



Carbon capture and storage (CCS) is seen as a key technology, without which the achievement of EU and global climate change targets will be extremely difficult. In order to reach these targets, the EU aims to have CCS technology available on a commercial basis as of 2020, which adds a certain sense of urgency to the endeavour. To this end, in 2007, the European Council announced up to 12 large-scale CCS demonstration plants.¹ No decision on possible public financial support has so far been taken.

1. What case for the public support of demonstration?

There is no consensus in the literature on whether full-scale demonstration requires public support and even less so about the level of support required. The solution depends very much on the technologies available. In competitive markets, i.e. in a deregulated environment, energy supply or industrial companies tend to shift their technology development and demonstration towards projects with a short-term payback and away from projects with a high level of economic or technology risk or very long times, such as carbon capture and storage. Private risk-capital therefore tends to engage only *after* successful demonstration. A study by Mc Kinsey & Company² suggests that early demonstration projects will typically cost between €60-90 per tonne of CO₂.

Demonstration is different from the deployment of technology. **Demonstration** describes a prototype that is set up with the primary purpose of

¹ This package has been complemented by a proposal to develop a legal framework for CCS, which is currently pending adoption by the Council and Parliament.

² McKinsey & Company, Carbon Capture and Storage: Assessing the Economics, 2008

The Demonstration Phase for Carbon Capture and Storage The case for public support

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showcasing the idea, testing performance or the method and the features of the product and, in the case of CCS, to develop the infrastructure. Demonstration aims at investors, partners, the public or potential customers in order to convince them of the viability of the chosen approach. In addition, there are important network effects – comparable to network externalities.³ The first demonstration installation needs to create the infrastructure (e.g. pipelines, storage site etc.), which the following installations can use too. It is assumed that the first demonstration projects are undertaken in clusters so that infrastructure can be used by different projects. Technology **deployment** policies aim at speeding up the use (i.e. deployment of) a tested (i.e. already demonstrated) technology. The primary aim of such deployment policies – as in the case of renewables – is reducing the costs to make these technologies competitive. Studies by the International Energy Agency, for example, indicate that for each doubling of capacity of renewable technologies (except wind), the costs decrease by between 15-19%.⁴ Some also argue that there are certain ‘learning curve’ effects (cost savings with the deployment of the technology) for CCS, in particular in the area of energy efficiency. But the level of these effects remains controversial.

³ Network externality has been defined as a change in the benefit that an agent derives from a good when the number of other agents consuming the same kind of good changes. They occur if participants in the market fail to internalise these effects.

⁴ IEA (2006), *Energy Technology Perspectives*. OECD/IEA, Paris

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This paper draws on the work of the CEPS Task Force on the EU ETS review.

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Be this as it may, it can be argued that in light of the urgency of making CCS commercially available for power plants or industrial installations, it could be seen as a ‘public good’. This is so because CCS can avoid the lock-in of conventional coal power plants which, for reasons of economy and security of supply, often remains the technology of choice, even in the EU but more so in countries such as China or India, where few or no alternatives to coal exist in the short term. There is thus a compelling rationale for the public to financially support CCS demonstration.

2. What level and source of support?

Even if one agrees in principle that there is a need for public financial support, this still does not answer the question of how much support and where the money should come from. According to the analysis of the European Commission’s Impact Assessment,⁵ the best option would be to establish an EU coordination mechanism, dealing *inter alia* with ways of providing private and public support. Ultimately, the Impact Assessment remained ambiguous about the possible public contribution to CCS demonstration.

The European Commission has included CCS in the EU ETS, i.e. stored CO₂ will not be required to surrender EU allowances. It refrained however from proposing to grant (additional) free allowances for the capture, transportation or storage of greenhouse gas emissions. Industry argues that additional financial support was needed for the demonstration phase. Without such support, large-scale demonstration projects would not be built, notwithstanding that some small scale projects are underway. Industry also argues that the need for public support will rapidly decrease as infrastructure develops and costs come down.

3. What next?

At this stage, it seems highly unlikely that the 12 demonstration plants will be built without additional support, at least at the pace needed to make the technology commercially available by 2020.

Since the decision to build the demonstration plants was an EU one, financial support should ideally come from the EU budget. There appears to be no

realistic possibility of making the necessary money available in the EU budget, however. This sends the responsibility back to the member states. While progressively significant amounts of additional resources will become available for member states in the form of auctioning receipts (in excess of €30 billion at a conservative estimate), this money will only become available around 2012. This will be too late. Stakeholders are therefore looking to the EU ETS, i.e. using part of the New Entrants Reserve – the free allowances that will be granted to new investors. Currently, the possibility of using up to €500 million is being discussed, i.e. approximately €15 billion in total at a price of €30 per EU allowance. Member states and especially new member states, where most of the New Entrants Reserve is likely to be used, will tend to oppose such a solution for fear that it deters new investment. This also raises the question of the share of industry participation.

Against the background of this discussion, three items stand out in particular.

First, the ‘EU mode’ of setting targets can only work if such targets are linked to credible implementation plans. Ambiguity is not an option. Otherwise, the EU and its member states risk facing another credibility gap, internally and externally, notably in international climate negotiations. This has been documented in an earlier CEPS Policy Brief.⁶

Second, there is a risk that the EU ETS is used to pursue other objectives than those of GHG reduction, such as energy policy, social, industrial or financial goals. A better solution for CCS demonstration funding would be to use member state budgetary resources rather than linking it to the EU ETS.

Third, the finance issue raises the question of whether CCS should not also expand beyond fossil fuel emissions and include CO₂ emissions of a biological origin, such as from the combustion of wood or the fermentation processes involved in the production of food and drinks. This would raise some registry questions, but these can be solved, however.

Whatever the final solution, at this stage we can identify a number of core **principles** that any solution should meet:

- a) Given the urgency with which CCS will be needed on a commercial basis, and taking

⁵ European Commission (2008), *Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels – Impact Assessment*. Commission Staff Working Document, SEC(2008) 47, 23.01.2008; p. 6

⁶ Egenhofer, C, *Looking for the cure-all? Targets and the new EU Energy Strategy*. CEPS Policy Brief No. 118

account both of the high commercial risk involved and initial infrastructure costs, a case can be made for CCS as a quasi ‘public good’ that will need additional financial support for the **demonstration** phase. The need for public support will rapidly decrease as infrastructure develops and costs come down.

- b) To use this support most efficiently and effectively, it:
 - i) must be able to support investment decisions **immediately**
 - ii) should ideally be operated at **EU level**
(to be non-discriminatory across the EU)

- iii) should be **limited** in scale and time
- iv) awarded on a **competitive basis**
- v) **performance-based** (e.g. rewards CO₂ stored)
- vi) **independent of the source** of the CO₂
- vii) while rapidly **decreasing** as more demonstration projects are developed.

In general, the uptake of demonstration projects is likely to be facilitated by a stable legal framework for CCS as well as by a predictable and ambitious CO₂ cap.

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