

UK Advanced Power Generation Technology Forum

Carbon Abatement Technologies – A view from Government

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Context

Fossil fuel power in the UK

- Coal provides 1/3 of UK electricity
- By 2015, 6 out of 19 coal-fired power stations will have closed and the average age of the fleet will be 41 years
- By 2020:
 - 25% (18.5GW) of current generating capacity will have closed
 - significant increase in renewable generation and new nuclear build, but will still need fossil fuel power stations (both coal and gas)

UK commitment to CCS

- UK committed to reduce GHG emissions by 80% by 2050
- CCS is only technology that can make a significant contribution to reducing emissions from fossil fuel power stations and other industrial plant
- Without CCS, marginal abatement costs rise from \$25 - \$43 per tonne CO₂
- UK Committee on Climate Change: 'CCS generation is an essential technology for reducing global emissions, but needs to be developed rapidly'
- Estimate global market for CCS on coal-fired power stations could be worth £2-4bn p.a to UK by 2030, creating over 50,000 jobs

EU Emissions Trading Scheme

- Within the EU, the EU ETS is the primary mechanism for driving emissions reductions from power generation
- EU ETS Directive (agreed in December 08) sets a cap that tightens year on year after 2013. By 2020, the cap will be 21% below 2005 emissions.
- Trajectories of future carbon price indicate that beyond 2025 it might be high enough to incentivise CCS – but only if already demonstrated
- EU ETS on its own will not be sufficient to bring forward CCS demonstration projects. Government action is required to support the transition to commercially deployable CCS

Domestic

UK Actions

- Aim is to be in a position by 2020 where CCS is commercial
- Approach to CCS has several strands which run in parallel:
 - Demonstration project
 - Regulatory Framework
 - Supporting R&D
 - Capture readiness
 - Moving from demonstration to deployment
 - Promoting global deployment of CCS

UK demonstration

- 300MW post combustion capture project on a coal-fired power station, with CO₂ stored offshore
- Project to be operational by 2014
- Focus on dissemination of knowledge
- Handled via competitive process
- 3 consortia: EON, Peel/Dong/RWE, Scottish Power

Regulatory Framework

- UK one of the first countries to implement national regulations for CO₂ storage
- Energy Act 08 sets out overarching framework for storing CO₂ in UK offshore sites, will enter into force in April 09
 - Lease for area where storage site is located
 - Licence for exploration and storage
 - Outlines sanctions
 - Provides for transfer of liabilities to state
 - Requires decommissioning
 - Extendable to EOR
- Consultation on detailed licensing arrangements closed Sept 08 – Government response to be published shortly
- Compatible with EU Directive

Support for R&D

- Environmental Transformation Fund - supports pre-commercial demonstration of key components and systems
- Technology Strategy Board – supports applied R&D
- Research Council – supports research and capacity building
- Energy Technologies Institute - call for CO₂ storage

Capture Ready

- Unreasonable to demand new build power stations to be fitted with CCS before it is demonstrated, but reasonable to suggest they are built to allow retrofit.
- 4 key elements required:
 - Clearly identified strategy by which a credible capture technology can be retrofitted
 - Space available both within and around the plant to permit capture technology to be fitted
 - Availability of suitable storage
 - Credible route for CO₂ to be removed and transported to storage site
- Government approach to be published shortly

From demonstration to deployment (1)

“We recommended that the UK should commit to reducing its GHG emissions by at least 80% below 1990 levels by 2050.”

“CCS Generation is an essential technology for reducing global emissions, but needs to be developed rapidly....It is now essential to invest in projects which demonstrate the effectiveness of various CCS technologies in large-scale installations, and which identify the feasible timescales and likely costs of extensive deployment.”

“Conventional coal-fired power generation should only be built on the expectation that it will be retro-fitted with CCS by the early 2020’s.”

Climate Change Committee, 1 December 2008

From demonstration to deployment (2)

“...we know that we must do more in the UK to drive the path towards low carbon, particularly CCS. So we will publish in the New Year proposals for how we can do that...”

Ed Miliband, 9 December 2008

From demonstration to deployment (3)

Deployment requires:

- Established, competitive supply base
- Commercial terms which support financing (supplier warranties, insurance etc)
- Efficient operation – minimised consumption of power and feedstocks
- Networks and storage sites
- EU ETS price
- Supportive regulatory framework

From demonstration to deployment (4)

Building market capacity:

- EU ambition for up to 12 projects operational by 2015
- G8 aim for 20 projects to be launched by 2010

We are developing an approach which will cover:

- Incentives for further UK CCS projects
 - EU financing mechanism, other?
 - Regulation?
- Infrastructure development for transport and storage
- Industry regulation
- Supply chain development - skills, industry capacity
- Technology development - continued R&D

International

Financing commercial-scale CCS globally

- Carbon price and reduced costs should be enough to incentivise CCS in the long term
- Developed countries starting to find ways to incentivise projects
 - direct funding, trading schemes, regulation
- Larger problem is financing CCS in developing countries.
Possible options:
 - CCS in CDM
 - Post-2012 (Kyoto) architecture
 - Multilateral financial institutions
 - Co-operative projects

Proposed EU Economic Recovery Package – includes up to 250 M Euro for one UK CCS project from EU list

EU Package – 12 December 2008

- Phase III of EU ETS – 300m free allowances from New Entrant Reserve for up to 12 CCS commercial-scale demonstration (and innovative renewables projects)
- If carbon price is €30-40, total pot worth €9-12bn
- 1 project can claim maximum 15% of pot
- Available until end 2015
- Selection criteria for projects to be determined by Commission
- Directive on CO₂ storage (also includes capture readiness)
- Full inclusion of CCS in Phase 3 of EU ETS

Capacity building

The framework for widely deployed CCS requires:

- Robust regulatory regimes
- Infrastructure
- Skills
- Shared learning from demonstration projects

Multilateral/bilateral collaboration

- Founder Member of the Global CCS Institute
- Carbon Sequestration Leadership Forum
 - Hosting Ministerial Conference in October 09
 - Vice Chair Policy Group
- IEA
 - GHG R&D Programme
 - Clean Coal Centre
 - Working Party on Fossil Fuels
- Other multilateral initiatives
 - 4 Kingdoms
 - North Sea Basin Task Force
- Bilateral co-operation agreements with US, China, UAE, Canada, Australia, France

Conclusion

- CCS is a critical technology for enabling diverse/secure energy supplies in a carbon constrained world
- Requires global co-operation between Governments and industry – we advocate a partnership approach
- Demonstration projects remain a vital step
- UK campaigning actively in EU and beyond to move from demonstration to deployment