

## Policy Options Paper

### Financing large scale demonstration of emerging energy technologies ( e.g. CCS Demonstration Plants)

#### 1 Introduction

The European Council of 15-16<sup>th</sup> October confirmed its determination to honour the ambitious commitments on climate and energy policy. In particular, the European Council requested the Commission to expedite the implementation of the Strategic Energy Technology Plan (SET Plan) of November 2007. In essence, the SET Plan proposes to better coordinate energy research at Community and national level. Further, the SET-Plan calls for a series of measures to develop large industrial scale demonstration of low-carbon technologies, which will require substantial funding.

Progress has already been made in the implementation of the SET-Plan, with the on-going establishment of six European Industrial Initiatives: wind, solar, bio-energy (second generation biofuels, CCS (CO<sub>2</sub> capture, transport and storage), electricity grids and sustainable nuclear fission). These initiatives are being developed in close cooperation with European industry. The Commission in its Communication on the Financing of the SET plan, which will be tabled by 2009, will address the demonstration needs of all these low carbon technologies.

The provision of financing options for the large scale demonstration of certain low-carbon technologies may in certain cases be urgent. In particular, Carbon Capture and Storage technologies (CCS), although not currently deployed on a wide scale and commercial basis, represent a promising technology option for fighting climate change. The Commission has broadly addressed the needs and importance of CCS in its recent initiatives, notably the CCS Communication of January 2007, the referred SET Plan and several elements of the January 2008 Climate and Energy package.

The next milestone on the way to a widespread use of CCS is to demonstrate its application in commercial large-scale power generation. The main long-term incentive for deployment of carbon capture and storage is that, as proposed in the revision of the ETS Directive, allowances will not need to be surrendered for CO<sub>2</sub> emissions permanently stored. According to the estimates, by 2020 or soon after, CCS equipped plants should be able to stand on their own feet in a market-driven environment shaped by the ETS. However, in order to make that happen (improve the technology, cut the costs, gain experience, etc.), the demonstration projects need to come on stream as soon as possible, in circumstances where extra costs associated with the demonstration of CCS are comparatively high and can not be fully compensated by the market<sup>1</sup>.

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<sup>1</sup> There is little possibility of a positive income stream to be generated by early CCS-equipped power plants as the cost of electricity produced (COE) would be higher than the going wholesale price in Europe. At this moment, the extra costs associated to the large scale demonstration of this technology will not be fully compensated by the normal provisions built in the new ETS directive; therefore, an addition transitory support mechanism is required.

In the longer term, increasing carbon price and technology improvements are expected to remove economic disadvantages for CCS, making it competitive without further public intervention..

The timely, large scale demonstration of CCS is crucial to make the technology commercially viable by 2020. In this context additional mechanisms should be envisaged for a temporary financial support to a limited number of CCS demonstration projects that would usefully stimulate and leverage the necessary investments

The scale and urgency of climate change will also require the demonstration and deployment of other large-scale renewable and low-carbon technologies and infrastructures that will help substantially to further mitigate the situation the world is now facing.

## **2 Present Commission approach to CCS is a good starting point**

With regards to CCS and after recognizing the need for providing additional public assistance to early demonstration projects as a complement to industry commitments, the European Commission has outlined in the beginning of the year<sup>2</sup> a pragmatic approach respecting current realities of the EU budget and political process. The Commission aims at encouraging and facilitating schemes in Member States and provides a coordination mechanism ("a project network") for information sharing and auxiliary support actions at EU level.

Furthermore, the Commission has been taking steps to mobilize available financial resources for the benefit of CCS. Research activities in support of early demonstration of CCS have been included in the work programme of FP7 and indicative budget allocations to these activities have been raised to levels substantially surpassing those in previous Framework Programmes. Commission services have been also in close contacts with administrations of relevant countries providing guidance on how existing allocations in Structural Funds and the Cohesion Fund could be employed in national support schemes for CCS projects. Finally, the Commission proposal for the ETS Directive gives an indicative minimum of 20% for ETS revenues to be used by Member States for supporting i.a. new low-carbon technologies, including CCS. The Commission in its environmental aid guidelines has set out rules for providing public funds to certain low carbon technologies, namely to energy generation from renewable energy sources. In the same guidelines, the Commission has acknowledged the strategic importance of CCS for the Community and has expressed a generally positive attitude towards State aid for early demonstration plants.

## **3 Recent Council conclusions and EP initiatives open new possible avenue**

In June 2008 the European Council has endorsed the importance of CCS demonstration projects and the need for specific instruments to support them by calling "on the Commission to bring forward as soon as possible a mechanism to incentivise Member State and private sector investment to ensure the construction and operation by 2015 of up to 12 demonstration plants".

Recent discussions on CCS financing in EP resulted in a number of EP initiatives for incentivising CCS, and notably an amendment tabled in the context of the ongoing discussions on the revision of the ETS Directive. The idea would be to set aside a certain amount of allowances in the new entrants' reserve for 2013 to 2020 of the revised ETS Directive for the benefit of early CCS demonstration projects. This amendment, which is

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<sup>2</sup> See the Communication on Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels adopted in January 2008 in the context of the Climate and Energy package.

technology-specific as formulated, is now being considered by the various institutions as part of the climate and energy package negotiations.

#### **4 Why supporting large-scale energy demonstration, such as CCS, from public funds and at what costs?**

Any additional mechanism based on those initiatives should not replace the present approach but rather enhance it by complementing the currently envisaged EU structure (i.e. such as the referred Commission Communication on the financing of low-carbon technologies, etc), as well as MS commitments, with an additional European financial dimension and adequate contribution from the private sector. While there is clearly a need for a coherent and technology-neutral approach in the spirit of the SET-Plan financing solutions for all promising low-carbon technologies at all levels of the energy innovation chain, it should not preclude the possibility of an early specific instrument addressing the temporary needs of a limited number of large-scale demonstration projects requiring coordinated and instant provision of temporary financial assistance, in particular CCS demonstration projects. In the specific case of CCS, such a specific mechanism for early demonstration should not be confused with a targeted support scheme for large scale deployment of CCS. Support schemes for deployment will need to be introduced at national level, respecting Community legislation, in particular state aid rules.

**Comment [rb11]:** At this stage there is hardly any evidence how MS will design support mechanism and there is no need to issue any preference.

The costs of large-scale CCS demonstration are difficult to assess for the moment as the additional capital and operating costs above those of standard power plants will much depend on the specific characteristics of individual projects (technology and fuel used, length of the period of operation/demonstration, type and distance of storage site, amount of CO<sub>2</sub> captured and stored, etc.). Furthermore, the need for these additional costs to be financed will strongly depend on the future allowance price.

For the specific example of CCS, analyses, studies and estimates available to date<sup>3</sup>, however, rather consensually indicate that the increase of capital and operating cost will be in the range of 0.5 – 1bn euro per industrial-size demonstration power plant. More specifically, assuming that the EU demonstration program will consist of 10-12 large scale projects operating for some 20 years and abating in total ca. 16 mill. tons of CO<sub>2</sub>/year, the total additional costs will be in the range of 5-12 bn euro.

#### **5 Guiding principles for further progress**

The EP proposed amendment to the ETS Directive for the benefit of early CCS demonstration can offer means of helping all new low carbon technologies demonstration, including early CCS projects, to cover part of the additional demonstration costs regular power plants will not face.

However, any use of the EU ETS new entrants' reserve for low carbon technologies, including CCS, must also be acceptable to Member States so as to contribute positively to a first reading agreement by December. At present, only UK and NL have expressed support for the technology-specific amendment adopted in the European Parliament. Any option supported by the Commission should therefore be aimed at building broader support for financing for large scale demonstrations of low carbon technologies in such a way that would be ultimately facilitate overall agreement on the climate/energy package.

<sup>3</sup> List most important ones – McK, JRC, ZEP, MIT, ...

It is clear that any low carbon technologies financing instruments, including for CCS, will need to make sure that the overall stability and coherence of the ETS mechanism is not compromised. Any support scheme has to meet a clear set of criteria:

1. Any use of allowances to support demonstration projects must come from within the overall cap;
2. To avoid possible windfall profits, allowances should not be awarded directly to investors;
3. It must be a temporary instrument and designed only for early demonstration projects;
4. Any earmarking of allowances for early demonstration projects must be technology neutral. However, individual support mechanisms for early demonstration can be technology specific.
5. Allowances specifically earmarked for support to early demonstration projects must not be the only support mechanism; specific support must have leveraging effect of opening the door to other forms/sources of financing;
6. The mechanisms for allocation of allowances must guarantee the establishment of an optimised portfolio of demo projects (i.e. avoid unnecessary overlaps and repetitions, preferably approved within the framework of SET Plan steering group (i.e. Member States with facilitation of the Commission)).
7. Any mechanism should distort the ETS as little as possible; utilising the new entrants reserve for low carbon technologies should not compromise its objective, namely to ensure that allowances are available for new market entrants.
8. Any support granted under a mechanism needs to respect state aid rules.

The following key issues will have to be addressed:

**a) *Technology neutrality***

The latest Davies-Doyle letter to the Commission, dated 27 October 2008, signals openness to using the mechanism also for other technologies, and there are indications that this could also defuse some opposition in Council. Any reference would have to be carefully phrased, referring for instance to large scale renewable and low-carbon technologies not yet demonstrated at commercial scale.

**b) *Number of allowances earmarked***

Should the mechanism remain technology-specific for CCS, 500 million allowances represents almost full incremental costs of the extra CCS component (Climate Change Capital estimated the costs at €14bn over 10 years; proposal would make some €15bn available over 8 years assuming an allowance price of €30). It represents around two-thirds of the New Entrant's Reserve (NER) for Phase III, which is of concern. Full incremental costs is against the principle of leverage funding, and against the European Council request for a mechanism to stimulate (not replace) MS and industry finance. There are also indications that the scale of the requested financing is a factor in the opposition of other MSs.

A sizable reduction in the number of allowances to be earmarked for CCS is likely to be an essential prerequisite for any agreement on financing. This could be phrased in terms of a requirement for matching funding from MSs together with substantial private sector investment, with a corresponding reduction in the total pot of allowances. The Commission

stands ready to contribute to the necessary technical and economic analysis on this particular issue.

### *c) Disbursement mechanism*

For CCS, the current AM 56 proposes free allocation of allowances to projects, conditional on CO<sub>2</sub> being actually stored in practice. This is against the direction in the revised ETS of phasing-out of free allocation by 2020. It also risks windfall profits to operators, if the allowance price is higher than expected.

Two main alternatives have been identified so far:

- Convert allowances into money (by auctioning them) and allocate the money at EU level to operators. This would require a Council and EP Decision based on Art 175(1) to establish the fund and the principles for its disbursement. It would probably take until 2011 to adopt a legal instrument.
- Establish in the ETS the principle that, pursuant to an European Union type-of-decision, Member States who commit funding to demonstration plants of European interest on their territory may draw allowances out of the ETS New Entrant Reserve. These could then be auctioned in line with the auctioning regulation to be drawn up. The amount of allowances to be drawn in individual cases could be determined by a Commission Decision. The revenue from auctioning these allowances would compensate (a fixed proportion of) MS funding given to the CCS and other low-carbon technology investors and award could also be made conditional on industry co-financing.

In both cases free allocation of allowances to companies and windfall profits for companies are avoided. Further work is needed to ensure that the distribution mechanism chosen leads to an optimised project portfolio covering a full range of technology options with minimised cost to the European taxpayer.

### *d) Supplementary funding options*

Supporting large-scale demonstration, and in particular CCS, by means of the use a specific targeted ETS New Entrant Reserve, will be a first step towards the financing of all low-carbon technologies as referred to in the SET Plan. The Commission's next step in this regards will be a **Communication on Financing Low Carbon Technologies**, which will be tabled by 2009, in close association with the European Investment Bank. It will evaluate the need for EU funding, including in the next financial perspective starting in 2014. This Communication will further examine ways to expand on other complementary financial mechanisms: private sector contribution of course, MS funding respecting State aid rules, international financial institutions (i.e. EIB) and, last but not least, what could/should come from EU funds as well.

## **6 Conclusions**

The initiative of European Parliament offers an opportunity to build into the ETS Directive a provision for a complementary support to the much needed early low carbon technologies demonstrations, including CCS, which at the same time meets the demand of the Council "to incentivise MS to ensure the construction and operation by 2015 of up to 12 demonstration plants".