

CCS Innovation Programme

£20 million Competition Call

13 March 2012

Amended 18 June 2012 (page 5 and 6, see footnotes)

DECC CCS Innovation Programme

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CCS Component Development and Demonstration

Summary

The Department of Energy and Climate Change (DECC) is to invest up to £20 million in development and demonstration of technologies associated with carbon capture and storage (CCS), and on feasibility studies associated with using captured CO₂ from the Ferrybridge CCPilot100+ and Aberthaw capture pilots. This competition follows a similar call in 2011 from the Technology Strategy Board, and both are part of the Government's broader £125 million CCS R&D Programme covering 2011-15.

The overarching aim of the Government's CCS programme, and of this Call, is to reduce the cost of CCS. Innovation has been identified as a critical factor in contributing to this. The APGTF's 2011¹ report highlighted some of the R&D challenges which this competition will seek to address.

This £20 million Innovation Call complements the Government's major CCS Commercialisation Programme and competition, which will be launched shortly and to which the Government has committed up to £1 billion capital funding.

The primary objectives of this call are:

- To successfully demonstrate, up to a scale of c10MWe, CCS components and

technologies which could be subsequently incorporated into the supply chain of original equipment manufacturers (OEMs) and developers of commercial scale CCS projects.

- To provide support to tackle the new challenges and innovation required to design and build components that - in terms of scale and/or complexity - go beyond current understanding and experience.
- To generate learning and practical experience that can improve confidence in innovative CCS components and technologies and so help reduce future costs.
- To ensure innovation support for CCS complements the existing research, development and deployment (RD&D) programmes being conducted in the UK.

Within approximately the next two years OEMs and project developers who are part of the soon-to-be launched CCS Commercialisation Programme could be placing orders for parts, and therefore it is hoped that some of the components and technologies developed under this Innovation competition may become part of that supply chain and future supply chains of subsequent of CCS projects, both within the UK and beyond.

¹ http://www.apgtf-uk.com/index.php?option=com_docman&task=doc_download&gid=18&Itemid=137

Competition guidance and application forms will be released on 21 March 2012. A briefing day² for potential applicants will be held on **26 March 2012 and 30 March 2012**, in London. The competition will then be open to applications from **30 April 2012** and the deadline for receipt of applications is at noon on **29 June 2012**.

Background and Challenge

Fossil-fuel-fired power plants and large energy-intensive industries such as chemical, cement and metals processing are amongst the largest emitters of CO₂ both in the UK and globally. Fossil power plants still produce more than 70% of the UK's electricity, and large energy intensive businesses are responsible for 45% of the UK's business and public sector CO₂ emissions.

All of these industries play a vital role in underpinning the UK infrastructure and economy either through security of electricity supply or through the support of our manufacturing and process industries. The UK has a target to reduce carbon emissions by 80% by 2050, whilst ensuring there is a secure, affordable supply of electricity to power a growing, competitive economy.

The UK can use CCS to help meet that goal. If successfully deployed, CCS can vastly reduce our emissions from electricity generation, whilst allowing the UK to continue using fossil fuels as part of a balanced low-carbon generation mix. The Committee for Climate Change has forecast that CCS capacity in the electricity generation sector could be up to 20GW by 2030 – but this higher deployment will only be achieved if CCS is cost-competitive with other forms of low carbon power generation.

There is large cost improvement potential from innovation across all parts of the CCS

technology chain, including: CO₂ capture; conversion & generation equipment; transport; storage; measuring, monitoring & verification (MMV); and mitigation & remediation (M&R). It is estimated that successful innovation has the potential to drive down the cost of CCS development to the UK by £10-45 billion to 2050.

Scope

This single-stage competition includes two strands. **Strand 1** will fund a handful of feasibility studies looking to use the captured CO₂ from the Ferrybridge CCPilot100+ and Aberthaw capture pilots (further information below). **Strand 2** focuses on the development and demonstration, up to a scale of c10MWe, of CCS components, systems and technologies which could be subsequently incorporated into the supply chain of original equipment manufacturers (OEMs) and developers of commercial scale CCS projects.

For both strands, the competition will support innovative technologies associated with CCS for large single-point emitters of CO₂, such as fossil-fuelled power plants, and energy-intensive industries. The challenge is to reduce the cost of CCS by developing more efficient, lower cost technologies, components and systems; and to develop understanding which reduces uncertainty and risk (and therefore leads to cost reduction) for any aspect of the CCS process.

All proposals must explain how, and by how much, the work is estimated to lead to CCS cost reduction.

Funding Allocation and Project Details

Strand 1 – Feasibility studies

DECC is keen to explore whether captured CO₂ from existing projects such as the Aberthaw and Ferrybridge CCPilot100+ capture pilots, could be cost effectively used for other R&D and innovation purposes.

Examples may include, but not be limited to:

- Looking at whether the vented CO₂ could be cost effectively used to a) test

² If you wish to attend, potential applicants must register and state their date preference by 22 March at ccs.innovation@decc.gov.uk. Places available on a first come first served basis - limited to 50 per session.

transport components and systems, or b) test storage sites offshore

- Studies looking to use the CO₂ to develop and test innovative carbon utilisation products – for example proposals which will use CO₂ in building products (mineralisation); chemicals; biofuel production (through algae)

We expect to fund only a handful of projects, which will only be considered if they represent a cost effective way of using the otherwise vented CO₂ from the existing capture projects. The Technology Strategy Board's 2011 competition funded a broad range of innovative carbon abatement feasibility studies, and therefore we are not looking to repeat this.

We will invest up to £500k in feasibility studies. Individual projects can attract public sector funding of between 40%-75% of eligible costs, up to a maximum of £100k, with an expectation that total costs will not exceed ~£150k for each project. Studies will:

- usually last six months, with the maximum duration being 12 months
- be industry led, and comprise of at least two organisations

Universities and research organisations are eligible to apply, but cannot lead a consortium.

Projects will need to discuss any proposals with the host site, and have their support at the stage of application.

Strand 2 – Component development and demonstration

We will invest up to £20 million in Innovation and RD&D projects which must include significant elements of the demonstration of systems, subsystems or components in real or closely simulated operating environments. Individual projects will typically attract public funding of between 25%-45% of eligible

costs. Typical grant levels of £0.5m-5m, leading to indicative total project sizes of approximately £1m-10m. Larger projects (i.e. >£10m or >10MWe) will be considered on their merits and against available funding. Examples of projects could include the development and demonstration of:

- new CO₂ capture solvents and testing at post-lab scale
- CO₂ capture technologies:
 - pre and post-combustion capture and oxy fuel firing
 - including application to CO₂ emitted from power generation or industrial processes
- all aspects of biomass CCS
- flexible CCS systems
- new materials for use in the CCS chain (e.g. materials for use within the capture system, or for use in pipelines carrying supercritical CO₂)
- metering technologies
- monitoring, measurement and verification technologies
- leakage remediation technologies
- injection technology
- offshore storage sites

Eligible projects are likely to be of two types:

- (i) demonstration-only projects, attracting around a grant for 25% of eligible costs
- (ii) projects that require elements of both industrial research and demonstration. These may be funded to a higher level, typically 25-45% of eligible costs, depending on the level of demonstration, however, a clear justification and breakdown of the two elements must be given.

Funding for feasibility studies under this strand, for example to inform larger scale projects, may also be considered.

The programme preference is for near-to demonstration projects relating to prototyping and scale-up issues that will accelerate cost reduction for CCS technologies, and commercial deployment in the 2020s. We would particularly encourage applicants to consider how, if demonstration is successful, their product or technology could potentially be incorporated into the Government's CCS Commercialisation Programme and subsequent commercial-scale projects.

Strand 2 **Collaborative RD&D** proposals should:

- be based on a proven post-feasibility technology concept
- take the technology to the next stage towards commercialisation
- deliver a step change in scale and output from a feasibility activity
- deliver a component, sub-system or full system demonstrator at a scale that will show commercial viability in a real operating environment and a clear route to market preferably through the support of an equipment manufacturer and/or end user as an active consortium member

Collaborations between organisations are strongly preferred. All projects must be business led, and collaborations between organisations will preferably involve partners from the supply chain and an OEM or end user.

Funding Note: DECC reserves the right to apply a portfolio approach within each strand depending on the quality of proposals received.

Budget Availability

Funding under this Call is only available until 31 March 2015³. Whilst projects may continue past this date (for up to one year), all grant supported expenditure must be incurred by 31 March 2015³. Whilst projects may incur cost throughout this period, DECC may choose to prioritise projects with significant planned spend in the FY 2012/13. If the £20 million budget is not fully allocated under this call, DECC may consider issuing a second call in late FY12/13.

International collaborations

DECC is exploring opportunities for collaborative innovation projects with other Governments. For exceptional projects, DECC may consider funding such international collaborations, although the majority of the activities must take place in the UK.

³ Amended on 18 June 2012 from "2014"

Key Dates⁴

Event	Date
Competition announced	13 March 2012
Competition guidance notes and application form released	21 March 2012
Briefing days, to register: ccs.innovation@decc.gov.uk	26 March 2012 30 March 2012
Competition opens for application	30 April 2012
Registration deadline	22 June 2012 (noon)
Deadline for receipt of full electronic applications	29 June 2012 (noon)
Deadline for receipt of full signed hardcopy applications	2 July 2012 (5pm)
Decision to applicants	31 August 2012

⁴ Table amended 18 June 2012 to include hardcopy application deadline

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