

David Rutland  
BERR  
1 Victoria Street  
London  
SW1H 0ET

22 September 2008

Dear Mr Rutland

### **Towards Carbon Capture and Storage**

The Institute of Biology, Institute of Physics and Royal Society of Chemistry welcome the opportunity to respond to the BERR consultation, "Towards Carbon Capture and Storage".

If you need any further information on the points raised, please do not hesitate to contact me.

Yours sincerely,

**Barbara Knowles**  
Head of Science Policy  
Institute of Biology

**Tajinder Panesor**  
Manager, Science Policy  
Institute of Physics

**Elizabeth Milsom**  
Environment and Energy Policy Manager  
Royal Society of Chemistry

## Towards Carbon Capture and Storage

### Section 1

The Institute of Biology, Institute of Physics and the Royal Society of Chemistry agree that the Government should initiate a commercial scale carbon capture and storage (CCS) project. We believe that fossil fuels will remain part of the global electricity generation mix for some time and that CCS will play a vital role in sequestering the resultant CO<sub>2</sub> emissions. We also believe that CCS can play a broader role, in capturing emissions from other large-scale industrial emitters and potentially in distributed carbon capture, for example, via biological capture<sup>i</sup>. These technologies are at an earlier stage in their development, but will remain important in the longer term (i.e. as fossil fuel reserves are depleted) and should not be neglected at this stage. It is also important to note that CCS as referred to in the consultation document appears to refer only to the physical approach employed at power stations and we will continue to use this definition in our response, but it should be made clear that this is not the full meaning of the term.

### Question 1

In order to further promote the development and deployment of CCS technologies in the UK, EU and globally, the Government should consider:

1. The demonstration of a range of CCS technologies, not just the current BERR CCS demonstration competition, which is limited to post-combustion technology. Post-combustion approaches are required if carbon capture is to be retrofitted onto existing power plants. Other methods of carbon capture include pre-combustion and oxyfuel, which in the longer term may prove to be more efficient and economical when designed with new build power plants. Even within the post-combustion approach, the choice to limit the competition to only a single demonstration is also very restrictive, and not the most effective way to ensure the technology reaches its potential. Currently the CCS sector faces a steep learning curve, and government financial support should be provided for CCS in a way which does not pre-judge what the best technical approaches are going to be.
2. All new power plants should be built "capture ready". We strongly believe that in the UK planning permission should only be given to plants that are planned to be 'capture ready'. The UK should also lobby the EU and educate globally the need for plants to be built capture ready to avoid the 40-60 years of carbon "lock-in" which would result.
3. The continued and secure funding of fundamental research in to new CCS technologies, the storage of CO<sub>2</sub> and alternative uses for CO<sub>2</sub> is essential. We believe that the physical sciences can play a major role in developing uses for captured CO<sub>2</sub>, such as a chemical feedstock.
4. All storage options for CO<sub>2</sub> must undergo rigorous research and development to ensure the effective, safe and long-term storage of CO<sub>2</sub>. Developing the right regulatory framework for managing the risks associated with long-term storage of CO<sub>2</sub> is required.
5. CCS is crucial but not the only factor to consider in terms of the environmental impact of new fossil-fuelled power plants. New plants operate at significantly higher efficiencies, and it is worth emphasising that CHP is by far the most efficient way to use fossil fuels, with efficiencies of up to 80%. CHP can be based on a variety of technologies including gas turbines, steam turbines, reciprocating engines and CCGT. It can also be used in combination with CCS.

6. For CCS to become an economically sustainable part of the energy market, a sufficiently competitive and stable price for carbon under the EU Emissions Trading Scheme needs to be obtained.
7. The Government should continue to ensure that its efforts continue to be complementary to those in other nations and seek opportunities for international collaboration.
8. As specified in paragraph 1.25, the scheme will find the cheapest way of reducing emissions. There may be a need for a more critical view of this approach, to take account of factors such as:
  - a. cheapest in the longer term (e.g. as changes occur to the energy economy options, including hydrogen production, may be more viable; utilisation of maximum oil resources will be more important on the storage side)
  - b. with the optimum environmental impact (e.g. how can pollutants other than carbon be integrated into the designs?)
  - c. retaining maximum generating capacity
  - d. optimal design options for global CO<sub>2</sub> reduction.
9. Skills for CCS: This is a very important issue which has not been included in the current consultation. BERR should work together with DIUS to consider this issue. The Government must ensure that the UK has the skills necessary to research, develop and implement all forms of CCS. Lessons can be learnt here from the nuclear industry, and we have an opportunity now to prepare for future competitiveness.

### **Section 3**

#### **Question 2**

We agree that developers should have suitable space on site or adjacent to the plant to accommodate a future carbon capture and processing plant. It is essential that all new build power plants are “capture ready” to avoid carbon lock in.

#### **Question 11**

We believe that any threshold limit may encourage the building of more smaller power plants in order to avoid any carbon capture-ready (CCR) regulations but these will still add up to overall larger CO<sub>2</sub> emissions. However, we recognise that this may discourage the building of the more efficient CHP type plants and believe that the inclusion of CCR to any design should be assessed on a case-by-case basis.

#### **Question 12**

We believe that all future fossil-fuelled power plants, not just coal-powered, should be built capture ready. Furthermore, the Government should look at rolling this out to other large emitters of CO<sub>2</sub>. The government should also consider introducing a cap in terms of emissions per unit generating capacity, rather than looking at either capacity or emissions in isolation.

#### **Question 16**

We would propose that the Government supports Article 32.

## Question 17

We would propose that the Government should take steps to domestically introduce requirements equivalent to article 32 in England and Wales. This would be justified as it would ensure CCS could be introduced at a later stage and will be essential for the UK reach its legally binding targets of CO<sub>2</sub> emission reductions set out in the 2008 Climate Change Bill<sup>ii</sup>.

## Question 21

As stated in answer to question 2, and noting that the average lifetime of a power plant is 60 years or more, we believe it is essential that all new build power plants are “capture ready”.

---

<sup>i</sup> Written proceedings from “Carbon capture and storage”, a seminar held by the Institute of Biology, Institute of Physics and the Royal Society of Chemistry,

[http://www.iop.org/activity/policy/Events/Seminars/file\\_30843.pdf](http://www.iop.org/activity/policy/Events/Seminars/file_30843.pdf)

<sup>ii</sup> <http://www.defra.gov.uk/environment/climatechange/uk/legislation/provisions.htm>



INSTITUTE  
OF BIOLOGY

**The Institute of Biology** is the professional body for UK biologists. Its members work in industry, research, education and healthcare, amongst other areas. It was founded in 1950, obtained a Royal Charter in 1979, and is a registered charity with over 13,000 members and over 40 affiliated societies covering every area of the biosciences.

## **IOP** Institute of Physics

**The Institute of Physics** is a scientific membership organisation devoted to increasing the understanding and application of physics. It has an extensive worldwide membership and is a leading communicator of physics with all audiences from specialists through government to the general public.

**RSC** | Advancing the  
Chemical Sciences

**The Royal Society of Chemistry** is the largest organisation in Europe for the advancement of the chemical sciences. Supported by a network of over 43,000 members worldwide and an internationally acclaimed publishing business, our activities span education, training, conferences and science policy and the promotion of the chemical sciences to the public.