



GHGT Times 10

Daily bulletin of the 10th Conference on Greenhouse Gas Control Technologies, Amsterdam RAI, 19-23 September 2010. Also available at www.ghgt.info

Today's highlight
The social event that can't be missed is the Conference Dinner. Dinner will be served in the Beurs van Berlage, the prominent building close to the Central Station.

Wednesday
22 September 2010

The secret of a good poster



"For scientists you use another language than for policy makers"

Yesterday, some 350 posters were exhibited at the first of two extensive poster sessions. Loads of detailed studies were shown, providing opportunities for networking. "This is the ultimate opportunity to exchange knowledge and business cards," said visitor and exhibitor John Arild Svendsen of Statoil. His statement was made very plausible by the large number of visitors, who had vivid conversations almost all afternoon.

But the competition is killing. Among 700 posters in total, every exhibitor wants to be recognised as 'outstanding'. Although no official competition was organised this time, Lila Guba of the University of New South Wales was happy her poster was already called 'brilliant' by at least one visitor. Guba: "Although I still prefer an oral presentation, preparing a good poster is a challenge. It takes a lot of time." Her recipe: "Formulate a clear message. See to it that you create this message for your specific audience. For scientists you use another language than for policy makers. And finally, use images and colours."

Quotes & Tweets

Michael Román (Stockholm Energy Institute):
"In climate change negotiations, CCS is only one of the many options."

drpeterneal twitters:
CCS = mature technology applied in new ways, at new scale

Eupaal twitters:
Maersk agreement with port of Rotterdam to transport CO₂ from Ruhr area to North Sea. A brand new CO₂ hub ready in 2015. Bravo!

A dialogue, and readiness to change a project

Yesterday morning, Peta Ashworth from Australian research institute CSIRO took her audience on a journey to a picturesque village where a family lived peacefully for generation after generation. The youngest of the family just built her a dream house last year.

When she returned from her local farm shop for tourists she heard a story on the radio about a multinational company planning to store CO₂ under her village. She also picked up some sentences on decreasing house prices and possible seismic activity. With this

example the energetic Australian wanted to show the audience that your personal background strongly influences your look at CCS. Ashworth showed there is a big difference between 'perceived risks' and 'real risks'. A change in a pipeline trajectory does not necessarily change the real risk. But it could make an enormous difference in the perceived risks in local communities.

Ashworth's message to take home was therefore: Cooperate as soon as possible with local communities and start a real dialogue. "If you start a dialogue, one should be

flexible in the project planning and really be prepared to change things. If all is fixed and unbreakable, it would not be a dialogue with the community, but just convincing the community."

This call was supported by the presentation on Monday by Jennie Stephens of Clark University. She showed three different case studies of CCS projects on different parts of the globe. All projects shown had civil society support and suffered no dispute or public opposition. One of the few common parameters in these projects was an open early dialog with the local community.

Enhancing oil recovery the main driver for CCS in emerging economies

In a panel discussion about capacity building, emerging economies proved to be particularly interested in CCS if they can apply Enhanced Oil Recovery (EOR). "EOR is sufficient to close the 'cost gap'," said Sam Nader of energy development company Masdar from Abu Dhabi.

EOR is the technology that pumps CO₂ into depleting oil fields, in order to push out the last remains of the local oil reserves. The CO₂ stays in the field, while the costs for this storage are more than compensated by the revenues from the surplus oil production. This is done for decades – long before climate change was on the agenda.

The countries in the panel that have substantial interests in domestic oil production, like Abu Dhabi and Indonesia, are the ones that are developing concrete plans for capturing CO₂. Others, like South Africa, are still struggling with funding, and other topics. "We have no oil reserves, so no EOR, so no funding," said Muzi Mkhize of the South-African Ministry of Energy. Mexico is still in between: domestic oil production, but yet no funding.

Non-OECD

"Whether you are a developing or developed country, the issues are the same: regulatory certainty, funding and public acceptance," summarised Chairman Brendan Beck of the International Energy Agency after the first round of discussions. In an earlier presentation he stressed the importance of applying large-scale CCS in emerging economies. The IEA calculated in its scenarios that bringing down the global CO₂ emissions in 2050 from 57 to 14 billion tonnes of CO₂ will require a large contribution from CCS in non-OECD countries. Beck calculated: "By 2020, CCS from OECD and non-OECD would be 50/50. But by 2050, 65% of all reduction by 3400 CCS plants world-wide would come from non-OECD countries."

Sam Nader from Abu Dhabi stressed that growth of CCS will also require education. "We have to build human capital in this sector." Whereas Brendan Beck offered the IEA expertise: "There are many structures for capacity building. Emerging economies are quite welcome to participate in the Global Energy Dialogue or in IEA Implementing Agreements like the IEA Greenhouse Gas programme."

Nothing as unique as storage sites

GHGT-10 is the place where lessons learned can be exchanged. Several sessions are dedicated to experiences in pilot projects. The most important lesson of yesterday's session: Nothing as unique as storage sites.

Besides some experiences regarding capture, most attractive conclusions could be drawn from the overviews of storage projects in In Salah, Snøvit and offshore Norway (Sleipner). Sleipner stored some 14 million tonnes of CO₂, In Salah nearly 4 Mt and Snøvit about 1 Mt. But apart from the size, the differ-

ences of these storage sites were remarkable. So immediate copying of technologies and storage methods will not be the proper way to learn from these experiences.

However, all three pilot and demo experiences showed an important common denominator to the audience. Each site showed the way how to learn from applying models, scaling-up, real injection and validating the initial models again.

Site characterization is one important issue to start any activity. Monitoring tools are important to

learn from the experiences and to validate models, while finding the right solutions how and where to use the wells are a prerequisite.

While scaling-up a storage site, non-technological challenges appear. Permitting procedures are obvious obstacles. When up-scaling means: leaving the power plant site, the project also reaches out to other stakeholders. Given the large possible differences among storage sites, a site-specific approach is therefore crucial to bring CCS into practice.

The link between CCS and climate change negotiations is still missing

Carbon capture is still not a very relevant topic within international negotiations regarding climate change policies. The last Climate Summit in Copenhagen hardly discussed CCS. Within the regular 'Kyoto mechanisms' like CDM, CCS is still not eligible. New mechanisms could create a new landscape but are still insecure.

The international politics were subject to the first discussion panel of the GHGT-10, yesterday morning.

The scene was more or less set by Michael Román (Stockholm Energy Institute) who said: "In climate

change negotiations, CCS is only one of the many options." Negotiations-watcher and chairwoman Heleen de Coninck of the Energy Research Centre of the Netherlands was well aware of the present deadlock. She inspired the discussion by applying John F. Kennedy's reversal trick "Don't

ask what your country can do for you, ask what you can do for your country" into: "Don't ask what climate change negotiations can do for CCS, but what CCS can do for the negotiations."

The focus of the debate was especially on the application of CCS in developing countries. De Coninck: "We should ask ourselves: Which countries have a particular interest in CCS? These countries could have some influence on the negotiation process." Looking around in the world, it seems that CCS is not exclusively developed in countries with large coal reserves. On the contrary: countries like Brazil and the states of the Middle East are very active.

For the Middle East, CCS is a way to hedge the risks in the fossil fuel markets they dominate. In this respect, CCS could pave the way for some input by the Middle East in the negotiation process. That could replace the usual opposition to any



new agreement, which represents their present attitude.

The panel and the audiences looked at the subject from many sides. One important observation of many attendants was that the international climate change politics have merely become a matter of economic development and cooperation. This led to a remark from the audience that climate change politics now lose focus. Discussing the climate within the general development issues makes it very difficult to come to an international climate change treaty. Which was definitely proven by the Copenhagen Climate Summit, last December.



"Which countries have a particular interest in CCS?"

Exotica: extracting CO₂ from thin air

Extracting CO₂ from flue gases or contaminated natural gas with rather high concentrations up to 10 or 15% is one thing, which is already quite complex. Extracting CO₂ from the air, with concentrations less than 400 parts per million, is another.

Following scenarios like the ones presented on Monday morning, 'negative emissions' could become important in the second half of the century. The combination of biomass and CCS is promising in extracting CO₂ from the atmosphere. In addition, some also dream

of just taking CO₂ directly from the air. This exotic idea was thrilling enough to have a special dedicated session.

But yesterday's session did not bring about great scientific belief in these technologies. Most attendants turned out to be very skeptical. One attendant even exclaimed: "It's nuts!" (Howard Herzog of MIT).

There are several 'industrial' technological options for scrubbing out the CO₂ from air. But because of the low concentrations, very large collectors are required. Apart from

the huge capital costs – in the order of some 100s of dollars per tonne of CO₂ reduced - large areas of land are needed.

And then there is the possibility to use mineral rock to absorb large quantities of CO₂. A multi-billionaire like Richard Branson is very interested in this kind of solutions. The Brit is still considering financing such a project in the framework of his CO₂-combatting competition programme.

But the GHGT-10 scientists showed great reserves. "Most minerals have already absorbed CO₂ for millions of years," one of the attendants said. "Pulverising minerals to enlarge the reaction surface will cost too much energy," said another.

Real scientific advocates were not available at the meeting. The people that were present were of the opinion: let's first start to apply CCS in flue gases and industry before we pass through to such an insecure path like this.



Student Café

Roll call in the Amsterdam Café at the RAI. While the older generation recollected the first GHGT in Amsterdam on paddle wheeler "Kapitein Kok", the younger generation was invited at the student reception. At this reception they strengthened their network, exchanged knowledge and prepared for discussions with the older generation today.... (photo Lucy Hoofst)

Capture:

"We are not there yet"

An overview of the CO₂ capture work of the last 18 years shows that the targets formulated in the first conference in this GHGT series are still there. Energy reduction and costs are the continuous goals. And the question which capture technology is the best is still unanswered. Yet an enormous progress has been made, according to the overview presented by 'veteran' Daniel Jansen, of Energy Research Centre of the Netherlands.

"A lot of research has been accomplished, but we are not there yet. Back in 1992, we were probably too enthusiastic about how new technology climbs the long way towards commercial application. Particularly the last step is difficult: applying a technology in a real working power plant that should have an availability of almost 100%. In the early years most of the work was done by scientists. The work got a real boost when the large industrial partners stepped in, around the year 2000."

"It is good to see that there are still ideas for next generation technologies on capture that can reach

an even lower energy penalty," continues the chemical engineer. In the session on novel concepts he learned of a new process based on electrochemical separation of CO₂ as proposed by the Massachusetts Institute of Technology. In this Carbon Capture concept, the electrochemically active sorbents undergo significant changes in their molecular affinity for CO₂ molecules as they go through an electrochemical cycle. "This idea is only at the start of a journey towards commercial application," says Daniel Jansen. "They have to be prepared for lots of hurdles if they apply this to real flue gases. Hopefully they can overcome this."

Disclaimer

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