. This proposed project would assemble these into a consistent, international set with common layers and parameters. This would be extended to include large emerging economies at the most appropriate level given the data available. The resulting atlas would encourage other emerging economies to fill in storage potentials at higher levels of detail. The aim would be to deploy the atlas using the Internet. Two examples are the China basin level mapping and the Australia regional level mapping exercises.

- b. Better Modelling to Estimate CO<sub>2</sub> Storage Capacities in Aquifers in Large Emerging Economies

*Initial interest:* Italy, the Netherlands, United Kingdom, Saudi Arabia, South Africa, Australia, Canada

*Description:* Modeling CO<sub>2</sub> storage in aquifers is reliant on a number of parameters to establish the efficiency of storage in geological systems. Assessment of these parameters at a regional level needs to be based on site-specific information which needs to be developed. This proposed project would develop these assessments in order to better understand regional coefficients in large emerging economies. Case studies would be developed to support these assessments.

Mr. Sharman stated that key groups in the Netherlands and the United Kingdom will be briefed and they drive the proposal writing. The deadline for this funding opportunity is February 26, 2008. The proposal to prepare and submit a CSLF response to the EC FP7 funding opportunity was approved.

John Bradshaw proposed a review of technology gaps and roadmaps and for the Technical Group to approach the IEA GHG with a list of ideas for collaboration. Dr. Bradshaw proposed generating the list of ideas in mid-2008 following the Cape Town meeting.

**20. Review of New Action Items**

New action items resulting from this meeting were reviewed and are listed below.

**Action Items arising from Al Khobar Technical Group Meeting**

<b>Item</b>	<b>Lead</b>	<b>Action</b>
1	Secretariat	Prepare a paper with the proposed modification to the Terms of Reference to be sent to the Policy Group for its approval at the Cape Town meeting.
2	Chair	Submit a list of ideas for IEA GHG/CSLF collaboration to the 9th International Conference on Greenhouse Gas Technologies (GHGT-9), November 2008, Washington, United States.
3	Secretariat and PIRT	Poll stakeholders about their interest in moving projects forward. Stakeholders would be asked to share their reasons for putting forth projects or reasons against submitting projects for CSLF recognition.
4	Chair	Establish a dialog with the Policy Group concerning CSLF recognition.
5	Secretariat	Develop additional categories under capture element for CSLF projects.
6	Chair	Recommend Dynamis project for recognition to the Policy Group at the Cape Town meeting.
7	Secretariat and Australia	Prepare report for distribution "Technical and Societal Issues for Eco-Management of Land Use in Developing Storage Sites for Carbon Capture and Storage – An Australian Experience."

## Attachment 1

### Suggested Modifications to CSLF Terms of Reference and Procedures

#### Existing Language, Sections 4.2, 4.3 and 4.4

4.2. Project Recognition. All collaborative projects will be recognized following a decision by the Policy Group. The Technical Group shall recommend technical projects to the Policy Group.

4.3. Project Agreements. Upon recognition, the parties to the recognized project should sign a Project Agreement based on minimum requirements to be set by the Policy Group.

The Secretariat shall have the responsibility of maintaining information on recognized collaborative projects and a synopsis including information on key contacts in the projects. The projects will be listed on the CSLF web site.

4.4. The Project Recognition Process. Proposals may be submitted by the representative of any Member to the Technical Group for projects in its area of responsibility as designated by Article 1.2 of these Terms of Reference. The proposals will contain the information required by the agreed Project Recommendation Guidelines and templates.

#### Suggested Change

4.2. Project Recognition. All projects proposed for recognition by the CSLF shall be evaluated via a CSLF Project Submission Form. The CSLF Project Submission Form shall request from project sponsors the type and quantity of information that will allow the project to be adequately evaluated by the CSLF.

A proposal for project recognition can be submitted by any CSLF delegate to the Technical Group and must contain a completed CSLF Project Submission Form. In order to formalize and document the relationship with the CSLF, the representatives of the project sponsors and the delegates of Members nominating a project must sign the CSLF Project Submission Form specifying that relationship before the project can be considered.

The Technical Group shall evaluate all projects proposed for recognition. Projects that meet all evaluation criteria shall be recommended to the Policy Group. A project becomes recognized by the CSLF following approval by the Policy Group.

4.3. Information Availability from Recognized Projects. Non-proprietary information from CSLF-recognized projects, including key project contacts, shall be made available to the CSLF by project sponsors. The Secretariat shall have the responsibility of maintaining this information on the CSLF website.