



# The IEA Greenhouse Gas R&D Programme An Overview

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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 2.5 million US\$/year.



# IEA Greenhouse Gas R&D Programme



 OPEC ORGANIZATION OF THE PETROLEUM EXPORTING COUNTRIES



ALSTOM



BG GROUP



EniTecnologie



EPRI

ExxonMobil

REPSOL YPF



Schlumberger



Statkraft

STATOIL



VATTENFALL





## 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





## 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<sub>2</sub> 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 IEA GHG 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 CO<sub>2</sub> storage in India

### Regulatory Support

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

### Technical Assessments

- Improved solvent scrubbing processes for CO<sub>2</sub> capture
- Capture of CO<sub>2</sub> from medium scale installations
- Improved Oxygen production processes
- Collection of CO<sub>2</sub> from distributed sources
- CO<sub>2</sub> Capture in the cement industry
- Co-production of hydrogen and electricity
- Remediation of leakage from geological storage
- Fuel Cells for CHP
- CO<sub>2</sub> Pipeline transmission costs





## Reports Issued Since 32<sup>nd</sup> Meeting

Title	Contractor	Publication date	Report number
CO <sub>2</sub> capture ready plants	E.ON	May 2007	2007/4
Impacts of CO <sub>2</sub> leaks on terrestrial ecosystems	BGS	July 2007	2007/3
Capture of CO <sub>2</sub> from medium scale sources	Ecofys	July 2007	2007/7
Remediation of leakage from geological storage	ARI	Aug. 2007	2007/11
Distributed CO <sub>2</sub> collection	Gastec	Aug. 2007	2007/12
Co-production of hydrogen and electricity by coal gasification with CO <sub>2</sub> capture	Foster Wheeler	Sept. 2007	2007/13
Improved oxygen production processes	Rodney Allam	Oct. 2007	2007/14



## Studies Underway - 1

<b>Title</b>	<b>Contractor</b>	<b>Scheduled publication</b>
Regional capacity for CO <sub>2</sub> storage in India	BGS	March 2008
Assessment of sub-sea ecosystem impacts	MBARI	April 2008
Fuel cells for combined heat and power	Jülich Research Institute	April 2008
CO <sub>2</sub> capture in the cement industry	Mott MacDonald	May 2008
CO <sub>2</sub> pipeline transmission costs	Gastec	June 2008
Removal of impurities from CO <sub>2</sub>	Advantica	July 2008



## Studies Underway - 2

Title	Contractor	Scheduled publication
Improved solvent scrubbing processes	SINTEF	July 2008
Assessment criteria	EPRI	August 2008
Operating flexibility of power plants with CCS	University of Waterloo	October 2008
Safety consideration	HSL	October 2008
Potential breakthrough capture processes	Innovaro	December 2008
Aquifer storage development issues	CO2CRC	February 2009



## Studies to be Started

Title	Proposal number
CO <sub>2</sub> capture in the iron and steel industry	91
Prospects for storage of CO <sub>2</sub> in EOR	108a
Prospects for storage of CO <sub>2</sub> in gas fields	108b
Retrofit and repowering with CCS	31-3
Estimation of CO <sub>2</sub> storage costs	31-5
Best practise guidelines on site characterisation	31-6
Use of biomass with CCS, part 1: combustion processes	32-1
Capture of lower fractions of CO <sub>2</sub>	32-2
Building the pipeline infrastructure	32-5
Long term integrity of storage – well abandonment	32-7





# International Research Networks

## CAPTURE

- International Network for CO<sub>2</sub> Capture
- Oxy-fuel Combustion Network

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- International Network on Biofixation of CO<sub>2</sub> and Greenhouse Gas Abatement with Microalgae

## STORAGE

- Risk Assessment Network

- Monitoring Network

- Well Bore Integrity Network

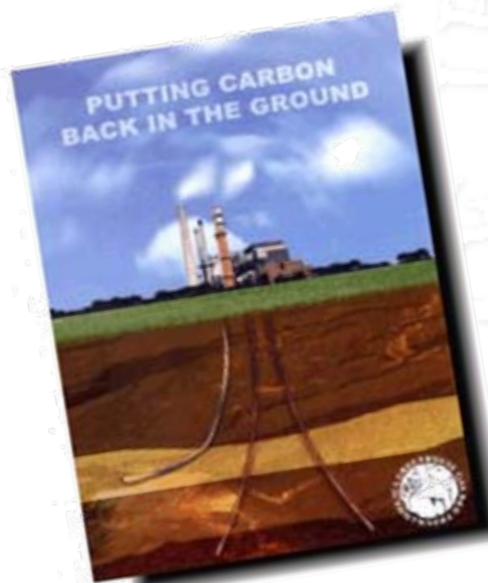
**IEA GHG  
Networks**



## Information Dissemination

Quarterly newsletter

Topical Reports



**GHGT-9**  
**16<sup>th</sup> – 19<sup>th</sup>**  
**November 2009**  
**Washington D.C.**  
**<http://mit.edu/ghgt9>**



## Practical R&D Activities

### Systems Studies/Capture

- DYNAMIS
- International Test Centre

### Technical Reviews

- WEYBURN
- RECOPOL
- OTWAY BASIN PILOT PROJECT

### Storage Projects

- SACS/CO2STORE
- CO2REMOVE
- CO2SINK
- MOVECBM
- WEYBURN







[www.co2captureandstorage.info](http://www.co2captureandstorage.info)

## Support Tools

- Monitoring Selection Tool
- Transmission Calculator
- Storage Cost Estimator

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## Host Site

- Network Meetings
- Technical meeting reports

## Databases

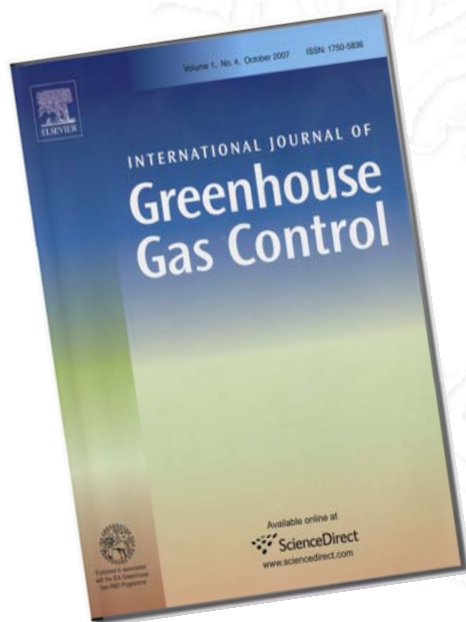
- CCS R,D&D Database
- CO<sub>2</sub> Emissions
- Risk Scenarios
- Best Practise
- Site characterisation





## New Initiatives in 2007

- International Journal on Greenhouse Gas Control launched
  - First year of quarterly editions successfully completed
- International Interdisciplinary Summer School launched





Thank You

Any Questions?

Reference material on IEA GHG can be found at:

[www.ieagreen.org.uk](http://www.ieagreen.org.uk)

Reference material on CCS can be found at:

[www.co2captureandstorage.info](http://www.co2captureandstorage.info)