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Carbon Capture and Storage (CCS) in the European Union Energy Union's Governance

Submission to the House of Lords EU Energy and Environment Sub-Committee inquiry: EU Energy Governance

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1. Identification

1.1

Scottish Carbon Capture & Storage (SCCS) is the largest Carbon Capture and Storage (CCS) research group in the UK. With internationally renowned researchers and state-of-the-art facilities, we are unique in our connected strength across the full CCS chain. We provide a single point of coordination for all aspects of CCS research, ranging from capture engineering and geoscience to public engagement, policy and economics. Founded in 2005, SCCS is a partnership of the British Geological Survey, Heriot-Watt University, the University of Aberdeen, the University of Edinburgh and the University of Strathclyde working together with three additional universities in Scotland. SCCS is publicly funded by the Scottish Funding Council (SFC) and the Energy Technology Partnership (ETP). More details at http://www.sccs.org.uk

1.2

Dr Vivian Scott, based at the University of Edinburgh, leads policy research in SCCS. He has worked extensively on the development of UK and EU CCS policy aimed at delivering and deploying CCS to contribute to climate change mitigation, and advised industry, government and the research community.

1.3

Professor Stuart Haszeldine (University of Edinburgh) is Director of SCCS. Stuart has 40 years research experience in energy and environment; innovating new approaches to oil and gas extraction, radioactive waste disposal, carbon capture and storage, and biochar in soils. Stuart provides advice to both UK and Scottish governments. He was elected FRSE in 2002, awarded the Geological Society William Smith Medal in 2011 and in 2012 was appointed OBE for services to climate change technologies.

2. Carbon Capture and Storage in the European Union

2.1

There is at present a considerable mismatch between the overall aspirations for CCS in the EU as a contributor towards achieving the EUs' climate mitigation objectives, and the current level of CCS development, deployment, and associated political focus on its support.

2.2

The European CCS funding support instruments (European Economic Recovery Plan, and New Entrants Reserve 300) have failed to deliver on the 2007 European Council's ambition for "up to 12 CCS demonstration projects on power and industry". To date the EU Emissions Trading Scheme has failed to provide a financially credible (high enough and sufficiently stable) carbon price to support CCS development. While the on-going ETS reform package for phase IV is welcomed the predicted carbon prices are unlikely to enable CCS retrofitting or new deployment, especially as it is expected that many industrial sectors will continue to benefit from an allocation of some proportion of 'free allowances'.

2.3

Currently only two Member States (the UK and the Netherlands) are actively supporting the development of specific commercial scale projects[1]. Norway (EEArea) has operated commercial CCS projects since 1966 and 2008. The UK is evaluating two 'commercialisation

[1] Peterhead, UK; White Rose, UK; Caledonia, UK; ROAD, NL

projects', for funding decisions early in 2016. The Netherlands project is negotiating funding support from Netherlands, Norway, France and Germany.

2.4

However, CCS remains critical to the delivery of the EU's emissions reduction targets, especially for addressing industrial emissions for which there is no other available technology[2]. CCS has repeatedly been demonstrated to be a key component of a secure, cost-effective low carbon EU energy system[3], with the absence of CCS in some studies found to double the cost of achieving 2050 decarbonisation objectives.

2.5

Europe has substantial opportunities for technologically and commercially deliverable, secure geological CO_2 storage, particularly in the North Sea region. These have sufficient capacity for many decades worth of EU emissions. However other than the UK, Netherlands and Denmark, sources of CO_2 emissions and appropriate and socially permitted geologies for CO_2 storage are in most cases not co-located. The infrastructure required to connect them is as yet non-existent. This presents two specific challenges at European scale: first the confirmation of sufficient CO_2 storage capacity, and second the provision of (trans-boundary) access to that CO_2 storage capacity for Member States without deliverable domestic CO_2 storage. Addressing both of these requires strategic action coordinated at European level due to the considerable (multi-years to decade) lead times associated with geological appraisal and infrastructure delivery for trans-boundary transportation by pipeline and/or shipping.

3. CCS in the EU Energy Union

3.1

The Commission's Energy Union Communication[4] (February 2015) as part of the "Energy Union for Research, Innovation and Competitiveness" recognises that CCS for power and industrial sectors "will be critical to reaching the 2050 climate objectives in a cost-effective way". However, CCS is labelled not among the four Energy Union "core priorities", but as an "additional priority" for Member States who "want to use these technologies".

3.2

This raises the question as to which Member States might consider CCS to be needed as part of their decarbonisation in order to achieve both the EU 2030 target of 40% emissions reductions, and be on a pathway towards the 2050 objective of 80-95% reduction in emissions. Currently, the power sector and industry are the first and third largest contributors respectively to EU emissions, and these proportions are generally maintained at individual Member State level[5]. Thus, if Member States wish to retain their industrial sectors (and associated jobs and investment), and/or the option of coal or gas power generation it appears that the majority of Member States will require to enact CCS for their emissions reduction obligations to be met.

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[2] CCS on commercial industry plant e.g. steel production is in build in other world regions demonstrating that technological immaturity is not a significant barrier to its application.

[3] EU Energy 2050 Roadmap, IEA Energy Technology Perspectives, Energy Technology Institute.

[4] A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy (25 February 2015) http://eur-lex.europa.eu/resource.html?uri=cellar:1bd46c90-bdd4-11e4-bbe1-01aa75ed71a1.0001.03/DOC_1&format=PDF

[5] Eurostat: http://ec.europa.eu/eurostat/statistics-explained/index.php/Greenhouse_gas_emissions_by_industries_and_households

4. Implications for Energy Union governance

4.1

CCS requires active inclusion in the development of Energy Union governance in order for the Energy Union objectives to be achieved. Primarily, this will concern the development, assessment and realisation of Member State's Energy and Climate National Plans.

4.2

It is likely that the majority of Member States will need to include CCS, in particular for industrial sources, in (or even prior to) the 2030s. The need for inclusion of CCS to deliver Member State outlooks to 2050 seems even more inevitable. Coherent delivery of these CCS contributions will need provision of both an investible business model, and the upfront identification, investigation and licensing of sufficient CO2 storage capacity with an identified and deliverable means of access (CO_2 transport link). For the latter, the realities of European geography and geology suggest that in many cases substantial trans-boundary shipment and storage of CO_2 will be a necessity. Thus, the successful deployment of CCS by many Member States will likely be conditional on effective regional plans to develop shared CO_2 storage resources and connecting transportation infrastructures.

4.3

In respect of the above, Questions 1, 2 and 3-6 ("looking forward") of this Call for Evidence are now considered:

Q1. Capacity Mechanisms

National capacity mechanisms, as currently designed, represent an inefficient, distorting and temporary solution to the need for flexible on-demand generation to support the growing proportion of intermittent renewable generation. Instead, security of supply should be addressed through both improved interconnection of national grid systems and the development of low-carbon on-demand supply including CCS on gas and coal power plant.

The construction and operation of early CCS projects can be supported through subsidy that recognises the relative technological immaturity of CCS and the high value of low-carbon on-demand generation as part of power supply systems. Such subsidy should ideally be coordinated between Member States and existing EU instruments (ETS) to prevent further distortions. Currently a renewed ETS derived Innovation Fund is intended to support CCS projects. This should learn from the failure of its predecessor and explore financing models such as a price-per-clean unit of generation or industrial product minus the current EU-ETS price. Specifically this could engage industrial emitters, where CCS delivery has so far proven intractable in the EU, even though CO_2 capture from some industrial sectors is technologically a low cost opportunity. A certificates system, obliging CO_2 storage or purchase of stored CO_2 on a proportion of both domestically extracted and imported fossil fuels should also be considered – this would revolutionise the investment and action by large corporates on carbon disposal[6].

Q2. Renewable Energy Targets

The agreed 2030 Climate and Energy targets present a confusing compromise of Member State perspectives. It is unclear how an EU-wide target for renewable-energy share without specified Member State contributions is to be administered. How might CCS delivery,

[6] Certificates for CCS at reduced public cost http://www.sccs.org.uk/images/expertise/reports/working-papers/wp-2015-04.pdf

beneficial to all, be accounted for within this structure? Can Member States (UK, NL) willing to advance CCS and develop CO_2 storage as an essential low-carbon technology receive credit for this contribution towards the overarching 40% GHG reduction target? This could perhaps be manifested in the form of a carbon reduction calculation rather than a renewable technology-share choice calculation, with CCS replacing a proportionally reduced obligation to contribute to the EU-wide 27% renewables target[7]. This should be conditional on provision of access to CO_2 storage for other Member States. The EU could facilitate connection between 'stranded' emitters and CO_2 storage as part of Climate National Plan assessment (see below) with assistance from the renewed Projects of Common Interest.

Q3. What are the implications of a strengthened EU approach to energy governance? What are the implications of not making swift progress towards a new and clear governance system?

Given the current general under-achievement of CCS delivery across the EU a strengthened EU approach to energy governance could provide much needed impetus and support. This should formally recognise the critical need for CCS delivery (rather than just a research agenda), and help put in place measures to support both the investment case for CCS projects across the EU (supplementing the EU ETS and able to contribute to both capex and opex), and as appropriate the development of domestic CO_2 storage capability or facilitation of trans-boundary access to CO_2 storage. As such, the current leadership in developing CCS projects by individual Member States should be recognised as beneficial to the EU as a whole and receive greater formal EU support.

Q4. If National Energy and Climate Plans were to be the basis for a strengthened governance, who should be responsible for assessment, review and enforcement? How can transparency of that process be assured?

Due to the likely need for some Member States to access non-domestic CO_2 storage, the role of CCS in individual National Energy and Climate Plans cannot coherently be treated in isolation (simply 'added' up). Therefore, any assessment of Plans will need to collate activities across the EU to calculate the balance between intended CCS contributions and available CO_2 storage capacities and review the appropriateness of collaboration between 'source' Member States and potential 'store' Member States. Given this cross-EU context the Commission should take a leading role in such assessment and periodically query any CCS contributions present in Plans where it appears inadequate preparatory action is being taken making a shortfall likely.

Here, it is important that Plans do not simply reach 2030 and stop, but are extended (at least indicatively) to achieve the 2050 objective, and that these extensions receive proper and public scrutiny. This will make very clear the blunt choice between the establishment of CCS or the closure of energy-intensive industries. The Commission should support this by making the EU Reference Scenario it produces for guidance extend to 2050.

Q5. What role should regional co-operation play in any new governance system? How can regional co-operation help to overcome the potential tensions between national and EU policy objectives?

Due to the different locations of emissions clusters and CO_2 storage provision (as outlined

[7] Here, the possible overlap between "renewable" biomass (subject to sustainability) and its potential for combination with CCS (in biofuel or power production) also needs to be considered by Member States and the Commission.

above) enhanced regional cooperation is critical to the timely delivery of the CCS contribution to the EU's decarbonisation. In many instances the EU's industrial regions appear much more aware of the importance of CCS to their futures than Member State governments. It would be productive for the EU to support the creation of an industrial regions CCS platform, that building on the work undertaken in Teesside, Yorkshire, Scotland, Rotterdam and Antwerp[8], could develop industrial CCS strategies and collaborate on designing and delivering EU-supported Projects of Common Interest in CO_2 transportation infrastructures.

Q6. Should a new governance framework be enshrined in legislation?

With respect specifically to CCS, legislation should recognise the critical need for its delivery, give credit for CCS leadership by individual Member States (see Q2), and give proactive support to regional cooperation to enable EU-wide deployment. Moreover, a broader legislative framework should present the delivery of the agreed 2030 climate and energy targets not as a hard stop followed by complete overhaul (as with the 2020 targets), but as a stage on a pathway towards achieving the 2050 decarbonisation goals. This would increase investment certainty in large energy infrastructures (including CCS) that require sustained confidence in long-term policy intent and stability.

[8] Teesside Collective, CO_2Sense Yorkshire, Scottish Enterprise and SCCS, Rotterdam Climate Initiative, Antwerp Port Authority.