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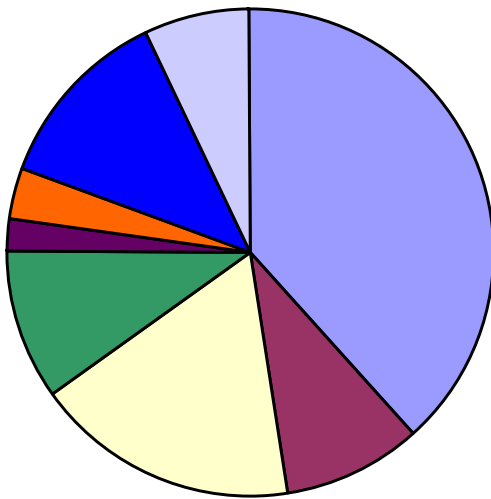
Carbon Capture & Storage Policy in the UK

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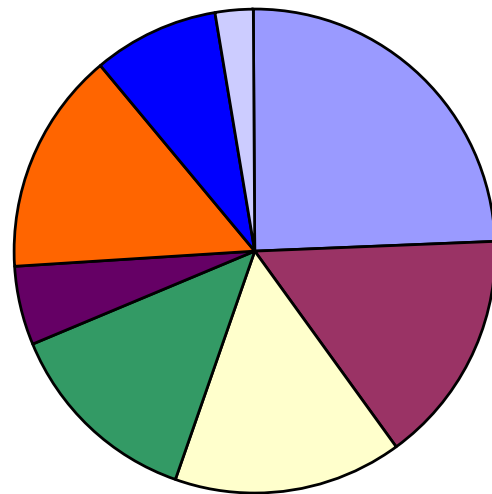
Stern Report (2006) - The distribution of emission savings by technology (to achieve 550 ppm)

Contributions to Carbon Abatement 2025



Abatement 11 GtCO₂

Contributions to Carbon Abatement, 2050



Abatement 43 GtCO₂

- Efficiency
- CCS
- Nuclear
- Biofuels
- dCHP
- Solar
- Wind
- Hydro

CCS Policy and Strategy

- **Current Activity**
- **Current issues**
- **International Collaboration**

Current Activity

Carbon Abatement Technologies Strategy - 2005

‘A Strategy for Developing Carbon Abatement Technologies for Fossil Fuel Use’

Carbon abatement technologies comprise:

- **Higher efficiency conversion processes**
- **Fuel switching to lower carbon alternatives**
- **CO₂ capture and storage (CCS)**



Carbon Abatement Technology Strategy Objective

‘To ensure the UK takes a leading role in the development and commercialisation of Carbon Abatement Technologies that can make a significant and affordable reduction in CO2 emissions from fossil fuel use’

Action Areas Within the CAT Strategy

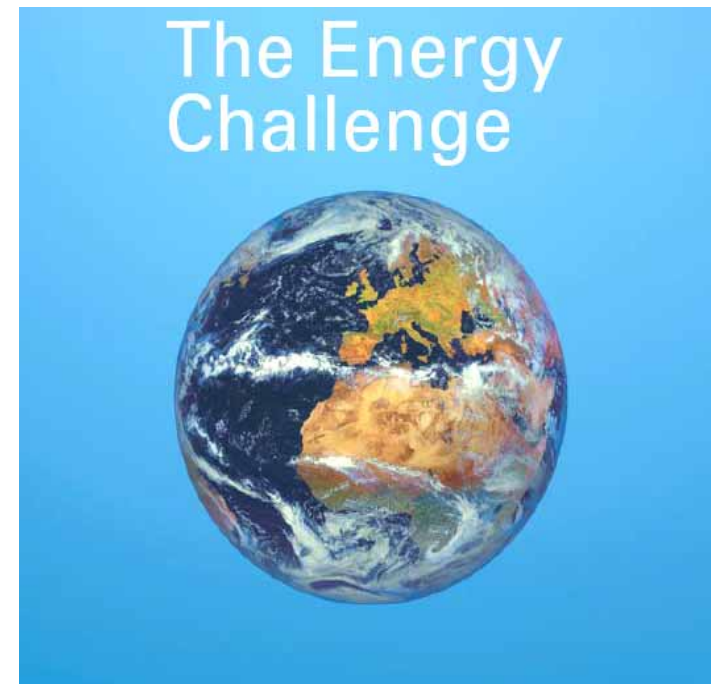
- **Research and development**
- **Demonstration**
- **Regulatory activity**
- **International collaboration and activity**
- **Increasing public awareness and stimulating debate on the role of CATs**

Support for R, D & D in Carbon Abatement Technologies

- **Some £20m has been allocated in the current Technology Programme for industry led collaborative applied research into DTI clean energy technologies which includes CCS R&D.**
- **It is envisaged that around £3-£4m will be spent on CATs annually.**
- **£35m for the demonstration of Carbon Abatement Technologies, including both Cleaner fossil fuels and Carbon Capture and Storage 2006-2010**

Demonstration for Carbon Capture and Storage (CCS)

- **The UK Energy Review stated that the next stage for CCS would be a UK commercial demonstration subject to further cost analysis**
- **The Chancellor's pre-budget report in December 2006 announced the appointment of consulting engineers to assist Government with cost decisions and to help design a competition**



Current Issues:

- **Decision on Full Scale Demonstration**
- **Publication of Energy White Paper**
- **Design of a Regulatory Regime**

Why do we need Demonstration?

- **The technologies involved in CCS are well understood but have yet to be demonstrated together at commercial scale on power plants**
- **Demonstration will allow the UK to reduce risk and demonstrate costs, the first step needed for longer term cost reductions to occur and the deployment of CCS on a wider scale**
- **Will enable the UK to ensure it has the appropriate regulatory regime for future CCS projects**
- **Demonstration is important both for the future UK energy mix – security of supply and international climate change objectives**

Decision on Full Scale Demonstration

- **There are currently 8-10 full-scale CCS demonstration power plants proposed in the UK**
- **The challenge is be able to express their costs in such a way as to ensure a level playing field should a competition be announced**
- **DTI appointed PB consulting engineers to inform Government of the relative costs of the projects and to help design a competition**
- **Final decision on competition to be made later in 2007**

UK CCS proposed Projects

- **8+ projects at feasibility study stages**
- **BP Peterhead-Miller CCS project. Nat gas, hydrogen, offshore EOR**
- **EON - New coal IGCC. Offshore storage**
- **Centrica /Progressive – New coal IGCC. Offshore storage**
- **SSE – Retrofit coal sc. Capture ready**
- **RWE – Retrofit coal sc. Offshore storage**
- **Plus others**

Designing a Regulatory Regime

- **A cross Government regulatory task force**
- **Amendments to international maritime treaties (London and OSPAR)**
- **Working with the Commission on any future CCS Directives**

UK Regulation

- **Established a UK regulatory Taskforce in 2006 drawing all the relevant agencies together**
- **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**
- **Consultation will be launched in early 2007**
- **Learning from Australia process to develop CCS regulation - John Bradshaw Geoscience Australia came over to brief UK Task Force in 2006**

A Future Regulatory Framework for CO₂ Storage in the UK Should:

- **Clarify under what criteria and how responsibility for a storage site changes in the post-injection phase**
- **Clarify the criteria allowing a CO₂ storage site to be abandoned**
- **Identify how liability can pass from one entity to another or from an entity to the State**

A Future Regulatory Framework for CO₂ Storage in the UK Should:

Identify what obligations are on the responsible party should CO₂ leak from a storage site, this may include:

- remedial action to prevent further leakage;
- rules to deal with emissions reductions credits claimed for CO₂ which is no longer stored;
- if an entity, payment of a penalty (if it is considered an offence for the leakage to occur);
- reporting obligations

International Collaboration

Developed Economies

- USA
 - Australia
 - Norway
 - Germany
 - Others
- Via IEA, CSLF & bilaterally

Share Info on

- Costs
- Technology
- Regulatory & policy frameworks
- R&D



EU 2020 Aspirations

- 1 of 10-12 EU demonstrations
- UK industry, influence via Technology Platforms and FP7

UK Demonstration Technology
Regulatory Framework

Influence over EU regulation of CCS

Emerging Economies

- NZEC China
- NZEC India



- China
 - India
- Via EU/ IEA, CSLF & bilaterally

Share Info on

- Costs
- Visits
- Engineer exchange
- Policy framework discussions
- Technology transfer
- Proof of concept for CDM/Stern

Collaboration with Norway

- **In November 2005 North Sea Basin Task Force with Norway established. forming the basis for a future regulatory regime for CO2 in the North Sea.**
- **Plans to extend this Task Force to cover other countries on the North Sea rim.**
- **Chancellor of the Exchequer and the Norwegian Prime Minister announced a collaborate study into a possible CO2 infrastructure in the North Sea and to identify a value chain for CO2 to be published in July 2007.**

EC and CCS Developments

EC Strategic Energy Review (2007), on CCS:

- **Favourable Regulatory Framework - remove barriers**
- **CCS in the Emissions Trading Scheme**
- **In principle, by 2020 all new fossil fuel fired plant should be fitted with CCS and possible retrofit to older plant.**

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 the Clean Development Mechanism**
- **Amendment of international conventions (e.g. London, OSPAR)**
- **In London Convention worked closely with Australia Dept Environment and Heritage [who proposed the CO₂ amendment which UK co-sponsored, and which led from UK-initiated work 3 years ago]**
- **EC Framework for phasing in of CCS**

IEA

- **UK vice co-chair of Working Party for Fossil Fuels**
- **Written a public outreach strategy in association with BP for the WPPF and this will be available later in the year**
- **UK sponsors IEA GHG and IEA Clean Coal Centre**
- **Under IEA WPPF and CSLF, UK works closely with Australia, e.g. for IEA CCS Legal Conference 17 Oct 2006 Paris.**

IEA G8 Summit, 6-8 July 2005

- **5 initiatives to accelerate the development and commercialisation of carbon capture and storage (CCS) technology**
- **3 initiatives to make electricity generation from coal and other fossil fuels cleaner and more efficient.**

These were presented in the G8 Gleneagles Plan of Action.



CCS Co-operation with Australia

- **IEA WFFF**
- **CSLF**
- **London Convention**
- **CCS fact-finding mission to Australia 2004 (UK gov and industry)**
- **IEA ZETS conference (Zero Emissions Technologies) Brisbane, Feb 2004**
- **Informal liaison on regulation, China, India**

Collaboration with USDOE

- **Collaboration under auspices of DTI-US DOE MoU**
- **Meet annually with USDOE at meetings of the Joint Coordinating Committee**
- **Two large collaborative R&D projects, one to develop a virtual plant demonstration model and the other on advanced materials.**



Operating in China

- Developed energy collaboration with China under a series of MoUs since 1996.
- Managed more than 15 UK-China collaborative projects.
- Translated into Chinese and disseminated in China key publications arising from programme activities
- Undertaken a series of inward and outward trade missions, focused workshops and seminars with government and other power sector organisations



MoU signing, November 2005

Lord Sainsbury, Parliamentary Under Secretary of State for Science

&

Innovation and Professor Xu Guanhua, Chinese Minister of Science and Technology

Near Zero Emissions Coal Project, China

- **NZEC - This initiative forms a centrepiece of the EU-China Partnership on Energy and Climate Security. There are three phases to this:**
 - **Investigation of the feasibility of CCS in China;**
 - **Engineering feasibility and design studies for a demonstration plant;**
 - **Demonstration of CCS in China.**

Support is being provided by Defra and DTI at £3.5 million and further support is needed for the design and demonstration of the project

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