

**APGTF Workshop**  
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# **Regulation of CCS**

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# International Regulation

- IPCC GHG Inventory Guidelines
- Marine Treaties – London and OSPAR
- North Sea Basin Task Force
- EU

# IPCC Guidelines for GHG Inventories

- Apr 2006
- Vol 2 Energy Chp 5 - *CO2 Transport, Injection and Geological Storage*
- Methodology

Site characterisation – inc leakage pathways



Assessment of risk of leakage – simulation/modelling



Monitoring – monitoring plan



Reporting – inc CO2 inj and emissions from storage site

# London Convention and Protocol

- Global agreement regulating dumping of wastes and other matter at sea
- Convention 1972 (80 countries), Protocol 1996 – ratified March 2006 (29 countries)
- What can be dumped is specified in LP Annex 1
- Some exceptions exist

# Amendment of London Protocol

- Amendment to Annex 1 formally proposed (Apr 2006) by Australia, co-sponsored by UK, Norway, France, Spain

## **Amendment adopted at 28th Consultative Meeting, 2 Nov 2006 - comes into force 10 Feb 2007**

“ CO<sub>2</sub> streams from CO<sub>2</sub> capture processes for sequestration ”  
....only if:-

- Into a sub-seabed geological formation
  - Consist overwhelmingly of CO<sub>2</sub>. May contain incidental associated substances derived from the source material and capture and sequestration processes used
  - No wastes or other matter are added for the purpose of disposal
- Waste Assessment Guidelines to be completed in 2007

# OSPAR

- Regional marine treaty to prohibit pollution of NE Atlantic, 1992
- 15 Parties + EC
- What can be dumped specified in Annex II
- Some exceptions exist
- Draft amendment to allow CCS proposed for OSPAR meeting June 07
- Developed regulatory principles with Norway (North Sea Basin Task Force)

# EC and CCS Regulation

## *EC Strategic Energy Review (2007), on CCS: -*

- Favourable Regulatory Framework - remove barriers
- **CCS in the Emissions Trading Scheme**
- In principle, by 2020 all new coal PS should be CCS, retrofit to older plant. Confirm asap

## *EC Communication on Sustainable Fossil Power (2007)*

- Consistent Regulatory Framework at EU level
  - Remove barriers
  - Amend existing directives or create free-standing framework
  - CCS in ETS from Phase III, consider for Phase II
- CCS acceptance in international regimes
  - Support CCS in CDM and amendment of international conventions (eg OSPAR)
- Framework for phasing in of CCS
  - In principle, by 2020 all new coal PS should be CCS, followed by progressive retrofit to older plant. Confirm asap

## UK Regulation

### Terms of reference of the cross-Government Task Force on UK Regulation of Carbon Capture and Storage: high level aims

To facilitate and regulate the development and use of CCS as one approach in a portfolio of measures to tackle the challenge of climate change and ocean acidification. In order to help achieve this, to remove uncertainties for industry and regulators relating to the regulatory regimes and processes involved in CCS, and to ensure the environmental integrity of CCS activities.

# Terms of reference: working groups

Clarify existing regulation and its application, to identify any gaps and the need for new regulation, and to develop new regulation as required, in the following areas:

## Offshore

1. Licensing of CO<sub>2</sub> storage sites, activities and transportation offshore
2. Conditions for abandonment of storage sites, and long-term liabilities for CO<sub>2</sub> storage

## Onshore

3. Enabling/facilitating capture and capture-ready power plant. Licensing of onshore transportation facilities and re-licensing of existing infra-structure for CO<sub>2</sub> transport
4. A fourth working group was later added, to look at the issue of licensing onshore storage sites.

# WG1: Offshore Licensing Issues

- *CO<sub>2</sub> storage in depleted oil/gas reservoirs (non EOR)*
- *CO<sub>2</sub> storage in saline aquifers*

# Some background issues re WG1..

- No current legislation addresses CCS per se
- CCS will require amendment of London Convention/OSPAR/Framework Directive. Need to declare rights to porous space under UNCLOS
- Some common ground with gas storage projects: eg need to declare rights to use porous space out to 200 mile limit (planned for 2008 regs)
- Need for any new/amended legislation to dovetail with existing legislation. Also Government drive for 'Better Regulation'. Do not want to delay legitimate projects
- Recognise difficulties of opening up possible CCS sites to competition
- While industry might prefer a 'one stop shop' for consenting authority this may not be the most pragmatic solution
- Need to cover potential for offshore capture and re-injection

# Examples of offshore activities that need to be addressed

- Control of drilling operations
- Appointment of operator
- Consent for development programmes/ construction
- Consent for injection
- Protection of rights of other sea users
- Requirement to keep records/submit reports/keep samples of drilling cores etc
- Restrictions on assignment
- Monitoring provisions (WG 2)
- Decommissioning provisions (WG 2)

# Some regulatory territory..

## **Petroleum Act 1998 (DTI)**

- **Model covers much of what we might want to do. Existing regs cover pipelines**

## **Food and Environment Protection Act 1985 & Coast Protection Act 1949 (Defra)**

- **Not currently designed for long term control/drilling operations/ monitoring/decommissioning etc**

## **Habitats Directive 1992**

## **SEA Directive**

## **EIA Directive**

## **Health and Safety at Work Act 1974**

# Some options..

## Use/modify existing legislation

- **Declare rights to use storage out to 200ml (Crown Estate)**
- **Use modifications to FEPA/Petroleum Act to enable it to cover respective CCS activities (incl decommissioning)**
- **Need to be clear about gaps/potential shortcomings**

## New legislation

- **Should we have both an ‘exploration’ and a ‘storage’ licence?**
- **Potential to use Petroleum Act model to cover other activities (incl concept of operator)**
- **Several primary legislation routes (forthcoming Bills) depending on timeframe: also Order in Council**

## WG2: Offshore decommissioning, long term liabilities

- Decommissioning and abandonment of storage facilities
- Long-term liabilities for abandoned CO<sub>2</sub> storage sites

# Existing Regulation

## UK domestic legislation

- The Petroleum Act 1998 – Part IV
- Food and Environment Protection Act 1995 (FEPA)
- Pollution Prevention and Control Act 1999 (PPC)

## International Law

- Environmental Liability Directive (ELD) – to be transposed into domestic law by 30 April 2007
- London Protocol to the London Convention
- OSPAR
- United Nations Framework Convention on Climate Change
- Second European Climate Change Programme (ECCP II)

# Existing Regulation

- The Petroleum Act 1998 is capable of regulating the decommissioning of all equipment used in connection with the exploitation of hydrocarbons (including enhanced oil recovery (EOR) projects).
- There is no existing legislation which would regulate the decommissioning of non-EOR-related equipment.
- The Pollution Prevention and Control regime may provide an interim solution to regulating certain long-term liabilities.

# Recommendations

A future regulatory framework on CCS should recognise that risks associated with geological CO<sub>2</sub> storage are both local and global in nature. Such a framework should be designed to maximise the environmental integrity of long-term geological CO<sub>2</sub> storage, limit risks to health and safety, and facilitate the commercial development of CCS.

# A future regulatory framework for CO<sub>2</sub> storage in the UK should:

- a) Clarify under what criteria and how responsibility for a storage site changes in the post-injection phase
  - i. clarify the criteria allowing a CO<sub>2</sub> storage site to be abandoned
  - ii. identify how liability can pass from one entity to another or from an entity to the State

## A future regulatory framework for CO<sub>2</sub> storage in the UK should:

- b) Identify what obligations are on the responsible party should CO<sub>2</sub> leak from a storage site, this may include:
  - i. remedial action to prevent further leakage;
  - ii. rules to deal with emissions reductions credits claimed for CO<sub>2</sub> which is no longer stored;
  - iii. if an entity, payment of a penalty (if it is considered an offence for the leakage to occur);
  - iv. reporting obligations

## A future regulatory framework for CO<sub>2</sub> storage in the UK should:

- c) Enable the UK to continue to deliver its annual greenhouse gas inventory even after abandonment – regulation should refer to the UNFCCC, Kyoto Protocol, and the relevant IPCC GHG Inventory Guidelines as necessary.

# WG3: Onshore Plant & Pipelines

- *CO<sub>2</sub> capture plant*
- *CO<sub>2</sub> transportation*
- *Capture ready facilities*

# CO<sub>2</sub> Capture

## Licensing and consent

- **Power Plant** – Electricity Act 1989, Section 36 (>50MWe SoS Energy, <50MWe LPA)
- **Other plant** – LPA

## Environmental standards

- Pollution Prevention and Control Act (EA for England and Wales, SEPA)

## Health and Safety

- Planning (Hazardous Substances) Regulations
- Control of Major Accident Hazards Regulations (COMAH)
  - Only applies to hazardous substances and supercritical CO<sub>2</sub> not yet classified as such.
  - HSE has raised some concerns over major accident potential

# CO<sub>2</sub> Transport - Pipelines

- Construction licensed under Pipelines Act 1962 by SoS Energy (>10 miles in length).
- Pipeline authorisations specify the substance to be conveyed therefore the licensing of reuse for existing pipelines uncertain.
- Health and safety issues are the same as for capture (Planning (Hazardous Substances) Regulations and Control of Major Accident Hazards Regulations (COMAH))
- Ancillary plant (compressor stations, etc.) come under Town and Country Planning Act.
- Transport by road, rail or water subject to a duty of care, and additional administrative requirements when CO<sub>2</sub> classified as a waste.

# Capture Ready plant

**How to implement any possible future requirement for fossil fuel to be built “capture ready”**

- Electricity Act 1989 – Section 36
- Statement of policy in favour of capture ready enabling this to be considered as part of the S36 consents process.
- Require a definition for “Capture Ready”

# Conclusion

- Most issues relating to onshore CO<sub>2</sub> capture and transportation are covered by existing regulations.
- Remaining questions concern:
  - Possible definition of “Capture Ready”
  - Treatment of supercritical CO<sub>2</sub> as a hazardous substance.
  - Reuse of pipelines

# WG4: Onshore Storage

- To develop possible options for a regulatory framework for the safe\* operation of onshore CO<sub>2</sub> storage activities.

\* to human health and the environment

# Onshore storage activities

- Site selection
- EIA and risk assessment
- Construction
- Injection
- Monitoring + reporting
- Remediative action where necessary
- Closure
- Long term monitoring
- Long term liability (WG2)

# Relevant legislation

- Town and Country Planning system
- Waste Framework Directive (75/442/EEC as amended by 91/156/EEC)
- Landfill Directive (99/31/EC)
- Integrated Pollution Prevention and Control Directive
- Groundwater Directive (80/68/EEC)
- Water Framework Directive (2000/60/EC)
- Habitats Directive (92/43/EEC)
- Seveso II Directive (96/82/EC)
- EIA Directive
- SEA Directive

# Waste legislation

- Landfill Directive prohibits the disposal of liquids/gas into or onto land.
- EOR maybe possible under “waste recovery”, but capture + injection would have to occur on same site.
- Option 1: A new CCS “Directive”  
OR
- Option 2: Changes to EU waste legislation  
OR
- Option 3: Disapplying Waste Framework Directive and using alternative regulatory instrument

# Next steps?

- Undertake analysis of other EU environment legislation (e.g. IPPC, Groundwater, Water Framework)
- Undertake analysis of UK legislation, principally Town and Country Planning Act and on health and safety.
- Understand when and how SEAs and EIAs should take place and identify gaps (e.g. science and guidance).

# UK Regulation: Next Steps

- Stakeholder meetings autumn 2006
- Further informal consultations
- Agreement in HMG on alternatives to pursue
- Consultation prior to legislation: early 2007
- Work with EU
- Legislative process