CO2 Capture and Storage

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Why CO₂ Capture and Storage?

- Climate change is occurring
- Need to reduce greenhouse gas (GHG) emissions
- Fossil fuels will continue to be the major energy source
- All international scenarios for deep GHG reductions include CCS
- CCS is one of a portfolio of mitigation options
- All options are needed

Source: IPCC (2007)
Carbon Capture and Storage

Three Options;
• Post Combustion
• Pre Combustion
• Oxy fuel

Two Options;
• Pipelines
• Ships

Three Options;
• Coal seams, 40 Gt CO₂
• Oil and gas fields, 1,000 Gt CO₂
• Deep saline aquifers – up to 10,000 Gt CO₂
CO₂ Injection and Storage Activities

- 50 Acid Gas injection sites in North America
- 4 New CO₂-EOR Pilots in Canada
- 70 CO₂-EOR projects in U.S.A.

Key:
- Depleted Oil Field
- ECBM projects
- EOR projects
- Gas production Fields
- Saline aquifer

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IEA Greenhouse Gas R&D Programme

• A collaborative research programme founded in 1991
• Our main role is to evaluate technologies that can reduce greenhouse gas emissions.
• Aim is to:
  
  *Provide members with definitive information on the role that technology can play in reducing greenhouse gas emissions.*
  
• IEA GHG is a IA in which the Participants contribute to a common fund to finance the activities. Funding is approximately 2 million US$/year.

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IEA Greenhouse Gas R&D Programme

- IEA GHG aims at producing information that is:
  - Objective in evaluating the relative merits of Greenhouse Gas mitigation options
  - Information generated is policy relevant but NOT policy prescriptive
  - We aim to be a trustworthy source of technical information. All IEA GHG studies are:
    - Reviewed by external Expert Reviewers
    - Subject to review of policy implications by Members

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Current Membership

www.ieagreen.org.uk
Previous Work by IEA GHG

• This IA has been operating for 15 years. It has:
  • Accumulated >100 studies covering carbon capture and storage (CCS), other mitigation technologies, and alternative energy carriers.
  • Succeeded in establishing CCS as a mitigation option capable of major reductions in the emission of CO$_2$ to atmosphere.
Phase 4

• Finished at end of 2004. During phase 4:
  • CCS moved, from being a technical possibility, firmly onto policymakers’ agendas.
  • Activities expanded to include: research facilitation, research networks, and communications initiatives. Aimed at: Confirming CCS as a major option for climate change mitigation.
What does IEAGHG do now?

• New 5-year phase started in 2005:
  • 3 Main activities:
    • Generate technology and market information
    • Confidence building
    • Information dissemination
  • Aimed at answering:
    • How do mitigation options compare?
    • Can CCS be done safely and legally?
    • What needs to be done to introduce CCS and be confident it will be successful?
Technology and Market Information

Implementation Support

- Methodology for CCS projects under CDM
- Guidelines for CCS site characterisation
- CCS Project Financing
- Regional capacity for CO₂ storage in India

Technical Assessments

- Improved solvent scrubbing processes for CO₂ capture
- Capture of CO₂ from medium scale installations
- Improved Oxygen production processes
- Collection of CO₂ from distributed sources
- CO₂ Capture in the cement industry
- Co-production of hydrogen and electricity
- Remediation of leakage from geological storage
- Fuel Cells for CHP
- CO₂ Pipeline transmission costs

Regulatory Support

- Risk assessment and regulatory needs
- Environmental impact assessment for CCS
- Capture-ready power plant
- Monitoring Selection Tool

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International Research Networks

**CAPTURE**
- International Network for CO₂ Capture
- Oxy-fuel Combustion Network
- International Network on Biofixation of CO₂ and Greenhouse Gas Abatement with Microalgae

**STORAGE**
- Risk Assessment Network
- Monitoring Network
- Well Bore Integrity Network
Information Dissemination

Quarterly newsletter

Topical Reports

GHGT-9
16th – 19th
November 2009
Washington D.C.
www.mit.edu/ghgt9

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New Capacity Building Initiative

• New annual Initiative launched in Germany in August 2007
• Annual summer school on CCS for 60 invited students
  • 24 countries represented in Germany
    • 4 Chinese students
• Annual summer schools will rotate between Europe, North America and Asia/Australasia
  • Next planned for Canada in 2008
  • 2009 proposed for Australia – to be confirmed
• Details and presentations can be found at:

  www.ieagreen.org.uk/summerschool
Possible Co-operation with China

- Chinese membership of IEA GHG has been discussed with MOST
  - Regular participation in International CCS Summer School
  - Secondments to IEA GHG to develop technical knowledge/skill base
    - Clearing House for secondments of Chinese technical experts within member countries
  - China to host future International Research Network meetings
    - CO2 Capture network meeting in June 2008 has been proposed with UK DEFRA support
  - Support Chinese participation at GHGT-9
Thank You

Any Questions?

Reference material on IEA GHG can be found at: www.ieagreen.org.uk

Reference material on CCS can be found at: www.co2captureandstorage.info