



House of Commons
Energy and Climate Change
Committee

**Carbon capture and
storage: Government
Response to the
Committee's Ninth
Report of Session
2013–14**

**Second Special Report of Session
2014–15**

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The Energy and Climate Change Committee

The Energy and Climate Change Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Department of Energy and Climate Change and associated public bodies.

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Publication

Committee reports are published on the Committee's website at www.parliament.uk/ecc and by The Stationary Office by Order of the House. Evidence relating to this report is published on the Committee's website at www.parliament.uk/ecc

Committee staff

The current staff of the Committee are Farrah Bhatti (Clerk), Vinay Talwar (Second Clerk), Tom Leveridge (Committee Specialist), Marion Ferrat (Committee Specialist), Shane Pathmanathan (Senior Committee Assistant), Amy Vistuer (Committee Support Assistant), and Nick Davies (Media Officer).

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Second Special Report

On 21 May 2014 the Energy and Climate Change Committee published its Ninth Report of Session 2013–14, Carbon capture and storage [HC 742]. On 15 August 2014 the Committee received the Government's response to the Report. It is appended below.

Appendix: Government Response

Introduction

The Government welcomes the Energy and Climate Change Committee's report on Carbon Capture and Storage.

Carbon Capture and Storage (CCS) is a critical technology with the potential to make a significant impact in reducing carbon dioxide (CO₂) emissions from the power and industrial sectors in the UK and worldwide. CCS offers the opportunity to continue to utilise fossil fuels and enjoy the energy security this brings but with vastly reduced emissions. Whilst not currently competitive with other low carbon forms of generation there is the potential for CCS costs to fall significantly as deployment increases. Projections in both the UK and internationally indicate it will be significantly cheaper to meet emissions reduction targets with cost effective CCS in the energy mix than without.

Government is committed to working with the CCS industry to deliver cost-competitive CCS by the 2020s. We have committed to provide £1bn capital support and operational support to successful projects in the CCS competition and on 7 August published a document "Next Steps in CCS: Policy Scoping Document" setting out Government's plans to support industry in bringing forward further projects in the UK.

Conclusions and recommendations

Government support for CCS

1. The expected start date of CCS has been pushed back from 2014 to potentially after 2020. Given the widespread acknowledgement of the importance of CCS to meeting future climate change targets this lost decade is extremely disappointing. While we take note of recent efforts by Government to work more closely with industry to accelerate CCS deployment, it is essential that the Government is able to commit to a realistic but ambitious timeline for taking final investment decisions. The rest of this report will look at what more the Government needs to do to accelerate CCS deployment and support a wider CCS industry. (Paragraph 19)

Political and financial risk

2. As we have heard, delay has called into question the credibility of Government policy designed to support CCS deployment. It is critical that the Government does not waste

any more time on unnecessarily delaying the start of the first CCS projects. We recommend that the Government aims to reach final investment decisions (FID) with the two projects left in the competition by early 2015 (in line with the Government's original competition timetable). This offers the only hope of making the first CCS projects operational by 2020. In turn this could help to bring down costs of CCS more quickly and, therefore, help the development of a wider CCS industry in the UK. (Paragraph 31)

The Government is committed to facilitating the development and deployment of cost-effective CCS by the 2020s. This ambition cannot be delivered by Government alone – it will require prospective CCS developers and others to bear a proportionate share of the cost and risk, because it is important that the development and deployment of CCS, as with other forms of low carbon generation, does not impose undue burdens on energy consumers.

CCS projects are complex, multi-billion pound infrastructure projects. The Government stands to invest up to £1bn in these projects, and additional support from consumers via Contracts for Difference, subject to value for money and affordability. Under the Commercialisation Programme, it was important that we undertook a thorough process to select the best projects, and we signed Front End Engineering Design (FEED) Contracts with White Rose in December 2013 and Peterhead in February 2014, with Government investing around £100m in FEED.

The Government recognises that the Committee has called for final investment decisions to be reached by early 2015, but it is not realistic for either Government or the developers to take multi-billion pound investment decisions until there is sufficient confidence in the engineering designs and costs.

The Government will continue to encourage developers to complete their FEED studies and provide that confidence as quickly as possible, but it is important to note that to maximise confidence in delivery, the projects are expected to undertake a significant amount of work over the remaining months to the end of 2015. During this period both projects will also need to obtain the necessary planning permission and consents which includes extensive public consultations; and detail their commercial structures for delivering the projects including engagement with the investment and finance communities.

Until FEED is complete, projects carry unacceptable and/or unquantifiable levels of risk for either Government or the developers to take a decision to invest.

3. The Government's Feed-in Tariff Contracts for Difference (CfD) will be essential for CCS projects as they will provide operational support as well as a route to market for non-competition projects. The Government should set out immediately in what ways CCS CfDs will differ from the more generic CfDs. We recommend that CfDs be tailored to individual CCS projects because of the unique characteristics of CCS (compared to other low carbon and renewable technologies). The Government must engage in a dialogue with industry to ensure that CCS CfDs are designed appropriately. (Paragraph 34)

4. Non-competition projects which do not have the benefit of being eligible for capital support, but which are still viable projects, are at risk of collapsing unless they get a clear signal from Government that they can negotiate with DECC for a CfD in parallel with competition projects. We recommend that as soon as the Government sets out more detail on the detailed nature of CCS CfDs, the Government should write to the non-competition projects inviting them to start the process of negotiating for CfD. (Paragraph 36)

The Government is in the process of negotiating tailored CfDs with the two preferred bidders in the CCS Competition. We expect this process to allow the companies to take Final Investment Decisions around the end of 2015, with Government taking decisions shortly afterwards.

We are also committed to putting the right tools in place under EMR to support CCS projects outside the Competition. In the 7 August publication "Next Steps in CCS: Policy Scoping Document", we set out our plans to engage with developers and other interested parties over the remainder of 2014 and 2015, on a non-exclusive and no-commitment basis, on the design of a generic CCS CfD and options for how these might be allocated in future. The design of a generic CCS CfD will also take into account progress in the CCS Competition where relevant for other early stage CCS projects. Without prejudice to future decisions on the Levy Control Framework (LCF) or any future allocation processes under the EMR enduring regime, this work should enable an appropriate suite of enabling architecture to be in place for CCS by 2016.

5. The CCS industry would benefit from having more clarity on the amount of funding available for CCS within the Levy Control Framework (LCF) up to 2021. It is also essential that the industry have visibility on the LCF post-2021. The Government should set out its thinking on the LCF post-2021 indicating whether the total will be maintained in real-terms. (Paragraph 39)

As set out in the indicative CfD budget notice for the autumn 2014 CfD allocation round on 24 July, the Government has held back a significant part of the budget for future allocations within the Levy Control Framework cap. The EMR announcement set out an indicative budget of £205 million for renewables CfDs and an indicative allocation of a further £50m to be allocated to established technologies in a further allocation round in autumn 2015, with other decisions on future allocations to be taken later. On our medium scenario there could be a further £1bn of LCF funding available up to 2020/21 for allocation to renewable and CCS projects (including the CCS Commercialisation Programme projects). The delivery years and level of this additional funding is a future decision to be taken by Ministers; this will depend on a number of factors, including forecast spend on other projects and decisions in relation to headroom and affordability. We expect decisions on funding for additional low carbon electricity generation after 2020/21 to be taken after the general election. We will continue to engage closely with any CCS developer who wishes to secure a CfD in the future.

Clustering and common infrastructure

6. It is astonishing that the Government has done so little to actively promote clustering given the benefits of doing so-including offering the greatest potential for cost

reduction. It serves as another example of how long it has taken the Government to encourage the deployment of CCS. The Minister should quickly set out, in consultation with the UK CO₂ Storage Development Group, a detailed action plan for how the Government will incentivise clustering of CCS infrastructure. (Paragraph 43)

The Government recognises the benefits of clustering and common infrastructure and has actively engaged with industry to explore the benefits that CO₂ transport and storage networks could have, beyond the initial projects they support.

Both preferred bidders in the CCS Competition propose the construction of transport and storage facilities that have capacity to take carbon dioxide from additional sources, so could contribute directly to the development of CCS clusters.

In addition, the Government has put in place legislation¹ for third parties to obtain fair and open access to CCS transport and storage infrastructure. The aim of the Regulations, which are based on arrangements in the upstream oil and gas sector, is to encourage the development of CCS infrastructure and third party access to existing infrastructure (where there is spare capacity available) in a way that responds to demand without imposing an unnecessary burden on those that own these assets. In this way the legislation encourages developers to explore the natural economic benefits of clustering.

Following the Committee's recommendation, the Government will explore with The Crown Estate, the owner of offshore storage sites, how its leasing arrangements can be further developed to encourage clustering in storage site development.

Enhanced oil recovery

7. We are pleased that the Government has accepted Sir Ian Wood's recommendations into maximising the recovery of UK oil and gas and is actively working with industry to explore the potential for enhanced oil recovery (EOR) to prolong the life of the North Sea reserves. We recommend that the Government should consider providing tax breaks to CCS consortia and oil and gas companies which pursue EOR. (Paragraph 47)

The Government believes there is significant potential for enhanced oil recovery on the UK Continental Shelf and is working with the industry to understand the potential role of CO₂-EOR in the deployment of CCS in the UK. Our publication "Next Steps in CCS: Policy Scoping Document", which we have published alongside this Response, provides more detail on our assessment of the UK's CO₂ EOR potential.

There is currently no consensus amongst industry as to how CO₂-EOR could or should develop in the UK. PILOT, the industry and government taskforce on EOR, has been working on these challenges and has been successful in raising awareness of EOR potential and encouraging operators to investigate EOR opportunities in their portfolio.

The Government will consider evidence from industry on the possible need to support oil and gas companies on EOR projects through its review of the oil and gas tax regime, which was announced at Budget 2014. HM Treasury published a call for evidence on 14 July, marking the start of 12 weeks of discussions with industry and other stakeholders on the long-term future of oil and gas tax.

¹ The Storage of Carbon Dioxide (Access to Infrastructure) Regulations (2011 No.2305)

Industrial CCS

8. Industrial CCS is one of the only large-scale mitigation options available to make deep reductions in the emissions from industrial sectors. We are disappointed that the Government has so far paid little attention to it. We recommend that the Government update its CCS Roadmap this year and outline in greater detail what role it envisages for industrial CCS and how it intends to support it. (Paragraph 51)

The Government agrees that Industrial CCS (ICCS) will be an essential technology to allow the decarbonisation of the wider economy at least cost. It is expected to be a key technology for decarbonising energy use in the iron and steel, oil refining, cement and chemicals industries, whose processes unavoidably generate CO₂ as a result of necessary chemical reactions.

Industrial CCS could be an important means of carbon reduction for industry from the mid-2020s in the UK. However, there are currently just a handful of ICCS projects around the world.

Our publication "Next Steps in CCS: Policy Scoping Document", published alongside this Response, addresses the challenge of ICCS and outlines the work the Government is currently supporting to further understand and support its development. This includes work as part of the Tees Valley City Deal to which the Government has provided £1m funding, and the Industrial 2050 Decarbonisation and Energy Efficiency Roadmaps project, both of which will conclude in 2015. Outputs from these pieces of work, and from the DECC and BIS commissioned techno-economic study on ICCS, published in May 2014, will inform policy development going forward.

Safety and reputational risks

9. It is very disappointing that after almost a decade the Government has still not recognised the need for a proactive approach to communicating CCS and instigated an appropriate programme. The Government cannot delay this any longer. We recommend that in order to address public opposition to CCS - similar to that experienced in other countries and in the UK in relation to other energy infrastructure - and to try and prevent it from growing, the Government develops and implements a national CCS engagement strategy framing CCS in a positive way, emphasising the potential benefits, dispelling myths and listening and responding to public concerns over safety. The Government should also mandate through licence conditions for CCS companies to develop and implement their own engagement strategies with local communities. This should be done before final investment decisions (FID) are taken. (Paragraph 57)

The Government is using a variety of tools to enhance public awareness and engagement on CCS. For example, DECC has developed an award winning [2050 Calculator](#) which enables audiences to explore the important role of CCS in allowing the UK to meet its energy needs whilst reducing emissions.

Preferred bidders in our CCS Competition are required as part of their FEED contract with Government to engage with and consult the communities local to their projects. The Government's planning and consents process also requires extensive public consultations

and engagement. Both preferred bidders are therefore engaging proactively with the local community and wider public in a variety of ways, including one-on-one meetings with stakeholders and meetings with local Councils and community groups. For example, Shell runs a series of community exhibitions and educational workshops with local primary schools and publishes a local newsletter on the Peterhead project. The experience of these two projects on community engagement and communications will be shared more widely through the Knowledge Transfer (KT) programme that is an integral part of the CCS Competition.

Regulatory risk

10. We recommend that the Government takes the opportunity, during the European Commission's review of the CCS Directive in 2015, to ensure that the Directive does not place unnecessary burdens on storage providers. The liabilities linked to long-term ownership of stored CO₂ will require some form of Government guarantee-and the Government will need to seriously consider taking long-term ownership of stored CO₂. The Government will need to take this decision very soon to avoid deterring investment. (Paragraph 61)

The UK is recognised as one of the most favourable policy and regulatory environments for CCS and has been a global frontrunner in the development of a regulatory framework to facilitate CCS. In 2007, the Government comprehensively reviewed the regulation necessary to enable CCS and quickly addressed barriers identified. [The Storage of Carbon Dioxide \(Access to Infrastructure\) Regulations \(2011 No.2305\)](#) creates provisions under the Energy Act 2011 enabling third parties to obtain fair and open access to CCS transport and storage infrastructure.

Furthermore, the Government recognises the importance of long term regulatory and price signals for investor certainty. To this end we have brought forward a 'triple lock' of policies which will, among other effects, encourage deployment of CCS. These policies are:

- (i) the stipulation no new coal power plants over 300MW should be built without CCS;
- (ii) the Carbon Price Floor which gives an economic incentive to reduce emissions from fossil fuelled power stations; and
- (iii) the Emissions Performance Standard which provides a regulatory backstop to the requirement of no new coal without CCS.

The Government will work closely with stakeholders and the European Commission to ensure that the revised CCS Directive does not impose any undue obligations on the CCS industry, including storage providers, or create disincentives for further investment.

Scientific and engineering challenges

11. The Government's focus on transport capacity rather than on storage capacity is surprising given how critical early provision of storage is to bringing down costs. We note the proposals outlined by the UK CCS Research Centre to undertake a programme of subsurface mapping to identify and characterise potential storage sites and the Crown Estate's suggestion that Government introduce targeted storage exploration

subsidies. We recommend that the Government work with the UK CO₂ Storage Development Group to explore these proposals and outline an action plan for actively promoting the development of storage sites. (Paragraph 67)

The Government has funded the CO₂ Stored database, through the Energy Technologies Institute (ETI), to produce the UK's first CO₂ storage site atlas. The web-enabled database – the first of its type anywhere in the world – contains geological data, storage estimates, risk assessments and economics of over 600 potential CO₂ storage units of depleted oil and gas reservoirs, and saline aquifers around the UK.

The UK CCS Research Centre (UKCCSRC) has an HMG funded budget of over £10m. It has run two funding calls and academics and technical experts have selected which proposals to fund in accordance with UKCCSRC's guidelines and priorities.

“Next Steps in CCS: Policy Scoping Document” seeks views on what further steps may be necessary to stimulate private investment in infrastructure deployment. We will work closely with The Crown Estate and other members of the UK CO₂ Storage Development Group as part of this process.

First mover advantage

12. There is already a global market for carbon capture technologies. Companies looking to deploy CCS in the UK may well be able to buy cheaper capture technologies which have already been developed in other countries. Other aspects of CCS-transport and storage infrastructure-are, however, inherently local in nature and will require development here in the UK. The UK is well placed to take advantage of its existing expertise in the North Sea oil and gas sector. (Paragraph 71)

The Government agrees that UK is well placed to exploit the potential global market for CCS, given the UK's strong oil and gas sector. Working with the Energy Industries Council, the Government has already held the first CCS Supply Chain conference in May 2014, to support companies who may wish to exploit supply chain opportunities under the multi-billion pound White Rose and Peterhead CCS projects.

Conclusion

13. CCS is one of the only technologies available that has the potential to decarbonise fossil fuel power plants and other industrial processes. The capture, transport and storage technologies involved are considered to be safe, the scientific and engineering challenges small and the capacity to be deployed at scale promising. New and novel CCS technologies, such as the NET Power cycle, have the potential to improve CCS prospects. It is widely acknowledged that CCS could play an important role in helping the UK to meet its carbon reduction commitments. This role may change over time to take account of global policy developments including the 21st Conference of the Parties in 2015. Although CO₂ emissions have reduced in this country and the EU, the carbon footprint of both has increased. If CCS was widely adopted abroad, it could help to reduce the UK's embedded carbon emissions. Deploying CCS in the UK could also increase UK plc's future share of the global CCS market, create a North Sea "storage market" whereby the service of permanently storing CO₂ was sold to other European countries, and protect jobs associated with the UK's coal and energy intensive

industries. The UK is considered ideally suited to take advantage of CCS because of its combination of geological, engineering, industrial and academic capabilities, together with a stated policy commitment to reduce CO₂ emissions and the foundational legislative framework required for CO₂ storage. (Paragraph 72)

14. The combination of high energy and-in the absence of an effective carbon market-financial costs make CCS uneconomic. The high cost of CCS means that it is likely to develop only in response to specific policy intervention, likely to be subsidy from the public purse and/or the consumer. The Government should be transparent about the costs of CCS and how they will be met. The Government therefore needs to prioritise designing a credible financial incentive framework most likely centred on the Contracts for Difference which the Government is introducing as part of its electricity market reforms. Progress on CCS in the UK has been frustratingly slow. It has taken successive governments the best part of a decade to provide a capital grant to a large-scale full chain CCS project. As a result, the expected start date of CCS has been pushed back from 2014 to potentially after 2020 which has increased uncertainty and threatens to undermine the credibility of Government policy. This lost decade is regrettable given the importance of CCS to meeting future climate change targets. (Paragraph 73)

15. In order to ensure the successful deployment of CCS in the UK the Government should aim to reach final investment decisions with the two projects left in the competition by early 2015 (in line with the Government's original competition timetable) to increase the chance that the first CCS projects will be operational before 2020. This commitment is welcome: it will help to bring down costs of CCS more quickly and, therefore, help the development of a wider CCS industry in the UK. (Paragraph 74)

16. It is unclear whether any financial advantage accrues to first movers, so there is a case for limiting the amount of consumer support which is allocated to the first CCS projects. Indeed, it is likely that most benefits will be accrued by second movers, which may explain why the big companies are reluctant to spend so much of their own money at this early stage of CCS development. It would be wise for the Government to direct its resources at the uniquely British aspects of CCS deployment such as transport and storage infrastructure and overcoming potential public opposition to ensure the maximum benefits for UK consumers are realised. (Paragraph 75)

The Government welcomes the Committee's Recommendations and reiterates its commitment to work towards the deployment of cost-competitive CCS by the 2020s. The development of CCS in the UK is likely to support thousands of jobs as well as contribute to an affordable, secure, low carbon energy system. Taken together, White Rose and Peterhead represent potential investment of over £2bn in CCS, and could support over 2000 jobs during construction.

The indicative CfD budget notice for the autumn 2014 CfD allocation round, published on 24 July, is a clear indication of the Government's commitment to delivering major reform of the electricity market to bring forward all low carbon generation – including CCS. The announcement signalled that around £1bn of funding remains available for low carbon generation projects, including renewables and CCS, between now and 2020/21.

On 7 August, the Government reaffirmed its commitment to the establishment of a CCS industry in the UK with the publication of "Next Steps in CCS: Policy Scoping Document". The document highlights the actions the Government has taken as part of its world leading programme, and looks ahead to the policy framework that will be required to support a second phase of CCS projects. It sets out the Government's intention to continue close engagement with the CCS industry, and seeks views and evidence to inform future policy development.