Carbon Capture & Storage Association

05 January 2015

CCSA response to:
National Infrastructure Commission call for evidence

The Carbon Capture and Storage Association (CCSA) is pleased to respond to the Open consultation on the National Infrastructure Commission (NIC), in particular the remit of the NIC in relation to the delivering future-proof energy infrastructure.

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 CCSA exists to represent the interests of its members in promoting the business of Carbon Capture and Storage (CCS) and to assist policy developments in the UK, EU and internationally towards a long-term regulatory framework for CCS as a means of abating carbon dioxide (CO_2) emissions.

Although the consultation document does not explicitly ask questions about different electricity generation technologies, CCS on coal, gas and biomass power stations has the potential to deliver large volumes of clean, dependable (reliable) and affordable energy to UK consumers. On this basis, and given the specific infrastructure requirements of CCS projects, the CCSA has provided some high-level comments in response to the consultation and would welcome further engagement with the NIC as it further develops its thinking.

<u>The value of CCS to the UK electricity sector and wider economy</u>

CCS is unique amongst low carbon technologies in its ability to reduce emissions from fossil fuel electricity generation and thereby provide dispatchable[1], low carbon electricity. Recent reports from the ERP and the CCC have found that with an increasing amount of renewable technologies on the system there is a growing need for zero carbon firm capacity (such as Carbon Capture and Storage (CCS)) in order to deliver an affordable and secure electricity system that contributes towards the fulfilment of UK carbon budgets.

Energy systems analysis from across the world has consistently demonstrated that CCS has an important role to play as part of a diverse energy mix and that it has the greatest potential to reduce the costs of meeting climate objectives to consumers of any low carbon technology. The Intergovernmental Panel on Climate Change (IPCC) found in its Fifth Assessment Report that the costs of meeting 2 degree climate objectives could more than double without CCS (increasing by more than 138%)[2]. By comparison, the same study found that 2 degree objectives could be met without any new nuclear capacity with a cost increase of just 6% and with only limited solar deployment at a cost increase of just 7%.

A similar conclusion has been reached for the UK through energy systems modelling conducted by the Energy Technologies Institute (ETI), Energy Research Partnership (ERP)

[1] Electricity supply that be turned on or off rapidly and ramped up and down according to supply and demand.
[2] Fifth Assessment Report: Working Group III: Mitigation (IPCC, 2014)

and the Committee on Climate Change (CCC). The ETI, for example, finds that without CCS the costs of meeting UK climate targets could more than double, costing an additional £32 billion per year by 2050[3]. Analysis conducted by Cambridge Econometrics for the CCSA and TUC translates this value to approximately £82 per household, per annum in 2030[4]. The recent CCC 'Power sector scenarios for the fifth carbon budget' report further highlights that *'CCS is very important for reducing emissions across the economy and could almost halve the cost of meeting the 2050 target in the Climate Change Act'*.

The initial investment costs of First of a Kind CCS projects in the UK may appear high (thought to be in the region of £150 - £200/MWh for the first projects that build out infrastructure) but this will rapidly reduce below £100/MWh as infrastructure is shared, economies of scale are achieved and the cost of capital comes down[5]. CCSA analysis has suggested that a CfD Strike Price of less than £100/MWh can be achieved with just 2.5GW of installed capacity[6]. In addition, CCS infrastructure (CO_2 pipelines and geological storage sites) can also present opportunities to reduce emissions from the industrial heartlands of the UK, preserving existing- and attracting new jobs, and unlocking new opportunities for innovation, for example decarbonised hydrogen production. This value is currently not captured when the costs of CCS are compared to those of other low carbon generation technologies.

Due to its flexibility, the longer term value of CCS to the UK energy system is estimated to be more than £200 billion by 2050. The recent Government decision to withdraw £1 billion from the UK CCS Commercialisation Programme (Competition) has dealt a significant blow to the CCS industry and risked significantly delaying its deployment, in-turn putting at risk the considerable economic benefit CCS has to offer the UK. Government justified its decision on the basis of affordability and (short term) value for money but maintains the position that CCS will be important to the UK in the longer term. If the UK is serious about wanting access to CCS in the future then it is essential that policy focuses on commercial-scale deployment and developing CO_2 transport and storage infrastructure. To this end, the NIC should ensure that the electricity market is able to support investment in CCS-equipped electricity generation whilst also working with DECC and the Oil and Gas Authority (OGA) to consider how the UK can most cost-effectively deliver CO_2 transport and storage infrastructure.

Q4.1 What changes may need to be made to the electricity market to ensure that supply and demand are balanced, whilst minimising cost to consumers, over the long-term?

The electricity sector is transitioning to one where all future electricity supplies will be from low carbon energy sources. In order to balance supply and demand in the future, significant investment in low carbon generation is required now. With a widespread increase in deployment of intermittent renewables, thermal generation plants, including those fitted with CCS, are likely to be increasingly used as back up generation. Although thermal generation plant are expected to operate at reduced capacity in the longer term future they will be vital for providing firm and dispatchable electricity and ensuring security of supply. When fitted with CCS these plant can also provide low carbon electricity and make a significant contribution towards reducing the emissions intensity of the power sector and therefore their development and operation should be incentivised appropriately.

[3] Carbon capture and storage Building the UK carbon capture and storage sector by 2030 – Scenarios and actions (ETI, 2015)
[4] The economic benefits of carbon capture and storage to the UK (CCSA, TUC, 2014)
[5] CCS Cost Reduction Task Force Final Report (2013)
[6] Delivering CCS (CCSA, 2015)

To bring forward new low carbon thermal plant policy measures are likely to be needed to provide revenue certainty in light of uncertain operating hours. In the 2011 EMR White Paper[7], DECC introduced the concept of a 'flexible CfD' that combined elements of a capacity payment with a payment for low-carbon output. Although this idea has yet to be developed further by Government, the CCSA believes the concept of a flexible CfD has merit and warrants further consideration as the UK energy system becomes increasingly reliant on intermittent and inflexible generation.

In addition to an appropriate investment framework that rewards both low carbon electricity generation and availability, there is a need for additional measures to support investment in CO_2 transport and storage infrastructure. Investment in this infrastructure (e.g. in advance of commercial operations commencing) should be an immediate priority given that the development of stores, or construction of new pipelines can take between 5 and 10 years before a generation/CO_2 capture project begins operating. The Zero Emission Platform – advisors on CCS to the European Commission – published a report in 2014, which outlined the market failure for investment in CCS infrastructure and recommended a 'market maker' type approach be adopted, based on a public private partnership to enable investment and reduce risk[8]. Such an approach may need to be considered in the UK to secure the necessary investments and warrants further consideration by the NIC, in conjunction with DECC and the OGA.

<u>Recommendations for the National Infrastructure Commission</u>

Given the significant value of CCS to the UK economy and the unique challenges facing the public and private sectors in its commercialisation, the CCSA believes that the NIC could make an important contribution towards the delivery of early CCS projects. It could do this by:

- Building on existing research and evidence to report on the likely infrastructure needs relating to CCS deployment in the UK, particularly the CO_2 transport and storage requirements necessary to meeting climate objectives at least cost.
- Working in conjunction with the DECC and the OGA to support development of a strategic CCS infrastructure plan for CO_2 storage in the UK Continental Shelf (UKCS).
- Considering and reporting on the need for a strategic CO_2 transport delivery body, in particular consideration of a Regulated Asset Base approach that could deliver right-sized infrastructure and enable economies of scale to be realised.
- Supporting CCS policy development in relation to infrastructure, particularly whether there is a need for Government intervention to support development of CO_2 transport and storage solutions. This issue is also being considered by a Parliamentary Advisory Group on CCS being led by Lord Oxburgh.

[7] EMR White Paper (DECC, 2011)
[8] Business Models for Commercial CO_2 Transport and Storage (ZEP, 2014)