



Office of Carbon Capture and Storage


The 2nd Annual Brussels Carbon Capture and Storage Summit 2011

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CCS in the UK

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Why CCS is important...

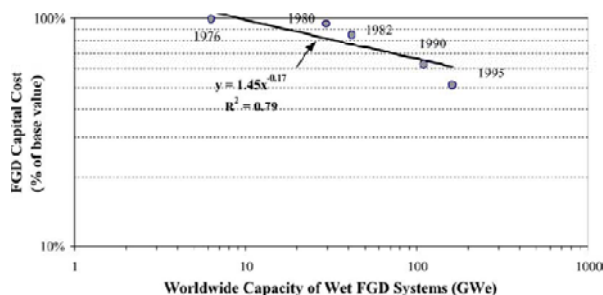


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- UK has legally binding CO₂ reduction targets under the Climate Change Act 2008
80% by 2050
- Through the Copenhagen Accord, the EU agreed global temperatures should not increase above
2°C
- According to estimates made by the IEA, tackling climate change will cost more in the future without CCS by
70%

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Why do we need to demonstrate CCS? FGD Capital Costs: learning rates



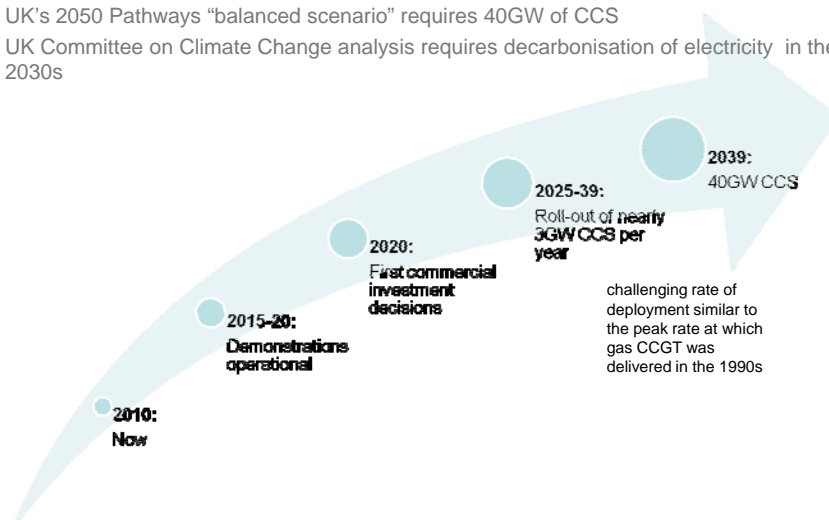
Learning rate 11% - we need to act now to start progressing to commercially viable cost.

FGD capital costs for a standardized coal-fired plant (500 MW, 3.5% S coal, 90% SO₂ removal) vs. cumulative installed FGD capacity worldwide. All data points normalized on an initial (1976) value of US\$ 254/kW in constant 1997\$. [Source: E.S. Rubin et al. / Energy 29 (2004) 1551–1559]

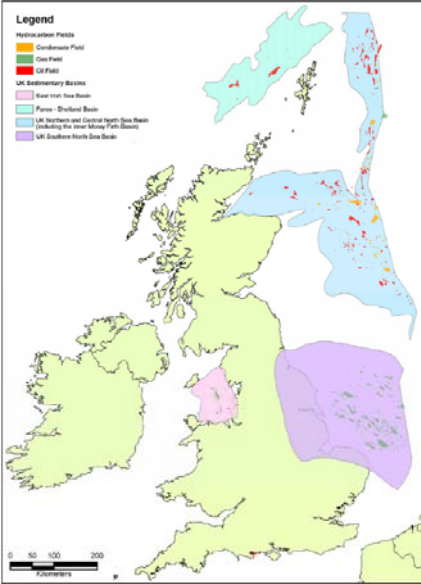
Demonstration to deployment: Example timeline



- UK's 2050 Pathways "balanced scenario" requires 40GW of CCS
- UK Committee on Climate Change analysis requires decarbonisation of electricity in the 2030s



Potential storage locations



Legend

- Hydrocarbon Fields**
 - Conventional Field
 - Gas Field
 - Oil Field
- UK Sedimentary Basins**
 - East Irish Sea Basin
 - Firth of Forth Basin
 - UK Northern and Central North Sea Basin (including the near-Moray Firth Basin)
 - UK Southern North Sea Basin

Source: British Geological Society

DEPARTMENT OF ENERGY & CLIMATE CHANGE
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Map showing the location of offshore hydrocarbon fields and the major oil and gas-bearing sedimentary fields

- UK is ideally placed for offshore CO₂ storage;
- The estimated CO₂ storage capacity of the UK and its continental shelf – 22 GTonnes;
- Approximately 100 years of capacity at UK current rate of emissions.

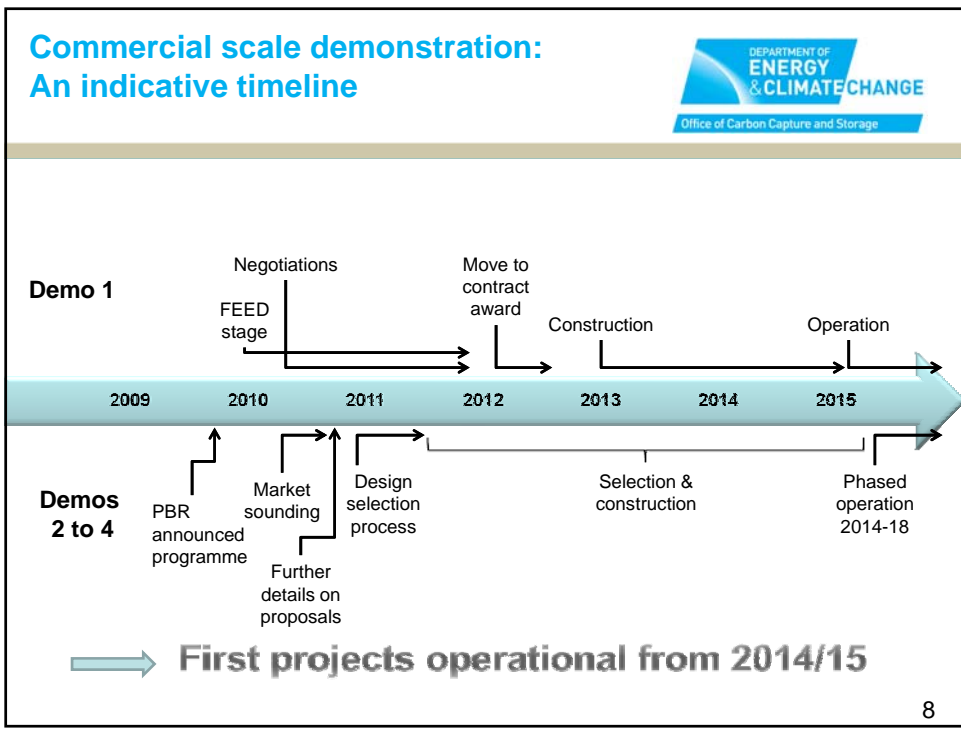
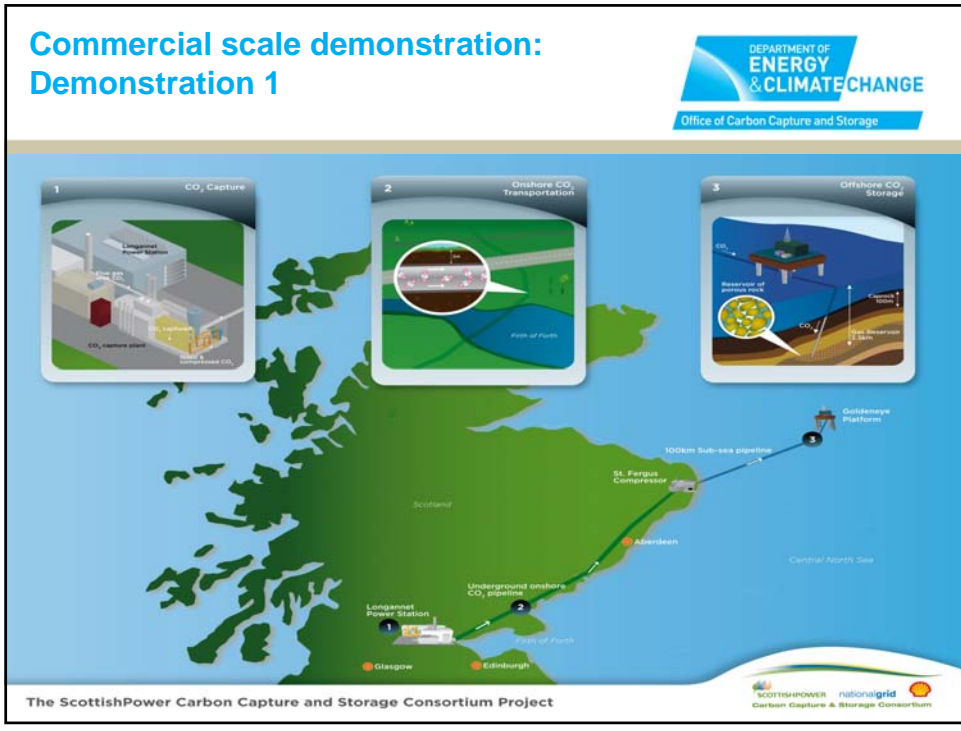
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What we're doing: Commercial scale demonstration



- **Project 1: 300MW post-combustion capture on coal with offshore storage**
 - Project selection through competition launched Nov 07;
 - FEED studies underway, aiming for contract award in 2011 and construction by 2014/15;
 - Government announced up to £1bn funding as part of the spending review, largest confirmed commitment to a single project in the world.
- **Projects 2-4: Further details on proposals have been published**
 - Engaged industry through market sounding exercise;
 - Announced that programme will be open to gas projects;
 - Set out further information on proposals on 21 December.

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Demonstration 1 - Making it happen: challenges



- Storage liabilities
- Funding
- Regulatory environment
- Integration
- Known unknowns – e.g. condition of the pipe and porosity of the reservoir.

- FEED helps to de-risk the project and reduce cost exposure for Government and industry.
- Active Ministerial engagement

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Working together and sharing knowledge is key... Knowledge Transfer



- Our aim is to provide key information to facilitate the development of other CCS projects in the UK and internationally.
- To deliver this, the Knowledge Transfer from projects is expected to go significantly beyond normal commercial practice.
- We will deliver Knowledge Transfer from the E.ON FEED and Scottish Power FEED. And Knowledge Transfer will be integral to the first demonstrator project.
- Knowledge generated from both FEED studies will be made available. We are in discussion with Bidder.

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What we're learnt so far



Lessons from the first demonstration competition process...

- Competitive process requires a combination of skills, public and private sector, and significant resource;
- The CCS chain has no established business model for working together and therefore it takes time and effort for participants;
- The greater dialogue before you select the project the clearer the risk allocation will be – and clearer risk allocation makes for success in delivering the project at a cost as well understood as can be;
- Bidders need as much regulatory certainty – e.g. on storage permits – as possible, but the regulatory framework often needs to be developed in parallel.
- Need to understand what ALL parties want from the project (Government, power station, pipeline, reservoir operators.)

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Demonstrations 2- 4



- Programme Information Document published in December.
- Primary purpose to give companies an early indication of likely requirements for projects and selection process under the Programme.
- Includes timetable for Programme and fit with NER – believe we can achieve.
- Will enable DECC to engage with potential applicants on the detailed design of the Programme ahead of formal launch.
- “Programme Surgeries” planned for March to assist potential applicants.

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What we're doing: Ongoing R&D



- Strong centres of academic research e.g. Edinburgh, Imperial College, Leeds, Nottingham and Cranfield Universities;
- Government funded pilot scale projects include:
 - Doosan Babcock oxyfuel combustion (coal) demonstration
 - suitable for new power plants and for retrofit applications
- Ferrybridge: UK's largest pilot plant demonstrating post combustion capture
 - Capacity to capture 100 t/d. Equivalent to 5MWe
 - Completion of capture unit expected for summer 2011
 - Test operations to start in Sept-Oct 2011
 - Provide data and experience to improve the designs of the commercial-scale demonstration projects.



Doosan Babcock OxyCoal Clean Combustion Test Facility. Image courtesy of Doosan Babcock

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What we're doing: Policy and Regulations



- CCS required on a proportion of all new coal;
- Carbon Capture Readiness for new large combustion plants;
- Primary legislation on CO₂ storage through Energy Act 2008 and well developed regulatory framework (with main challenge now to apply in practice);
- Majority of European Directive on Geological Storage of CO₂ has been transposed.
- We have created a forum to bring together the main CCS regulators to ensure regulations are developed and applied in a timely way.

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What next?



- Published further details on the programme for demonstrations 2 – 4 on 21 December;
- Published consultation on infrastructure issues on 10 December;
- Working with HM Treasury to inform decisions on the funding mechanism for Projects 2-4;
- Expect to agree contract for Project 1 during 2011.



Tough, but feasible.

The UK is committed to successful, early deployment of CCS

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Annex



