

# The Royal Society's response to House of Commons, Science and Technology Committee inquiry into Carbon Capture and Storage Technology

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This document is the Royal Society response to the House of Commons Science and Technology Committee inquiry into carbon capture and storage technology.

This submission has been prepared in consultation with our Energy Policy Advisory Group (EPAG) and has been approved by Treasurer and Vice-President Sir David Wallace CBE FRS.

We welcome the opportunity to respond to the Committee's call for evidence for the inquiry into 'Carbon Capture and Storage' (CCS). The following points reflect our view on the viability of CCS as a carbon abatement technology for the UK and the UK Government's role in funding CCS R&D and providing incentives for technology transfer and industrial R&D in CCS technology.

- Carbon capture and storage should be considered as part of a package of possible approaches to prevent CO<sub>2</sub> reaching the atmosphere. These include using less energy, using renewable and low carbon energy sources and developing technologies that allow the continued use of fossil fuels while reducing our greenhouse gas emissions. We recommend that the Committee consider in detail the findings of the Intergovernmental Panel on Climate Change (IPCC) Special report on Carbon dioxide capture and storage (IPCC 2005).
- The capture of CO<sub>2</sub> from large stationary sources is technically feasible, but expensive. Without an appropriate incentive, or an economic framework to fund its installation and use, it is unlikely to be deployed widely. Capturing CO<sub>2</sub> and compressing it for transportation and storage requires additional plant and processing, which reduces the overall efficiency of the plant, thereby increasing the cost of generation, as well as the amount of CO<sub>2</sub> per kilowatt of energy produced. However this additional CO<sub>2</sub> could also be sequestered. Technological advances could help to reduce costs and increase the efficiency and effectiveness of the capture technology.
- Consideration should also be given to the potential scale of the industry and associated infrastructure required if carbon capture and storage is to deliver substantial reductions in carbon dioxide emissions.
- In our report *Economic instruments for the reduction of carbon dioxide emissions* (Royal Society 2002) we recommend that a price should be attached to the emission of CO<sub>2</sub> to the atmosphere, either through a carbon tax or by tradable emission permits. This has the potential of making carbon capture and storage economically viable. However consideration is required as to how to design an effective economic instrument that can ensure the long-term investment that this technology requires. Such an incentive could come from the EU Emissions trading scheme. In the short term, financial incentives may be needed to ensure that all new power plants are designed to reduce the cost of retrofitting capture technology.
- Storage of carbon dioxide is already being undertaken in a number of places worldwide, primarily for the use of Enhanced Oil Recovery (EOR). The geology surrounding active oil and gas wells is largely understood and offer good prospects for use as storage sites. For the UK the detailed knowledge from the North Sea oil and gas industry means that their potential use for CO<sub>2</sub> storage is reasonably well

understood. However less is known about the geology globally and before widespread global deployment is undertaken considerable effort will be required to characterise and understand the geology of other potential sites, particularly if saline aquifers are to be used rather than oil wells. The recent IPCC Special Report (IPCC 2005) highlights the need for further geological characterisation of potential CO<sub>2</sub> storage sites.

- The Committee should consider issues relating to the storage of CO<sub>2</sub> including clarification around who will own, regulate, fund and monitor the long-term storage of CO<sub>2</sub>. In addition consideration should be given to the timescales required for implementing the appropriate regulatory and legal agreements. The DTI review of the feasibility of carbon dioxide capture and storage in the UK (DTI 2003) highlights the need for clarification or amendment of the OSPAR Convention and the London Convention/Protocol, which govern the disposal of wastes in or under the oceans. Although these conventions do not prohibit the use of CO<sub>2</sub> for EOR or other operational reasons, it may take several years to secure international agreement for the widespread storage of CO<sub>2</sub>.
- Despite the potentially huge global capacity for sequestration offered by ocean storage, where CO<sub>2</sub> is deposited on or above the sea floor in the deep oceans, consideration must be given to the environmental risks. In our report on *Ocean acidification due to increasing atmospheric carbon dioxide* (Royal Society 2005), we highlighted that research into the impacts of high concentrations of CO<sub>2</sub> in the oceans is in its infancy.
- The program of funding and development of CCS within the UK should take place within the broader framework of international activities to ensure that it is contributing to an international program of emission reduction. Even if the UK were to capture and store a substantial quantity of its own emissions, this would be only a small contribution to the global reductions in emissions required to reduce the risks posed by climate change. However by showing leadership, the UK might engage with India and China in managing their potential future emissions of carbon dioxide effectively, to much greater global effect.
- The Committee needs also to consider the potentially important role that public opinion could have on the development and deployment of carbon capture and storage.

## References

DTI (2003). *Review of the feasibility of carbon dioxide capture and storage in the UK*. Department of Trade and Industry URN 03/1261

IPCC (2005). *Special Report on Carbon dioxide Capture and Storage - Summary for Policymakers*. IPCC Geneva, Switzerland. <http://www.ipcc.ch/activity/ccsppm.pdf>

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