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Jostling for position in the CCS competitions

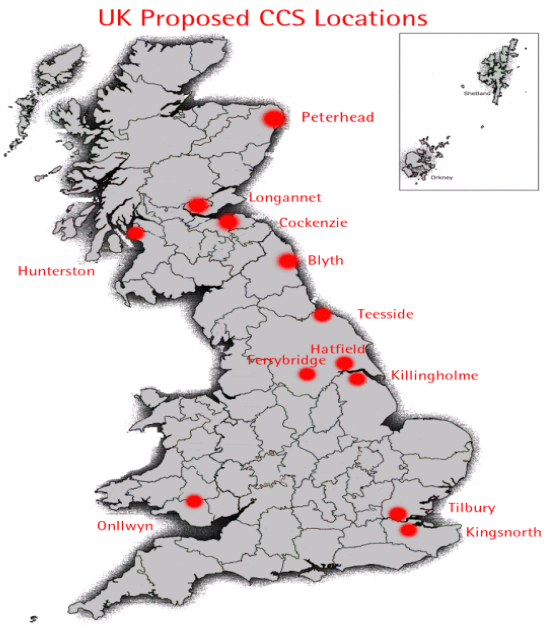
The DECC competition for funding the demonstration of carbon capture and sequestration (CCS) has received much media attention over many months without a clear decision. There were two further developments last week, neither was encouraging. According to Monday's *Times*, funding could be delayed for up to three years because of treasury constraints. And on the same day Danish developer Dong said it was pulling out of the project for a new CCS-ready coal station at Hunterston, although sponsor Peel Energy reaffirmed its commitment.

But as we shall see in this *Energy perspective*, this news-flow is not untypical and reflects a change in the wider environment, which has become much tougher. It also reflects a bias on the conversion part of the process, which is by no means the full picture and tends to make the choices look simpler than they in fact are.

Under orders

The UK competition was originally launched two years ago by the Prime Minister for a single project demonstrating post-combustion carbon dioxide capture technology, and perhaps linked to an EU proposal to have up to 12 CCS projects in service by 2020. Subsequently DECC decided to be more ambitious changing the rules to allow more time for deliberation and increasing the number of projects supported to up to four, demonstrating both pre-combustion capture as well as post-combustion capture technologies on a commercial scale.

More detail was fleshed out in June's *A framework for clean coal* consultation (*ES189, 29/06/09, p4*). It confirmed the Government's thoughts for financial support for up to four commercial-scale CCS demonstrations (including the original competition project) by 2014 (although this deadline already looks unrealistic as it can take up to five years to deliver a large-scale conventional generation station). New coal-fired power stations would only be consented if they could demonstrate CCS on at least 300MW net (around 400MW gross) of capacity from day one. Each project would have to store 20mn tonnes (t) of CO2 over 10-15 years. They would need to retrofit CCS to their full capacity within five years of the technology being judged technically and economically proven, with an emissions performance standard ratcheting down individual station emissions towards best practice levels. Options for transferring money from consumers to developers for financing the projects were also set out, including the introduction of another levy on power bills.



Source: Carbon Capture and Storage Association

On your marks

Over the summer speculation has also increased that CCS funding might fall victim to public sector funding cuts. It would be natural to think Treasury savings should not come into the equation if CCS is to be funded from a levy on electricity bills. But the Treasury still needs to approve any levies, because they effectively amount to a tax.

DECC tried to scotch these rumours by saying the ambitions remain firm, with a spokesman saying last week: "We're determined to drive the development of CCS as part of the transition to a low carbon economy." But despite a clear personal interest from the energy secretary, Ed Miliband, his under-study Lord Hunt had little tangible to offer at the government-

sponsored Coal Forum in September. He started by saying he was there to listen. And that is just what he did, as industry delegates repeated what they had said in their consultation submissions.

Nine competition bids were received and evaluated by the Government, and at the end of June last year a short-list of four projects was announced. The four pre-qualified bidders were: a retro-fit of CCS on an existing coal-fired power station, two new build clean coal power stations and one integrated coal gasification combined cycle (IGCC) power station. Subsequently one bidder, BP Alternative Energy with its IGCC proposal, has withdrawn leaving the field to E.ON UK, Peel Energy/RWE Npower, and Scottish Power (*see table below*).

Runners and riders

Additionally there is another project that has come into the reckoning for funding. This is another IGCC project, this time for a mine-mouth power station, by Powerfuel. The proposal is led by 'King Coal' Richard Budge at his resurrected Hatfield colliery near Doncaster.

The competition pre-qualification short-list together with Hatfield includes both pre-combustion CCS technology together with post-combustion technology at both new and existing coal-fired units. This seems a very balanced choice of technologies and applications. But if Treasury pressure to cut public spending is taken into account, some fear that choices can become opportunities to fudge the issue. In many respects events during the past few weeks could make the DECC decisions considerably easier, as we seem to be moving towards self-selection leaving just one project for the Government to support, although there, is of course, EU support on offer too.

Recent media reports have suggested that the Hatfield IGCC project will be the only UK winner of the European Commission support for CCS, working towards the EU ambition for up to 12 CCS projects in service by 2020. Six or seven projects throughout Europe including Hatfield are reported to have been initially selected (though any list is yet to be approved by the Council of Ministers, and there is industry sentiment that—in contrast to the GB process—the process for selection has been anything but thorough). The Hatfield project involves pre-combustion separation of carbon dioxide from a syn-gas stream formed by the gasification of coal that will power the IGCC power plant. The plant is effectively at the deep-mine mouth and therefore does not involve additional transport of fuel, and it says it has received UK consents (though at this stage this can not apply across the whole process as transportation and storage consents have yet to be defined). If it is EU-supported, the likelihood is surely that Hatfield project will now go ahead, provided that the balance of financing can be raised by a merchant developer in tough capital markets.

Proposals for large CCS developments in UK

Project	Developer	Technology	Shortlist
Hunterston	Ayrshire Power (RWE, Npower, Peel Energy)	Super-critical	Y
Teesside	Coastal Energy	IGCC	
Killingholme	E.ON UK	IGCC	
Kingsnorth	E.ON UK	Super-critical	Y
Hatfield	Powerfuel	IGCC	
Blyth	RWE Npower	Super-critical	
Tilbury	RWE Npower	Super-critical	
Longannet re-plant	Scottish Power	Super-critical	Y
Ferrybridge re-plant	Scottish and Southern Energy	Super-critical	

Another UK applicant for the EU funding was E.ON UK for Kingsnorth. The week before last though the company announced that it was deferring its investment decision for up to two to three years due to lower demand. This, it claimed, had pushed back the need for new plant in the UK to around 2016, although it remained committed to the development of cleaner coal and CCS. Another interpretation was that the Kingsnorth project has lost out in the E.ON global investment plans. Notably they include a CCS project in Holland that has reportedly already won €180mn EU CCS funding. So Kingsnorth will have to compete again internally within the E.ON Group for future investment funding.

Also at the beginning of October, Dong announced that it was resolved to strengthen its capital structure through reduction in its investment program for the coming years. This year Dong is investing DKK 20bn on energy projects,

and it was to continue investment at similar levels going forward. But investment next year now will be half the current year spend, and little more in 2011. Those cuts included the Hunterston coal project.

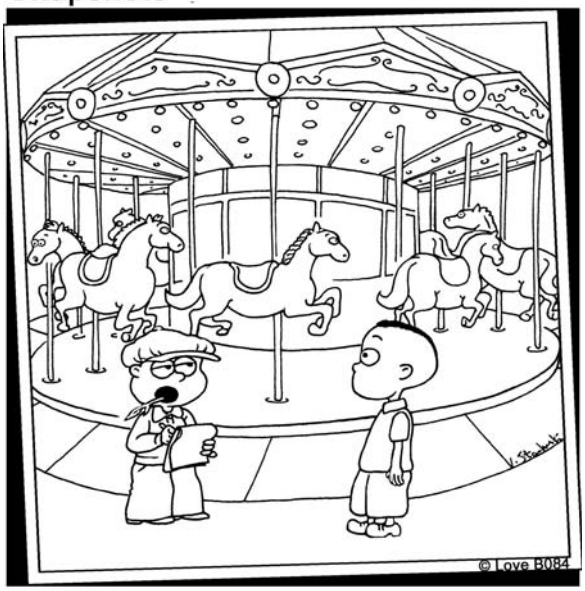
RWE already has clean coal technology projects being developed in continental Europe that include IGCC with CCS. From a UK perspective, the experience of E.ON at Kingsnorth, where environmental campaigners view the project being deferred as a major victory, may well put the RWE Tilbury project more in the sights of the anti-coal lobby. And at the weekend, as if to ram the point home, protestors demonstrated at E.ON UK's flagship 2GW coal plant at Ratcliffe-on-Soar. There is also a well-organised campaign in the west of Scotland against the proposed Hunterston project, and Tilbury could become a new focus of campaigners' attention, particularly as it was seen to be behind Kingsnorth in terms of consenting and approval. As an alternative, RWE may switch its clean coal investment focus towards its site at Blyth in Northumberland where coal is less emotive and in a location that may create less opposition.

Short-priced favourite?

This leaves Scottish Power's 2.4GW Longannet Power Station retro-fit, seen by some as a clear favourite to win the DECC competition. The company already has a pilot CCS capture project up and running on the site that was inaugurated earlier this summer. Shell and National Grid joined the Scottish Power consortium a couple of months ago, and they seem to have given the project additional impetus. National Grid owns and operates a number of high pressure NTS gas pipelines that pass not too far from the station site. The NTS feeders were constructed to convey gas from St Fergus to the south, but at least one of these high pressure pipe-lines will become under-used as northern North Sea reserves are depleted.

Shell owns and operates a major gas sub-terminal at St Fergus that has diminishing supplies of liquids and gases from several North Sea Fields, such as the Brent system, Fulmar and Goldeneye. The plan would be to connect Longannet to a largely redundant NTS feeder pipeline that could be used to back-flow CO2 from Longannet to St Fergus. Within the St Fergus complex, the high-pressure feeder could be connected to the Shell sub-terminal by a short connection of high pressure pipe-work from the National Grid NTS terminal. Once at the Shell terminal, the Goldeneye offshore pipe could be used to transport CO2 to the offshore platform where it could be injected into strata that once held gas condensate. The Goldeneye pipeline connects a short-term gas condensate field in the outer Moray Firth to St Fergus, and it is the newest and shortest pipe run to the Shell terminal. It does not convey any third party gas and liquids from adjacent fields. There will be increased pumping required along the route, and additional injection equipment at the offshore field. Whilst this CCS project will no doubt be expensive, it could prove to be considerably cheaper than other proposed CCS projects in England.

Snapshots



"I gotta pack of M&Ms on the orange mare."

No announcement is likely until the turn of the year, and much of 2010 will be taken-up with detailed front-end engineering design (FEED) work. Scottish Power and its consortium partners seem confident that they can get a CCS demonstration project in service by the 2014 deadline. They also have the active support of a Scottish administration keen to see CCS established as an alternative to new nuclear north of the border.

And compared with the Longannet route to long-term storage in the Goldeneye field, the two other potential CCS clusters in England look considerably more expensive. The proposed Thames and Humber Clusters would need more onshore and offshore infrastructure to convey CO2 to the proposed storage sites in the Southern Gas basin, although these depleted dry gas fields are in some cases closer to shore than the oil and gas liquids fields of the Central North Sea that feed into the St. Fergus gas terminal. These factors too would appear to favour the Longannet proposal getting government approval and development assistance.

Staying the course

Treasury expediency may force the Government's ambitions on CCS to be scaled-back, but the industry is keen to push forward efforts to prove that the technology works commercially. But the development plans need to be realistic—the individual parts of the process are proven albeit not yet at a commercial scale. And there is a political imperative for new coal-fired generation capacity to be fitted with CCS.

And let's not forget there is also a longer-term need for CCS to be fitted on gas-fired CCGT plant too. Flexible fossil fuel power generation will be needed in the future to balance the intermittency of renewables and add load shape to nuclear output.

The clear message for policy-makers is that the challenges have to be measured up to: a future without clean coal is a future in which governments here and elsewhere fail to meet their environmental targets. It follows that it is extremely important that the Government takes the time to make the right decisions despite industry frustrations.