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GHGT-9

Editorial

GHGT-9, the latest conference in the Greenhouse Gas Control Technologies series, was held from 16–20th November 2008 in Washington D.C. It was organised by MIT in collaboration with the IEA Greenhouse Gas R&D Programme (IEA GHG). The US Department of Energy was the major sponsor, with additional support coming from 29 other sponsors. The GHGT series has grown rapidly since it began in 1991, and the 2008 conference was the largest yet, with over 1460 delegates.

In reflecting the focus of international activity, the four day conference concentrated on CO_2 Capture and Storage (CCS), and covered every aspect of these technologies. A total of 269 oral presentations were given, which necessitated addition of a sixth parallel session, and about 450 posters were presented. The papers and posters presented at the conference are contained within these proceedings. GHGT-9 highlighted that significant progress has been made in CCS technologies, and the evolving policy and regulatory environment in which these technologies operate, since the last conference (GHGT-8) was held in Norway in 2006.

Some of the key points noted at the conference were:

- There is growing recognition of the role, need for and scale for CCS as a key climate change mitigation technology in the work of the IPCC and IEA. Overall, the main policy driver for all mitigation measures, not just CCS, will be national greenhouse gas (GHG) emissions policy.
- Demonstration projects are urgently needed to enable the world to 'learn by doing' in all aspects, both technical and regulatory.
- Engagement with major developing countries such China, India and others has been growing but is still insufficient given the growth of electricity generation capacity in those countries.
- Regulatory developments for CCS have been rapid and positive, in many regions since the last conference in 2006.
- A key characteristic of all the regulatory developments is the need for flexibility within them, particularly for issues such CO_2 purity and monitoring technique requirements. Flexibility allows learning from the early projects to be incorporated in the regulations as they are developed.
- From a business perspective, there is a need to improve collaboration among various CCS industry stakeholders. This would enable enhanced leverage of funding for various projects. Governments should assist with this process.
- The potential of CCS and biomass as an effective greenhouse gas mitigation technology should be realised, and recognised in emissions trading schemes.
- Public awareness is very important, and more work is required in this area. Public awareness will become more focused on projects and local issues rather than on the abstract concept of CCS in the future. The association between CCS and coal should also be deemphasized, as CCS also applies to other fuels and sectors
- The insurance and finance industries have a growing interest in CCS, which is welcomed.
- The cost of capture is now estimated to be 10–20% higher than it was five years ago, primarily because of escalating material costs in the period up to early 2008. The degree to which basic material costs will come down as a result of the current global economic crisis is yet to be known. However, the only way to confirm cost estimates is to actually start building demonstration plants and commercial CCS facilities. Over the long term there are several promising technologies, which are expected to significantly reduce capture costs
- New capture pilot plants have and are being built around the world, particularly for post-combustion capture, and this represents real progress. However, we also need demonstration plants at a commercial scale for coal-based power plants (e.g., capturing 2–4MtCO_2/year).

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- There are some promising new solvents such as advanced amines and ammonia that offer the potential to significantly reduce energy requirements compared to conventional amines. Further testing and scale up is needed to rigorously quantify these benefits.
- There are still three general capture options on the table (post-combustion, pre-combustion and oxyfuel) with activities in all area being pursued.
- Flexibility of CCS operations is important, particularly within liberalised electricity markets. New work streams on flexibility of capture systems, poly-generation and matching peak demand are making good progress, but need to move beyond just the capture system.
- Much work has been done on improving storage capacity assessments, which are moving from theoretical capacity estimates to more realistic understanding on the useable capacity. Knowledge has developed considerably in this area since GHGT-8 and this remains an area of rapid progress.
- There is a specific need for greater understanding of saline water displacement and pressurisation in saline aquifer formations.
- Considerable progress had been made in understanding the trapping mechanisms that 'lock up' CO_2 and reduce the potential for leakage over time. In conjunction with rigorous site selection and characterisation procedures and improved engineering design of storage projects, this will allow continued downward re-assessment of potential storage security risks.
- A variety of monitoring techniques continue to be improved and proven. An example is the demonstration of satellite monitoring at In Salah, Algeria showing that this technology can be included in the portfolio of standard monitoring techniques.
- Work in the area of geological storage is evolving from a technology perspective to an assurance based perspective.

Further details on these points and much more are contained in the technical papers contained in this procedia. Collectively, they paint a picture of the current state-of-the-art in CCS. We hope to see further progress on these issues at the next conference (GHGT-10) in Amsterdam in *September*, 2010.

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