Geosequestration technology: Addendum to CSIRO Submission

House of Representatives Standing Committee on Science and Innovation

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October 2006

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Introduction

This addendum addresses the issue of the impact of carbon dioxide capture and storage on the cost of power generated in Australian black coal-fired power stations. This issue was not specially addressed in CSIRO's initial submission but was subsequently raised during hearings before the Committee.

Costs of carbon dioxide capture and storage

The issue of the cost of carbon dioxide capture is one that is difficult to assess as the actual costs will be very much site-specific and dependent upon the technologies under consideration. Extrapolation from the cost data available in the public domain, such as the IEA Report [1] that quotes MHI and Fluor costs, indicates that the current cost of applying post-combustion capture to Australian black coal-fired power stations might be around $35/MWh. This does not include the cost of subsequent storage, although the cost of storage is generally expected to be significantly less than capture. However, it should be emphasised that translating cost data from overseas studies to Australia is fraught with difficulties and thus, while it can be concluded that implementation of CO_2 capture technology is likely to double the cost of power generation from coal. CSIRO is not in a position to be precise. Such an estimate is, however, consistent with a recent edition of *Nature* [2] where it is stated that "rough estimates suggest that the average production costs of electricity will double, from 4 to 7 cents per kilowatt-hour".

Of course the question remains as to what these increases in the generation costs will mean for the retail price of electricity to consumers. This is not something that CSIRO can be definitive about, other than to say that while the cost of implementing capture technology might approximately double the cost of the power generated, this is only a proportion of the cost that consumers pay. Other overheads include the cost of transmission, distribution and retail sales. The final cost to customers is therefore dependant upon these costs and on the pricing policies of the parties involved. The *Nature* article quotes a claim that as "the costs of distribution and transmission are hardly affected … the retail cost of electricity would increase by just 20%." [2]

While the cost of implementing carbon dioxide capture and storage with current technology might approximately double the cost of power generated, it is necessary to look to at the impact of research on reducing costs in the future. Current research being undertaken overseas and within Australia can be expected to reduce the costs of both capture and storage over time. It is possible that within 15 to 20 years, the cost of capture and storage might reduce to around $25/MWh, but this depends very much upon location. This would represent a significant reduction in costs from present estimates.

The effect of carbon dioxide capture on the net output from the power plant is another significant issue. A study carried out by CSIRO in 1999 [3] indicated that adding capture plant to an existing power plant would reduce net output by around 30%. However, with improvements to solvents and better integration between the capture plant and the power generation plant this reduction is currently estimated to be around 25%. With further incremental developments that will improve the efficiencies of both the generating plant and the capture process, the reduction in net output might be as low as 16% by 2015.

References

[1] IEA Greenhouse Gas R&D Programme, 2004. Improvement in power generation with post combustion capture of CO_2. Report No. PH4/33.

[2] Q. Schiermeier (2006). Putting the carbon back. Nature, Vol. 442, 620-623.

[3] N.C. Dave, G.J. Duffy, J.H. Edwards and A. Lowe, (2000). Evaluation of the options for recovery and disposal/utilisation of CO_2 from Australian black coal-fired power stations. Final Report - ACARP Project No. C7051, CSIRO Energy Technology/ Co-Operative Research Centre for Black Coal Utilisation, 141pp.