Providing incentives for CCS demonstration and deployment:

« *Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels* »

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Important notice!

The views expressed here are mainly those of the author and many not ***necessarily*** *reflect those of the European Commission*

Some barriers to CCS

- Regulatory framework
- Completion of technology development (especially for capture)
- ***Size of each investment***
- ***Increased operating costs***
- ***Missing CO_2 infrastructure***

Important Drivers

- Setting legal limits for CO_2 emissions by individual Member States
  - Review and adoption of « national allocation plans » by the European Commission
- Introduction and modification of an emission trading scheme (ETS)
- Setting up the regulatory framework to allow and facilitate the storage of CO_2

Three incentives for demonstration

Three specific initiatives to stimulate early large-scale CCS demos:

- Creating a network of flagship demonstration projects as a support action under the EU's seventh Research Framework Programme (FP7)
- Facilitation of state aid clearance for demonstration projects
- Commitment to address the higher operating costs => Community measures to improve "bankability" of projects

Need for public funding

- Industry must play an important part as they will eventually be the major beneficiary
- However industry should not be left completely only to its devices.
- Support from public funds will be needed, certainly in the first demonstration period
- Eventually the EU's emission trading scheme (ETS) should provide a market-driven mechanism adequately rewarding low-CO2 practices over carbon-intensive ones.

Major challenge for CCS

- A - or ***the*** - major challenge of the CCS demonstration projects seems to be the financing.
  - The projects face the challenge of substantial up-front investment costs, large not only in its absolute size but in particular in comparison with non-CCS equipped plants;
  - Operating costs will inevitably be higher

Four questions

- how much money is needed?
- how much will the industry pay?
- in what form should the public money come?
- where will the public money come from?

Additional investment costs

- The industry estimates that up to €1bn will be needed for CCS-related **R&D** between now and 2020.
- **Demonstration** will be costly- newly built power plant with a CCS facility would represent incremental costs requiring either an additional upfront capital in the range of €1100 - €1700 per each kW of installed capacity
- This equates to €860 - 1360 million or a demonstration power plant of around 800 MW compared to similar power plants without CCS.
- In the EU this means the set of up to 12 demonstration power plants of at least 300 MW will need incremental capital of €4 – 8 billion
- First analyses show that projects in the programme would face incremental costs associated with the deployment and use of CCS corresponding to **€25-67 per each ton of CO2** produced but not emitted (i.e. stored) from an 800 MW plant.

In percentage terms…..

- The larger up-front investment is estimated to be 30 to 70 % more, compared to non CCS-equipped power plants
- Higher operating costs are 25 to 75 % more, compared to non-CCS equipped power plants – mostly due to efficiency losses and costs of capture and transport.

The role of industry

- European industry has taken a number of important initiatives – especially through the ZEP – on CCS
- However a clear commitment to the substantial resources to large scale demonstration have been « scarcer »
- ***The dedication of substantial resources by companies is a precondition for the stimulation of sustainable fossil fuel technologies in commercial power generation***. (Without them, public funding may not be triggered ….)

State support for CCS demos

- Public funds will clearly be needed to support the necessary investment for the construction of the demonstration projects
- This could mean state aid being provided by the Member States
  - The Commission will need to assess this situation and possibly look favourably on such support
  - CCS demonstration projects may be identified as projects of common European interest

Supporting operating costs

- The ETS will be the first-line incentive for CCS.
- Additional schemes could be needed to reinforce/back-up ETS:

  - feed-in tariff
  - preferrential grid access/RO
  - fixed reward per captured and stored t_{CO_2}
  - direct operating subsidy/ETS price guarantee

A source of finance?

- The **<u>European Investment Bank</u>** (EIB) is currently analyzing the possibility of developing new products for financing CCS – in addition to already existing means under the « Risk Sharing Finance Facility » (RSFF).

Infrastructure needs

- CCS will need infrastructure for transport and storage of CO2 and provisions for linking of emission sources into such infrastructure.
- The **cost and time** needed to develop CO2 infrastructure will be significant
- Access to CO2 infrastructure should not be limited to the owners of the infrastructure but should remain open to other users
- In the EU, the introduction of CO2 infrastructure in the **Trans-European Networks** (TEN-E) policy is a possible option for giving to such CO2 networks a European dimension and for bringing some additional financial support.

Summary

- CCS demonstration and deployment are essential
- But CCS demonstration and deployment will be expensive
- There will be increased costs for:
  - Investment
  - Operation
  - Infrastructure
- Very significant public funds (and strong political support) will be needed – and must be made available. (The Commission will return to this topic later this year)