



POLICY GROUP

CCS in the Academic Community: Academic Council Meeting Readout

Background

At the June 2015 CSLF Mid-Year Meeting in Regina, the CCS in the Academic Community Task force was re-started with a near-term goal of identifying and engaging academic programs on CCS throughout the world. The task force was requested to provide a report summarizing its findings and recommendations, which was delivered at the 6th CSLF Ministerial Meeting in Riyadh.

Members of the task force are Canada, Poland, Saudi Arabia, South Africa, the United Kingdom, the United States, and the Global CCS Institute. A meeting of this council was held at the CSLF Mid-Year Meeting in London on June 27, 2016. This readout is an overview of this meeting, and will provide background to the list of recommendations.

Action Requested

The Policy Group is requested to review the readout of the Academic Council meeting.

CSLF Mid-Year Meeting

Academic Council Meeting | June 27, 2016

Meeting Notes



Opening remarks and introductions

1. Host welcome
2. CSLF Academic Taskforce Overview
3. Readout from February International Academic Summit: Davey Fitch, Scottish SCCS
 - SCCS is the largest CCS research group in the UK (includes several universities, BGS)
 - Grouping of academia, industry, and government
 - Working to develop variety of international links
 - Publicize jobs/internships, funding opportunities, collaborations
 - Working with industry and public bodies
 - Held International Academic Summit in February 2016 in Edinburgh
 - Funding from NRCan, DECC, and CSLF Capacity Building Fund
 - Event was a forum for academics to progress institutional links in person
 - 18 academic institutes and 130 delegates in attendance
 - Formal MOU signed between University of Edinburgh and SaskPower
 - Produced output report following the meeting
 - Going forward: greater coordination in international funding opportunities, student mobility, and teaching internationalization
 - Goal: worldwide CCS and research network; wide buy-in globally
 - Next steps and actions similar to CSLF goals
 - Conclusions: lots of good will globally but busy academics
 - Someone needs to be responsible to drive it
 - Funding for research helps but better timeline, coordination needed
 - Need to avoid duplication of efforts and making the most of new ways of learning/communicating
 - May be time for an academic network
4. Meeting Expectations and Outcomes: Moderated by Jarad Daniels, U.S. DOE/CSLF Secretariat
 - Value added/relevance of group
 - CSLF is good at engaging on policy—opportunity to coordinate data points and well positioned in global community
 - Where can the Academic Council do the most good? How is it uniquely positioned?
 - Where is there a need/what can be the role?
 - How can we leverage and facilitate existing entities
 - Development of academic materials globally?
 - How do we communicate opportunities, efforts, etc.?
 - Group: come up with deliverables, timelines, responsibilities
 - in time for next meeting—concrete plan (recommendations)
 - important to identify individuals with specialist knowledge and coordinate effectively (may also need to consider funding incentives)
 - Ed Rubin: critical part is financial and other resources
 - There are no easy mechanisms currently for pooling funds

Session 1: Student Training and Practical Learnings on Carbon Capture and Storage

5. Summer Schools and Research Opportunities

a. Stephen Bryant

b. Tim Dixon, IEA Greenhouse Gas Programme

- IEA GHG summer school is well established and well linked
- Original rationale—shortage of education training in CCS; growing need for expertise and anticipated future employment level; level of student applications; host offers
- Consistently high level of applications and interest
- Many host offers, and strong sponsor support
- Objectives: improve CCS knowledgeable human resource
 - Educate young researchers in all CCS areas, broaden knowledge base, wider context
- Inspire young researchers to make careers in CCS
 - CCS awareness and global network of peers/contacts
- Accommodation and course funded by sponsors (travel is not covered)
- Curriculum: both technical and non-technical aspects
 - Updated throughout the year
- Group work with topics—research, collaboration, integration
- Alumni: 461 students from roughly 49 countries; around 25% from developing countries

6. Government Internships and Leadership Development: Mohammad Abu Zahra

- Masdar Institute in UAE
- Research university at a graduate level
- Focus: sustainable technology and clean energy
- Work in collaboration with MIT
- Government sponsors scholarships
- Research and themes: clean energy, water use, sustainability
- CCUS: area has 10-12 faculty members covering capture, storage monitoring, EOR, policy, and other areas
- Sponsors and collaboration: some academic institutions, companies
- Testing and evaluation of CO₂ capture and utilization (ESL)
- Maersk: feasibility study of CCUS integrated, oxy-fuel
- MIT: core research—development of new sorbents, system
- Masdar/DOE project: led by RTI group; solid sorbent and suitable processes for post-combustion CO₂ capture
- Other areas include CO₂ capture by chemical looping
- YFEL: Young Future Energy Leaders
 - 1 year program—competitive application, funded
 - Launched in 2009; happens in tandem with Abu Dhabi Sustainability Week every January
 - Students from various majors
 - International students come from IT or STEM courses
 - Local young professionals in related fields
- CCS program in development as part of YFEL
- Other aspects: courses, workshops, international events, community service

7. Industry Hands-On Training and Opportunities
 - a. Margot Hurlbert, University of Regina: (with input from Mike Monea)
 - Experience with industry with SaskPower
 - Numerous industry partners, collaborations through project
 - New knowledge center set up between BHP Billiton and SaskPower
 - Test facility: will be used as a training center
 - There is a need to resolve issues at the Boundary Dam Project
 - SaskPower: will work with the University of Calgary, bring in academic institutions
 - Water, environment, clean energy research cluster exists
 - Global leadership in CCS and other clean energy activities is a focus
 - 4 of 9 Canadian research chairs work in climate and energy
 - 80 researchers are working in the climate cluster
 - University of Regina is home to a Greenhouse Gas Technology Center
 - Soon: research chair in power engineering will be set up
 - There is a proposed center of excellence in CCUS
 - University of Regina would be a hub of research industries, industry, government, environmental NGOs, communities
 - Vision of the center is to focus on engineering, research, technology development, as well as environmental impact, sustainability, public policy implications
 - Why hands on training? Academics, industry, and students all benefit
 - b. Mohamed Pourkashanian, University of Sheffield
 - Experience with the UKCCSRC
 - Focus on education, training, capacity building; aim to invest in highly skilled individuals
 - Universities involved include Cranfield, University of Edinburgh, Imperial College London, Leeds, Nottingham, and Sheffield
 - PACT facilities are involved
 - Specialist national facilities for research and development in advanced fossil energy, bioenergy, and CCS technology; pilot scale platform
 - Aim: support and catalyze industrial work
 - PACT sites/capability; plug and play facilities (ex: carbon capture plant)
 - PACT operational: partnership, collaborations, capacity building and skills
 - Partnership agreements in place
 - Two doctoral training centers—5 academics, 70 partner organizations
 - Also: CPD programs; industry training
 - Education: focus is on post-graduate training
 - Professional development training programs such as short courses, workshops, trainings
 - Development of collaborative training and capacity building in CCS, as well as capacity building and training in CCUS, such as summer schools
 - Aim to involve politicians and acquaint them with the technology
 - PACT is part of the International CCS Test Center Network
 - PACT 2—future capability review
8. Open discussion: Moderated by Vic Der, Global CCS Institute
 - Topics for discussion include effectiveness of student training, learning activities
 - Priority area of emphasis and focus going forward
 - CSLF can serve as a central repository of information

- Is there a need for a more comprehensive program, for example among all summer schools?
- Funding issues—these remain an obstacle
- Strong recommendations will be made to the Policy Group
- We need to leverage existing capabilities and come up with a path forward
- Need commitment to spend time and create an ask for Policy Group ministers
- What are some items worth doing, and what will it take?
- This meeting can help frame this ask, frame a proposal
- Need to prove cost effectiveness and other aspects
- CSLF: can act as a central repository for countries who don't have educational resources
- Government support is critical but academics need to champion this as well
- Is there a role for distance learning? Ex: UK Open University, Future Learning

Session 2: CCS Curriculum and Research Projects Development—Initial Gap Analysis

9. CCS Curriculum Development in Canada: Naoko Ellis, University of British Columbia

- Multidisciplinary and focused programs, courses can help; also, joint degree programs
- Example of Canadian program: 3 institutions plus the University of Calgary
 - 6 year course, distance course, 13 week course all exist
 - Various topics available
- University of British Columbia has a Clean Energy Research Centre and a graduate course on low carbon future
- Various disciplines are brought together under one course or program
- Field research station under Carbon Management Canada, other institutions
- New facility near Vancouver will offer training in this area
- There are possibilities to leverage technology and academic clusters
- Need to train, increase public awareness, support for public policy
- “Ideas to impact”—ties between academia and industry; process of research, translation, and implementation
- Gap analysis: very sparse; can leverage unique facilities and key institute activities/keep and build connectivity (bi-annual conferences); show a collective face to the world

10. CCS Curriculum Development in the United Kingdom: Colin Snape, University of Nottingham

- EPSCRC (Engineering and Physical Sciences Research Council) hosts an engineering doctorate center
 - 4 year doctoral program across 2 centers
 - Over 100 doctoral students, 25 industrial partners
- UK is a focal point for training in the field, with strong links
- An advanced skills gap remains
- Effect of emissions legislation is also involved
- A large age gap remains among researchers (established professionals versus younger researchers entering the field)
- There are distinctive features of industrial doctorate center
- Students are fully engaged with industry
- Among distribution of projects, 40% go to CCS topics

- CO2 capture, transport, storage, combustion, high temperature materials are all areas covered
- Training module remains varied: largely non-technical covering economic, business, policy aspects
- Public engagement is an ongoing training
- Summer school series exists: focused on the Far East
- Winter schools: this is a joint program with UKCCSRC – more economic
- The University of Nottingham hosts a campus in China
- Currently using CDT model to grow collaborative doctoral training internationally
- Taking broader approach to training—focusing beyond students

11. CCS Research Project Opportunities: Ed Rubin, Carnegie Mellon University

- History of collaborations, exchanges, and visits
- Examples of several students who did exchanges as part of exchange/collaboration programs
- These occurred as a result of several factors:
 - Personal relationships among faculty
 - Mostly on an ad hoc basis
 - Some were institutional programs designed to facilitate and support research collaborations (ex: UKCCSRC)
- CSLF: not doing as much as it should or could to support these activities
 - Made pitch to CSLF Policy Group at Riyadh meeting
- CSLF is in a good position to grow these activities
- Path forward should include identifying and linking academics and researchers with CSLF Technology and Policy Group plans and priorities
- Determine where and how CSLF and member countries can facilitate international collaborations and opportunities for exchanges that further goals
- There is a need to assess current funding commitment and mechanisms

12. CCS Research Opportunities in Norway: Arne Graue, University of Bergen

- Aim to make petroleum activities more sustainable
- Convert oil and gas industries into more sustainable/cleaner industries
- Need to increase coordination and collaboration among academics
- Public interest is there but not informed
- CCS leaders and researchers need to inform the public, rely on fact-based information
- Industry also needs to be on board
- Potential tax credits also need to be considered
- Norwegian experience—Petroleum School of Norway established; several MOUs exist
- NorTex Center: Norway and Texas utilizing experience in oil
- Similar collaborations need to be done on a larger scale
- CO2-EOR is one way to make a profit
- Existing infrastructure, on-shore oil fields—these are advantages in Texas
- Collaboration: among 11 universities in 55 countries with funding
 - This is an example of the way forward

13. Open discussion: Moderated by Mohamed Pourkashanian, University of Sheffield

- How can we link and integrate activities together?
- Cost remains an important factor in academia

- Variation among countries in context and regulation on funding
- Suggestion: have an academic get involved in stakeholder group
- How can CSLF help to expand linkages, communicate out?
- One problem: younger faculty with fewer resources and assistance

Session 3: Communications and Outreach

14. Stakeholders Engagement within the U.S.: Sallie Greenberg, University of Illinois

- U.S. has the Regional Carbon Sequestration Partnerships—7 regional partnerships
- Primarily: function of a few organizations and parties
- Outreach working group has existed since phase 1
- These partnerships are specifically project based; focused on project based outcome
- Foundation work—best practices manual
 - A new addition will follow later this year
- World Resources Institute produced a report on stakeholder engagement
- Formal engagement processes should start very early in the life of a project
- RCSP has engagement recommendations
- What’s needed: effective stakeholder guidelines and engagement objectives
- Activities happen around the who/what/how
- Stakeholders can be anyone: public, industry, government
- A project field site or another tangible item is helpful
- How do you turn a small amount of time into something impactful
- Engagement process needs to be spread across the project life cycle
- Uncertainty can be among geologic, sociological factors, others
- Research question and answer for science and society
- Similar concerns among industry/researchers, public
- Recommendations to projects: do your homework, communicate frequently, establish relationships, know audience and topic, be prepared, listen, and respond
- How do CSLF members interact and participate?

15. Engaging Industry on CCS: David Risk, St. Francis Xavier University

- Engagement is a limited “market space”
- Few players, but many requests received
- Industry gets tired of academics and pitches
- There need to be mechanisms for alignment and collaboration: brokering, centers, open model
- Some existing models exist: Carbon Management Canada, PTRC, IEAGHG
- IEAGHG model: virtual think tank
 - Industry—IEAGHG equals classroom
 - Student: academic research opportunity
 - Researcher: collaborative project
- Carbon Management Canada model—research provider, broker
 - Industry: gets problems examined/solved
 - Student: semi-embedded in environment
 - Researcher: gets involved in industry; experience
- PTRC model: strategic research, deployment
 - Industry: builds strategic expertise; learns
 - Student: semi-embedded; management
 - Researcher: deployment of expertise

- Individual partnership is one outcome
 - Solo research provider model:
 - Industry: solve a company specific issue
 - Student: embedded research; can commit to project, get mentors, experience, funding
 - CSLF model: depends on who, why, and the tie to industry
 - Broker/network role; niche service model; project model
16. Communications through CSLF: Tom Howard-Vyse, CSLF Communications Taskforce
- Communications experience in climate, energy
 - Worked on communications for Don Valley Project in the UK
 - Aspects of communicating: building expertise, project details, various industry expertise
 - What is the policy climate in 2016? How does government see CCS?
 - How do energy and climate goals sit? For example, in the UK, this will involve Treasury, DECC, and others
 - CCS remains a “political orphan”
 - End of commercialization competition and slashing of the £1 billion fund, questions over government commitment, and recent shake-up of DECC
 - Initial observations on CCS and the CSLF:
 - technology is proven; projects exist and can be visited (in some cases)
 - CSLF brand is not widely known; website needs to be revamped
 - Messages may be without a strategic engagement strategy
 - Context: post-COP21, fossil fuel phase-out, public awareness
 - What can be done? Better public outreach/education, government and policy support
 - Overall: strengths and weaknesses remain, as well as opportunities and threats
 - Shared goals: enhance the CSLF, renew public awareness, strengthen political leadership on CCS, broaden coalition
 - Going forward: finding the right place, time, context, audience
 - Communications strategy: advocacy and strategic engagement
 - Aim to create a virtuous cycle
 - Highlight and establish leadership
 - Messaging strategy: public interest must frame CCS messaging
17. Open discussion: Moderated by Kathryn Gagnon, Natural Resources Canada
- How can members and the CSLF pool resources?
 - Is there a repository for projects and other useful information?
 - Shared space, one-stop shop
 - How is success defined in the CCS realm? For example, how would a project’s success be defined?

Session 4: Academic Community and Capacity Building

18. International Capacity Building Activities: Stuart Haszeldine, Scottish CCS (Absent)
19. Capacity Building in Mexico: Jazmin Mota Nieto, Secretariat de Energia (SENER), Mexico
- Within capacity building efforts in Mexico, focus is on encouraging involvement in CCS across various sectors
 - Currently preparing for an upcoming pilot project
 - CEMCCUS and CONACYT: collaboration on roadmaps, crafting a strategy with several objectives

- Plan: UNAM and UC Berkeley are developing a joint masters program
 - Specialized curriculum, exchanges, and projects
- Letter of understanding was signed between the University of Alberta and PTRC: work will cover CCUS research and capacity building in Mexico
 - Drawing on expertise from PTRC at Aquistore and Weyburn Midale
- A memorandum was also signed between Scottish CCS and UNAM
- Continuing to focus on fostering international exchanges
- Capacity building work will require CSLF support, ongoing partnerships and projects, collaborations

20. CSLF Capacity Building Program: Adam Wong, U.S. DOE and CSLF Secretariat

21. Open Discussion: Moderated by Chris Littlecott, E3G

- Compared to other disciplines, research agendas and issues do not seem to change in CCS
- Academics have a large role to play in keeping the ball rolling even if other developments have stalled (ex: regulatory, policy)
- Academics need to show that technology works and show developments on cost reductions to make it competitive
 - Need to show benefits, spillover effects
- Sharing labs, infrastructure, and facilities could help as part of collaborative activities
 - Research could be made more efficient
- Expanding definition of capacity building is necessary
- Expand role of academics to get them involved in pilot projects and offer help for pre-feasibility studies, project development
- Post-Paris: sustain linkage to deep decarbonization, emission reduction—highlight the role CCS has to play in this

22. Open discussion: entire group

- Report out to the Policy Group meeting (June 30th) will be given by Jon Gibbins (UKCCSRC)
- Are these 4 priorities in agenda the right set to focus on?
- There is some overlap between training and curriculum—sessions 1 and 2 could be combined
- What are the prospects for online training? Can the Academic Council help to identify and pinpoint online training?
- The Council should have an ambassador to help ensure capacity and training for carrying out CCS work, projects
- Aim to utilize the CSLF website to broadcast information, pool resources
- How can we “embed” students as part of their training?
- What are the recommendations and asks to the Policy Group?
- What is the best way to organize this process?
 - Governments have a lot invested already
 - How can we utilize existing facilities, capabilities?
- 2 sets of recommendations:
 - Small asks that governments can do
 - Larger asks, long term projects
- Important to keep communications group clued in
 - Important to showcase talent, technologies

- Also important to start work on agreements now—implementing is time-consuming and process can be long
- Will be helpful to put out a call to academics and institutions for their help
- Also aim to make material available (ex: open source, modularized material)
- Many training resources already exist—existing entities and resources should be linked
- There is also the industry connection aspect—how can we create linkages? Look to industry and those who have experience in this field
 - An example is the BHP Billiton/SaskPower Knowledge Centre
- Need to leverage existing summer schools—perhaps focus on creating ones in other countries
- Overall: stick to a flexible and nimble model with fewer restrictions
 - Can be tailored to various areas
- Next steps: what is the best way to move forward?
- Will additional meetings of the Council follow? Ex: CSLF Annual Meeting
- In period before October, will there be additional meetings, webinars?
- How will the group approach the 2017 Ministerial?