10 May 2006

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Dear Katherine,

Carbon Capture and Storage: a Consultation on Barriers to Commercial Deployment

As a founder member of the Carbon Capture and Storage Association (CCSA), AMEC's views on carbon capture and storage are substantially reflected in the paper submitted by the CCSA in response to HM Treasury's Consultation on the Barriers to Commercial Deployment of Carbon Capture and Storage. Also, our views on the wider issues facing the UK in relation to energy security and supply are included in AMEC's submission to the DTI Energy Review.

In addition to the response from the CCSA, there are a number of issues that AMEC would like to emphasise.

As demand for energy continues to rise, the world has little alternative but to continue to generate a substantial proportion of its power from fossil fuels for some time to come. Hence, the growing interest in the development of carbon capture and storage (CCS) technologies around the world. The Americas, Japan, Australia and Norway are leading the way, and the UK must ensure that it is not left behind in the development and exploitation of these technologies, particularly as the impact of CCS on CO_2 emissions and its ability to help the UK to meet its 2050 emissions targets is now recognised.

From recent studies, for the UK, estimated CO_2 emissions associated with new build fossil fuel power plant over the next 10 - 15 years could be in the range 40 - 100 million tonnes CO_2 per year, depending upon fuel type. CCS would reduce these emissions by up to 90%. In a scenario of much higher fossil fuel usage and CO_2 emissions, for example all-coal new plant build, no nuclear build and limited renewables penetration, CCS could help significantly to meet CO_2 emission targets. Potential annual CO_2 capture and storage capacity of around 170 million tonnes would be required. For such capacities, excluding capture costs, we estimate that transportation and geological storage in offshore depleted reservoirs would require £1 - 2 billion capital investment cost for new build power plant and over £3 billion if applied to all fossil fuel power plant. This is based on new build plant being close to offshore reservoirs and having new dedicated offshore facilities.

Malcolm Wicks, Minister of State for Energy, said recently, "A few years ago the idea of carbon capture and storage would have been considered the stuff of science fiction. Today, here and around the world, it is a serious contender in our future arsenal against the potentially devastating effects of climate change."

CCS is technically feasible. There are a number of proven capture methods, both pre and post-combustion; transport of CO_2 by road, sea and pipeline is already commonplace; and the injection and commercial storage of gas underground in depleted oil reservoirs or salt caverns on land has existed for a number of years. CCS simply extrapolates existing technologies - its individual aspects have all been proven. What is new is bringing them all together and the scale of the application.

In addition to its environmental benefit, CCS can also be used for enhanced oil recovery (EOR). The International Energy Agency has estimated that EOR techniques, including via CCS, could increase the worldwide oil recovery rate to the extent that more new reserves would result than those currently discovered in Saudi Arabia.

Also, CCS has a valuable role to play in relation to energy security, by enabling countries to continue to exploit their own fossil fuel reserves and reducing reliance on politically unstable areas of the world. The US has a 250-year domestic supply of coal - a key factor in the nation's future energy security, and BP's plans to inject CO_2 into its Miller field in the North Sea could extend the life of the field by 20 years and enable an additional 40 million barrels of oil to be recovered.

The Government can play a considerable role in encouraging the take-up of CCS. It is clear that oil and gas, and power generation companies will not implement CCS under current market conditions without additional financial incentives e.g. the US$55 a tonne carbon tax introduced by Norway that pushed Statoil to capture and store, rather than vent CO_2 from its Sleipner field into the atmosphere.

The nature and extent of government incentives required needs to be fully investigated. One potential option could be to gain credit for the CO_2 abated under the EU Emissions Trading Scheme, which began in January 2005, or future global CO_2 trading schemes.

As a global engineering services company, we do not see any skills/manufacturing barriers to the application of CCS technology in the UK. This applies to access to CO_2 capture technology and associated equipment, CO_2 transportation systems (pipelines and compressors) both onshore and offshore, offshore platforms and associated reservoir facilities.

AMEC has a number of relevant experiences applicable to CCS. It has captured and reinjected excess CO_2 from gas fields to make them commercially viable; it has undertaken EOR through injection of different gases, including CO_2, on a number of projects; and it has experience in designing, delivering and maintaining gas reception, compression and storage facilities.

For AMEC, CCS is a reality, and with its onshore and offshore engineering skills base, particularly in process engineering, and its capability for managing major projects, it is in a strong position to support customers as they look to investigate CCS further.

Of the factors against CCS, perhaps the greatest is cost. Substantial capital investment will be needed to develop CCS schemes; however, economies of scale will be created as the scale of its application grows. The UK Energy Research Centre believes the cost of CCS is likely to reduce by at least 30 per cent in the next 10 years. In addition, one of the benefits of early adoption of CCS technology would be the maximum use of existing North Sea offshore infrastructure. This not only allows potential benefits from EOR to be considered, but also we estimate that potential capital cost savings of 40-60% are possible for new CCS offshore reservoirs by maximising the use of existing offshore pipelines and facilities.

One potential route forward could be the development of local CO_2 networks. Much of the cost of a CCS solution will be the capex and opex cost of the compression facility and transportation pipeline. If a number of large scale sources within a region were to share this cost, the effective cost of transport/tonne of CO_2 could be dramatically reduced. It would make commercial sense to focus efforts on establishing a transport network within a region of high density emissions, relatively close to an existing onshore oil field or conversely on the North East coast.

The commercial and contractual negotiations required to set up and operate a multi-user combined CCS/EOR project would be significant and may block progress e.g.

- Commercial viability will not be evident until enough parties have signed up to the deal and someone must lead the marketing of the project during the initial period.

- The contracts between the parties will be complex taking into account numerous and variable revenue streams (oil and carbon trading), variations in emissions volume and operational costs.

There is no one solution to climate change, but CCS has the potential to make an important contribution to the reduction of greenhouse gas emissions and to energy security. Its cost, while high, must be compared with other low carbon energy technologies, such as wind and nuclear. As with these other technologies, the total carbon footprint of CCS must also be examined carefully to ensure that current capture techniques do not use more then we gain.

In summary, a number of things need to change to make CCS a viable option:

- Governments need to give CO_2 a price that makes it worthwhile for companies to invest in CCS;

- The many parties involved need to work together to develop further the technology and test its viability; we believe the CCSA is an important step in bringing some of these parties together.

- There needs to be a public debate about the acceptability of CCS, which hitherto has attracted little public attention.

- Potential legal barriers need to be addressed for example concluding the current negotiation by the UK Government in relation to seeking changes to the London and OSPAR Conventions or determining the long term liabilities associated with reservoir storage.

If you would like clarification of any of the above or if you think a copy of our DTI Energy Review submission would be helpful, please do not hesitate to get in touch.

Yours sincerely

Duncan Guy
Senior Vice President Business Development