



**Minutes of the Policy Group Meeting
Riyadh, Saudi Arabia
Tuesday, November 3, 2015**

LIST OF ATTENDEES

Chair

Christopher Smith, United States

Policy Group Delegates

Australia: Josh Cosgrave, Andrew Barrett
Brazil: José Renato
Canada: Geoff Murphy
China: Xian Zhang (*Vice Chair*), Qiang Liu
European Commission: Jeroen Schuppers
France: Bernard Frois
Germany: Thomas Gäckle, Almut Fischer
Italy: Sergio Persoglia
Japan: Takashi Kawabata, Ryoza Tanaka
Korea: Byeong Yeol Jeon, Sang Joo Baek
Mexico: Rubén Beltrán-Palafox
Netherlands: Paul Van Slobbe
Norway: William Christensen, Fredrik Netland
Poland: Marek Malarski
Romania: Daniela Barbu, Mircea Toader
Saudi Arabia: Khalid Abuleif (*Vice Chair*), Hamoud AlOtaibi
South Africa: Gina Downes, Tony SurrIDGE
United Arab Emirates: Arafat Saleh Al-Yafei, Khaled Al-Yaqoubi
United Kingdom: Tony Ripley (*Vice Chair*), Brian Allison
United States: Julio Friedmann, Mark Ackiewicz

Representatives of Allied Organizations

Global CCS Institute: Victor Der, Andrew Purvis
IEA: Tristan Stanley
IEAGHG: Tim Dixon

CSLF Secretariat

Jarad Daniels, Richard Lynch, Adam Wong

Invited Speakers, Distinguished Guests, and Observers

Australia: Max Watson
Canada: Eddy Chui, Michael Monea
Chinese Taipei: Vincent S.N. Chen, Yi-Shun Chen, Shoung Ouyang
Czech Republic: Pavel Kavina
France: Didier Bonijoly
Korea: Chang Keun Yi, Chong Kul Ryu
Netherlands: Hans Schoenmakers

Norway:	Trygve Riis, Lars Ingolf Eide, Åse Slagtern
Qatar:	Saif Al-Naimi
Romania:	Andrei Gerea
Saudi Arabia:	Saeed Alalloush, Ahmed Aleidan, Ahmed Al-Fahdah, Abdelrahman Al-Gwaiz, Fahad Almuhaish, Wolfgang Heidug, Hatem Mohiey, Muhammad Zahid
United Kingdom:	David Hone
United States:	Mihaela Carstei, Ed Dodge, Stephanie Duran, Scott McDonald, Tip Meckel, Michael Moore, Barry Worthington

1. Welcome and Opening Statement

The Policy Group Chair, Christopher Smith, called the meeting to order and thanked the Ministry of Petroleum and Mineral Resources of Saudi Arabia for hosting. He acknowledged the hard work of the Policy Group, Technical Group, Stakeholders, and CSLF Secretariat. Mr. Smith stated that globally, progress has been made to advance carbon capture and storage (CCS) since the last CSLF Ministerial in 2013. Mr. Smith made note of the upcoming 2015 United Nations Climate Change Conference (COP21), and stressed that CSLF collaboration will become even more important.

2. Meeting Host's Welcome

Hamoud AlOtaibi, Advisor to the Office of Climate Change at Saudi Arabia's Ministry of Petroleum and Mineral Resources, welcomed the meeting attendees to the Kingdom of Saudi Arabia. Mr. AlOtaibi stated that the 6th CSLF Ministerial is the largest and most high-profile meeting, and Saudi Arabia is honored to be hosting a large number of Ministers and high-level officials. Mr. AlOtaibi also welcomed the non-CSLF members to the meeting, and encouraged their full participation in the discussion. With COP21 occurring later in the month, Mr. AlOtaibi expressed the need to increase the discussion regarding policy issues on CCS.

3. Introduction of Delegates

Policy Group delegates introduced themselves. Nineteen of the twenty-three CSLF Members were present, including representatives from Australia, Brazil, Canada, China, European Commission, France, Germany, Italy, Japan, Korea, Mexico, Netherlands, Norway, Poland, Saudi Arabia, South Africa, the United Arab Emirates, the United Kingdom, and the United States. Observers representing the Global CCS Institute, International Energy Agency, the IEA Greenhouse Gas R&D Programme (IEAGHG), Australia, Canada, Chinese Taipei, Czech Republic, France, Korea, Netherlands, Norway, Qatar, Romania, Saudi Arabia, the United Kingdom, and the United States were also present.

4. Adoption of Agenda

The Agenda was adopted without change.

5. Review and Approval of Minutes from Regina Meeting

The Minutes from the CSLF Policy Group Meeting on June 19, 2015, in Regina, Saskatchewan, Canada were approved without change.

6. Review of Regina Meeting Action Items

Jarad Daniels, Director of the CSLF Secretariat, provided a brief summary of the action items from the CSLF Policy Group Meeting on June 19, 2015, in Regina, Saskatchewan,

Canada. All action items have been completed or were to be completed during the day's meeting.

7. Consideration of Applications for CSLF Membership

Andrei Gerea, Minister of Energy, Small and Medium-Sized Enterprises, and the Business Environment, Romania, presented Romania's application for CSLF Membership. Romania is in an enviable position with regard to energy. Romania is the third most energy independent country in the European Union. The country has a long standing production of coal and oil and gas, stretching back more than 150 years. Romania is rapidly becoming a regional leader in tackling climate change and looking into the future for appropriate technologies to achieve these goals. As part of the national priorities for energy and climate change, CCS plays a key role in ensuring Romania's ability to maintain a balanced energy mix and create a competitive economy while it pursues ambitious decarbonization goals.

After the remarks by Minister Gerea, the Policy Group voted to approve and welcome Romania as a CSLF member.

8. Report from CSLF Technical Group

The Technical Group Chair, Trygve Riis, provided a summary of the previous day's meeting. The Technical Group voted to recommend the following five projects that had been nominated for CSLF recognition:

- CO₂ Capture Project, Phase 4
- CO₂CRC Otway Project – Stage 2
- Oxy-Combustion of Heavy Liquid Fuels Project
- Carbon Capture and Utilization Project / CO₂ Network Project
- Dry Solid Sorbent CO₂ Capture Project

Key Technical Group deliverables for the CSLF Ministerial Conference include:

- Technology Roadmap (TRM) Interim Report
- Report on Development of 2nd and 3rd Generation CO₂ Capture Technologies
- Key Messages from the CSLF “Lessons Learned from Large-Scale CCS” Workshop
- Messages and Recommendations from CSLF Technical Group

The Technical Group reached a consensus on the following items:

- Form a working group to determine the way forward for future Technology Road Map update activities. Members of the working group are Australia (Chair), Norway, South Africa, the United Kingdom, the United States, the IEAGHG, and the CSLF Secretariat.
- Form a new Task Force on Offshore CO₂-EOR, to be chaired by Norway. Other members are Canada, China, the United States, and the IEAGHG.
- Form a new Task Force on Bioenergy with CCS, to be chaired by the United States. Other members are Italy, Norway, and the IEAGHG.
- Form a new Task Force on Improved Pore Space Utilization, to be co-chaired by Australia and the United Kingdom. Other members are France, Japan, the United Arab Emirates, and the IEAGHG.
- The Technical Group is temporarily postponing decisions on forming new task forces in the areas of Geo-steering / Pressure Management Techniques and Industrial CCS. These will be taken up again at the next meeting
- Norway was re-elected as Technical Group Chair for a period lasting three years

- Australia, Canada, and South Africa were re-elected as Technical Group Vice Chairs, for a period lasting three years

After the update from Mr. Riis, the Policy Group voted to approve the five nominated projects for CSLF recognition.

9. Report from the CCS in the Academic Community Task Force

Wolfgang Heidug, Advisor to the King Abdullah Petroleum Studies and Research Center (KAPSARC), reported from the CCS in the Academic Community Task Force. Formed in 2008 at the Policy Group Meeting in San Francisco, this Task Force's mission is to identify and engage academic programs on CCS throughout the world and to help determine the path forward for the CSLF. More recently, the Task Force conducted a baseline survey of CCS academic research programs, current international collaborations, student exchanges, summer schools, and CCS networks. Additionally, the Task Force has developed an Initial Plan of Action. After the presentation, Australia expressed an interest in contributing to the expanded work program reports of the Task Force.

10. Report from the CSLF Capacity Building Governing Council

The Capacity Building Governing Council Chair, William Christensen, summarized the status of the CSLF Capacity Building Program. The CSLF Capacity Building Fund was established by the CSLF Ministers at the 2009 CSLF Ministerial in London, and contributions committed total US \$2,965,143.75, with donors from Australia (via the Global CCS Institute), Canada, Norway, and the United Kingdom. As of now, US \$1,984,409 has been committed for 14 approved projects in 5 countries. Of the 14 approved projects, 10 have been completed and 4 are to be negotiated or revised. The funds currently available for allocation are US \$924,072.80 (AU \$1,180,169.60). A new call for project proposals was distributed after the CSLF Policy Group Meeting on June 19, 2015, in Regina, Saskatchewan, Canada, and the Governing Council welcomes submissions for the remaining available funds. New CSLF Members are encouraged to submit project proposals for funds.

11. Discussion of Committee Work Plan Status:

a. Financing for CCS Projects

Task Force Chair Bernard Frois spoke on the Financing for CCS Projects work. There is an increased interest in CCS, due to the fact that several operating plants now exist employing a range of technologies that has started to create the "precedent" base the financial world needs to get comfortable with the industry. CCS is recognized as a clean energy mechanism, as organizations such as the IEA has identified CCS as one of the most important technologies to mitigate temperature increase. A large number of projects around the world demonstrate that the technology works with a growing recognition of the economic impact (EOR, water, chemical products) of CCS projects. Success stories have encouraged investments (SaskPower et al.) and a broad suite of financing mechanisms exists. However, short and long-term funding mechanisms are still needed. CCS will require:

- Long-term signal of support/need for CCS
- Policy parity; a level playing field with other low carbon technologies
- Short term support to build and operate CCS demonstration plants

David Hone, Chief Climate Change Adviser, Shell International Ltd., presented on behalf of the World Business Council for Sustainable Development (WBCSD) about the CCS component of the Low Carbon Technology Partnerships Initiative (LCTPI). Within the

CCS work, the LCTIP is developing an idea for financing next generation CCS projects. CCS currently demands either a significant carbon price in the market, or a major grant or capital injection from government with a modest carbon price in the market. Indications are that this does not represent a sustainable model going forward, as there is a resistance to high carbon prices due to competitiveness concerns and/or higher energy prices, along with fiscal tightness in many countries that may mean less availability of grants.

WBCSD has put together new idea for funding CCS, using a mechanism that rewards the storage of CO₂. This can be done by the creation of a credit that represents one tonne of CO₂ stored (the Zero Emission Credit or ZEC), while near term demand is created through an investment fund and long term demand comes through national compliance based systems. This prototype fund may drive early demand and act as a buyer of ZECs and is not directly involved in projects. This fund is modelled after the World Bank Prototype Carbon Fund (2000-2015) and would involve many smaller investors (companies, governments, foundations, individuals) rather than large single grants.

It was agreed that the group will reconvene another roundtable meeting after COP21 to discuss opportunities for the CSLF to advance financing of CCS projects.

b. Supporting Development of 2nd and 3rd Generation CCS Technologies

Task Force Co-Chair Geoff Murphy provided an update on the Supporting Development of 2nd and 3rd Generation CCS Technologies work. At the CSLF Policy Group Meeting on June 19, 2015, in Regina, Saskatchewan, Canada, existing and potential policy and funding mechanisms to drive RD&D and reduce costs were reported, and Canada noted that a consultant had interviewed over 35 CCS stakeholders. The conclusions from the technical literature review identified approximately 30 groupings of emerging technologies. Most of these emerging technologies are 3rd generation (i.e. unlikely to reach large scale implementation before 2030), while a minority was classified as 2nd generation (i.e. ready for large scale implementation by 2020 – 2025). The review also identified 11 test facilities around the world to speed up the development of emerging technologies, the majority of which are designed for post-combustion capture of CO₂. The review also identified various barriers, such as lack of market, high costs, technical and operational challenges, insufficient test sites in key geographies and sectors, and storage availability and lack of clear regulations. The review found high priority mechanisms identified in the interviews to overcome each barrier. All of these findings were reported in a background document available for the meeting. The group found seven recommendations for CSLF Ministerial Consideration. In order to deliver, enhanced networks, expanded online tools, and enhanced research cooperation should all be utilized. It was agreed that the CSLF Secretariat would work with Canada and Norway to implement these positions and opportunities onto the CSLF website, in order to open it up to other members.

c. Global Collaboration on Large-Scale CCS Projects

Jarad Daniels delivered an overview on the work of the Large-Scale CCS Projects efforts. The CSLF is well-positioned to facilitate global collaboration efforts for large-scale CCS projects, whether as new projects or by adding additional functionality and value to existing or planned commercial projects. Furthermore, as many of the recently deployed large-scale CCS projects are focused on storage via enhanced oil recovery (EOR), the needs of large saline formation storage has remained underserved. Mark Ackiewicz provided an update on the work that the United States Department of Energy (US DOE) and Shell's Quest Project was doing to facilitate these efforts. The CSLF will form the

Large-Scale Saline Storage Project Network to serve two purposes: 1) facilitate collaborative testing of advanced technologies at large-scale saline storage sites, and 2) form a global network of large-scale injection sites that can share best practices, operational experience, and key learnings. As a first step in this effort, US DOE and the Shell Quest CCS Project have collaborated over the past year on identifying opportunities to field test advanced technologies funded through the US DOE at the Quest Project in Alberta, Canada. It was stressed that commitment by all parties, both governments and projects, is key for this work. Delegates and representatives from various projects spoke on how the CSLF can leverage opportunities for future collaboration, as together the projects can help to lower costs and advance CCS, and also demonstrate the policy side to CCS. It was agreed that the efforts of this group will continue to find a way to leverage large-scale CCS projects.

d. Communications

Hamoud AlOtaibi led the update from the CSLF Communications Task Force. The Task Force has looked at consultants outside the CSLF to deliver key CCS messages from communications experts. One of these consultants, Ed Dodge, then spoke on a CSLF Communications Strategy. This strategy should identify a vision, message, messenger, audience, and medium. Near and long-term goals should be needed, with the ultimate goal of including CCS in the clean energy vision to the public. CCS should be considered part of the portfolio of clean energy solutions alongside efficiency and renewables. CCS can be a component of advanced refining to produce clean fuels the world is increasingly demanding, and it should be noted that CO₂ is useful, and is not just burying the garbage.

After a discussion among the delegates, it was determined that the communications strategy from the CSLF needs to further investigate what message it is sending, how it sends this message, and who is receiving the message.

12. IEA CCS Activities Update

Tristan Stanley, Energy Analyst at the International Energy Agency (IEA), presented on how CCS fits into the global energy picture, particularly in the context of reducing global emissions. The IEA's recent "Energy Technology Perspectives 2015" (ETP 2015) maps a process for governments to achieve climate change goals. In all scenarios, from 2-6 degrees (2Ds-6Ds), a portfolio of technologies is required to get to emission reduction goals. In the 2Ds, CCS is important in both electricity and industry, and over two-thirds of total CO₂ captured and stored is in non-OECD countries. In the 2DS, by 2050, 5 - 6 Gt of CO₂ per year are captured and stored in all sectors. The ETP 2015 also noted that CCS deployment has begun in "sweet spots," and that "learning-by-doing" is now also underway for CCS in power generation. The IEA is also looking at storage of CO₂ through enhanced oil recovery (EOR), and has analyzed three EOR operational models: Conventional EOR+, Advanced EOR+, and Maximum Storage EOR+. CO₂ supply prices should be sensitive to climate policy. *Ceteris paribus*, lower cost CO₂ should translate into higher utilisation rates and higher incremental recovery. There is a large technical potential for storage, and the potential for incremental production is equally large. Under all ETP scenarios by the IEA, the Net Present Value (NPV) of Advanced EOR+ comes out ahead. Current IEA CCS activities also include retrofitting CCS on coal-power in China and CCS in COP21.

13. Global CCS Institute Update

Victor Der provided an update on Global CCS Institute activities. The Institute will soon release "The Global Status of CCS: 2015," which is the Institute's annual publication on

the progress of CCS globally. A summary report is currently available to CSLF participants, prior to the release of the official publication. The Institute will also host a series of events on CCS during COP21, and all participants are invited to attend. The Institute's objectives include:

- Accelerate global adoption of safe, commercially and environmentally sustainable CCS – Advocacy and Knowledge-Sharing
- Drive cooperation to deliver on “20 by 2020” diverse portfolio of fully-integrated, large-scale operating demos
- Coordinate efforts with networks of existing bodies to overcome barriers to broad industrial-scale deployment
- Focus on projects and support large-scale demos through facilitation of issues, discussion with key stakeholders (including governments) and networks for technical knowhow
- Act as active clearinghouse and standard setter for CCS information, aimed at technology and processes deployment

The Institute has held a number of past events to promote CCS, along with a number of key upcoming Institute events, and ongoing key activities to advance CCS. The Institute has also disseminated a number of lessons learnt and case study reports, which are valuable to current and future projects, along with some new and updated Institute publications and reports. Going forward, the Institute will continue to promote the importance of CCS through a number of methods, while maintaining a focus on serving its members' (currently 83 and growing) needs and key issues and priorities by taking actions within the Institute's mission.

14. Stakeholder Recommendations to CSLF

Barry Worthington, Executive Director of the United States Energy Association, spoke on CSLF Stakeholder activities. Over the past two days, CSLF Stakeholders focused on finance, regulations, communications, CCS in developing countries, and new transient technologies. Several new concepts were introduced including private activity bonds as a novel financing tool for CCS development, along with a sharper focus on carbon markets, particularly after COP21. The potential was raised for carbon capture units to be small, modular, factory manufactured units to supplement the current efforts to gain scale-up. Stakeholders discussed barriers to CCS, and questioned if there were any unrecognized obstacles. The CSLF Stakeholders have prepared a set of 15 recommendations for the CSLF Ministers, which were reviewed in preparation for the next day's CSLF Ministerial Meeting.

15. 2015 CSLF Ministerial Meeting

Khalid Abuleif delivered an update on the logistical aspects for the next day's 2015 CSLF Ministerial Meeting. Ministers and Heads of Delegation are expected from over 25 countries, as a number of non-CSLF members will also be represented.

16. Review of Draft 2015 CSLF Ministerial Communiqué

Jarad Daniels led the discussion regarding the draft 2015 CSLF Ministerial Communiqué. Input from countries was solicited and included into an updated CSLF Ministerial Communiqué, which was agreed on by the CSLF Policy Group for discussion at the next day's 2015 CSLF Ministerial Meeting.

17. Review of Policy Group Messages to Ministers

Christopher Smith provided a review of the Policy Group Messages to the Ministers, which included an overview of the Policy Group's key activities and achievements since the last CSLF Ministerial in 2013. This message would be presented to the Ministers the next day.

18. Election of Policy Group Chair

Jarad Daniels presided over the election. Prior to the meeting, the United States was nominated for Policy Group Chair by Canada, China, the European Commission, Italy, Norway, and Russia. By consensus, the United States was re-elected as Policy Group Chair, for a period lasting three years.

19. Update on Future CSLF Meetings

Jarad Daniels provided a short summary of upcoming CSLF meetings. Options are still being considered for the 2016 CSLF Mid-Year Meeting. Takashi Kawabata, Japan, conveyed the Japanese government's desire to host the 2016 CSLF Annual Meeting in October 2016 in Japan. The budget request in Japan is currently in progress, and a final decision will be made in January 2016. The meeting will likely include a site tour of the Tomakomai CCS Demonstration Project, which will begin injection in April 2016.

20. Open Discussion and New Business

As a last minute addition to the agenda, the Republic of Serbia presented an application for CSLF membership, signed by Serbia's Minister of Mining and Energy Aleksandar Antić. After a review of the application letter, the Policy Group voted to approve and welcome Serbia as a CSLF member.

21. Action Items and Next Steps

Jarad Daniels, Director, CSLF Secretariat, provided a summary of the day's Policy Group Meeting, and noted the significant agreements and action items. The Policy Group reached a consensus on the following items:

- Approve Romania and Serbia as the CSLF's 24th and 25th members
- Approve the following five nominated projects for CSLF recognition:
 - CO₂ Capture Project, Phase 4
 - CO₂CRC Otway Project – Stage 2
 - Oxy-Combustion of Heavy Liquid Fuels Project
 - Carbon Capture and Utilization Project / CO₂ Network Project
 - Dry Solid Sorbent CO₂ Capture Project
- Reelect the United States as Policy Group Chair for a period lasting three years

Action items from the meeting are as follows:

Item	Lead	Action
1	CSLF Capacity Building Governing Council	Continue soliciting new CSLF Capacity Building Program project proposals while also targeting new CSLF members that could be eligible to receive funds

Item	Lead	Action
2	France	As part of the Financing for CCS Projects work, convene a meeting after COP21 to discuss opportunities for the CSLF to advance financing of CCS projects, considering new data and efforts announced at COP21
3	Canada and Norway	Continue as co-leads for the Supporting Development of 2 nd and 3 rd Generation CCS Technologies work to support and coordinate development of 2nd and 3rd generation CCS technologies
4	CSLF Secretariat	Improve the CSLF website functionality to support efforts such as Supporting Development of 2nd and 3rd Generation CCS Technologies
5	China and the United States	Continue to lead on the Global Collaboration on Large-Scale CCS Projects work, and engage large-scale projects to discuss opportunities to leverage large projects, in coordination with the CSLF Technical Group and the Global CCS Institute
5	Saudi Arabia, Global CCS Institute, IEA	As part of the Communications effort, continue to refine the communications strategy based on the core messages agreed to by Ministers in the Communiqué; Define key audiences and find appropriate mechanisms to convey key messages to each respective target audience
6	CSLF Secretariat	Work with CSLF members to find a host for the 2016 Mid-Year Meeting; Work with Japan to potentially host the 2016 Annual Meeting in Japan, to highlight the Tomakomai CCS Demonstration Project.

22. Closing Remarks / Adjourn

Christopher Smith delivered closing remarks. He expressed his optimism for the next day's CSLF Ministerial Meeting, where the CSLF will highlight its accomplishments to the Ministers and agree on the Ministerial Communiqué. Mr. Smith thanked Saudi Arabia as hosts and all participants for their contributions, and adjourned the meeting.