Minutes of the Technical Group Meeting

Warsaw, Poland
Thursday, 07 October 2010

LIST OF ATTENDEES

Technical Group Delegates

Australia:	Clinton Foster (Vice Chair), Aleksandra Kalinowski
Brazil:	Paulo Rocha, Paulo Negrais Seabra
Canada:	Stefan Bachu, Eddy Chui
China:	Xiaochun Li
European Commission:	Jeroen Schuppers
France:	Pierre Le Thiez, Didier Bonijoly
Germany:	Jürgen-Friedrich Hake
Italy:	Giuseppe Girardi
Japan:	Takeshi Hirota
Korea:	Chang-Keun Yi, Chong-Kul Ryu
Netherlands:	Harry Schreurs
Norway:	Trygve Riis (Chair), Kristoffer Stabrun
Poland:	Elżbieta Wróblewska
Saudi Arabia:	Khalid Abuleif
South Africa:	Tony Surridge (Vice Chair), Fred Goede
United Kingdom:	Philip Sharman
United States:	Joseph Giove, George Guthrie

Representatives of Allied Organizations

Global CCS Institute:	Bill Koppe, Gwendaline Jossec
IEA GHG:	Tim Dixon

CSLF Secretariat

John Panek, Rich Lynch

Invited Speakers

Bill Spence, Shell International Exploration and Production B.V., Netherlands
Ramón Treviño, Gulf Coast Carbon Center, United States

Observers

Australia:	Lila Gurba
Brazil:	Roberto Heemann, Marcelo Ketzer
Germany:	Axel Liebscher, Andreas Ruch
Poland:	Renata Kałuzna, Aleksandra Koteras, Marcin Mazurowski, Dorota Polak-Osiniak
United States:	Judd Swift

1. Technical Group Chairman's Welcome and Opening Remarks

The Chairman of the Technical Group, Trygve Riis of Norway, called the meeting to order, welcomed the delegates and observers to Warsaw, introduced Vice Chairs Clinton Foster of Australia and Tony Surridge of South Africa, and expressed appreciation to Poland, and especially to the Ministry of Economy, for hosting this meeting. Mr. Riis welcomed the presence of both the International Energy Agency Greenhouse Gas R&D Programme (IEA GHG) and the Global CCS Institute at this meeting, as it reinforces an outcome from last year's Ministerial meeting in London, where the Ministers agreed that cooperation and knowledge-sharing on CCS needs to be increased.

Mr. Riis provided context for the meeting with a brief summary of the previous CSLF Technical Group Meeting of March 2010, in Pau, France. The Pau meeting was very productive, in that an ambitious schedule was set up for the 2010 update to the CSLF Technology Roadmap and a new task force was formed, with four working groups, to assess progress on closing technology-related gaps related to carbon capture and storage (CCS). The update to the Roadmap is now complete; reports on it and from the new Task Force will be presented during this meeting. Mr. Riis also stated that at Pau, the Technical Group also endorsed Australia's Gorgon CO_2 Injection Project for CSLF recognition and since then, several other projects have been nominated for CSLF recognition and these will be taken up later in the meeting.

Mr. Riis ended his remarks by acknowledging the activity of Dr. Foster as Chair of the new Task Force, along with the four Working Group Chairs, in recognition that the Task Force has already made significant progress. Lars Ingolf Eide of the Research Council of Norway was also recognized for the substantial amount of work he did during the Roadmap update process.

2. Introduction of Delegates and Observers

Technical Group delegates and observers present for the session introduced themselves. Seventeen of the 24 CSLF Members were present at this meeting, including representatives from Australia, Brazil, Canada, China, the European Commission, France, Germany, Italy, Japan, Korea, the Netherlands, Norway, Poland, Saudi Arabia, South Africa, the United Kingdom, and the United States. Observers representing Australia, Brazil, Germany, Poland, and the United States were also present.

3. Adoption of Agenda

The Agenda was adopted with no changes.

4. Approval of Minutes from Pau Meeting

The Technical Group minutes from the March 2010 meeting in Pau, France, were approved as final with no changes.

5. Review of Action Items from Pau Meeting

John Panek of the CSLF Secretariat reported that all action items from the Pau meeting had been completed or were in progress.

There was brief discussion about two action items where Stefan Bachu of Canada, at the request of the Technical Group, had developed and submitted to the IEA GHG proposals studies of progress regarding the potential for CO_2 storage in shales and in basalts. Dr. Bachu noted that these two proposals had not been approved. Tim Dixon of the

IEA GHG responded that the two proposals had not been rejected as such; they had not gained the necessary number of votes during the April 2011 IEA GHG Executive Committee (ExCo) meeting, and would automatically be resubmitted at the next ExCo meeting. Mr. Dixon also noted that the IEA GHG had approved a scoping study on these topics based on papers presented at the recent GHGT-10 Conference in the Netherlands.

There was also brief discussion about one other action item, concerning distribution of IEA GHG technical reports to CSLF Members who are not also members of the IEA GHG. Mr. Dixon informed the Technical Group that the IEA GHG has granted permission for the CSLF Secretariat to distribute IEA GHG technical reports to CSLF delegates. He also stated that the IEA GHG has formed a working group to look at making its reports more widely available, but that a final decision on this has not yet been reached.

6. Report from CSLF Secretariat

John Panek gave a brief presentation that provided an update on the status of the Technical Group's Action Plan that was developed at the Pau meeting. All near-term items are essentially complete, and the long-term items have been folded into the activity plans of individual task forces.

Mr. Panek concluded his presentation with the status of the CSLF Stakeholder Registry. There are now 286 stakeholders, and the number of stakeholders continues to increase.

7. Update on Strategic Plan Goals and Objectives

Chairman Riis provided a brief update on the status of the CSLF Strategic Plan. The Strategic Plan contains eleven different Action Plans, three of which are relevant to the Technical Group.

Action Plan #2 (*Identifying Potential for CCS Technology Development and Deployment Opportunities*) provides that: "The Technical Group will expand its Roadmap to include actions that can be taken by its Members, or others, by comparing the technology gaps it identifies to ongoing or planned projects and identifying unmet research needs." This has been accomplished by the 2010 update to the Roadmap, and also by formation of the new Task Force to assess progress on closing technology-related gaps related to CCS.

Action Plan #7 (*Collaborating on Capacity Building in Academia for Member Developing Countries*) provides that: "The Technical Group forms a new Task Force to engage the academic community in CCS, with the intent of identifying academic CCS programs and the developments of curricula for graduate and postgraduate programs." The CCS in the Academic Community Task Force, which had been formed in June 2009, is actually a joint Policy and Technical Group task force. Marcelo Ketzer of Brazil, the Task Force Chairman, stated that a report from the Task Force would be presented at the Joint Meeting of the Policy and Technical Groups on October 8th, and that the goal of the Task Force was to complete its survey report, on worldwide academic institution postgraduate courses involving CCS, in time for the 2011 CSLF Ministerial Meeting.

Action Plan #10 (*Collaboration with Other International Organizations*) provides that: "The CSLF will establish a formal, long-term working relationship with the International Energy Agency (IEA) and Global CCS Institute." Mr. Riis noted that ongoing relationships have now been established with the Global CCS Institute and the IEA GHG; both are active in all CSLF Technical Group activities and have representation in Technical Group task forces and working groups. This ongoing coordination now

ensures that each organization focuses on the areas that are its strengths and that duplication is avoided. The CSLF cooperates with the Global CCS Institute and the IEA GHG on a variety of activities and there is a consistent exchange of information, ideas, and developments in CCS. Mr. Riis also mentioned that representatives of both the Global CCS Institute and the IEA GHG would be giving presentations about their organizations later in the meeting.

8. Report from Projects Interaction and Review Team (PIRT)

The PIRT Chair, Clinton Foster of Australia, gave a presentation that summarized the PIRT's accomplishments since the Pau meeting. There have been four major areas of activity:

- Update of CSLF Technology Roadmap
- Development of Technology Gaps Analysis
- Development of Plan for Attracting New Projects
- Approval of Projects Proposed for CSLF Recognition

Update of CSLF Technology Roadmap

Dr. Foster stated that the 2010 CSLF Technology Roadmap had been endorsed by the PIRT for recommendation by the Technical Committee to the Policy Group. Dr. Foster noted that there had been a rather aggressive schedule for accomplishing the 2010 update to the Roadmap in the relatively short amount of time between the Pau and Warsaw meetings; one of the hallmarks of this update was the wide engagement of Technical Group delegates and stakeholders to obtain needed information, and strong engagement and action from the CSLF Secretariat to expedite the update process. The 2010 CSLF Technology Roadmap also draws on outcomes from the IEA, the Global CCS Institute, the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP), and other organizations.

Dr. Foster stated that all modules of the Roadmap had been updated from the 2009 version, and one of the main changes from the 2009 version was the stronger emphasis on CCS integration and demonstration of the complete CCS value chain, including CO_2 source and capture, transport, and storage. After ensuing discussion there was broad consensus to endorse the Roadmap and send it forward to the Policy Group for final approval, with the qualification that CSLF delegates could provide updates to country-specific information in the Roadmap until mid-October.

Development of Technology Gaps Analysis

Dr. Foster briefly described a gaps analysis exercise, conducted by the Secretariat, which analyzed the 27 active and completed CSLF-recognized projects in relation to the technology gaps listed in the CSLF Project Submission Form. The results identified gaps and technical issues addressed by one or more projects and showed which gaps are not addressed. An example is that 13 different projects feature CO_2 storage in saline aquifers, while no project addresses storage of CO_2 in low-permeability rock. The results could also be used to help identify new projects that would address any remaining gaps. Ensuing discussion centered on the definition of when a gap is being fully addressed; there was consensus that instead of claiming a gap is "addressed" by a project, it would be better stated that a project "is addressing" a gap, as it is entirely possible that some gaps are not being completely addressed by CSLF-recognized projects. Dr. Foster stated that the new Task Force to assess progress on closing technology-related gaps will provide some clarity on what technology gaps are being fully addressed.

Development of Plan for Attracting New Projects

Dr. Foster noted that this topic was actually part of a broader project engagement strategy that the Technical Group was developing. At the Pau meeting, Technical Group delegates were requested to contact CSLF-recognized projects in their countries to obtain responses to the following queries:

1. *What do you need to make the project succeed?*
2. *What advantages do you see from greater CSLF project interaction?*
3. *What else should the CSLF do?*

In all, 17 projects responded, and the consensus appeared to be that project sponsors sought CSLF recognition because they saw it as a conduit to success, as being associated with the CSLF will promote the project globally and provide early international recognition. Project sponsors also saw potential advantages in interaction among CSLF-recognized projects, which would increase technical knowledge and promote sharing of best practices and lessons learned. Dr. Foster noted that development of a plan for a CSLF projects workshop, to be discussed later in the meeting, would also be a plan forward for attracting new projects, so further discussion on this item was postponed.

New Projects Proposed for CSLF Recognition

Dr. Foster stated that the following four projects had been unanimously accepted by the PIRT at its meeting on October 6th, with the recommendation that they be endorsed by the Technical Group and sent forward to the Policy Group for final approval.

- CO_2 Field Lab Project (nominated by Norway, France, and United Kingdom)
- SECARB Early Test at Cranfield Project (nominated by United States, Canada, and the United Kingdom)
- Quest CCS Project (nominated by Canada, United States, and United Kingdom)
- CCS Bełchatów Project (nominated by Poland, European Commission, and United States)

Chairman Riis also noted that the Gorgon CO_2 Injection Project (nominated by Australia, United States, and Canada) had been approved by the Technical Group at the Pau meeting, and invited presentations by representatives of each of the five projects.

9. Presentations from Projects Nominated for CSLF Recognition

CO_2 Field Lab Project

Chairman Riis, representing project sponsor CLIMIT, gave a presentation about the CO_2 Field Lab Project. This is a pilot-scale project, located at Svelvik, Norway, which will investigate monitoring technologies for CO_2 leakage detection in a well-controlled and well-characterized permeable geological formation. Relatively small amounts of CO_2 will be injected to obtain underground distribution data that resemble leakage at different depths. The resulting underground CO_2 distribution will resemble leakages and will be monitored quantitatively with an extensive set of methods deployed by the project partners. The main objective is to assure and increase CO_2 storage safety by obtaining valuable knowledge about monitoring CO_2 migration and leakage. The outcomes from this project will help facilitate commercial deployment of CO_2 storage by providing the protocols for ensuring compliance with regulations, and will help assure the public about the safety of CO_2 storage by demonstrating the performance of monitoring systems.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

SECARB Early Test at Cranfield Project

Ramón Treviño of the Gulf Coast Carbon Center in the United States, representing project sponsor Southeast Regional Carbon Sequestration Partnership (SECARB), gave a presentation about the SECARB Early Test at Cranfield Project. This is a large-scale project, located near Natchez, Mississippi, USA, which involves transport, injection, and monitoring of approximately one million tonnes of CO_2 per year into a deep saline reservoir associated with a commercial enhanced oil recovery operation, but the focus of this project will be on the CO_2 storage and monitoring aspects. The project will promote the building of experience necessary for the validation and deployment of carbon sequestration technologies in the United States, and will increase technical competence and public confidence that large volumes of CO_2 can be safely injected and stored. Components of the project also include public outreach and education, site permitting, and implementation of an extensive data collection, modeling, and monitoring plan. This "early" test will set the stage for a subsequent large-scale integrated project that will involve post-combustion CO_2 capture, transportation via pipeline, and injection into a deep saline formation.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

Quest CCS Project

Bill Spence of the Shell International Exploration and Production Company, representing project sponsor Shell Canada Ltd., gave a presentation about the Quest CCS Project. This is a large-scale project, located at Fort Saskatchewan, Alberta, Canada, with integrated capture, transportation, storage, and monitoring, which will capture and store up to 1.2 million tonnes per year of CO_2 from an oil sands upgrading unit. The CO_2 will be transported via pipeline and stored in a deep saline aquifer in the Western Sedimentary Basin in Alberta, Canada. This is a fully integrated project, intended to significantly reduce the carbon footprint of the commercial oil sands upgrading facility while developing detailed cost data for projects of this nature. This will also be a large-scale deployment of CCS technologies and methodologies, including a comprehensive measurement, monitoring and verification (MMV) program.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

CCS Bełchatów Project

Elżbieta Wróblewska of Poland, representing project sponsor PGE Górnictwo i Energetyka Konwencjionalna SA, gave a presentation about the CCS Bełchatów Project. This is a large-scale project, located in central Poland, which will demonstrate commercial-scale CO_2 capture, transport and storage at a new lignite-fired power plant unit. The project will demonstrate the full CCS value chain, including capture, transport, and safe geological storage of up to 1.8 million tonnes of CO_2 per year. Project components include identification of potential issues related to intellectual property, storage site selection, permitting, facilities and pipeline construction, and public engagement activities. Success of this project will expedite commercialization of CCS for large-scale fossil fuel power generation.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

Gorgon CO_2 Injection Project

Clinton Foster, representing Chevron Australia Pty Ltd., gave an update presentation about the Gorgon CO_2 Injection Project, which had previously been approved by the Technical Group at the Pau meeting. This is a large-scale project that will store approximately 120 million tonnes of CO_2 in a water-bearing sandstone formation two kilometers below Barrow Island, off the northwest coast of Australia. The CO_2 stored by the project will be extracted from natural gas being produced from the nearby Gorgon Field and injected at approximately 3.5 to 4 million tonnes per year. There is an extensive integrated monitoring plan, and the objective of the project is to demonstrate the safe commercial-scale application of greenhouse gas storage technologies at a scale not previously attempted. The project has already progressed through its early development stages including site selection and appraisal, and is fully funded. Injection operations are expected to commence by the end of 2014.

10. Reports from the Task Force to Assess Progress on Closing the Gaps

The Task Force Chair, Clinton Foster, stated that there was consensus at the PIRT meeting on October 6th that henceforward the name of this Task Force would be the "Task Force to Assess Progress on Technical Issues Affecting CCS," as it will have additional activities besides working on CCS technology gaps. Dr. Foster gave a brief presentation that described the function of the Task Force and its makeup. The Task Force consists of four Working Groups: Capture Technologies (chaired by the United States), Transport and Infrastructure (chaired by the Netherlands), Storage (chaired by Canada), and Integration (chaired by the Global CCS Institute). There are four main goals:

- Measure the progress of technical requirements to achieve 20 commercial CCS projects by 2020 (G8 goal);
- Complement the PIRT by assessing the level of CCS readiness of CSLF-recognized projects;
- Develop a focused CSLF community of users, by assessing existing CSLF-recognized projects against the respective gaps considered by each Working Group; and
- Maximize the learnings and access to information from the CSLF projects to assist the CSLF community in reaching the 2020 goal.

Report from Capture Technologies Working Group

The Working Group Chair, George Guthrie of the United States, gave a brief presentation about the proposed path of the Working Group. The current plan is to assess the current listing of capture-related technology gaps as shown in the Gaps Analysis Checklist and provide any recommended changes or additions to the Task Force Chairman. Once a revised Gaps Analysis Checklist was agreed to, the Working Group would then assess all CSLF-recognized projects against the revised checklist to determine what gaps are being addressed and which are not.

Report from Transport and Infrastructure Working Group

The Working Group Chair, Harry Schreurs of the Netherlands, gave a brief presentation that echoed the Capture Technologies Working Group's proposed path. Mr. Schreurs also stated that the Working Group is recommending that five new gaps be added to the Gaps Analysis Checklist:

- Acquire experimental thermodynamic data for CO_2 with impurities
- Understand effects of impurities on compression, transport, corrosion
- Understand the effects of supercritical CO_2 on sealing materials
- Develop flow models for dense CO_2 streams in pipelines
- Understand effects and impacts of pipeline leaks

Mr. Schreurs closed his presentation by stating that CCS transport and infrastructure gaps were perhaps the most problematical to assess – either they were fairly easy and were components of many projects, or they are not shown as being addressed because project sponsors are uncertain if their projects include them. Mr. Schreurs offered his opinion that more interaction with CSLF-recognized projects is needed quickly to assist the Working Group complete its mandate.

Report from Storage Working Group

The Working Group Chair, Stefan Bachu, provided an update on the status of the Working Group. Dr. Bachu stated that henceforward, the name of the working group would be expanded to "Storage and Monitoring Working Group," as the current Gaps Analysis Checklist sections assigned to this Working Group includes both Storage and Monitoring categories. Dr. Bachu noted that the CSLF Technology Roadmap does not match the Gaps Analysis Checklist in terms of categories – the "Gaps Identification" module of the Roadmap covers only Capture, Transportation, Storage, and Integration, and does not identify Monitoring as a separate category (it is included in Storage). Dr. Bachu suggested that the Roadmap and the Gap Analysis Checklist should therefore be synchronized (i.e., cover the same categories). Also, Dr. Bachu stated that the work being done by his Working Group and the Task Force in general is increasing the granularity of the Checklist, with Working Group members adding very detailed subjects and detail in their own areas of expertise to the Checklist to the point where it is becoming unmanageable and might discourage or intimidate project sponsors from applying for CSLF recognition.

Ensuing discussion resulted in broad agreement for Dr. Bachu's position regarding the excessive granularity of the Gaps Analysis Checklist. However, as pointed out by Philip Sharman of the United Kingdom, a less detailed Checklist may result in the need to request additional information from project sponsors during the time it is being considered for CSLF recognition. In the end, there was consensus that the four Working Groups should develop condensed and concise lists of gaps to be included in a revised Gaps Analysis Checklist. These will be reviewed by the PIRT at its next meeting.

Report from Integration Working Group

The Working Group Chair, Bill Koppe of the Global CCS Institute, gave a brief presentation about the proposed scope of the Working Group. The current plan is to be more broadly focused on project development issues of integration, e.g., the efficient phasing of storage, transport and capture assessment in integrated project development. Mr. Koppe stated that the Working Group also intends to look more at developing example project schedules, economic models and project development checklists and challenges. Mr. Koppe added that his intention is that the Global CCS Institute will develop draft scopes and deliverables, while Working Group members will operate as reviewers and sources of data. The Output will center on industry experience, with an objective of producing concrete deliverables in less than 12 months.

Following the presentation, Joseph Giove of the United States volunteered to join the Working Group. Pierre Le Thiez of France also volunteered to join, and stated that the water-related issues should perhaps be considered by the Working Group, since power plants typically require large amounts of water. Harry Schreurs volunteered for the Working Group as well, and stated that the CSLF-recognized CCS Rotterdam Project would be a good proving ground for assessing integration-related gaps as that project will have multiple CO_2 sources and sinks. There was consensus to add Mr. Giove, Dr. Le Thiez, and Mr. Schreurs to the Working Group.

11. Update of CSLF Project Submission Form

Chairman Riis stated that this item had been mostly handled during the previous item, as there had been consensus that the four Working Groups should develop condensed and concise lists of gaps for a revision to the Gaps Analysis Checklist in time for the next PIRT meeting. After ensuing discussion there was agreement to keep the existing Project Submission Form / Gaps Analysis Checklist for now, while the new Task Force to Assess Progress on Technical Issues Affecting CCS and the PIRT work to develop a revision to the Form and Checklist, as described earlier. Harry Schreurs proposed that two Checklists are actually needed – the concise Checklist for the Project Submission Form and a "deeper level of granularity" Checklist that can be used to evaluate projects. There was consensus to adopt this approach, and the four Working Group Chairs were empowered to shorten the existing Checklists as needed to produce the concise versions.

12. Report from Risk Assessment Task Force (RATF)

The Task Force Chair, George Guthrie, gave a brief update on the RATF. The RATF has completed its Phase I activities, which centered on examination of risk-assessment standards, procedures, and research activities relevant to unique risks associated with the injection and long-term storage of CO_2. Risks associated with CO_2 near-term injection processes include predicting the stress state of the reservoir, while risks associated with long-term processes related to impacts of CO_2 storage include health, safety, and environmental risks, potential impact on natural resources (such as groundwater, mineral resources, etc.), and return of CO_2 to the atmosphere. The RATF's Phase I Report is online at the CSLF website. Additionally, the RATF coordinated with the Policy Group's Communications Task Force on a set of five "inFocus Carbon Capture and Storage" outreach documents, also available at the CSLF website, which provide information about the safety of CCS to a non-technical audience.

Dr. Guthrie stated that RATF Phase II activities, now underway, include a gaps assessment to identify CCS-specific tools and methodologies that will be needed to support risk assessment, and a feasibility assessment of developing general technical guidelines for risk assessment that could be adapted to specific sites and local needs. The RATF intends to leverage its activities with those of the IEA GHG Risk Assessment Network to facilitate the completion of these two assessments.

Dr. Guthrie noted that the planned Phase II feasibility assessment could be adapted to specific sites and local needs, and recommended that the RATF re-focus around updating Phase I assessment of risk assessment approaches / drivers within ongoing activities. There was consensus to accept this recommendation. Dr. Guthrie stated that the RATF expects to complete its Phase II Report in time for it to be a deliverable at the 2011 CSLF Ministerial Meeting.

13. Discussion of Themes for 2011 CSLF Ministerial Meeting

Chairman Riis stated that, as delegates are already aware, there will be another CSLF Ministerial next year in China. Mr. Riis then offered his opinion that since there will be a discussion on this topic during the next day's Joint Meeting, the Technical Group should first discuss the topic so that it can have input on what the themes of the Ministerial will be. In response, Stefan Bachu stated that the Technical Group should give the Ministers a sense of what the CSLF hopes to achieve by the year 2020 – the CSLF has done good work, it is continuing to do good work, and the Ministers need to state their support so that the CSLF can continue to do good work. Tony Surridge of South Africa agreed with Dr. Bachu and stated that the CSLF was once the only significant organization involved with CCS but now there are others; given that, should the CSLF continue its current course or perhaps make changes in its mission? Pierre Le Thiez also agreed with Dr. Bachu and stated that CCS will enter a new phase after 2013, in that the worldwide focus will shift to large-scale demonstration projects; the CSLF will need to be able to assess this large-scale phase before deployment begins. Finally, Philip Sharman offered suggestions for technical themes specific to China, including the role of CCS for coal-to-liquid fuels processing, for enhanced coalbed methane recovery, and for industrial applications. Mr. Riis stated that he would bring these suggestions forward to the Policy Group during the October 8th Joint Meeting.

14. Development of Plan for Projects Workshop

Clinton Foster stated that, as part of a broader project engagement strategy that the Technical Group was developing, sponsors of CSLF-recognized projects were asked an additional question besides the ones described under the "Development of Plan for Attracting New Projects" agenda item, above:

4. *Would you be interested in participating in a conference / workshop on CSLF projects? And if so, what format is desirable for you?*

Dr. Foster stated that responses were received from 17 projects. In general, project sponsors were supportive of the concept of CSLF projects workshops, as long as they were focused and topic-specific. This would make it easier for delegates and stakeholders to share learnings from CSLF-recognized projects. Also, project sponsors preferred that any workshops of this nature should allow sufficient time for in-depth discussion of presentations and that the outcomes from these workshops be summarized and made available at the CSLF website. Above all, there was a strong recommendation from project sponsors that CSLF projects workshops avoid duplication with the dozens of other conferences, meetings, and workshops about CCS that are scheduled each year.

Ensuing discussion attempted to find a way forward. Khalid Abuleif of Saudi Arabia brought forth an offer from Saudi Arabia to host a one-day CO_2 storage-themed workshop in early 2011 that could perhaps be dovetailed with a CSLF meeting of some kind. There was agreement to accept this offer, but there was also general agreement that future projects workshops needed to go even further. Stefan Bachu suggested that one way to avoid duplication with other events was to sponsor a series of "lessons learned" workshops where there would be presentations from project sponsors about challenges they faced and how these challenges were overcome. Jürgen Friedrich Hake of Germany agreed with Dr. Bachu and stated that since this is a "leadership" forum, the CSLF should sponsor events that provide information to decision makers that will allow them to make informed decisions concerning CCS deployment. There was consensus that the PIRT will further develop the workshop concept at its next meeting. Chairman Riis thanked Saudi

Arabia for its offer to host the storage-themed workshop and requested that the Secretariat work with Saudi Arabia's delegation to develop a date for the meeting, an agenda, and other details.

15. Update from the IEA Greenhouse Gas R&D Programme

Tim Dixon gave a presentation of IEA GHG and its activities. The IEA GHG is a collaborative research programme founded in 1991 as an IEA Implementing Agreement financed by its members. The goal of the organization is to provide its members with definitive information on the role that technology can play in reducing greenhouse gas emissions. IEA GHG activities include publication of more than 120 studies and reports, sponsorship of ten research networks, and co-sponsoring the biennial Greenhouse Gas Technologies (GHGT) conferences, and an annual summer school on CCS for graduate students.

The CSLF Technical Group, since 2008, has a mutual representation agreement with the IEA GHG. In that regard, the Technical Group can be represented at IEA GHG Executive Committee (ExCo) meetings and the IEA GHG is invited to attend and participate in CSLF task force, PIRT, and Technical Group meetings. As described above, Stefan Bachu, at the request of the Technical Group, had developed and submitted to the IEA GHG proposals studies of progress regarding the potential for CO_2 storage in shales and in basalts, but both of these proposals had not been approved. Mr. Dixon re-confirmed that both of these proposals would be taken up again at the next IEA GHG ExCo meeting, and he also stated that proposals from the CSLF for additional new studies were welcome. The deadline for submission of proposal outlines is January 2011.

During the ensuing discussion it was suggested that the two proposals be combined, but Dr. Bachu disagreed, stating that there is not much commonality between the two types of geological formations. Dr. Bachu stated that the proposal about shales is of immediate importance, especially for North America where shales are fractured during natural gas production which destroys their integrity as a CO_2 storage reservoir caprock. Due to the proposal's immediate relevance, the IEA GHG was urged to give it priority consideration.

16. Update from the Global CCS Institute

Bill Koppe of the Global CCS Institute gave a presentation about the Institute and its activities. The Institute was formed in 2008 and currently has more than 260 members. About half the membership is from industry, while national governments make up about 15% of the membership. A significant activity of the Institute is publication of its "Strategic Analysis of the Global Status of Carbon Capture and Storage." There are now more than 300 CCS projects worldwide, about 80 of which are large-scale projects. There has been a significant increase in CCS project activity in the past year.

Mr. Koppe briefly described the Global CCS Institute's project support process. The Institute is now completing a selection process which has earmarked about A$50 million toward direct project support. More than 50 project proposals that were submitted to the Institute in January 2010 have been evaluated and the shortlist of projects to receive Institute support will be announced soon. There will be additional proposal solicitation rounds as time goes on.

Mr. Koppe also briefly described the Institute's Thematic Groups, which are networks that help to connect Institute members to learning from supported projects. There are currently four themes:

- Hub Development Challenges (in collaboration with the Clinton Foundation)
- Storage Learning from Enhanced Oil Recovery Operations (in collaboration with the IEA GHG)
- Project Integration Challenges (in collaboration with the CSLF's PIRT)
- CO_2 Storage and Groundwater Resource Management (in collaboration with the IEA GHG)

Mr. Koppe stated that each Theme network has individual tasks and that the networks are set up for interaction with other organizations and allied networks via the Institute's Digital Knowledge Sharing Platform. The Institute will provide funding for individual tasks and meeting venues.

17. New Business

Tony Surridge announced that South Africa launched its CO_2 Storage Atlas in September 2010. In all, approximately 150 gigatonnes of storage capacity was identified, 90% of which is offshore under seabeds. One of the storage basins still needs more investigation and several basins are being investigated for eventual use.

Stefan Bachu brought forth an offer from Canada to host the next Technical Group meeting in Edmonton in May 2011. Chairman Riis thanked Canada and the Technical Group accepted the Canada's offer to host the meeting. The Secretariat was requested to work with Dr. Bachu to develop a date for the meeting, an agenda, and other details.

18. Review of Consensus Reached, Action Items, and Next Steps

Consensus was reached on the following items.

- The Task Force to Assess Progress in Closing the Gaps is now known as the Task Force to Assess Progress on Technical Issues Affecting CCS. The Storage Working Group for that Task Force is now known as the Storage and Monitoring Working Group.
- France, the Netherlands, and the United States have become members of the Integration Working Group of the Task Force to Assess Progress on Technical Issues Affecting CCS.
- Saudi Arabia will host a CSLF Projects Workshop during the January/February 2011 timeframe.
- Canada will host the next CSLF Technical Group meeting in Edmonton, Alberta, Canada, in May 2011.

Action items from the meeting are as follows:

Item	Lead	Action
1	Technical Group Chair	Provide the Technical Group's recommendation to the Policy Group that the CO_2 Field Lab Project, the SECARB Early Test at Cranfield Project, the Quest CCS Project, the CCS Bełchatów Project, and the Gorgon CO_2 Injection Project be recognized by the CSLF. (*Secretariat note: This was done at the October 8th Joint Meeting of Policy and Technical Groups.*)

Item	Lead	Action
2	Technical Group Chair	Provide the Technical Group's recommendation to the Policy Group that the 2010 CSLF Technology Roadmap be approved. (*Secretariat note: This was done at the October 8th Joint Meeting of Policy and Technical Groups.*)
3	Delegates	Provide updated country information to Secretariat for Module 2 (Current Status of CO_2 Capture and Storage) of the Roadmap no later than 15 October 2010.
4	PIRT	Further develop Projects Workshop concept at its next meeting.
5	Working Groups under Task Force to Assess Progress on Technical Issues Affecting CCS	Prepare two versions of updated Gaps Analysis Checklists – a "concise" Checklist for the Project Submission Form and a "deeper level of granularity" Checklist that can be used to evaluate projects. Working Groups Chairs are empowered to shorten the "concise" Checklist as necessary.
6	Risk Assessment Task Force	Adapt Phase II feasibility assessment of developing general technical guidelines for risk assessment to specific sites and local needs.
7	Secretariat	Work with Saudi Arabia's delegation to develop date, agenda, and other details for Storage-themed Projects Workshop.
8	Secretariat	Work with Canada's delegation to develop date, agenda, and other details for the next Technical Group meeting.

19. Closing Remarks / Adjourn

Chairman Riis thanked the delegates, observers and Secretariat for their hard work, expressed his appreciation to host country Poland, and adjourned the meeting.