



## Minutes of the Joint Meeting of the Policy and Technical Groups

Perth, Australia  
Friday, October 26, 2012

### LIST OF ATTENDEES

#### Policy Group Delegates

Chair:	Barbara McKee (United States)
Australia:	Ann Boon, Margaret Sewell
China:	Sizhen Peng, Jiutian Zhang
France:	Bernard Frois
Japan:	Koji Hachiyama, Kei Miyaji
Norway:	Tone Skogen
Saudi Arabia:	Hamoud Al-Otaibi
South Africa:	Faizel Mulla, Gina Downes
United Kingdom:	Jonathan Hood
United States:	James Wood

#### Technical Group Delegates

Chair:	Trygve Riis (Norway)
Australia:	Clinton Foster, Richard Aldous
Canada:	Stefan Bachu, Eddie Chui
China:	Qi Li, Jiutian Zhang
European Commission:	Jeroen Schuppers
France:	Didier Bonijoly
Germany:	Torsten Ketelsen
Italy:	Giuseppe Girardi
Japan:	Ryozo Tanaka
Netherlands:	Paul Ramsak
Norway:	Jostein Dahl Karlsen
Saudi Arabia:	Ahmed Aleidan
South Africa:	Tony SurrIDGE
United Kingdom:	Philip Sharman
United States:	George Guthrie, Darren Mollot

#### CSLF Secretariat

Richard Lynch, John Panek, Jeffrey Price, Adam Wong, Kathy Paulsgrove

**Observers**

Australia:	Wayne Calder (Dept. of Resources, Energy and Tourism); Maureen Clifford (CarbonNet Project); David Cooling (Alcoa of Australia, Ltd.); Asha Titus (University of Newcastle); Dominique Van Gent (Western Australia Dept. of Mines and Petroleum); Zoe Naden (Dept. of Resources, Energy and Tourism); John Nayton (Nayton Communications); Claire Richards (Dept. of Resources, Energy and Tourism); Clement Yoong (Coal Innovation NSW)
India:	Preeti Malhotra (Alstom)
Netherlands:	Bill Spence (Shell)
Chinese Taipei:	Chi-Nen Liao, Shih-Ming Chuang, Shoung Ouyang, Ren-Chen Wang (Industrial Technology Research Institute)
United States:	Arthur Lee (Chevron); Victoria Osborne (Striker Communications); Barry Worthington (U.S. Energy Association)
Global CCS Institute:	Barry Jones
International Energy Agency:	Juho Lipponen

**PROCEEDINGS****1. Opening Remarks**

Barbara McKee opened the meeting and thanked the Australia Department of Resources, Energy and Tourism for hosting the Annual Meeting, the Western Australian Department of Mines and Petroleum for hosting the dinner the previous evening and the Gorgon Project for hosting the Opening Reception. She then reviewed the agenda of the Joint Meeting and stated that she understood that several new projects were being submitted for CSLF recognition.

Delegates were asked to briefly introduce themselves, which they did.

**2. Adoption of Agenda**

The Agenda was approved without change.

**3. Review and Approval of Minutes from Beijing Meeting**

The draft of the Minutes of the previous Policy Group Meeting, held in Beijing, China in September 2011, had been circulated for comment to the Policy Group prior to the meeting. The final draft, which incorporated comments received, had been posted on the CSLF website. The Minutes were approved without further change.

**4. Review of Beijing Action Items**

Jeffrey Price of the CSLF Secretariat went through the status of the Action Items. He stated that all of the action items were either completed or underway. One Action Item for the Communications and Public Outreach Task Force would be accomplished by a roundtable later in the meeting.

## 5. Report from the Policy Group

Barbara McKee presented the report on the Policy Group meeting. The meeting consisted of task force reports, a policy roundtable on the topic of “Advancing CCUS in a Time of Challenge,” election of a Policy Group Chair, review of the 2013 CSLF Ministerial Concept Paper and selection of the Ministerial Steering Committee.

The Capacity Building Governing Council reported that twelve projects had been funded by the US \$2.965 million CSLF Capacity Building Fund in four countries (Brazil, China, Mexico and South Africa). US \$514,812 is available for further projects. The Financing Task Force held two workshops over the last year. The theme of the first workshop, held in Paris in January 2012, was “What will it take to turn ambition into reality?” and the theme of the second, held in Washington in September 2012, was “Lessons from first movers in CCUS.” Key messages from these workshops were that electricity prices alone are insufficient to cover costs and no one financing approach fits all projects.

The Policy Roundtable featured several presentations and a discussion. Several key points emerged from the discussion: country circumstances vary; one size does not fit all; EOR is not a business model but a mechanism to cover some costs; and it is vital to re-energize political and public support. Most importantly for this meeting, a request was made to the Technical Group for a Roadmap achievable in the near term (i.e., by 2020).

The United State was re-elected Policy Group Chair for the next 3 years.

There was a lively discussion with many comments on the Draft Concept Paper for the 2013 Ministerial. The key issue discussed most extensively was how the potential for utilization of CO<sub>2</sub> differs among countries. Members were requested to provide input as soon as possible to the Secretariat, which will draft a revision by January 2013. The revision will guide the work of a Steering Committee for the Ministerial. The discussion emphasized that a Roadmap with short-term goals was of absolute importance.

## 6. Report from the Technical Group

Trygve Riis, Technical Group Chair, Norway, presented the report from the Technical Group which discussed both the June 2012 Technical Group meeting in Bergen, Norway and the meeting the previous day in Perth.

The meeting in Bergen recommended three projects for CSLF recommendation, considered the Phase II report of the Risk Assessment Task Force and received reports from four new task forces. The continuation of the work of the Risk Assessment Task Force is to be taken up by the Risk and Liability Task Force. The meeting in Bergen also included a workshop on CO<sub>2</sub> capture and a visit to the CSLF-recognized CO<sub>2</sub> Technology Centre Mongstad, which is the world’s largest CO<sub>2</sub> capture test facility.

Mr. Riis also reported on the Technical Group meeting in Perth. The four new task forces are making good progress and three new Technical Action Plans are being addressed. Norway was re-elected Technical Group Chair and Australia, Canada and South Africa were elected Vice Chairs. Two projects proposed for CSLF recognition were discussed and approved for recommendation to the Policy Group. It was also decided that work on the Technology Roadmap will continue under the guidance of a Steering Committee chaired by

the Technical Group Chair. The Norway Ministry of Petroleum and Energy is funding an consultant who will work on the Roadmap.

Responding to the request from the Policy Group for a short-term roadmap, Mr. Riis said that it would be possible to have clear short-term recommendations, targets and goals for the Ministers. The Technical Group would also be willing to say that, if it is done the right way, CO<sub>2</sub> storage is safe.

The Technical Group also had a robust discussion of the Ministerial Concept Paper. The Technical Group's opinions on the Concept Paper were that:

- The term “fighting poverty” is not a credible part of the title.
- We need to be careful mixing up the terms CCS and CCUS. There are different conceptions of how these terms relate to each other. Which, for example, is a subset of the other? This needs to be clarified.
- CO<sub>2</sub>-EOR is an important bridge to CCS but is not applicable to all countries. An exclusive emphasis on EOR may be a disincentive for some Ministers to participate.
- References to activities of the Technical Group are missing from the Concept Paper.
- CO<sub>2</sub> is seen as the main issue, not EOR, which is seen as a bridging technology.
- It was unclear whether the term “business case” should be in the title.
- Geologic storage is safe with proper operation.

France suggested that the Technical and Policy Groups should have a dialog with each other on messages to the Ministers. This suggestion was taken up as an Action Item.

## **7. Review and Approval of Proposed Projects**

Trygve Riis gave a presentation on the projects that the Technical Group was recommending to the Policy Group for recognition by the CSLF. Five projects were recommended:

- Illinois Basin – Decatur Project,
- Illinois Industrial Carbon Capture and Storage Project,
- Air Products CO<sub>2</sub> Capture from Hydrogen Facility Project,
- South West Hub Geosequestration Project, and
- CarbonNet Project.

Mr. Riis noted that these projects were much larger and more expensive than previous CSLF-recognized projects and were being recommended at an earlier stage of development than those previous projects. Therefore there may be a somewhat higher risk that these projects may not be completed, but the recommended projects do have substantial government commitments. He said that these projects would add value to the CSLF portfolio of projects. According to the Secretariat the CSLF currently has recognized 34 projects, 23 of which are active and 11 of which have been completed.

All of the projects recommended were approved.

## 8. Report from the Task Force on Risk and Liability

George Guthrie, Co-chair, presented the report of this new Task Force and then asked for discussion. He noted that the Task Force is a joint Task Force of the Technical and Policy Groups and the workshop was held to improve the understanding of the relationship between geologic risk and potential financial liabilities.

The workshop was jointly sponsored by the CSLF, Global CCS Institute, and the IEA and was held at the IEA's offices in Paris on 10–11 July 2012. Participants included 62 representatives from governments, industry, academia/research, multilateral institutions, law firms, financial institutions, NGOs and consulting firms. The workshop had five sessions (geologic risks, industry perspective, economics of liability, government and policy responses, and “How safe is safe enough?”) A report on the workshop is posted on the CSLF website. Several recommendations based on the workshop were made in the report:

- Take all opportunities to highlight that risks of storing CO<sub>2</sub> can be managed.
- Conduct another workshop on risk and liability in the Asia-Pacific region.
- Continue and expand capacity building for regulatory institutions.
- Consider the role of international or national standards for geologic storage of CO<sub>2</sub>.
- Conduct dialog with the insurance industry about coverage for geologic storage.
- Consider ways to enhance and support public outreach on geologic storage.
- Conduct further RD&D to resolve remaining geologic storage uncertainties.

Bernard Frois, Co-chair, said that the workshop was a mixed bag and that we heard different things with each session. We could do better by having the Technical Group and the Policy Group interact more on risk and liability. He thought that the report on the workshop was too long and did not have any useful messages. He agreed to write a short executive summary that would be sharp and crisp and have useful messages.

Stefan Bachu of Canada stated that he attended the workshop and thought that two key messages came out of the workshop and the report, which should be conveyed to the Ministers:

1. CO<sub>2</sub> storage is safe if properly done and this must be conveyed to the public.
2. Most risks associated with storage can be dealt with by industry but industry cannot address undefined or unlimited liabilities.

George Guthrie, in response to comments from China and South Africa, noted that the Task Force addressed geologic storage and not risks of capture because the Technical Group's Risk Assessment Task Force concluded that industry already had ways to deal with risks related to CO<sub>2</sub> capture and transportation. Also, as was discussed in the workshop, legal frameworks vary widely by country. He also stated that the next steps for the Task Force would be to consider another workshop in the Asia-Pacific Region and to work with the stakeholders group to help craft a statement of safety that can be presented to the Ministers.

## 9. Update on the Nagaoka CO<sub>2</sub> Storage Project

Koji Hachiyama, Director, Global Environmental Partnership, Ministry of Economy, Trade and Industry, Japan, gave a presentation on this project. This presentation consisted of an overview of the project, a discussion of the well-based CO<sub>2</sub> monitoring at the injection site

and a description of the site safety assessments conducted after two large earthquakes. The project injected 10,400 tons of CO<sub>2</sub> into a sandstone formation from 2003 to 2005 and consisted of an injection well and several observation wells. Several different types of monitoring were used and these showed that the CO<sub>2</sub> was held in place by several different trapping mechanisms. The project experienced two large earthquakes, the first during injection and the second after injection ceased. No movement or leakage of injected CO<sub>2</sub> was detected after either earthquake and none of the facilities used for the test were damaged. This confirms the safety of CO<sub>2</sub> storage in the Nagaoka Project. They are currently trying to communicate what this shows about the safety of CCS to the public in Japan, which is very concerned about earthquakes.

## 10. New Business

There was no new business.

## 11. Advancing CO<sub>2</sub> Utilization: A Policy and Technical Roundtable

Trygve Riis, Technical Group Chair, Norway, moderated this roundtable discussion on several different options for CO<sub>2</sub> utilization. He said that while EOR is the best-known type of utilization, there are other aspects of utilization that also will be discussed.

Stefan Bachu, Alberta Innovates–Technology Futures, Canada, spoke on the technical aspects of advancing CO<sub>2</sub> utilization. He stated that there are three broad categories of potential uses for CO<sub>2</sub>: resource recovery (mostly EOR, but also other types of energy recovery), non-consumptive uses such as desalinization, and consumptive uses such as production of building materials. Of these, CO<sub>2</sub>-EOR is the only mature technology and has the most potential. CO<sub>2</sub>-EOR differs from CO<sub>2</sub> storage. There may be technical issues with transitioning relating to how CO<sub>2</sub> storage and EOR are implemented and regulated, for example, monitoring and reporting requirements. There are also many policy issues in transitioning from CO<sub>2</sub>-EOR to CO<sub>2</sub> storage such as jurisdictional issues, long-term liability regulatory frameworks and credits for stored CO<sub>2</sub>.

Darren Mollot, United States Department of Energy, described the work of the CSLF's CO<sub>2</sub> Utilization Task Force. He said that the purpose of the Task Force is to study the most economically promising CO<sub>2</sub> utilization options with the potential for a net reduction of CO<sub>2</sub> emissions. The final Phase I report of this Task Force was completed in October 2012. It identified numerous uses of CO<sub>2</sub>. Some of these uses are for hydrocarbon recovery; others are non-consumptive use of CO<sub>2</sub> and still others are consumptive uses. A tentative list of eight promising CO<sub>2</sub> pathways was identified in each category. The next step for the Task Force will be to develop a Phase II report which will provide a more thorough discussion and analysis of the most attractive options identified.

David Cooling of Alcoa of Australia Ltd., Australia described the Residue Carbon Capture Project which is an example of CO<sub>2</sub> utilization. This project was visited in the site tour the previous day. The production of aluminum from bauxite creates a highly caustic wet mud which must be dried and disposed of, which is a very capital and labor-intensive process. Treating the mud with CO<sub>2</sub> makes it less caustic and enables it to be dried more easily, thus opening opportunities for reuse and allowing it to be spread on the ground as a biologically active soil. This provides a permanent sink for the CO<sub>2</sub>. CO<sub>2</sub> for this project is available

from the nearby Kwinana Carbon Capture Plant. CO<sub>2</sub> adds value to Alcoa of Australia Ltd. Potential future developments include use of CO<sub>2</sub> from other sources and new uses of the process.

Sizhen Peng of the Administrative Centre for Agenda 21, Ministry of Science and Technology, China said there are many different potential approaches to CO<sub>2</sub> utilization other than CO<sub>2</sub>-EOR. He said CCUS should help with sustainable development. CCUS should serve as an important tool to match urgent and important energy and resource needs. He gave several examples of CO<sub>2</sub> utilization in China such as the production of liquid minerals or solving water resource issues. For example, water could be extracted when CO<sub>2</sub> is injected in areas with water shortages.

Ahmed Al-Eidan, Saudi Aramco, Saudi Arabia, spoke about the relationship between CCS and CCUS. He said that CCUS can be a bridge to CCS. It has to have the components of safe storage, an anthropogenic source should be used, and it should have a monitoring program and closure. There are still areas to improve on CO<sub>2</sub>-EOR, particularly in the residual oil zone and injection of carbonated water. Technologies for CO<sub>2</sub> geologic storage and EOR can complement each other.

A discussion followed the presentations. Mr. Riis noted that CO<sub>2</sub> is recycled in EOR and this makes it much more complicated to convince people that EOR is safe storage. He asked how it would be possible to show that it is safe storage. The response was that if wells used for EOR are properly sealed, CO<sub>2</sub> already there will stay in place. Ultimately, most of the injected CO<sub>2</sub> will stay in the ground. It was also pointed out that if CO<sub>2</sub> storage has no value, oil producers will emphasize EOR, not storage.

Mr. Riis asked whether other methods of using CO<sub>2</sub> for hydrocarbon production are near-term. Stefan Bachu responded that there are differences between EOR and enhanced gas recovery. In oil production, most of the original oil in place will be left after primary recovery, meaning that most of the oil remains to be produced by enhanced oil recovery. By contrast, 80 to 90 percent of gas in a reservoir is typically produced and this usually makes it uneconomic to recover the rest. Enhanced Coal Bed Methane Recovery pilots have been scientifically successful but not economic. Using CO<sub>2</sub> for shale gas and oil production is very new.

Mr. Riis asked whether non-consumptive uses could contribute. The response was that there may be opportunities to use the same CO<sub>2</sub> twice and thus eliminate the need to generate CO<sub>2</sub> for the second use. There are also exotic options such as algae, but they are probably some time off.

Consumptive uses such as the production of new minerals were seen as too expensive due to the extensive materials handling and high energy use. These processes would only work if done as part of another process.

## **12. Roundtable: Outreach on Critical Issues**

James Wood moderated this roundtable discussion. Opening the roundtable, Mr. Wood defined public outreach as making an effort to understand, anticipate and address public perceptions of and concerns about CO<sub>2</sub> storage. It is very difficult to reach the public when the public has limited technical literacy. Public outreach faces several key challenges. These

include timing, uncertainty, fear of the unknown and independent verification of responsible behavior. He noted that the US Regional Carbon Sequestration Partnerships has prepared a best practices manual on public outreach for carbon storage projects. Outreach efforts should identify key stakeholders early and understanding their concerns at an emotional level is necessary in order to develop and implement an effective communications strategy. Key messages must be tailored to their concerns and communicated by an established “face” of the project. He also described how the Hydrogen Energy California (HECA) Project did effective public outreach by demonstrating that it was producing local benefits.

Victoria Osborne of Striker Communications, a United States public relations firm, raised the question of whether a communications process for CCUS can be developed in a proactive way. She said that this would require an updated definition of public relations as a strategic communications process that builds mutually beneficial relationships, but there are many roadblocks to such a process. It is often not true that more information leads to greater acceptance; the public and the media want stories, not facts. She also raised questions about the effectiveness of the websites of CCUS organizations such as the CSLF and the Global CCS Institute, noting that they attract far less traffic than do the websites of major Environmental NGOs. Public relations efforts draw on passion, resources and time. Different communicators have these to different extents. Bloggers, for example, have much passion and time, but few resources, while NGOs have much passion and resources, but not much time. An effective communications campaign by CCUS advocates would require a balance of passion, time and resources as well as a good story.

Dominique Van Gent of the Western Australia Department of Mines and Petroleum described the lessons learned from the community consultation process for the Southwest Hub Project, an integrated CO<sub>2</sub> project in which CO<sub>2</sub> is permanently stored in red mud from aluminum production. The community consultation strategy, developed in 2010, consists of numerous discussions with community groups about each activity in the project, but each activity must be part of the total project. One of the key lessons is that language—the exact words used—are important. In particular, avoid technical language, which is not understood. The involvement of the local community, both local companies and schools, helps to develop good community relationships. It is as important to listen as it is to talk and also make yourself available to answer questions. Avoid surprises to the community and local government. Acceptance comes when the community’s questions are answered in a way that is understood.

Bill Spence, Shell, Netherlands, spoke on Shell’s experience with community outreach. He contrasted the approach Shell used at the early CCS project at Barendrecht in the Netherlands and the lessons learned in that project, with the approach used later for the Quest project in Alberta, Canada. The project at Barendrecht was abandoned due to the opposition of the local community. The developers of that project did not understand that community’s concerns. There is a need to listen.

John Nayton of Nayton Communications, Australia discussed problems with communications. He saw a major problem being a difference in personality types between executives and general public stakeholders, citing differences in personalities as measured by the Myers-Briggs psychological test of those two groups. He said that what matters to executives in making judgments is science, evidence, processes, problem-solving, experience and facts. By contrast, most stakeholders make judgments based on considerations such as

credibly, accountability, transparency, confidence, oversight and integrity. Delivering “facts” is inadequate to communicate to stakeholders. Effective communications is about earning trust and credibility, ensuring that those who are accountable, not public relations people, do the communications, and build long-term relationships. Stakeholders want to be considered and to be treated with respect.

At the conclusion of the presentation James Wood suggested that feedback be gathered on how the CSLF projects itself on its website in order to see how it can be improved.

### 13. Closing Remarks and Adjourn

Barbara McKee asked if there were any conflicts with November 4 through 8, 2013 for the CSLF meeting next year with the Ministers meeting on November 7. No concerns were expressed and so planning will go forward with those dates.

Margaret Sewell noted that we talked about re-energizing the interest in CCS and that the Ministerial will be an opportunity to accomplish that by having the Ministers make strong statements, particularly about safety of storage.

Chair McKee thanked the delegates and observers for their hard work and participation over the last three days and said that much had been accomplished. She also thanked the Australian hosts for their hospitality and the members of the Secretariat who worked hard on this meeting and supported CSLF task forces. She also said that the United States very much appreciates the opportunity to continue to chair the Policy Group. Finally, she encouraged all the participants to continue their efforts to make CCUS a commercial reality throughout the world.

#### **ACTION ITEMS FROM THE JOINT MEETING OF THE POLICY AND TECHNICAL GROUPS**

<b>Item</b>	<b>Lead</b>	<b>Action</b>
1	Technical Group	Create a roadmap with clear and concise messages for Ministers and others for what must be achieved by 2020
2	Technical Group Chair	Serve on the Steering Committee for the next Ministerial
3	Technical and Policy Groups	Conduct a dialog over the next several months to discuss issues and messages for the Ministers
4	France	Write a short executive summary of the Paris Workshop on Risk and Liability
5	Task Force on Communication and Public Outreach	Review the CSLF website to make it more attractive for a wider audience
6	Secretariat and Ministerial Steering Committee	Plan for the CSLF meetings next year on November 4 through 8, 2013, with the Ministerial being on November 7
7	Ministerial Steering Committee	Develop a statement for the Ministers to make at the Ministerial that CCS/CCUS will be safe