Evaluating technology options to mitigate greenhouse gas emissions

ieaghgsummerschools

IEA GREENHOUSE GAS R&D PROGRAMME

International Energy Agency

The International Energy Agency (IEA) was established in 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme. The IEA fosters co-operation amongst its 28 member countries and the European Commission, and with other countries, in order to increase energy security by improved efficiency of energy use, development of alternative energy sources and research, development and demonstration on matters of energy supply and use. This is achieved through a series of collaborative activities, organised under more than 40 Implementing Agreements. These agreements cover more than 200 individual items of research, development and demonstration. The IEA Greenhouse Gas R&D Programme is one of these Implementing Agreements.

Disclaimer

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Front & back cover images all from the summer school locations; Kloster Seeon Germany, Vancouver Island, Canada, Lorne, Australia, and Svalbard, Norway

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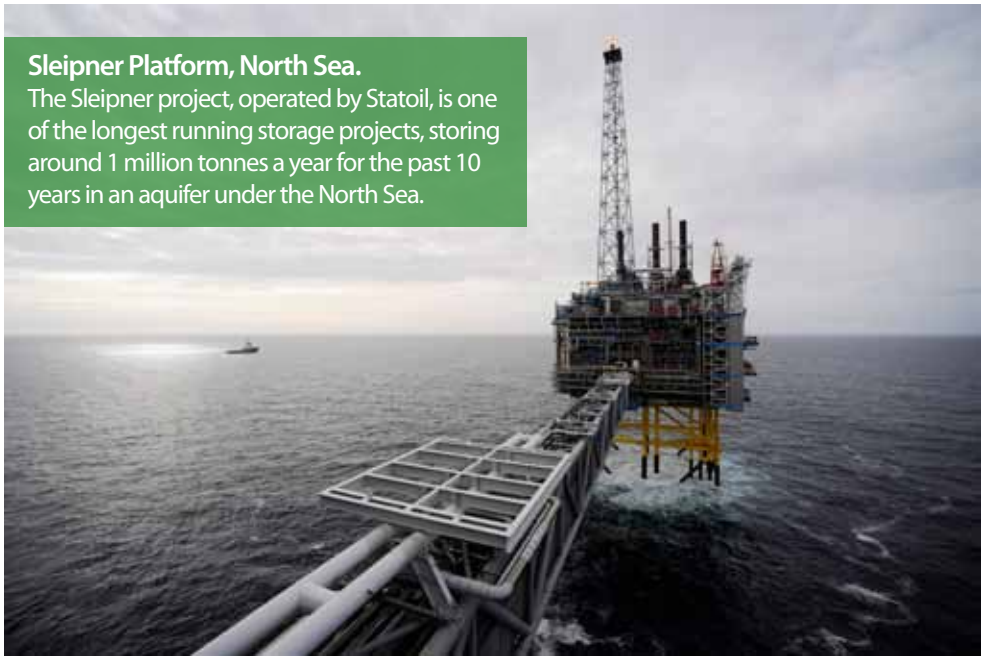
Students of the 2nd Summer School / Australian Coast, on 3rd Summer School Field Trip

Introduction

Carbon dioxide capture and storage (CCS) is now generally seen as having the potential to make a substantial contribution to reducing emissions of CO_2 into the atmosphere. In particular global implementation of CCS could allow large scale reductions of CO_2 emissions to be achieved before the end of the next century. Presently, the potential of CCS is being explored in more than 100 projects around the world and international conferences serve as platforms to exchange the results from these activities amongst experts.

Capacity Building for the Future

In order for wide scale deployment of CCS to take place it will become increasingly necessary to have qualified people available to work in all aspects of the industry. For this to happen, it will be necessary to broaden the knowledge base worldwide, in both industrialised and developing countries and this is particularly important at an academic level. Training courses or summer schools contribute to this by targeting young scientists, who may become interested in building a career within the field of CCS. The summer school aims to accelerate and support the dissemination of knowledge of the potential for CCS to students and young professionals around the world.



Sleipner Platform, North Sea.
The Sleipner project, operated by Statoil, is one of the longest running storage projects, storing around 1 million tonnes a year for the past 10 years in an aquifer under the North Sea.

The summer school is aimed at young scientists; mostly PhD students and Post Docs with backgrounds in engineering, geo-technologies and socio-economics. It was initiated to provide students from diverse academic backgrounds with a broad understanding of the issues surrounding CCS and to encourage their active participation in this area. Around 50 to 60 students from both developed and developing countries participate in each programme. Part of the aim of the summer school is to select students with a broad range of backgrounds and geographical distribution, including developing countries.

In Salah, Algeria.
The In Salah project is an example of storage in an on-shore location. In Salah has been operating for many years, and has provided some very useful monitoring data and results.

The Programme

The summer school lasts for one week and includes presentations by invited experts in all areas of the CCS chain, as well as time for group discussions. Over 20 international experts in the field of CCS attend each summer school, representing industry, academic research and governments. The experts remain present throughout the week of the summer school and are on hand for technical questions throughout the event. They are there to lead discussion in their areas of expertise and are also available for leading smaller discussion groups on the project topics and other topics of interest to the students. This is a tremendous opportunity for the students to gain from the knowledge and experience of the assembled experts, and past students have commented on the benefits they have gained from this experience.

The programme covers all aspects of the CCS chain and aims to present the most recent information and findings available for each field. An array of topics are covered by the programme and these include:

- Sources of CO_2
- Capture of CO_2
- Transport of CO_2
- Underground geological storage of CO_2
- Mineral carbonation and industrial uses of CO_2
- Health and Safety issues
- Costs and economic potential of CCS
- Regulatory regimes
- Public Communication
- Implications of CCS for GHG inventories and accounting.

In addition to the discussion programme there is also a group programme. This involves the students being divided into small groups in order to undertake short research activities on issues of importance within the CCS area. Time is dedicated to group work throughout the week, and the students will then have the opportunity to give a presentation in front of the assembled experts and their own peers on the last day of the programme. Time is also allocated for networking and for informal discussions with the assembled experts.

Each summer school also involves a social programme of evening activities, with the aim of maximising the opportunities for networking between the students, the mentors and the assembled experts, which may help them in any further endeavours within their studies and future research.

Students leaving at the end of the week will have developed a network of contacts in the field of CCS and will have gained a broad overview of the issues surrounding technology development and implementation in CCS.

Success Story

One of the students from the 1st summer school, Mohammad Abu Zahra, now works as a Project Manager for IEAGHG. In his words, this is what the Summer School meant for him.

"Joining the first CCS summer school was a great experience, and very exciting. From the technical content point of view, even for someone who has been working in the CCS field for couple of years, the CCS summer school helped the students to learn something about everything. It is possible that you will not learn many new technical details in your own field, but what you will learn is much about the rest of the CCS chain.

Another important aspect is the social interactions with young professionals and established experts working in different areas of CCS, from whom I have made many friends and still have active communication with many of them, discussing both technical and non-technical issues.

Having the chance to meet experts from different industrial and academic organisations is another advantage of such an event. The fruitful discussions with experts and representatives of the different companies involved helped many of the young researchers and students to understand the CCS market requirements and to decide for themselves the direction they desire for their future careers. Maybe joining the summer school back in 2007 was one of my personal motivations to be in my current role as a Project Manager with IEAGHG.

In the CCS summer school, we have learned, met people, made friends and had fun, and I would encourage everyone working in CCS to take part in future events if they have the opportunity. "

Summer School History

The IEAGHG International Summer School is now in its 4th year of existence, and the previous schools have all grown in popularity, with an increase, year-on-year, in applications received.

Kloster Seeon, Germany.
Venue for the first IEAGHG Summer School.

The first IEAGHG summer school took place in Kloster Seeon, Germany in 2007 and was such a resounding success, that it was decided that IEAGHG would commit to repeating the event on an annual basis. The plan was then formulated for the school to move around the globe, with slight regional bias towards local students. The next school, in 2008 was held by Tigh-Na-Mara, Vancouver Island, Canada, the following one in Lorne, Australia in 2009 and this year's summer school will take place in Svalbard, Norway.

Throughout the week the students are assessed and on the final day of each summer school, the experts select the outstanding students of the week who are then awarded the best student award. This assessment is made across every aspect of the week, including the student's input to the lectures, the group work and also during the social programme. The selected students are then invited to return to the next summer school to act as student mentors to the next group of students, with all costs covered. In the 2008 summer school, one of the outstanding students, returned not only as a student mentor, but also gave an excellent presentation on CO_2 transport to the group.

The more recent summer schools have included fieldtrips to CCS sites. The 2009 programme held in Lorne, Australia, included a fieldtrip to the Otway CO_2 storage site and the 2010 school will include a visit to the Longyearbyen injection site. The second part of this year's fieldtrip will also include visiting Billefjorden to view geological structures.

Injection Well at Otway project, Australia.
The field trip for the 3rd Summer School visited the Otway Injection Project.

2010 Summer School

This year's summer school will be held in Svalbard, Norway from the 22nd to the 27th August and will be hosted by The Gas Technology Centre NTNU-SINTEF, in collaboration with BIGCCS and SUCCESS.

The students are expected to arrive on the Sunday evening and the activities planned will include a welcome address by Perr Kyrre Reymert, who works in the Governor at Svalbard Environmental Department, as well as a more general introduction to the programme and to the university. The week will start on the Monday with lectures dedicated to CO_2 capture processes, with the talks detailing pre-combustion, post-combustion and oxyfuel technologies as well as industrial sources of CO_2. The next day focuses on geological storage of CO_2, which will include talks on site selection, CO2-EOR, modelling, monitoring and verification and wellbore integrity. The next day is the fieldtrip and the last full lecture day on Thursday will involve presentations on transport, risk assessment, public communication and legal and regulatory requirements for both Norway and internationally. The final day on the Friday is when the students are given the opportunity to impress by giving their group presentations on topics that they will have been working on and discussing throughout the week to the experts, mentors, and their peers.

The whole of the Wednesday will be taken up with the fieldtrip, which will involve a visit to the CO_2 injection site at Longyearbyen as well as a boat trip to Billefjorden in order to view geological structures. This will involve identifying the location of possible CO_2 reservoir rocks and seals as well as practical tasks using hand specimens and sand/ clay samples to observe rock properties, such as porosity and permeability.

Svalbard, Norway.
The brightly coloured houses are a traditional feature of Svalbard.

Summer School 2011

The next summer school is planned to be held in Champaign, Illinois, USA, and further information will be made available at:

www.ieaghg.org/index.php?/20091223124/summer-school.html

Any young scientists interested in attending the school are encouraged to apply for this. Call for applications will take place in early 2011.

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