

Forming Tomorrow's Leading Experts on CCS

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Greenhouse Gas R&D IA

EGRD Seminar

Developments in Energy Education

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Framing Questions



- ***What are the barriers and opportunities to expanding university, training or capacity-building programmes across borders or regions?***
- ***What does it take to influence education institutions to expand their programmes?***

Barriers to CCS Education and Training



- **Ageing workforces**

- Gaps in skill sets and specialist staff
- Lack of engineering/geosciences skill base
- Lower engineering service levels (compared to 1970s)
- Competition from oil and gas sector for skilled staff

- **Lack of information in academia and among PhD and post-doctoral students**

- Limited CCS-specific study programmes and diplomas
- Field research costly
- Fewer opportunities for students from non-OECD countries

Opportunities to Form Tomorrow's CCS Experts



- ✓ **CCS Summer Schools**
- ✓ **Student Mentoring Programme**
- ✓ **Academic Community Task Force**
- ✓ **Assistance with other Programmes**

CCS Summer School



• Aims

- Encourage students to consider a career in CCS
- Build international contacts

• Target Group

- Young scientists
 - e.g. PhD students and Post-Doctorates with background in engineering, geo-technologies, or socio-economics.
 - Blend of students from developed and developing countries.

• Attendance to date

- 279 students representing 35+ countries and six continents

CCS Summer School



• Schools held/planned

- Germany, August 2007
- Canada, August 2008
- Australia, August 2009
- Norway, August 2010
- United States, July 2011
- China, August 2012

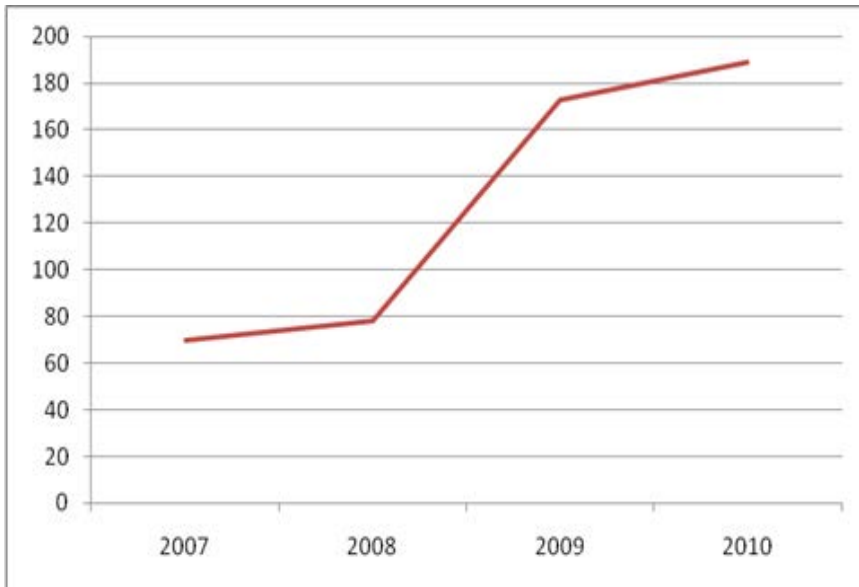
Format

- One week course
 - All aspects of CCS
 - Technical and non-technical
 - Group work
 - Mentored student groups
 - Social programme
 - Best group and best student awards

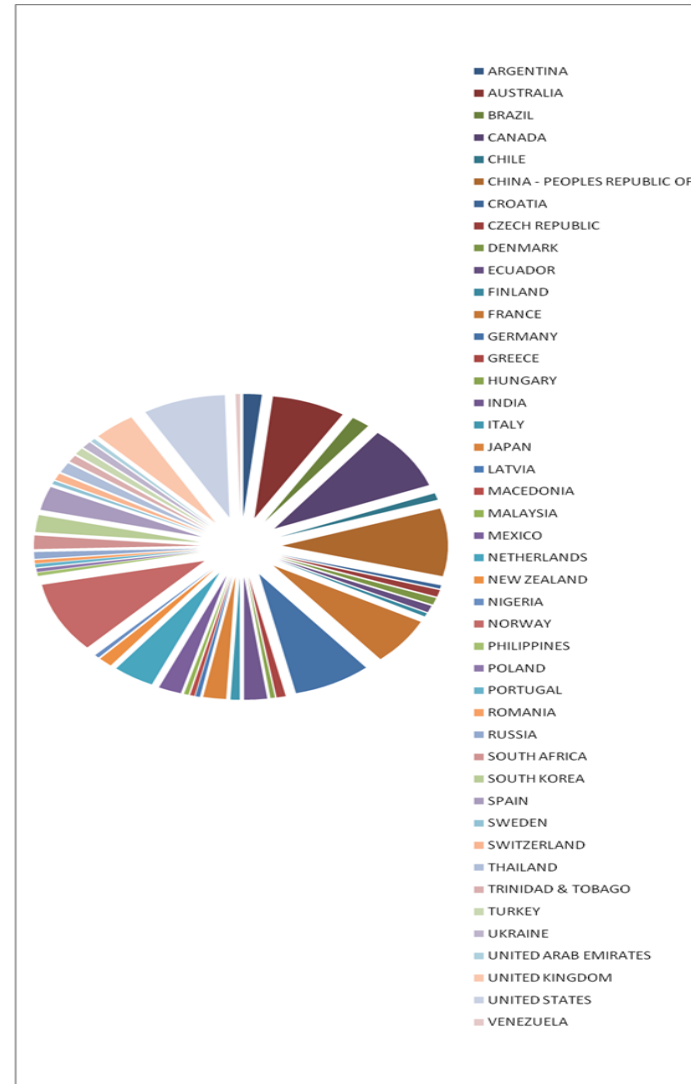
CCS Summer School



Growing interest



Database, 600 students
Facebook attendee site



CCS Summer School



- **5th International Interdisciplinary CCS Summer School, Champaign, Illinois, July 2011**
 - Hosted by Midwest Geological Sequestration Consortium (MGSC) and the Sequestration Training and Education Programme (STEP)
 - 53 students from 25 Countries: 21% from non-OECD countries
 - 29 Experts and 2 student mentors



CCS Summer School 2011 Highlights



- **Additional topics**

- China CCUS Developments & Perspective
- Project Integration Panel Discussion
- NGO Perspective
- Industry Perspective Panel Discussion

- **Illinois Basin Decatur Project Field Trip**

- **Best Group Project**

- “G6 - Should CCS be mandatory in the developed world? What are the pros and cons?”

- **Most outstanding students**

- Viktor Andersson, Chalmers University of Technology, Sweden
- Carrie Petrik-Huff, University of Massachusetts

CCS Summer School 2011

Sponsors and Supporters



CCS Summer School

Student Feedback



- *“I now have an idea how to speak to people about CCS to increase awareness in my country.”*
- *“The most favourite thing for me it was opportunity to see how CCS works in reality.”*
- *“It was a full program but I learned a lot and had a really nice time.”*
- *To improve the Summer School for next year I would...“have more time to sleep.”*
- *To improve the Summer School for next year I would...“I think that invite NGOs which does not support CCS in order to have a very interesting discussion.”*

CCS Summer School 2012

Beijing, China



- **5th International Interdisciplinary CCS Summer School**
 - Tsinghua University, Beijing, China
 - August 12th – 17th 2012
 - Deadline for applications 29th February 2012



CCS Student Mentoring Programme



- **Premier international conference on greenhouse gas mitigation technologies – the GHGT series**
- **Provides opportunity to hold student mentoring activities on the margins**
 - GHGT-10, Amsterdam, September 2010
 - 1,650 attendees from 23 countries
 - Academia, industry and government
 - 950 technical papers presented
 - GHGT-11, Kyoto, Japan, November 2012
 - Similar level of attendance expected
 - Similar number of research papers

CCS Student Mentoring Programme



- **1st Student Mentoring Programme**
 - GHGT-10, Amsterdam, 19-23 September 2010
 - Hosted by GHG R&D IA and the Global Carbon Capture and Storage Institute (GCCSI)
- **Students selected from 2010 Summer School applicants**
 - Various disciplines and varying level of experience
- **23 students participated**
 - 11 from 7 non-OECD countries
 - 12 from 10 OECD countries



CCS Student Mentoring Programme



- **Two levels of funding**

- 100% funding for students from non-OECD countries
- Student bursaries for OECD students providing registration fees and a 100 Euro travel allowance

- **Structured Programme**

- Introductory session (GHG R&D IA, IEA Secretariat, Schlumberger) providing a grounding in CCS, and student's presentations
- Tailored conference programme based on students' interests and advice on sessions to gain full perspective on CCS
- 'Ask-a-mentor' sessions daily, allowing dedicated discussion with expert mentors
- Topic based discussion and wrap-up session

CCS Student Mentoring Programme



- **2nd Student Mentoring Programme**
 - GHGT-11, Kyoto, Japan, 18-22 November 2012
 - Hosted by the GHG R&D IA and the GCCSI
- **Experts from industry and academia will serve as 'mentors' throughout the Programme**
- **Students will be selected among applicants to the 5th and 6th CCS Summer Schools**
- **Programme tailored to students needs**

CCS Academic Community Task Force



- **Mission**

- Identify and engage programmes on CCS throughout the world to help determine the path forward for the Carbon Sequestration Leadership Forum (CSLF).

- **Co-Chairs**

- GHG R&D IA
- Brazilian Center of Excellence in Research and Innovation in Petroleum, Mineral Resources and Carbon Storage (CEPAC)

- **Goals**

- Map CCS post-graduate academic courses worldwide
- Gap analysis
- Ensure industry and government needs are included
- Propose targeted activities where needed

CCS Academic Community Task Force



- **First Activities**

- GHG R&D IA, *The Landscape of Carbon Capture and Storage Management Education in the UK*, (2009/TR5)
- CEPAC to expand on UK study to include Europe, US, South America, Japan, Korea, South Africa, New Zealand and Australia

- **Work Plan 2012-2016**

- Create database from mapping
- Review CCS programmes to identify gaps
- Track number of students studying CCS in order to inform academic needs and decisions concerning investments
- Dedicated academic forum to encourage international academic collaboration (CSLF Academic Bulletin Board)
 - Inviting academic assistance for moderating forum

CCS Academic Community Task Force



- **Work Plan 2012-2016, cont'd**
 - Links to CSLF Capacity Building Task Force
 - Ongoing review of plan to target CSLF task force activities
- **Next meeting of the Academic Community Task Force**
 - CSLF Annual Meeting Perth, Australia, 22nd – 26th October 2012

Assistance with Other CCS Programmes



- **United Kingdom Carbon Capture and Storage Consortium Early Career Researchers' Programme**
- **The CO₂ Geological Storage (CGS) Europe Spring School**

Key Messages



- **Raising awareness of CCS is needed now in order to avoid gaps in skilled engineers and scientists in the future**
- **Industry, government and academia must be involved**
- **For academia**
 - **Establish relationships with PhD and post-doctorate students through summer schools and mentoring programmes**
 - **Track student participation to inform future investment decisions**
 - **Review academic programmes to ensure CCS is covered and that industry needs are incorporated**





Thank You.

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For more information:

GHG R&D IA www.ieaghg.org

GHGT conference <http://www.ghgt.info/index.php/Content-GHGT11/ghgt-11-overview.html>

GCCSI <http://www.globalccsinstitute.com/>

CSLF <http://www.cslforum.org/>

CGS <http://www.cgseurope.net/Default.aspx?section=477>