12 November 2010

Carbon Capture and Storage Association
Response to
Project Transmit: A Call for Evidence

Introduction

The Carbon Capture and Storage Association welcomes this opportunity to respond to the Consultation on Project Transmit: A Call for Evidence.

The CCSA brings together a wide range of specialist companies across the spectrum of CCS technology, as well as a variety of support services to the energy sector. The Association exists to represent the interests of its members in promoting the business of CCS and to assist policy developments in the UK and the EU towards a long term regulatory framework for CCS, as a means of abating carbon dioxide emissions.

This paper is submitted by the Carbon Capture & Storage Association (CCSA) as a contribution to the Ofgem Project Transmit consultation. The CCSA has no direct experience of infrastructure charging regimes nor expertise in infrastructure design. However, there are a number of points of principle we would like to draw attention to. Since Carbon Capture & Storage is not yet an established practice in the UK it will be necessary to anticipate the infrastructure needs of this new industry as well as the impact that this will have on the existing infrastructure capacity in gas and electricity transmission.

CCSA Comments

- **CCS will be an essential and very large component of the UK energy mix into the future.**

The Committee on Climate Change have recommended that, in order to establish the right trajectory towards the statutory 80% reduction in UK emissions by 2050, the power sector will need to be largely decarbonised by 2030. Considering anticipated increases in power demand from vehicles and heating as well as the requirement to replace existing fossil and nuclear plants the Office for Carbon Capture & Storage have estimated the need to build upwards of 40GW capacity of fossil power equipped with CCS to be fully on stream within the 2030s. Beyond that CCS can be applied to biomass plants and will be needed for many industrial processes from 2020.

The need for decarbonised heat and transport will also lead to large scale CCS.

- **In the UK CO2 will be stored in offshore geological formations**

The UK has abundant potential geological storage reservoirs for CO2 beneath the bed of the North Sea as well as the Irish Sea to a more limited extent. Offshore storage is more costly than onshore but is considerably more socially acceptable. On this basis current policy is totally focused on storage offshore.

The North Sea has been extensively surveyed, drilled and exploited and therefore offers better developed and understood storage sites than elsewhere in Europe, implying the UK could or should be at the forefront of CCS deployment. In total depleted oil and gas fields and other suitable geological formations (saline aquifers) could provide storage capacity for many decades.

- **A new CO2 pipeline infrastructure will need to be created both onshore and offshore**

The sheer scale of CO2 production from fossil power plants means that for onshore transportation at least pipeline is the only sensible way of conveyance. (n.b. one tonne of coal produces over two and a half tonnes of CO2; A 1GW coal power plant produces 5m tonnes p.a. and a gas power plant about half of that.)

If careful infrastructure planning is carried out then the distances of onshore pipelines should be quite small. Unlike the gas network, CO2 pipelines will not have to serve highly distributed markets.

Offshore pipeline infrastructure may be a great deal more extensive with a number of main feeders leading out to multiple storage sites in the southern and northern North Sea as well as the Irish Sea.

- **Development of CO2 infrastructure will attract additional investment**

Experience in the USA where CO2 is transported in large volumes for enhanced oil recovery has shown that the existence of the pipeline attracts new investment in plant with CO2 recovery.

- **New power plants will be erected as close as possible to the shoreline**

Planning issues relating to the onshore transportation of CO2 by pipeline will favour minimisation of onshore routes leading to a trend to erect new fossil power plants as near as possible to the shoreline.

Existing sites that are close to the shoreline and have established grid access will clearly be in a preferred position for future development. If policy favours a mix of fossil generation including coal then those sites that are equipped with coal import facilities will be in a premium position and may even be regarded as being nationally strategic.

- **Sources of emissions tend to be clustered around river estuaries**

The requirement for cooling water and in some cases coal import has led to power plants being located near river estuaries. Steel plants have also been located in these clusters for importation of iron ore; similarly for oil refineries and petrochemical plants. The result is that there could be ‘easy wins’ in terms of providing infrastructure in those areas where a relatively small collector pipeline onshore may be installed for large volumes of CO2 to be stored. For example, over 60 m.t.p.a. may be collected in the Humberside region and this may well increase substantially into the future when the infrastructure is installed to transport and store the CO2.

- **Inland fossil power and industrial plants, together with their infrastructure may become stranded assets**

The corollary of the clusters statement above is that where there are existing power and industrial plants with inland locations it may be difficult to warrant the expense and the environmental impact of providing long onshore pipeline connections for relatively small annual tonnages of CO2. This could mean that existing inland fossil fuel power plants become stranded assets with consequent local imbalances of power and gas transmission capacity.

- **Consideration needs to be given to the infrastructure needs of offshore wind and its fossil back-up**

Construction of offshore wind farms will mean that power will need to be fed into the grid from the shoreline as well. In certain instances, where fossil power with CCS is used to back up wind generation this may be complementary. However, careful analysis will be needed especially as early CCS capacity will be seeking to run base load. The incentive to build and operate power plants with CCS in the mid to low merit range will be a crucial component of electricity market reform.

It is well understood that there will need to be more load responsiveness in the electricity market with more intermittent renewables. There are various technical ways for CCS equipped plants to be more responsive with some of them involving storage of various sorts. In this context, and to help de-carbonise natural gas supplies, it would be prudent for regulations to enable and encourage adding H2 into natural gas pipelines. As the specification cost to include H2 in new facilities is minor, this would be a prudent consideration.

- **CCS will help decarbonise heat, transport and industrial processes**

CCS could prove more economic to consumers than other technologies aimed at eliminating emissions. By providing economic, decarbonised power, CCS can enable indirect abatement. Generation of syngas or H2 with CCS can enable partial or complete decarbonisation of heating as well as industrial energy users, enabling users to postpone expensive conversions or additional heating systems.

There is some uncertainty as to whether these energy users will use more electricity, substitute primary fuel, or use onsite CCS. For example steel making could become more electricity intensive, more hydrogen intensive, or more reliant on onsite post combustion CCS. Because of the economy of scale issues small, mobile, and widely distributed users are not expected to use CCS directly, but will use H2 which is

decarbonised (by CCS or from renewable sources) or decarbonised electricity (from CCS, nuclear or renewables with storage).

Because of the associated ability for storage, the low transport costs, and wide process options, we see potential for H2 infrastructure, but also a growth in electrical infrastructure even if electrical loads are managed to better match supply. However the exact size and timing of such growth in infrastructures is difficult to foresee, we just recommend that infrastructure regulation and charging recognise and allow those potential growths. We appreciate that Project TransmiT does not cover H2 or CO2 infrastructures, but we hope that it recognises their future role in the UK.

- **Regulatory certainty is vital for CCS investor confidence**

Considering the low value attributable to the disposal of CO2, the very high capital value of CCS schemes and the associated business risks regulatory certainty is fundamentally important. Onshore pipeline infrastructure for CO2 will develop with a limited length and limited numbers of inputs considering the clustering referred to above. Contractual relationships between sources, transporters and storers of CO2 will be a key part of the success of the whole CCS business chain.. In the context of pipelines for CO2 and H2 there is no perceived need for market regulation as is the case for fuels and offshore hydrocarbons.

The view expressed in this paper cannot be taken to represent the views of all members of the CCSA. However, they do reflect a general consensus within the Association.