



IEA Greenhouse Gas R&D Programme



# **CO<sub>2</sub> Capture and Storage: Legal, Regulatory and Public Acceptance Issues**

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## Introduction

- Cover three Non-technical Issues that confront CCS
- Legal Issues
  - Acceptance under international law and treaties
    - Climate change
    - Maritime area
- Development of regulations for CCS
  - National regulations
  - EC Emissions Trading scheme
- Public awareness



## Legal Issues

- International legal framework relates to offshore storage
- On shore storage can be considered as being covered by national legal frameworks.
- The main international frameworks covering CCS are:
  - The Law of the Sea (UNCLOS)
  - Climate Change Framework
    - Kyoto Protocol



## Kyoto Protocol

- Kyoto Protocol has now been ratified.
- CCS not currently listed as a mitigation option under Kyoto Protocol.
- Requirement under Article 2 for parties to undertake R&D and promote the development of CCS.
- Growing interest by parties to the protocol led to the UNFCCC requesting an expert workshop to be held to advise on the status of technology
  - Regina, Canada, November 2002



## Inventories & Accounting

- For CCS to be included in the Kyoto Protocol and accepted under the flexible mechanisms
  - Emissions Trading, CDM and JI
  - Allows emission credits to be transferred
- Inventory and accounting procedures need to be agreed
- Currently IPCC is updating its inventory guidelines, which will be published in 2006
  - Guidelines now include CCS



## Marine Protection

- Marine protection law established in 1992 to prevent dumping of waste at sea
  - Framed in London Convention
  - Set global standards on marine pollution
- Beneath the London Convention there are regional frameworks
  - OSPAR best known
  - OSPAR sets stricter regulations than the LC



## London Convention

- Convention was framed before CCS was considered
- Convention can be interpreted that it does not specifically rule out sub sea bed storage
- Main issue relating to CCS is whether CO<sub>2</sub> is considered as an “industrial waste” or not.
- CCS was specifically considered at Scientific Committee meeting in May 2005



## Scientific Committee Findings

- CO<sub>2</sub> working Group established
- Report presented:
  - Continued take up of CO<sub>2</sub> from the atmosphere will cause damage to the marine environment
  - One way of avoiding this is CCS in sub sea structures
  - One caveat inserted however was:

*“Risk of leakage has to be evaluated against the effects of atmospheric CO<sub>2</sub> on the marine environment.”*

- Report will be presented to London Convention Consultative Committee in October 2005



## OSPAR Convention

- Convention decided in 2002 to establish a clear position on CCS
  - Commissioned a report by the Jurists and Linguists
  - Presented in 2004
- Main conclusions:
  - Ship based disposal is prohibited
  - Discharges from land based sources are not prohibited but must be regulated/authorised



## OSPAR Convention

- Main conclusions cont'd:
  - CO<sub>2</sub> from offshore activities is not prohibited but must be strictly regulated
  - Placement for scientific study is not prohibited but must be in accordance with the Convention
  - CO<sub>2</sub> from land based sources used for offshore EOR is authorised



## OSPAR

- Since that time OSPAR have organised a workshop on CCS in Norway
- Results of which were presented to the Biodiversity Committee in February 2005
- Recommendation was for the Offshore Industry Committee to consider issues relating to CCS and report back in 2006
  - Issues to be reported on:
    - Effects of elevated atmospheric CO<sub>2</sub> levels on the marine environment
    - Risk characterisation for suitable storage sites
    - Monitoring and detection of sub sea leakage



## Summary

- Acceptance of CCS under International Law is progressing
- By late 2005 CCS could be endorsed under the Kyoto Protocol
- By 2006 CCS could be fully accepted by Maritime Treaties
  - Under OSPAR it is not excluded in all cases currently



## National Regulatory Development

- IEA GHG has reviewed existing regulations for CCS
  - Capture plant need no further action
  - Transmission system
    - National regulations available
    - Development of international standard underway
    - Some reinforcement for block valves in areas of high population density
  - Storage system
    - Currently regulations largely absent
    - Best approach to extend existing national regulations



# National Regulatory Development (2)

- Development of national standards are underway
- Adaptation of existing standards is favoured route
  - Netherlands - adapted Mining Act for K-12B Project
  - IOGCC in USA are looking at modified existing regulations
    - Use US DOT standards and permits for pipelines
    - Use CO<sub>2</sub>-EOR regulations and permits to cover injection operations
    - New monitoring standards to cover long term standards
    - New regulations needed for well abandonment and remediation
  - US EPA are considering modifying Underground Injection Programme regulations to cover CCS
    - With some enforcement on subsurface monitoring
  - Canada has looked at modifying natural gas storage standards



## Emissions Trading

- European Emissions Trading system (ETS) started trading in January 2005
  - Linking directive to transfer JI and CDM credits into ETS
- Article 14 requires the member states to develop guidelines for monitoring and reporting
  - UK DTI has undertaken a study that reviews monitoring requirements
  - Proposed a set of guidelines for EC to consider



## Emissions Trading

- Proposed guidelines include
  - Fugitive emissions treated as per IPCC Reporting guidelines
  - Indirect emissions can be calculated
  - Seepage from storage reservoir should not be treated using discounting/default factors
    - Treated under permitting and licensing regime that requires:
      - Time limited licensing - renewal based on performance review to include monitoring data
      - Demonstration of “due diligence” in site selection
      - Monitoring and reporting of leakage due to seepage or sudden release
  - Long term liability passes to Government after injection is over



## Monitoring for CCS Under ETS (1)

- Main components proposed are:
  - Pre-injection monitoring
    - License reviewed every 5 years in line with ETS cycle
      - Give operator opportunity to update monitoring results
      - Allows regulator to revise ETS allowances
    - License will require that site passes acceptable site performance criteria – “due diligence”
    - Baseline survey essential
    - Monitoring will be site specific



## Monitoring for CCS Under ETS (2)

- Site Characterisation requirements for license approval
  - Detailed geological model
    - Identify faults/fractures or other seepage pathways
  - Predictive model and site simulation
  - Risk Assessment
  - Environmental Impact Assessment
  - Remediation strategy is produced



## Monitoring for CCS Under ETS (3)

- Injection monitoring
  - 5 year cycle proposed
    - More frequent will add expense but not necessarily extra data
  - If seepage identified frequency could be increased to quantify flux
- Post injection monitoring
  - Cycle time could decrease as confidence grows that containment is assured



## Monitoring for CCS Under ETS (4)

- Programme requires independent expert review of:
  - Monitoring programme
  - Monitoring results throughout
- Monitoring System proposed by UK DTI to EC for adoption by member countries
- Outcome awaited
  - No timescale set by EC to adopt



## Public Awareness

- Surveys in Europe and North America indicate public awareness of CCS is limited
  - Awareness of impacts of climate change extensive
- After explanation of technology the public surveyed were not against technology
  - Careful on use of terminology
  - “ Bubbles of CO<sub>2</sub>” - but bubbles burst
- Need to build public awareness of need for, and benefits of CCS
- Public need to be engaged early in an open and transparent process



## Public Attitudes to CCS

- Public attitudes can be influenced by NGOs
- But should not ignore strength of local opinion
- Local issues may dominate planning applications
- Despite general acceptance of principle may not accept local sighting of technology
  - The NIMBY lobby
  - Example - wind farms in UK.



## NGO Attitudes to CCS

- NGO have been actively involved in dialogue on CCS
  - Dialogue activities underway via CCP and EC
  - Many national activities underway
- CEN Europe has completed a review for NGOs on CCS
  - Generally supportive of geological storage
- NGO's actively involved in IPCC SRCSS



## NGO Attitudes to CCS

- NGOs are against Ocean Storage
  - European and North American response
- NGOs are now open minded to the implementation of CSS
  - With some caveats
- Typical caveats suggested are:
  - Highest efficiency power generation technology used
  - Environmental issues throughout the fossil fuel production and use attended to
  - Guarantee zero leakage from storage reservoir
  - Don't want research money diverted from renewables



## Conclusions

- CCS should be accepted under International Law in the next few years
- Development of national regulations to cover on shore storage is underway
- Public awareness on CCS is limited
- Need for increased activity on public engagement