



First CCS plant for the UK may be limited to 'post-combustion' technology

The Carbon Capture and Storage Association (CCSA) and several of its member companies are in discussion with the Government over the details of its Competition to support the building of a pilot carbon capture and storage (CCS) plant to be operational within a decade. The Association and member companies attended an 'Industry Day' at the Department for Business, Enterprise and Regulatory Reform (BERR) in November.

The UK is firmly on course to build what will be the first commercial-scale CCS power plant in the world, following an October announcement by the Business and Enterprise Secretary John Hutton that the Government is to support a single 'post-combustion' project for a coal-fired power station. This was followed in November by an announcement in the Queen's Speech on the forthcoming Energy Bill 2008, which will: "create a regulatory framework to enable private sector investment in CCS projects."

Prime Minister Gordon Brown threw his weight behind CCS development in November, in a speech on climate change to the WWF where he officially launched the Competition.

The large-scale deployment of CCS is widely acknowledged to be the only way to reconcile meeting carbon dioxide reduction targets with the continuing use of indigenous fossil fuels in the UK. But development times can be lengthy and early investment in demonstration plants is essential to meet evolving emissions targets.

The CCSA welcomed the Hutton announcement, which will see a pioneering full-scale plant built by 2014, but is disappointed that the Government has chosen to select just one specific technology: a single coal-fired project where carbon dioxide is captured after the combustion of the fuel, for storage offshore. Plans were already in place to build up to five 'pre-combustion' capture projects and, unless there is a change of heart by the Government, these projects will be abandoned, leaving the technology to be developed elsewhere in the world.

The Government says that post-combustion capture is the most relevant technology to the majority of existing coal-fired generation capacity around the world, and that Britain could take a lead in developing and then exporting the technology, particularly to China and India.

However, the UK CCS industry is developing a number of technologies for commercial sized projects, including pre-combustion capture, as well as post combustion, and is

looking to develop several plants, for both coal and gas-fired power stations, rather than just one. By choosing to support only one, modestly sized project, the Government will miss the opportunity to make the UK a world leader across the technology options.

CCSA Chief Executive Dr Jeff Chapman concluded: "This news has severely damaged the confidence of sectors of the industry, and will result in several projects being abandoned after considerable development costs. This particularly affects several pre-combustion CCS projects that were significantly advanced in their development, with a total capacity over ten times the size of this proposal and likely to be installed in a shorter timeframe than that envisaged in the announcement."

Worse, without early investment in a programme of commercial-scale CCS plants, the UK must commit to a host of new-build fossil fuel power plants without any associated carbon dioxide reductions, thereby increasing emissions of carbon dioxide. The scale and scope of the Government's proposed single demonstration project is simply not in proportion to climate commitments or the necessary programme to replace aged electricity generating capacity.

The CCS project envisaged by the Government should demonstrate post-combustion technology on a coal-fired power station, with carbon dioxide stored offshore. The Government says it will consider a phased approach to the project, as long as the full CCS chain is demonstrated by 2014, and the project captures around 90% of the carbon dioxide emitted by the equivalent of 300 MW of power generating capacity as soon as possible thereafter.

Norway, Australia and the US have also committed to supporting commercial-scale CCS plants: post-combustion capture technology on a natural gas power station in Norway; and pre-combustion capture technology on a coal power station in the US.

Back in the UK, E.ON has confirmed its intention to take part in the Government's CCS Competition. The company is one of a handful of UK companies that have developed both pre- and post-combustion projects, most notably through its plans for carbon capture-ready supercritical coal-fired units at Kingsnorth in Kent.

www.berr.gov.uk/energy/sources/sustainable/carbon-abatement-tech/ccs-demo/page40961.html

Three new CCGT power stations will be 'capture-ready'

Government consent for the building of three new gas-fired combined cycle (CCGT) power plants in Derbyshire, Nottinghamshire and South Wales includes an obligation on the developers to ensure that carbon capture plant can be retrofitted at a later date, should that be necessary.

The proposed stations, which have each won both Government 'Section 36' consent under the Electricity Act 1989 and planning permission, will therefore be 'capture-ready' once built, and could be fitted with equipment to capture carbon as part of a CCS scheme.

E.ON UK plans to build a 1,220 MW CCGT power station at Drakelow, south Derbyshire; EDF Energy plans a similar, but 1,270 MW power station at West Burton, Nottinghamshire; and Severn Power seeks to build an 800 MW station at Uskmouth, South Wales.

In all three cases, Ministers have also placed conditions in the planning consent that the companies install the necessary plant and pipework to ensure that the station can operate in combined heat and power (CHP) mode, if the opportunity materialises.

Amendment to OSPAR permits carbon storage under the North East Atlantic

An amendment to allow all forms of CO₂ storage from carbon capture and storage (CCS) in sub-seabed geological formations was approved in June by the 1992 OSPAR Convention, the convention which protects the marine environment of the North East Atlantic. The OSPAR amendment proposal, led by the UK, Norway and the Netherlands, was accepted by consensus in response to the impacts of increased atmospheric carbon dioxide on the marine environment through climate change and ocean acidification.

The amendment followed science-based analysis and the development of technical guidance to provide a risk assessment and management framework for deploying CCS in the marine environment. A significant barrier to the development of CCS has therefore been removed, and project developers should be able to move forward towards deployment of commercial-scale projects.

The 1992 OSPAR Convention is managed by the OSPAR Commission, made up of representatives of the governments of 15 Contracting Parties and the European Commission. At the summer meeting in Ostend, Belgium, a consensus was reached by all contracting parties to support the amendment. The package was accompanied by a decision to prohibit storage of carbon dioxide in the water column. It will come into effect once ratified by seven contracting parties.

The UK has taken a lead role in providing the legal clarity necessary to begin taking forward CCS projects. In November 2006, the Contracting Parties to the 1996 Protocol to the London Convention, the global marine protection convention, agreed a similar amendment enabling CCS, also co-sponsored by the UK.

www.ospar.org/eng/html/welcome.html

Welcome

**Jeff Chapman, Chief Executive,
Carbon Capture and Storage
Association**



The pace and volume of work being done at the CCSA continue at the high levels set at its launch in the spring of 2006. So far, it has all been about policy, with a great deal of discussion with UK Government and the EU Commission on establishing regulation for CCS. To reflect developments in the policy arena we have now established working groups of the Association to cover:

- *Regulation & Licensing* – to take a proactive stance on shaping the development of detailed secondary legislation applicable to CCS projects in the UK, as well as developing a CCSA position on relevant EU regulatory developments;
- *Planning & Environmental Impact Assessment* – to ensure CCS projects are developed to the highest environmental standards consistent with business objectives, as well as addressing any planning barriers;
- *Communications* – to increase the public standing and political attractiveness of CCS;

- *Incentives* – to encourage governments at home and elsewhere to adopt incentive policies that target and deliver investment in CCS;
- *Health & Safety* – to help the CCS industry better understand and manage H&S issues relating to the capture, transportation and storage of carbon dioxide;
- *International* – to seek to influence the international agreements on climate and trade that provide the environment in which CCS policy making and investment can take place.

In addition to keeping a very close eye on developments in the UK, the CCSA will also involve itself in the events that impact on international investment. Three key international events scheduled to take place over the next year will have enormous implications for the development of CCS both in the UK and across the world.

The UN Climate Change Conference in Bali, Indonesia in December 2007 is expected to set the scene for the world's post-2012 climate change agenda, when the first Kyoto commitment period ends, and should create the environment within which commitments can be made on CCS development.

At the G8 Summit, to be held in Hokkaido, Japan in July 2008, the IEA will report back on early opportunities for CCS, as requested by the G8 summit in 2005. Finally, the UN Climate Change Conference in Poland in December 2008 will define whether and how CCS can be accommodated in the

Kyoto Clean Development Mechanism (CDM), setting precedent for any ensuing agreements.

It is absolutely essential for the sake of the climate that these international agreements are now established and favour the widespread adoption of CCS.

Zero emission fossil fuel power plants seek Euro-funding mechanism

The European Technology Platform for Zero Emission Fossil Fuel Power Plants (ETP-ZEP) is identifying suitable market-based funding mechanisms to facilitate the establishment of CCS projects in Europe; in particular in the context of the EU Emissions Trading Scheme. The ETP-ZEP is a coalition of scientists, industry and environmentalists united in their support for CCS as a key solution for combatting climate change within a portfolio of solutions.

The EU has made its position on CCS very clear: it is a critical solution for combatting climate change and its widespread deployment is essential. Indeed, without CCS, the EU's target to reduce carbon dioxide emissions by 60% by 2050 is simply not achievable. This view was endorsed by the EU Spring Council in March, which set an aspirational goal of 10–12 full-scale demonstration plants to be operational by 2015. The wider aim is to ensure that CCS is commercially viable for all new fossil fuel power plants by 2020.

Time, however, is running out, says the ETP-ZEP – if the EU goal is to be achieved, immediate action is required. This means implementing an EU-wide initiative which integrates all aspects of CCS – including technology, infrastructure, the environment, health & safety, legal and regulatory issues, funding mechanisms, public communication and international collaboration. At its heart is the EU Flagship Programme to build 10–12 demonstration projects covering a variety of CCS technologies across Europe.

But these demonstration projects will only be feasible if there is sufficient economic incentive for them to take place: stable, market-based funding mechanisms that close the cost gap between electricity production with and without CCS, according to ETP-ZEP.

Full accreditation of CCS under the EU ETS is essential on the grounds that a tonne of carbon dioxide stored, rather than emitted, is equal to a tonne avoided. But while the EU ETS will serve as the main instrument for implementing CCS on a wide scale (and low carbon technologies in general) in the long term, it is currently not a sufficient incentive for those willing to take on the technological and commercial risks of setting up the first full-scale demonstration projects.

On the other hand, the EU ETS is expected to provide a plentiful source of funds from the auction of allowances in Phase II and III. Each Member State will be in a position to provide financial support for CCS projects if it so chooses. The ZEP has considered how this revenue source may be returned in support of CCS development. The CCSA Incentives Group is also active in this pursuit.

A draft Directive on the regulation of CCS is expected to be published by the EC in January 2008. It is also widely expected that, under proposed amendments to the ETS Directive to cover Phase III also to be published in January, carbon dioxide that is captured and stored will be credited as not having been emitted.

www.zero-emissionplatform.eu/website/

Project update

RWE npower plans pilot carbon capture pilot at Aberthaw

RWE npower has announced plans to design and build the first carbon capture pilot plant at a UK coal power station. The first phase, to be located at Aberthaw Power Station in South Wales could be fully operational as early as 2010.

An initial £8.4 million investment will focus on a 1 MW capture plant, with further investment planned to support a capture and storage demonstrator plant of at least 25 MW. This will act as a crucial test-ground for the potential of CCS technology as a means to generate low-carbon energy.

Both plants will be designed using 'post-combustion' technology which, unlike alternative CCS approaches, can be applied to existing coal power plants. The pilot will allow the CCS concept to be tested in as close to real operational conditions as is possible. The larger capture and storage demonstrator plant would form part of one of the new 'supercritical' power stations which are currently under feasibility and planning at npower's existing sites in Tilbury, Essex and at Blyth, Northumberland.

Andy Duff, CEO, RWE npower, commented: "This pilot is a critical step in our plans to move towards cleaner coal power stations which, alongside investment in other low carbon energy initiatives, will ensure we can



Aberthaw Power Station

continue to meet the country's energy needs, whilst significantly reducing carbon dioxide emissions."

Meanwhile, RWE npower's sister company, RWE Power has announced an agreement with BASF and The Linde Group regarding the development of new processes for carbon dioxide capture from combustion gases in coal-fired power plants. The agreement will include the construction and operation of a pilot facility at the lignite-fired power plant of RWE Power AG in Niederaussem, Germany to test new developments and solvents for the capture of carbon dioxide.

Project update

Yorkshire bids for Government support for storage project that would aid the whole region

Regional Development Agency Yorkshire Forward has launched a bid for the UK's largest ever study into the emerging technology of storing carbon dioxide underground – in an attempt to capture £100 million of Government funding.

If the bid is successful, the region will be in a position to build the world's first large-scale carbon capture project. The initiative could see Yorkshire's three main coal-fired power stations – Drax, Ferrybridge and Eggborough – pioneering the application of 'clean coal.' And, once the infrastructure is in place it is hoped that other regions in the UK, and some European countries, will be able to tap into the new infrastructure.

Yorkshire Forward has signed-up key partners from the energy sector including BP, Shell, E.ON, Drax and Scottish and Southern Energy – and has won the backing of the TUC. If successful, officials say it will bring hundreds of millions of pounds into the economy.

Mike Smith, head of sustainable development at Yorkshire Forward, said: "We have formed the UK's largest partnership into looking at carbon capture and storage. We have taken a different approach to everyone else. There are lots of different projects across the country, but we're the only region that said let's all come together and look at a project that will benefit all of us, including the three power stations in Yorkshire."

Each of the partners has contributed to the £100,000 cost of the study and, if selected, the Government's £100 million will form a sizable chunk of the projected £250 million building costs.

Project update

Scottish Power plans capture-ready supercritical upgrades

ScottishPower has unveiled a feasibility study to convert its two biggest power stations to clean coal technology in what would be the largest project of its type in Europe.

The initiative is to fit new 'supercritical' turbines and boilers, which will burn coal at ultra-high temperatures and pressure, at the Longannet and Cogenzie power plants, which have a total generation capacity of 3390 MW, more than a quarter of Scotland's total electricity needs. And the refitted stations will also be designed to incorporate carbon capture technology currently being developed at Longannet. This involves pumping carbon dioxide emissions from the station into deep underground coal seams to drive out methane gas which can then be used as a fuel. The carbon would remain trapped in the coal seams.

Alstom Power and Doosan Babcock would provide the design input for the supercritical turbines and boilers that could be fitted at each site. This would deliver a reduction in carbon emissions of 20%.

Longannet Power Station



Watch this space

The world of energy policy-making never stands still. Check the CCSA website for updates on these issues as they emerge: www.ccsassociation.org.uk

Policy measure	Expected ...
Draft EU Directive on the regulation of CCS	24 January 08
Amendments to the EU ETS Directive on Emissions Trading that will incorporate the inclusion of CCS into the scheme	24 January 08
Communiqué on CCS from DG TREN	24 January 08
Regulatory consultation documents from the UK Government on licensing storage and the meaning and application of the term 'capture-ready'	Late January 08

“To fight climate change and secure our energy supplies, we need to further develop and deploy carbon capture and storage technologies. We know that even with the ambitious action on renewables recently set out by the Prime Minister, and other low-carbon technologies, fossil fuels are going to remain a significant part of the world's energy supplies for decades ahead. This means we must develop ways to reduce the impact on the climate of burning those fuels, and CCS is one of the most promising technologies we have before us. There's much work to be done – but I'm confident it can be achieved.”

Phil Woolas MP, Minister for the Environment

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The CCSA is a business association formed in the UK represent the interests of its members in the development of business in geo-CCS wherever opportunities may exist.

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CCSA members

Air Products	DNV	PWC
Alstom	Drax Power	Renew Tees Valley
AMEC	EDF Energy	Rio Tinto
Atkins	E.ON UK	Rolls Royce
BG Group	ERM	RWE
BP	General Electric Int	Sasol
British Cement Association	Herbert Smith	Schlumberger
British Geological Survey	Hydrogen Energy	Scottish & Southern
Camco International	ILF Consulting Engineers	Scottish Centre for Carbon Storage
Chevron	Linde Gas	Scottish Enterprise
Clean Energy Group	Linklaters	Scottish Power
Climate Change Capital	Marathon Oil	Senergy
CO ₂ DeepStore	MMI Engineering	Shell
Coal Authority	Nexen Exploration	Statoil
ConocoPhillips	Norton Rose	Total Holdings
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Doosan Babcock	Progressive Energy	