

South African Centre for Carbon Capture & Storage

Second South African CCS Week Report

From the 24th to the 28th of October 2011, the South African Centre for Carbon Capture and Storage (SACCCS) hosted the Second South African Carbon Capture and Storage (CCS) Week. The purpose of the second CCS Week was to disseminate information around local and international CCS research and development and to showcase CCS activities currently underway in South Africa. Included in the week were a two day CCS conference and four technical workshops on: CO₂ injection projects, CCS legal and regulatory frameworks, CCS risk assessment and CCS public engagement.

The week was organised by the SACCCS and the Department of Energy (DoE), and sponsored by the Carbon Sequestration Leadership Forum (CSLF).

The first South African CCS week was held in October 2009 as an initiation event for CCS development in the country. The presenters during the first event were mostly international, who brought their experiences with regards to CCS in their own countries. Following the first CCS Week, the Minister of Energy requested a similar event for CCS which led to the second CCS Week being held in 2011.

The CCS Conference

The South African CCS research conference was held from the 25th to the 26th of October. The conference focused on the South African and the southern Africa regional CCS activities that are currently underway. Delegates were welcomed to the 2nd South African CCS conference by the Director-General of the Department of Energy, Ms Nelisiwe Magubane.

To commence the conference, an update was given on CCS globally and in South Africa to highlight what has been done so far with regards to CCS. It was highlighted by SACCCS that plans are currently underway for a CO₂ Test Injection Project in South Africa to begin injection in 2016. This session allowed delegates to familiarise themselves with what is currently happening on CCS in South Africa and globally so that they could help identify opportunities and projects relevant to SACCCS.

During the second session, speakers presented the industry's perspective of CCS with a number of South African companies outlining work they are currently doing to mitigate greenhouse gas emissions. During this session, it was highlighted that conventional coal-fired power plants release approximately 21% of greenhouse gases globally and over 70% of greenhouse gas emissions in South Africa. Eskom, the South African power utility stated that CCS forms one part of its emission reduction scenarios to capture the CO₂ released to the atmosphere during electricity generation. Sasol also believed that the growing demand on energy will increase greenhouse gas emissions and therefore CCS is one technology that can be used to reduce CO₂ emissions.

Day one of the conference concluded with presentations from all students who received post-graduate bursaries from SACCCS. Students presented research findings from their work. It was important for these students to give an update of their work as a way of showcasing SACCCS and South African capacity building in the CCS field.

Dinner was arranged after day one of the conference. The main purpose of this dinner was for delegates to network and socialise with other delegates informally. An entertainment group was also hired to entertain delegates during dinner.

The presentations during the first session on the second day of the CCS conference focused on CCS legal and regulatory issues in the Southern African region (i.e. South Africa and Botswana). It was highlighted that South Africa does not have specific regulations on CCS. Currently, there are pieces of legislations that can be amended to support CCS since regulations on CCS still need to be developed. The same issue of not having regulations in place for CCS in Botswana was also raised. Both South Africa and Botswana indicated that they could learn from each other based on the experiences from their countries.

Session two of the second day focused on CCS enablers in South Africa. These included the NGO's perspective, CO₂ markets and the clean development mechanism (CDM) and CCS in the Southern African region. In a presentation from WWF, it was highlighted that a comprehensive implementation plan for low-carbon technologies for industrial development will be the solution to mitigate greenhouse gas emissions. It was also suggested that if South Africa wants to reduce its CO₂ emissions, the low-carbon re-industrialisation process should commence immediately. It was also highlighted that during the climate change negotiations held in 2010, a decision was taken that CO₂ capture and storage in geological formations should be included under the CDM.

During the final session, researchers from various institutions were afforded opportunity to present their research findings in CCS related fields. Topics such as CO₂ mineral carbonation and other aspects of CCS were addressed.

To conclude the conference, the Head of SACCCS: Tony Surridge thanked all the speakers, delegates and SACCCS staff members for a successful conference.

CCS Technical Workshops

During the CCS Week, four technical workshops focusing on important aspects of CCS were held. The workshops were as follows:

- CO₂ injection projects;
- CCS legal and regulatory framework;
- CCS public engagement; and
- CCS risk assessment.

CO₂ injection projects workshop

South Africa launched the Atlas on Geological Storage of Carbon Dioxide in South Africa (Atlas) in October 2010 and plans are under development for a CO₂ Test Injection Project by 2016. The workshop on CO₂ injection projects was held on the 24th of October. The main purpose of this workshop was to share the information on the progress made with regards to CO₂ storage locally since the launch of SACCCS in 2009 and also to learn about the guiding principles of conducting a successful CO₂ injection project from the global injection projects.

The speakers during session one covered topics on the progress of CO₂ storage in South Africa. These included CCS activities currently underway in SACCCS, the Atlas that was launched last year and the Test Injection Scoping Study that will be completed early next year.

During the next two sessions, the workshop heard from a number of international presenters with first-hand experience of actual CO₂ test injection and CCS pilot projects. Global projects included the Illinois Basin – Decatur Project in the USA, the Otway Project in Australia and the Mountaineer Project also from the USA.

The presentation on CO₂ storage in Illinois included an overview of U.S. Department of Energy Regional Carbon Sequestration Partnership Program. The presentation then went on to provide insight into the Illinois Basin – Decatur Project scope for the permit and building of the test injection project, data collection and analysis for baseline data, injection,

monitoring and modelling schedule as well as post-injection monitoring and analysis. The Illinois Basin – Decatur Project site will obtain CO₂ from Archer Daniels Midland Company ethanol fermentation plant. This CO₂ will be compressed, dried and delivered through a 6,000 ft (1,829 meters) pipeline to the wellhead. Currently, the storage site is still under construction but injection of CO₂ is planned to commence during the months of October or November 2011.

The presentation on the Australian CO₂CRC Otway Project outlined the process they used for site selection and characterisation, CO₂ storage capacity estimation, injection, the cost associated with storage facility, monitoring and verification, risk assessment, regulatory issues and public perception. Stage one of the Otway project commenced in April 2008 and a total of 65,000 tonnes of CO₂ was injected into the depleted gas field. The CO₂ injected at this stage were naturally occurring CO₂ extracted from a Buttress well, only a short distance from the injection well. Monitoring was done after this injection and the results indicated that the CO₂ injected had stabilised and therefore no risks of CO₂ leakages were detected. Stage two of Otway project is looking at storing CO₂ in saline aquifers but this is still underway.

The presentation on the Mountaineer project highlighted the technology options considered by Alstom for CO₂ capture such as using chilled ammonia, advanced amines, oxy-combustion with air separation and chemical looping combustion. From the proposed technologies highlighted, the chilled ammonia process was selected and demonstration of this first integrated plant commenced during October 2009. Alstom is currently working towards commercialising this technology by 2015.

Legal and regulatory framework workshop

The CCS legal and regulatory framework workshop was held on the 27th of October and was led by the South African Department of Energy (DoE) and supported by SACCCS. The main purpose of this workshop was to address current developments on CCS legal and regulatory frameworks in South Africa, learn from global perspectives and experiences on CCS projects and then come up with a way forward of achieving a regulatory framework for CCS deployment.

National speakers shared their views on CCS legal issues and also their experiences on regulatory frameworks in the country. It was mentioned that studies are still underway on CCS legal and regulatory aspects. It was also mentioned that the South African DoE has established an Interdepartmental Task Team to address legal and regulatory issues for CCS.

A presentation from the South African Department of Environmental Affairs (DEA) highlighted their legal perspectives on climate change. It was also emphasized that DEA will be available to assist SACCCS with the application and issuing of permits for CO₂ storage. A presentation from Shell covered the global regulatory framework developments for CCS. It was mentioned that there is a future for CCS in the UK and globally as a solution to deliver secure, low carbon technologies but UK will have to take significant efforts and decisive actions to realise the potential of CCS.

International Energy Agency (IEA) covered liability issues and property rights for a CCS project. It was highlighted that the IEA CCS Roadmap was released in 2009 with the following recommendations:

- Existing legal and regulatory frameworks should be reviewed and adapted for CCS demonstration by 2011 in OECD countries and by 2015 in all non-OECD countries with CCS potential, and
- All countries should have a legal and regulatory framework suitable for large-scale CCS deployment by 2020.

The Global CCS Institute (GCCSI) highlighted their CCS Legal and Regulatory Toolkit (Toolkit) that can be used for testing CCS legal and regulatory frameworks. The main objective of the Toolkit is to enhance understanding of regulatory processes, identify opportunities to streamline regulatory systems in order to improve the efficacy of regulations and to ensure that viable regulatory processes for CCS projects exist.

In conclusion, the DoE proposed that a workshop should be held in 2012 with World Bank, IMBEWU and Interdepartmental Task Team to address the way forward on achieving an integrated regulatory framework for CCS in South Africa.

Public engagement workshop

The public engagement workshop was held on the 28th of October. The purpose of this workshop was to look at the South African public engagement processes similar to CCS and learn from global CCS projects on how they engaged with their communities on CCS issues. The SACCCS presentation highlighted the main purpose of public outreach and also addressed South Africa's challenges for a public outreach programme. The GCCSI presentation highlighted the general steps to be followed in order to have a successful public engagement programme.

During the second session, a presentation from the Illinois Basin – Decatur project highlighted the importance of engaging the public on CCS and also highlighted tools that can

be used in a successful engagement programme. It was stressed from the Illinois Basin – Decatur project that knowing the target audience before commencing with public engagement activities is important since the messages will not be the same for all audiences. From the Otway project, the importance of communicating CCS to the public was also highlighted. An interesting tool used by the Otway project for public engagement was the appointment of a community liaison officer who was a local resident living in the community where storage facilities were developed. The community liaison officer was employed to help communicate the details of the project to the community. Eskom’s presentation addressed the importance of public engagement specifically in South Africa. It was highlighted that community engagement throughout the project life cycle is crucial because the community needs to be aware of what is happening in their area.

During the discussions, it was emphasized that South Africa will have to look at some of the activities other countries used to communicate with the public and also learn from the challenges experienced by similar projects. Based on the lessons learned from these projects, SACCCS will draft the plan for public engagement taking into account all the target audiences. It was emphasised that SACCCS should start engaging the public now in order for the CCS project to be successful, SACCCS could also consider appointing a community liaison officer from the community where storage facilities are proposed.

Some of this work is underway with a study on CCS public engagement being developed by the DoE and World Bank with support from SACCCS. SACCCS will have to look at various platforms suggested by this study and identify activities to showcase CCS issues based on the plans for the CO₂ Test Injection Project. SACCCS should also develop a communication plan, highlighting all the target audiences and also aligning it with the DoE and World Bank study to avoid communicating different messages.

Risk assessment workshop

The risk assessment workshop was held parallel to the public outreach on the 28th of October 2011. The main purpose of the workshop was to discuss technical risk assessment issues pertaining to CCS in South Africa and globally and also to outline the principle factors in a CCS project risk assessment.

During the first session, a presentation from the International Performance Assessment Centre for Geological Storage of CO₂ (IPAC-CO₂) gave a general introduction to technical risk assessment. A presentation from SACCCS outlined CCS technical risk assessment and the risk methodologies that can be used in a CCS risk assessment were highlighted.

The second session covered the South African and international CCS risk assessment processes and analogues. Det Norske Veritas (DNV) presented various risk methodologies that can be used to do a risk assessment for a CCS project. SASOL presented the methodology that they use for risk assessment for various energy projects in South Africa. The methodology described how SASOL evaluates and mitigates their business and project risks. The methodology could be used for a CCS risk assessment. Shell shared their practical experiences on CCS risks management indicating that all the areas of a CCS project were important when it comes to risk management.

During panel discussion, speakers discussed in further detail the risks associated with a CCS project. It was emphasised that there should be a holistic approach to ensure that all CCS areas are important when doing a CCS risk assessment.

In conclusion, both local and international industries (i.e. Sasol, IPAC-CO2 and DNV) offered to assist SACCCS with future CCS risk assessment workshops.

Highlights of the event

The main aim of the CCS week was to disseminate the progress of research and development of CCS in South Africa. Below are some highlights of the week outlining how this aim has been achieved.

- The South African DoE announced the formation of a CCS Interdepartmental Task Team to develop a legal and regulatory framework for CCS in South Africa. The Task Team involves the six departments most relevant to CCS in South Africa, namely, the DoE, Department of Mineral Resources, DEA, National Treasury, Department of Science & Technology and Department of Trade & Industry.
- South African speakers presented their research findings on CCS and also indicated that they will be available to offer advice to SACCCS on specific issues if requested. Most of these findings were from desktop studies since CCS is still at its early stage in South Africa.
- Most speakers and delegates mentioned that SACCCS should also look at the risks associated with CCS and ensure measures are put in place to manage these risks.
- Speakers also indicated that there should be continual consultation with the stakeholders involved during the whole process of the Test Injection Project.
- It was also mentioned that SACCCS should secure funding early in order for the project to be successful. It would not help to have all the plans in place without having the funds to implement the project.

- Some speakers emphasized the importance of alignment within the project team regarding the scope of work for a project, outlining clear responsibilities with regard to the project work and good co-ordination of various public and private research initiatives.
- The South African DEA also offered to assist with the application process and issuing of the CCS permit.
- South Africa has learned a lot from international speakers such as those from the Decatur project in the USA and the Otway project in Australia who talked more on their practical experiences with regards to CCS. South Africa will use the information for the CO₂ Test Injection Project and the other projects within SACCCS.

Potential next steps

There are a number of steps that SACCCS should consider following the 2011 CCS Week. These include assessing if an event of this nature should be held in the future and if so, when the event should be held. It was also highlighted that SACCCS should consider organising follow-up sessions with the interested parties to assess if CCS week should be held as a whole week event or split to a two day conference and workshops to be held separately from this week. The DoE also stressed that it should organise a workshop to look at ways of developing a CCS regulatory framework.

Presentations from the CCS Week are available on the SACCCS website – www.sacccs.org.za. For more information on the CCS Week please contact Sharon Mashau on 010 201 8135 or via email: sharonm@sanedi.org.za.