Minutes of the Technical Group Meeting

Warsaw, Poland
Tuesday, 28 October 2014

LIST OF ATTENDEES

Chair Trygve Riis (Norway)

Technical Group Delegates

Australia:	Clinton Foster (*Vice Chair*), Zoe Naden
Canada:	Eddy Chui (*Acting Vice Chair*), Kathryn Gagnon
China:	Sizhen Peng, Xian Zhang, Chenyong Sun
European Commission:	Estathios Peteves
France:	Didier Bonijoly, David Savary
Italy:	Giuseppe Girardi
Japan:	Ryozo Tanaka, Takashi Kawabata
Korea:	Chang Keun Yi, Seung Phill Choi
Mexico:	Giselle Pérez
Netherlands:	Paul Ramsak
Norway:	William Christensen, Lars Ingolf Eide
Poland:	Elżbieta Wróblewska, Piotr Kisiel
Russia:	Oleg Tailakov, Valery Zakharov
Saudi Arabia:	Ahmed Aleidan
South Africa:	Tony Surridge (*Vice Chair*), Landi Themba
United Kingdom:	Philip Sharman, Suk Yee Lam
United States:	John Litynski

Representatives of Allied Organizations

IEA GHG: Tim Dixon

CSLF Secretariat

Richard Lynch, Adam Wong

Invited Speakers

Małgorzata Mika-Bryska, Deputy Director, Energy Department, Ministry of Economy, Poland
Elżbieta Wróblewska, Coordinator, Unit of New Technologies and Environmental Protection, Energy Department, Ministry of Economy, Poland
Liv Bjerge, Project Manager, Norcem CO_2 Capture Project, Norway

Observers

IEA:	Tristan Stanley
Poland:	Alexander Koteras, Adam Wócicki
South Africa:	Gina Downes
United Kingdom:	Luke Warren
United States:	Jim Wood

1. Chairman's Welcome and Opening Remarks

Trygve Riis

The Chairman of the Technical Group, Trygve Riis, called the meeting to order and welcomed the delegates and observers to Warsaw.

Mr. Riis provided context for the meeting by mentioning that during this meeting the Technical Group would be updating its Action Plan, especially for two proposed actions where decisions on whether or not to move forward had been postponed at the March 2014 Technical Group meeting in Seoul, Korea. Appraisals on these proposed actions, by delegates from the United Kingdom and South Africa, are agenda items for the current meeting. Mr. Riis also noted that two currently active task forces will be providing updates, as will the Projects Interaction and Review Team which has researched and developed a progress report on the CSLF Technology Roadmap.

In closing, Mr. Riis also mentioned that the current meeting includes an informative presentation about the current status of CCS in Poland and a presentation about the Norcem CO_2 Capture Project which has been nominated for CSLF recognition.

2. Host Country Welcome

Małgorzata Mika-Bryska

Małgorzata Mika-Bryska, Deputy Director of the Energy Department at Poland's Ministry of Economy, welcomed the CSLF Technical Group to Warsaw and provided a keynote message for the meeting. On October 24th, the European Council agreed on the 2030 climate and energy policy framework for the European Union, and this included a binding EU target of a 40% reduction in greenhouse gas emissions by 2030 as compared to 1990. Ms. Mika-Bryska stated that this decision sets a benchmark for the rest of the world and it is hoped that all economies, not just the major economies, would agree to make emissions reductions of this magnitude next year in Paris at the 2015 United Nations Climate Change Conference.

Ms. Mika-Bryska closed her brief remarks by stating that the CSLF is an example of the kind of forum that is very important part of the global dialog on climate change. A common effort toward finding ways to propagate technologies like CCS for addressing climate change is the right path not only for Europe but also the rest of the world.

3. Introduction of Delegates

Technical Group delegates present for the meeting introduced themselves. Seventeen of the twenty-three CSLF Members were present, including representatives from Australia, Canada, China, the European Commission, France, Italy, Japan, Korea, Mexico, the Netherlands, Norway, Poland, Russia, Saudi Arabia, South Africa, the United Kingdom, and the United States. Observers representing the International Energy Agency, Poland, South Africa, the United Kingdom, and the United States were also present.

4. Adoption of Agenda

The Agenda was adopted without change.

5. Approval of Minutes from Seoul Meeting

The Minutes from the March 2014 Technical Group Meeting were approved with one minor alteration: in Item 9, change the description of the GHGT-12 conference to show that it was organized by the IEA GHG and not sponsored by that organization.

6. Report from CSLF Secretariat

Richard Lynch

Richard Lynch provided a two-part report from the Secretariat which covered the status of action items from the March 2014 meeting in Korea and some of the highlights from that meeting.

Mr. Lynch stated that there were eight Action Items from the March 2014 meeting, seven of which are now complete. For the remaining Action Item, the Secretariat will not be creating a new page at the CSLF website for compilation of Best Practice Manuals and other related results from the recently-concluded task force in that area. Instead, the Global CCS Institute has recently brought this information online at its "**decarboni.se**" website and the Secretariat will create a link to that page from the CSLF website.

Concerning the March 2014 meeting, Mr. Lynch mentioned that it was a four-day event, including a technology workshop and visits to CO_2 capture pilot plants at Hadong and Boryeong. The Technical Group created a new Task Force on Offshore CO_2 Storage (led by the United States), and concluded activities for the Review of Best Practices and Standards Task Force (which had been led by Norway). The overall meeting also included a Roundtable on CCS Technologies and Projects for Emerging Economies which depicted how CCS would work best in emerging economy countries.


Elżbieta Wróblewska

7. CCS in Poland

Elżbieta Wróblewska, Coordinator of New Technologies and Environmental Protection in the Energy Department at Poland's Ministry of Economy, gave a presentation that described the status of CCS in Poland. Poland's energy

mix for electricity generation is extremely dependent on hard coal and lignite, which combined account for nearly 85% of power generation. Therefore, clean coal technologies, including development of CCS and CO_2 utilization technologies, have become a priority. Poland's involvement with CCS dates back to 2008 when the Ministry of Environment initiated a four-year research program to locate and characterize geological formations where safe and secure sequestration of CO_2 could be done. In 2009, the Ministry of Economy issued the "Energy Policy of Poland until 2030" and included CCS as a part of the overall energy strategy.

Ms. Wróblewska stated that Poland began a R&D program on "New Technologies for Energy Generation" in 2009, with three of the four main tasks concerning research on clean coal technologies including CCS options. In particular, Poland's Institute for Chemical Processing of Coal (IChPW) has tested, at small pilot-scale, two promising technologies: high-pressure coal oxycombustion and fluidized-bed coal gasification utilizing CO_2 as a feedstock in the gasification process. This latter method was shown to improve the efficiency of production of end-products such as fuels and chemicals.

Concerning CO_2 capture, Ms. Wróblewska stated that two pilot-scale facilities have been built, at the Łagisza and Jaworzno coal-fueled power plants, for testing vacuum-pressure swing adsorption and amine-based CO_2 capture technologies. Information gained will help optimize such systems for subsequent use in larger-scale pilots. As for CO_2 storage and utilization, Ms. Wróblewska mentioned that there have been a number of studies and assessments in those areas, and that the Ministry of Environment and the National Centre of Research and Development have funded a program which includes case studies, injection simulations, laboratory experiments, and other related activities. These had been intended to support the now-cancelled Bełchatów CCS Project, but the outcomes could be used in conjunction with any other projected future demonstration project.

Ms. Wróblewska ended her presentation by describing Poland's laboratory infrastructure for support of CCS and related topics. The IChPW, located in Zabrze, has been working on pressurized oxycombustion of solid fuels and chemical looping combustion. The Central Mining Institute, located in Katowice, has been supporting interdisciplinary research, including process engineering analyses. There is also a technology centre, located at an experimental mine in Mikołów, which is involved in coal gasification research. These are all part of The Clean Coal Centre, a €41 million project co-financed with European Union funds. A new Energy Centre at the AGH University of Science and Technology in Kraków is also part of the overall project and will open in late 2014.

During the ensuing discussion, William Christensen inquired about Poland's short-term plans for CCS development, including the status of the Bełchatów CCS Project where a full-scale CCS project had been planned at the power plant's new 858 megawatt lignite-fueled unit. Małgorzata Mika-Bryska responded, stating that the Bełchatów Project was not moving forward largely because of cost. The agreement with the European Union to become one of its flagship projects meant that if the project had proceeded, it would have had an obligation to be in operation for ten years. Given the current high operational cost (and plant efficiency loss) for CO_2 capture, this would have resulted in a cumulative extra cost of approximately one billion zlotys which would have raised the price of energy from the power plant to an unacceptable level. Ms. Mika-Bryska stated that Poland had instead opted, in the near term, to work on CCS at a smaller scale and the laboratory infrastructure described by Ms. Wróblewska is an example of that.

8. Update from the IEA Greenhouse Gas R&D Programme (IEA GHG)

Tim Dixon

Tim Dixon gave a presentation about the IEA GHG and its continuing collaboration with the CSLF's Technical Group. The IEA GHG was founded in 1991 with the mission to provide information about the role of technology in reducing greenhouse gas emissions from use of fossil fuels. The focus is on CCS, and the goal of the organization is to produce information that is objective, trustworthy, and independent, while also being policy relevant but not policy prescriptive. The "flagship" activities of the IEA GHG are the technical studies and reports it publishes on all aspects of CCS, the nine international research networks about various topics related to CCS, and the biennial GHGT conferences, the most recent of which was held earlier in October in Austin, Texas, USA.

Mr. Dixon mentioned that since 2008 the IEA GHG and CSLF Technical Group have enjoyed a mutually beneficial relationship which allows each organization to cooperatively participate in the other's activities. This has included the opportunity for the Technical Group to propose studies to be undertaken by the IEA GHG. These, along with proposals from IEA GHG Executive Committee (ExCo) members, go through a selection process at semiannual ExCo meetings. So far there have been three IEA GHG studies that originated from the CSLF Technical Group: "Development of Storage Coefficients for CO_2 Storage in Deep Saline Formations" (March 2010), "Geological Storage of CO_2 in Basalts" (September 2011), and "Potential Implications of Gas Production from Shales and Coal for CO_2 Geological Storage" (November 2013). The most recent proposal from the Technical Group was for a benchmarking lifecycle assessment of carbon capture, utilization, and storage (CCUS). Mr. Dixon stated that this was approved at the 46th IEA GHG ExCo Meeting, in October, with the anticipated outcome being a workshop and an accompanying report. Mr. Dixon also stated that the next deadline for receiving outlines for proposed IEA GHG studies is 22 January 2015.

During ensuing discussion, John Litynski and Sizhen Peng both mentioned that work going on in their countries could perhaps be inputs to the benchmarking lifecycle assessment, and agreed to provide relevant information as it becomes available. Dr. Peng noted that a Chinese report covering 25 different CO_2 utilization technologies had been completed and that an English language version of the report would be available at about the end of 2014. The Secretariat was requested to post a link to the Chinese report, once it is available, at the CSLF website.

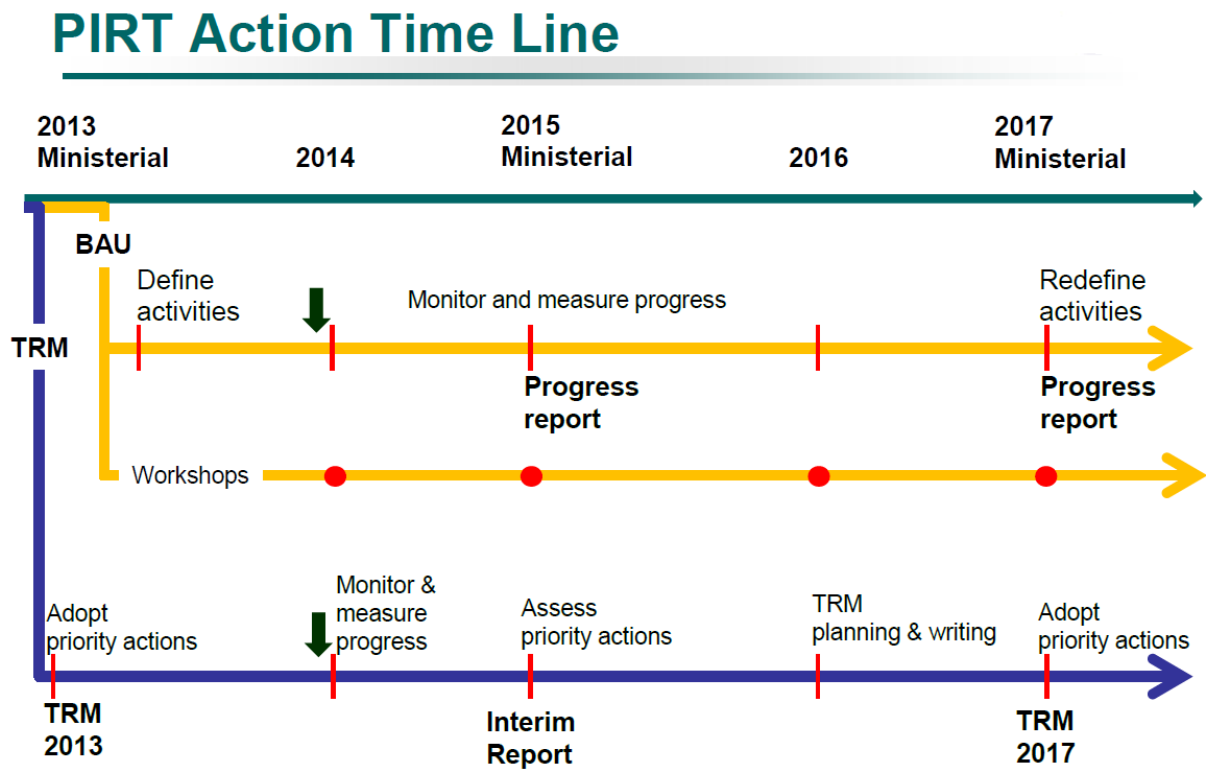
9. Report from the CSLF Projects Interaction and Review Team (PIRT) and Update on the CSLF Technology Roadmap (TRM)

The PIRT Chair, Clinton Foster, gave a short presentation that summarized the previous day's PIRT meeting, including a brief update on the CSLF-recognized Gorgon Project. The PIRT currently has two main types of responsibilities. "Business As Usual" (BAU) activities include monitoring and measuring progress of the portfolio of CSLF-recognized projects, investigation of any new projects proposed for CSLF recognition, and

organizing CSLF Technology Workshops. In parallel to this, the PIRT also has primary responsibility for updating the TRM.

Dr. Foster stated that the PIRT is on track in both of these areas of responsibility. During its previous day meeting, the PIRT had evaluated the Norcem CO_2 Capture Project as a first step in the CSLF recognition process and had been updated on the status and progress of the CSLF-recognized Gorgon CO_2 Injection Project (both of these BAU activities). In addition, the PIRT had developed a plan for producing a TRM Interim Report in time for the next CSLF Ministerial Meeting.

Clinton Foster



Specific outcomes from the meeting were:

- The PIRT recommends approval by the Technical Group for the Norcem CO_2 Capture Project.
- The PIRT will continue to gather information, from organizations which are actively working on various aspects of CCS, about "Identified Technology Needs" that were described in the 2013 TRM.
- The Secretariat will organize information received and working groups formed within the PIRT will examine this information as it pertains to the ten needs areas:

  Area #1: CO_2 Capture Technologies in Power Generation (*Norway*)

  Area #2: CO_2 Capture in Industrial Sector (*South Africa* and *United Kingdom*)

  Area #3: CO_2 Transport (*Australia*)

Area #4: Large-Scale CO_2 Storage (*Japan* and *France*)

Area #5a: Monitoring (*United States* and *France*)

Area #5b: Mitigation / Remediation (*European Commission*)

Area #6: Understanding the Storage Reservoirs (*United Kingdom* – to be confirmed)

Area #7: Infrastructure (*United Kingdom*)

Area #8a: CO_2 Utilization, non-Enhanced Oil Recovery [EOR] (*France*) [also see below]

Area #8b: CO_2 Utilization, EOR (*Saudi Arabia* and *Canada*)

- The ten working groups will write short progress reports for these areas that will be combined into a TRM Interim Report for the next CSLF Ministerial Meeting.

Dr. Foster stated that the Secretariat had prepared a short TRM Progress Report for the current meeting, which was based on information-gathering activities subsequent to the March 2014 meeting. A template, developed by the Secretariat, was used to solicit the opinions of organizations in CSLF member countries about perceived progress in the ten needs areas. As of September 29th, a total of twelve completed templates had been returned and these were used as inputs to the TRM Progress Report. There was judged not to be enough information yet to definitely describe the global status of CCS, but some trends were evident:

- For 1st generation technologies, none of the 10 technology needs areas were perceived as "fast moving" in terms of progress. Progress in most areas was perceived as a mixed opinion of "very slow" and "moderate".
- Results for 2nd and 3rd generation technologies were similar, but many more "no opinion" responses were received.
- There appeared to be a geographical bias in responses so far received. North American responders were, in general, more pessimistic on the amount of progress being made.
- All types of barriers and/or drivers (economic, policy, and technology) were perceived to exist for most technology needs areas.
- Individual country results provided a wide range of responses, showing that issues surrounding CCS are viewed by different countries in different ways.

One of the conclusions from this exercise was that the 2013 TRM is still reasonably accurate in its depiction and portrayal of the status and barriers/drivers for development and deployment of CCS technologies. There is still a need for progress in all of the technology needs areas, some more than others. Also, results confirm that worldwide, CCS is not a "one size fits all" collection of technologies and there appears to be a great need for individualized country-specific technology roadmaps.

Dr. Foster closed his presentation by noting that at the previous day's PIRT meeting, Canada had volunteered to be part of the Area #8b working group on EOR. Sizhen Peng then requested that China be part of the Area #8a working group on non-EOR CO_2 utilization, and this was welcomed and accepted by Dr. Foster on behalf of the PIRT.

10. Report from Review of CO_2 Storage Efficiency in Deep Saline Aquifers Task Force

Richard Lynch provided a brief update on the task force and its timeline on behalf of the Task Force Chair, Stefan Bachu, who could not attend the meeting. The task force was

established at the November 2013 meeting in Washington, with the mandate to critically review, compile and report on relevant literature published since the 2007 final report by the CSLF Task Force for Review and Identification of Standards for CO_2 Storage Capacity Estimation. Storage capacity estimates can be "static" (i.e., based on pore volume) or "dynamic" (i.e., based on injectivity and pressure build-up). The mandate of the task force was to review, compile, and report on published literature since the 2007 final report of the previous task force, and also to review and evaluate the applicability of various published values for the storage efficiency coefficient 'E', which is the amount of CO_2 that can be stored in a unit of aquifer pore volume.

Mr. Lynch mentioned that Dr. Bachu intends to report on the task force's findings in a special issue of *The International Journal of Greenhouse Gas Control*, which will be published mid-year 2015, and this paper would also serve as the task force's final report. The title of Dr. Bachu's paper will be "CO_2 Storage Efficiency in Deep Saline Aquifers". Dr. Bachu also provided his intention to disband the task force, and there was consensus that upon publication of the paper the task force will have concluded its activities.

11. Report on Barriers and Technical Needs for Sub-Seabed Storage of CO_2

John Litynski

John Litynski gave a brief update on the task force and its timeline on behalf of the Task Force Chair, Mark Ackiewicz, who could not attend the meeting. The task force was established at the March 2014 meeting with the mandate to identify technical barriers and R&D needs/opportunities for sub-seabed storage of CO_2. Mr. Litynski stated that the task force had so far established its membership and developed a draft outline of what its final report would be. A first draft of the report is expected by about the end of 2014. At the 2015 CSLF Mid-Year Meeting, the task force will report its findings and conclusions, and submit its final report to the Technical Group. Sections of the report will be written by the United States, Japan, Norway, and the IEA GHG. Mr. Litynski also stated that the task force will hold a teleconference soon to finalize the report's outline.

During the ensuing discussion, Tim Dixon stated that the IEA GHG would like to contribute to the chapter of the report on "Monitoring, Verification and Assessment Tools for Offshore Storage" that Norway will be drafting. Suk Yee Lam stated that the United Kingdom was volunteering to join the task force. Both of these offers were welcomed and accepted by Mr. Litynski on behalf of the task force.

Tony Surridge

12. Appraisal of the Proposed Technical Group Action concerning CCS with Industrial Emissions Sources

Tony Surridge provided an assessment of the proposed Technical Group Action Plan item on "CCS with Industrial Emissions Sources". At the March

2014 meeting, a decision had been postponed on whether or not to form a task force in this area pending review of results from a Norwegian workshop and a United Kingdom report related to this topic. Dr. Surridge stated that additionally, a "framework" report had been completed by South Africa on this topic. Based on the findings of the two reports and workshop, Dr. Surridge concluded that there was no need for a new task force. The delegations from Norway and the United Kingdom added their support for this recommendation and after brief discussion there was consensus not to form such a task force.

13. Appraisal of the Proposed Technical Group Action concerning Energy Penalty Reduction

Philip Sharman

Philip Sharman provided an assessment of the proposed Technical Group Action Plan items on "Energy Penalty Reduction". At the March 2014 meeting, a decision had been postponed on whether or not to form a task force in this area. Mr. Sharman stated that results from the United Kingdom's CCS Cost Reduction Task Force had provided a good basis for further work in this area, as it had identified several prime targets for cost reduction, including designing CCS projects (including transport) at an optimal scale and de-risking the CCS chain by encouraging the right funding mechanisms and stronger/better regulatory frameworks. However, further work in this area would be premature, until results from ongoing front-end engineering design (FEED) studies are available for some of the large-scale projects that are now in planning stages. Mr. Sharman concluded that there was not yet a need form a new task force in this area and instead continue to collaborate with the Policy Group on its action for "Supporting Development of 2nd and 3rd Generation CCS Technologies". There was consensus to accept this recommendation.

14. Review of Technical Group Action Plan

Trygve Riis stated that the Secretariat had prepared an Action Plan Status Report, which was included in the meeting's documents book. Mr. Riis inquired if there were ideas for other possible additions to the Technical Group's Action Plan, but there were no proposals for new task forces.

15. Review and Approval of Project Proposed for CSLF-Recognition: Norcem CO_2 Capture Project

Liv Bjerge

Liv Bjerge, Project Manager for the Norcem CO_2 Capture Project, gave a presentation about the Norcem project. This project, located in southern Norway at a commercial cement production facility, is testing four different post-combustion CO_2 capture technologies at scales ranging from very small pilot to small pilot. Technologies being tested are a 1st generation amine-based solvent, a 3rd generation solid sorbent, 3rd generation gas separation membranes, and a 2nd generation regenerative calcium cycle, all using flue gas from the cement production facility. Objectives of the project are to determine the

long-term attributes and performance of these technologies in a real-world industrial setting and to learn the suitability of such technologies for implementation in modern cement kiln systems. Important focus areas include CO_2 capture rates, energy consumption, impact of flue gas impurities, space requirements, and projected CO_2 capture costs. Project partners include Norcem, HeldelbergCement, and the European Cement Research Academy, and the project has also received funding from Norway's CLIMIT program. The project began in 2013 and is expected to continue into 2017.

After a brief discussion, there was consensus to recommend to the Policy Group that the Norcem CO_2 Capture Project receive CSLF recognition.

16. Collaboration with the CSLF Policy Group

Trygve Riis informed the Technical Group about outcomes from the June 2014 Policy Group Meeting in London. One of the actions from that meeting was formation of a joint Policy-Technical task force on "Supporting Development of 2nd and 3rd Generation CCS Technologies", with Norway assuming the lead for the Technical Group. The technical mandate of the task force includes:

- Mapping/identifying 2nd and 3rd generation technologies under consideration in CSLF member countries, especially those that may mature in the 2020-2030 timeframe;
- Identifying major challenges facing development of these next generation technologies; and
- Using existing networks such as the International CCS Test Centre Network to map potential for testing these next generation technologies at existing test facilities.

Mr. Riis stated that he would be reporting on this topic at the Policy Group meeting on October 30th, but previewed his presentation at this current meeting in order to get comments and suggestions from the Technical Group delegates. Kathryn Gagnon remarked that this task force builds on the good work done by Lars Ingolf Eide in setting up the International Test Centre Network and creates a hub structure that facilitates information gathering. Suk Yee Lam noted that the United Kingdom had commissioned an in-house report from the IEA GHG assessing new CO_2 capture technologies that would provide valuable information for the task force, and Tim Dixon commented that the report should be released by about the end of 2014. Philip Sharman inquired about the scope of the task force and if it should be limited to utility applications related to cost of electricity, and Mr. Eide responded that the task force would be limited in scope to only CO_2 capture technologies, but that this could include industrial applications.

Mr. Riis noted that for this task force to be successful, other CSLF member countries would need to volunteer to participate. In response, delegations from the European Commission, Japan, Korea, the United Kingdom, and the United States all expressed their interest in contributing, as did the IEA GHG. Mr. Riis stated that he would recommend to the Policy Group that Norway and Canada be co-chairs, with Canada being mainly responsible for Policy-related aspects and Norway taking the lead for all Technical-related components.

17. Update on Future CSLF Meetings

Richard Lynch announced that the next CSLF meeting will be in June 2015 in Regina, Saskatchewan, Canada. This will be a five day meeting, organized as follows:

- Day 1: PIRT meeting (in afternoon)
- Day 2: Technical Group meeting
- Day 3: Technology Workshop
- Day 4: Visit to CSLF-recognized Boundary Dam Project
- Day 5: Policy Group meeting

Mr. Lynch stated that further details concerning the Regina meeting would be forthcoming soon. Ahmed Aleidan then stated that Saudi Arabia will be hosting the 6th CSLF Ministerial and that a more formal announcement would be made during the October 30th Policy Group meeting.

18. Open Discussion and New Business

Clinton Foster proposed that the Technical Group consider a new activity that would examine how gas stream compositions affect the performances of CO_2 capture solvents. Such an investigation might be relevant to the new Policy-Technical task force on "Supporting Development of 2nd and 3rd Generation CCS Technologies". Dr. Foster stated that he would prepare a paper on this topic for the next Technical Group meeting.

Tony Surridge reported that South Africa has published a framework report with support from the CSLF Capacity Building Fund, on impacts of CCS on South African national priorities beyond climate change. This report, titled "CCS Impact on South African National Priorities", is now linked at the CSLF website (from the "Publications and Links" page). Dr. Surridge also stated that South Africa will be conducting a pilot-scale surface CO_2 monitoring project that will develop baselines and methodologies for utilization by the planned pilot-scale CO_2 storage project scheduled for 2017. Dr. Surridge mentioned that there have already been two workshops held in support of this project, one in South Africa and one at the recent GHGT-12 Conference, and that CSLF members were welcome to participate.

19. Review of Consensuses Reached and Action Items

Consensus was reached on the following items:

- The Norcem CO_2 Capture Project is recommended by the Technical Group to the Policy Group for CSLF recognition.
- The Review of CO_2 Storage Efficiency in Deep Saline Aquifers Task Force has concluded its work and will disband following publication of its journal paper.
- The Technical Group will not form a task force to address the Action Plan item on "CCS with the Industrial Emissions Sources".
- The Technical Group will not yet form a task force to address the Action Plan item on "Energy Penalty Reduction".
- The Technical Group will continue its collaboration with the Policy Group on "Supporting Development of 2nd and 3rd Generation CCS Technologies" with Norway the lead for all technical-related components. Other task force members will include Japan, Korea, the United Kingdom, the United States, and the IEA GHG.

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 Norcem CO_2 Capture Project be recognized by the CSLF. (*Note: this was done at the October 30th Policy Group meeting.*)
2	CSLF Secretariat	Finalize the minutes from the March 2014 meeting, incorporating one minor change.
3	CSLF Secretariat	Provide a link at the CSLF website to the English-language version of China's report on CO_2 utilization technologies.
4	CSLF Secretariat	Produce a new Action Plan Status Report for the next Technical Group Meeting.
5	Technical Group Chair	Provide the Technical Group's recommendation to the Policy Group that Norway and Canada be co-chairs for the joint Policy-Technical task force on "Supporting Development of 2nd and 3rd Generation CCS Technologies". (*Note: this was done at the October 30th Policy Group meeting.*)
6	Australia	Prepare a paper for the next Technical Group meeting on a possible new activity for examining how gas stream compositions affect the performances of CO_2 capture solvents.

20. Closing Remarks / Adjourn

In adjourning the meeting, Trygve Riis expressed his appreciation to the host country Poland, the CSLF Secretariat, and all the meeting attendees. Mr. Riis mentioned that the meeting was very interactive and participatory, and that much had been accomplished in this the beginning of the run-up to next year's Ministerial meeting.

Addendum to Minutes:
Affiliations of CSLF Technical Group Delegates

Ahmed Aleidan, Petroleum Engineer, EXPEC Advanced Research Center, Saudi Aramco, Saudi Arabia

Didier Bonijoly, Deputy Director for Geosciences, BRGM, France

Seung Phill Choi, Senior Advisor, KCCSA, Korea

William Christensen, Deputy Director General, Ministry of Petroleum and Energy, Norway

Eddy Chui, Director, Clean Electric Power Generation, CanmetENERGY, Natural Resources Canada

Lars Ingolf Eide, Consultant, CLIMIT Programme, Research Council of Norway

Clinton Foster, Chief Scientist, Geoscience Australia

Kathryn Gagnon, Policy Advisor, Innovation and Energy Technology, Natural Resources Canada

Giuseppe Girardi, Manager, Sustainable Fossil Fuels and CCS, ENEA, Italy

Takashi Kawabata, Deputy Director, Environmentally Sustainable Industries and Technologies Office, Ministry of Economy, Trade and Industry, Japan

Piotr Kisiel, Senior Expert, Energy Department, Ministry of Economy, Poland

Suk Yee Lam, Office of Carbon Capture and Storage, Department of Energy and Climate Change, United Kingdom

John Litynski, Division of Carbon Capture and Storage R&D, Office of Fossil Energy, United States Department of Energy

Zoe Naden, International CCS Policy, Clean Energy and Environment Division, Department of Industry, Australia

Sizhen Peng, Deputy Director General, ACCA21, Ministry of Science and Technology, China

Giselle Pérez, SENER, Mexico

Estathios Peteves, Head of Unit – Energy Systems Evaluation, Institute for Energy and Transport, European Commission

Paul Ramsak, Energy and Climate Agency, Netherlands

Trygve Riis, Special Adviser, Division for Energy, Resource's and the Environment, Research Council of Norway

David Savary, Senior R&D Engineer, Solvay, France

Philip Sharman, Director, Evenlode Associates Ltd., United Kingdom

Chenyong Sun, Deputy Director General, Department of Social Development, Ministry of Science and Technology, China

Tony Surridge, Senior Manager: Advanced Fossil Fuel Use, SANEDI, South Africa

Oleg Tailakov, Vice-Rector of T.F. Gorbachev Kuzbass State Technical University, Russia

Ryozo Tanaka, Senior Researcher, CO_2 Storage Research Group, RITE, Japan

Landi Themba, Director, Coal and Gas Policy, Department of Energy, South Africa

Elżbieta Wróblewska, Coordinator of the Team for Environmental Protection and New Technologies, Energy Department, Ministry of Economy, Poland

Chang Keun Yi, Director, Climate Change Technology Research Division, KIER, Korea

Valery Zakharov, Director of the Institute of Comprehensive Exploitation of Mineral Resources, Russian Academy of Sciences

Xian Zhang, ACCA21, Ministry of Science and Technology, China