24 August 2000

Committee Secretary
Joint Standing Committee on Treaties
Parliament House
Canberra ACT 2600

Dear Sir/Madam

INQUIRY INTO THE KYOTO PROTOCOL

Recommendation

Australia's largest potentially useable onshore CO_2 sink is not trees but the deep subsurface. The Kyoto Protocol requires modification to provide the future opportunity for geological sequestration to be recognised as a valid, quantifiable, and auditable carbon sink under the terms of the protocol. It should also be allowed as a future tradeable carbon credit.

Background

On a global scale the largest carbon sink is the ocean (Table 1) and a number of schemes have been proposed for the deep ocean disposal of anthropogenic CO_2. However there is environmental and international opposition to the use of this option. The other large CO_2 sink is the deep subsurface. Whilst this is much smaller than the ocean in terms of total volume available for CO_2 sequestration, it appears to be at least an order of magnitude larger than the terrestrial biota. This option known as geological sequestration of CO_2 may be of particular future significance to Australia as it seeks to decrease its level of greenhouse gas emissions.

Table 1
Worldwide Capacity of Carbon Reservoirs

Carbon sequestration reservoir	Capacity, Gtc
Oceans*	$1{,}400 – 2 \times 10^7$
Geologic Structures*	300 – 3,200
Terrestrial Systems (forestation & soil)	>100
Fixation and/or re-use (advanced concepts)	??
1990 Global Anthropogenic Emissions, Gtc/yr	6.0

*Source: *Carbon Dioxide Disposal from Power Stations*, IEA Greenhouse Gas R&D Programme, 1998; Carbon management, Assessment of fundamental Research Needs, DOE Office of Science.

A short paper on the option is attached but in summary the method involves:

- separation and capture of CO_2 from major stationary sources;
- compression of the CO_2 to a supercritical state; and
- injection of the supercritical CO_2 into a suitable sedimentary basin, at a depth of about 600 – 800 metres.

Provided the geological location is chosen carefully, the CO_2 will stay in the subsurface for hundreds to thousands of years and longer. There is one location (Sleipner) in the North Sea where the method is being applied commercially. It is also being applied indirectly for enhanced oil recovery at more than 50 locations around the world, the majority of these in the USA.

Application to Australia

At the present time, the Australian Petroleum Cooperative Research Centre (APCRC) has a major program (costing approximately $10 million over 4 years) underway to determine the applicability of geological disposal of CO_2 to Australia. This program, known as GEODISC, is being undertaken in conjunction with six major petroleum companies (BHP, BP, Chevron Australia, Chevron International, Shell and Woodside) and the AGO. It involves APCRC researchers from AGSO, CSIRO, Curtin University, Adelaide University and the University of NSW. Whilst the program has only been underway for about a year and only half of the sedimentary basins have been assessed on a preliminary basis, it does appear that the potential of Australian basins to sequester CO_2 on a long term basis is likely to be very considerable. What we do **not** know, and it is important to emphasise this, is the true cost of geological sequestration. Overseas figures suggest costs of the order of US$10 a tonne of CO_2 sequestered (which does **not** include any of the very major costs associated with separation and capture) but we do not yet know how relevant that cost figure will prove to be for Australia. The APCRC will continue to assess the potential for geological sequestration of CO_2 in Australia, and will determine the costs of the technique and its likely environmental and community acceptability as well as its technical feasibility. Whilst GEODISC is focussing in particular on the natural gas industry, it is likely that its outcomes will be as highly relevant to other major CO_2 emitters, notably the power and mineral industries.

Issue

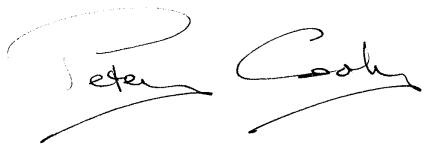
Inevitably, for Australia to meet its Kyoto target, it will have to employ a range of measures including decreasing the carbon intensity of Australia's energy, more efficient use of energy and more effectively using its carbon sinks. Forest sinks will be an important part of the strategy, particularly given their added benefits in

terms of land management. But based on our current level of knowledge it appears that the geological subsurface is Australia's largest potential sink for anthropogenic CO_2. Not only that, but given our arid climate and comparatively sparse terrestrial vegetation cover, the ratio of 'geological sinks' to 'terrestrial vegetation sinks' is likely to be higher for Australia than for any other Annex A country. This does not mean that we will therefore use this as our main response to Kyoto, for as pointed out earlier, we do not yet know what the cost of using the technique in Australia will be. Our response to Kyoto will inevitably involve a range of carbon sinks, but geological sinks have the potential to be one of our most important sinks if the technique can be applied cost effectively and can be shown to be environmentally acceptable.

What then is the issue? The issue is that under the Kyoto Protocol, geological sequestration is not recognised as a valid method of decreasing CO_2 emissions. This is despite the fact that geological sequestration is orders of magnitude longer than for trees, may be easier than trees to monitor for compliance purposes and represents a much larger sink. It may prove to be more or less costly than trees as a sequestration option. Again, it must be emphasised that the method is seen as in addition to the use of trees and other options, not as the sole solution. It is also seen as a 'transitional technology' in that as it may enable us to minimise emission from the continued use of fossil fuels until we move to greater use of renewable energy. However the lack of 'recognition' by the Protocol provides little encouragement for more serious consideration of this option by the international community.

If geological disposal of CO_2 can be shown to be a cost effective technique and it is accepted by the Protocol as a valid long term sequestration option for decreasing CO_2 emissions, then Australia potentially has much to gain — probably more than any other Annex A country. It is therefore important that the Protocol be amended to encourage consideration of geological sequestration as potentially one of the most important measures for decreasing the levels of anthropogenic CO_2 emissions into the atmosphere.

Yours faithfully



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