Detailed guide: UK carbon capture, usage and storage

Updated: CCUS conference November 2018: programme added.

The government's new approach to CCUS

In October 2017, the government announced its new approach to carbon capture, usage and storage in the Clean Growth Strategy.

The new approach is designed to enable the UK to become a global technology leader for CCUS and ensure that government has the option of deploying CCUS at scale during the 2030s, subject to costs coming down sufficiently.

To progress this ambition, the government has set out action under 3 themes:

- Re-affirming our commitment to deploying CCUS in the UK subject to cost reduction
- International collaboration on CCUS
- CCUS innovation

Re-affirming our commitment to deploying CCUS in the UK subject to cost reduction

CCUS has the potential to decarbonise the economy and maximise economic opportunities for the UK. However, it is currently expensive and cost reductions are necessary to be able to deploy CCUS cost effectively in the UK, providing value for money for both the taxpayer and consumers.

Through the Clean Growth Strategy the government has set out a programme of work that will be undertaken to establish the additional steps that are required to meet the ambition of having the option to deploy CCUS at scale during the 2030s, subject to cost reduction. In delivering this work, government will work collaboratively with the CCUS industry, including existing projects.

CCUS Cost Challenge Taskforce

Government has established a CCUS Cost Challenge Taskforce to provide advice on the steps needed to reduce the cost of deploying CCUS in the UK. The Taskforce is expected to deliver its plan to government in summer 2018.

Read more about the CCUS Cost Challenge Taskforce.

Deployment pathway for CCUS

Following the advice of the CCUS Cost Challenge Taskforce, the government

will set out a deployment pathway for CCUS by the end of 2018. The deployment pathway will set out the steps needed to meet the government's ambition of deploying CCUS at scale during the 2030s, subject to costs coming down sufficiently. This will include looking at the options for permanent storage of carbon dioxide in the UK, as well as elsewhere, via international shipping.

Review of delivery and investment models for CCUS

The government will review the delivery and investment models for CCUS in the UK to understand how the barriers to cost effective deployment can be reduced, and how the private and public sectors can work together to deliver the government's ambition for CCUS.

The review will consider the models required to:

- Deploy carbon dioxide capture in the industrial sector
- Deploy carbon dioxide capture in the power sector
- Establish the infrastructure required to transport and store carbon dioxide

Further details on the review of delivery and investment models for CCUS will be published on this website later this year.

To inform this review, BEIS commissioned Pale Blue Dot Energy Limited to conduct a study, 'CO2 transport and storage: Review of business models (Phase 1)'. The study draws upon case studies from both CCS and non-CCS infrastructure projects to identify key challenges which might constrain the development of carbon dioxide (CO2) transport and storage infrastructure and discusses the range of possible business models that could be employed to overcome these barriers to deployment.

CO2 transportation and storage business models (Phase 1): summary report

PDF, 1.13MB, 51 pages

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CO2 transportation and storage business models: appendix

PDF, 258KB, 18 pages

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Test the development of CCUS industrial decarbonisation clusters

Government will work with the ongoing initiatives in Teesside, Merseyside and Grangemouth to test the potential for development of CCUS industrial decarbonisation clusters.

Ministerial-led CCUS Council

The government has established a new CCUS Council with senior representatives from across the CCUS sector to review progress and priorities on CCUS. The Council is co-chaired by the Minister of State for Energy and Clean Growth and James Smith, Chair of the Carbon Trust.

The CCUS Council is the primary forum for engaging the CCUS sector on CCUS. It replaces the CCS Development Forum.

Read more about the CCUS Council.

International collaboration on CCUS

Through the Clean Growth Strategy the government has committed to convene and lead a new international working group to drive down the cost and accelerate deployment of CCUS, including by:

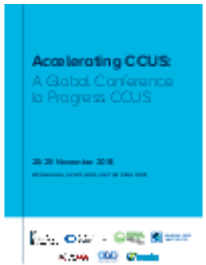
- participating in Mission Innovation and its Carbon Capture Challenge and working closely with private sector led initiatives such as the Oil and Gas Climate Initiative
- developing closer collaborative working with countries such as Norway, the United States, Canada and Australia, including joint working on innovation and carbon dioxide transport and storage solutions and working multilaterally through the Carbon Sequestration Leadership Forum and the North Sea Basin Taskforce
- continuing to be a global leader in CCUS investments through the UK's £60 million international CCS programme which has been running since 2012, by investing a further £10 million in the programme. This will further strengthen international action on CCUS and draw on technical expertise
- organising an international Global Carbon Capture Usage and Storage Conference in 2018 with international partners

Accelerating CCUS: A Global Conference to Progress CCUS, 28 to 29 November 2018

The UK government and its international partners have organised 'Accelerating CCUS: A Global Conference to Progress CCUS' in Edinburgh, Scotland, on 28 to 29 November 2018. Incorporating 2 days of CCUS focused events, the conference will gather speakers, delegates from governments, industry, academia and leading experts from around the world to discuss the value of CCUS, business models, the future of CCUS technologies and practical solutions and actions to accelerate the deployment of CCUS globally.

The Global Conference will run alongside a CCUS Summit, which will be co-hosted by the UK government and the International Energy Agency on 28 November, bringing together world energy leaders from government and industry to discuss concrete actions to scale up CCUS globally.

The programme for the Global CCUS Conference is now available and includes details on how to register your interest:



Accelerating CCUS Global Conference, Edinburgh 28-29 November 2018: programme

PDF, 358KB, 5 pages

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Please note: the event is invite only, so registering your interest does not guarantee you a place. You will receive either an invite or confirmation you have not been selected by the end of September 2018.

CCUS Innovation

CCUS research, development (R&D) and innovation will play an important role in reducing the costs of CCUS, by developing cheaper and more efficient technologies and components, exploring new applications and supporting innovations that reduce the cost of transporting and storing carbon dioxide.

Since 2011 the government has invested over £130 million R&D and innovation support to develop CCUS in the UK.

The government is continuing this support by committing to spend up to £100 million from the BEIS Energy Innovation Programme to support industry and CCUS innovation and deployment in the UK.

Carbon Capture and Utilisation Demonstration

The government will make up to £20 million available from the Energy Innovation Programme for a Carbon Capture and Utilisation (CCU) demonstration programme to invest in new innovative technologies that capture and utilise carbon dioxide.

This programme will encourage industrial sites to capture carbon dioxide which could then be used in industrial applications. This would help to enable a pathway for learning and development of capture technologies at an intermediate scale, reducing the costs and risks.

Read more about the CCU demonstration programme

Novel capture technologies

The government will also support next generation capture technologies, with an aim to lower the cost of capture compared to the current best performing technologies.

Accelerating CCS Technologies European Research Area Network (ERA-NET)

The UK is participating in the ERA-NET scheme to accelerate CCS technologies (ACT) along with 8 other European countries – Germany, Greece, Netherlands, Norway, Romania, Spain, Switzerland and Turkey. Together these countries have provided €25.34 million to support a first call for collaborative projects to accelerate the deployment of CCUS within Europe. The European Commission has added a further €11.26 million in co-funding, giving a total of €36.6 million in support.

Within the €36.6 million, BEIS has committed £4.4 million, matched with a further £2.2 million in co-funding from the European Commission, to support UK participation in 5 collaborative projects with European partners.

Read more about our CCUS innovation programmes.

CCS Commercialisation competition

The government took the decision to close the CCS Competition, which ran from April 2012 to January 2016 following confirmation from both bidders that they will not proceed with their respective projects in the absence of government capital funding support.

CCS knowledge sharing

The government is committed to sharing the knowledge from UK CCUS projects and to learning from other projects around the world to help accelerate CCUS cost reduction, as well as sharing information from the reports it commissions. This information is beneficial to academia and the CCUS industry, as well as raising the public profile of CCUS.

Knowledge from White Rose and Peterhead CCS projects

Under the 2013 / 2014 Front End Engineering and Design (FEED) contracts, the Peterhead and White Rose CCS projects delivered 86 reports. Under FEED, the completed reports are defined as Key Knowledge Deliverables (KKDs). The reports will enable both the Peterhead and White Rose projects to share the knowledge and learning acquired on their respective CCS projects.

The Key Knowledge Deliverables from the White Rose and Peterhead FEED studies cover aspects of delivering a large scale commercial CCS project, including: commercial and financing arrangements; programme and risk management; consents and permitting; technical design, engineering and integration; health and safety; and lessons learnt.

Peterhead and White Rose Key Knowledge Deliverables

Knowledge from Kingsnorth and Longannet CCS projects.

Since 2011 the government has made available substantial amounts of

information from the engineering and design studies (known as FEED) of previous CCS projects funded by the government.

Kingsnorth FEED

- Front End Engineering and Design Material
- Executive Summary
- Project Design
- Technical Design – Carbon Capture and Compression Plant
- Technical Design – Pipeline and Platform
- Technical Design – Wells and Storage
- Health and Safety
- Environment and Consents
- Project Management Reports

Longannet FEED

- Programme Abstract
- FEED Cost Abstract
- Design Abstract
- End to End CCS Chain Operations Abstract
- FEED Decisions Abstract
- Health, Safety and Environment Abstract
- Risk Management Abstract
- Consents and Permitting Abstract
- Stakeholder Profiling Abstract
- CCS Project Costs Abstract
- Lessons Learned Abstract

CCS Cost Reduction Task Force

The task force was set up in spring 2012 to advise the government and industry on the steps needed to reduce the cost of CCS, so it can compete with other low carbon technologies in the 2020s. The CCS Cost Reduction Task Force published their final report in May 2013.

Read more about the CCS Cost Reduction Task Force.

Commissioned CCS Reports

CO2 Storage Liabilities in the North Sea – An Assessment of Risks and Financial Consequences

UK Canada Joint Statement on Carbon Capture and Storage CCS

Regulatory regime for CCUS in the UK

The Energy Act 2008 (the Act) provides for a licensing regime that governs the offshore storage of carbon dioxide. It forms part of the transposition into UK law of EU Directive 2009/31/EC on the geological storage of carbon dioxide. The Carbon Dioxide (Licensing etc.) Regulations 2010 (SI 2010/2221),

which transpose many other requirements of the directive, came into force on 1 October 2010.

The regime applies to storage in the offshore area comprising both UK territorial sea and beyond designated as a gas importation and storage zone (GISZ) under section 1(5) of the Act.

In 2016, licensing powers were transferred from the Secretary of State for Business, Energy and Industrial Strategy to the Oil and Gas Authority (OGA). The OGA is now the licensing authority for offshore storage, except within the territorial sea adjacent to Scotland, which Scottish ministers authorise. The OGA regulates offshore carbon dioxide storage, approves and issues storage permits, and maintains the carbon storage public register. In addition to applying for a licence, developers must obtain a grant of the appropriate rights from The Crown Estate or the Scottish Crown Estate.

Further information is available at:

www.thecrownestate.co.uk/

www.crownestatescotland.com/

The UK is one of 5 countries to have ratified the Article 6 amendment to the London Protocol, which would allow for the transboundary export of CO2 for offshore geological storage and is working with countries through the North Sea Basin Taskforce and other fora to further advance ratification.