European Technology Platform for Zero Emission Fossil Fuel Power Plants, ZEP

Comments on the Community Guidelines for State aid for Environmental Protection

DG Competition has recently published a first draft of the new guidelines for State aid for Environmental Protection. The new guidelines will be discussed with experts from the EU Member States on 2 July and in September before final adoption by the College of Commissioners at the end of the year. The guidelines will enter into force on 1 January 2008 and last for five years. Stakeholders have been invited to submit comments to DG Competition by 25 June. These are the initial comments from ZEP to the Commission.

Introduction

CO_2 is the most central greenhouse gas and anthropogenic CO_2 emissions are mainly caused by the use of fossil fuels, as these are the most important sources of global energy. Enhanced energy efficiency and increased renewable energy production will contribute to the reduction of CO_2 emissions. However, according to scenarios established by the International Energy Agency (IEA) [i] such measures do not have the potential to reduce global CO_2 emissions as much as the IPCC target, *i.e.* 50 to 80 percent by 2050. Consequently, additional measures are required to reduce global CO_2 emissions.

Use of Carbon Capture and Storage (CCS) is an important strategy to reduce global CO_2 emissions according to the IPCC [ii], and the study published by Bellona [iii] shows how a combination of; (1) increased energy efficiency; (2) increased renewable energy production; and (3) a wide implementation of CCS, can reduce global CO_2 emissions by 70 percent by 2050.

The European Commission published its Communication to the Council and the European Parliament on 10 January 2007 on "Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020." The Commission concluded it will "determine the most suitable way to support the design, construction and operation by 2015 of up to 12 large-scale demonstrations of sustainable fossil fuels technologies in commercial power generation". This conclusion was subsequently endorsed by the European Council, at the Spring Summit on 8-9 March this year.

An option for financing the CCS demonstration projects, is direct public investment in new technologies with a view to reduce the commercial, political and technological risks otherwise not borne by industry. To allow for substantial public financing, a clarification is necessary on how such investments will be treated under the EU State Aid Guidelines for Environmental Protection.

The European CCS Flagship Programme

The EU established, in 2005, the *European Technology Platform for Zero Emission Fossil Fuel Power Plants* (ZEP). Its recommendations are summarized in the ZEP *Strategic Overview* report[iv].

One of the ZEP recommendations was to establish a Flagship Programme, which involves the construction of 10 to 12 demonstration plants across Europe. The plan is to put these demonstration plants into operation before 2015. The aim is to demonstrate CCS

technologies, and to bring down associated costs and risks thereby ensuring commercialization and wide deployment of large scale European fossil fuelled power plants with no CO_2 emissions by 2020. A few plants are listed in Annex I.

To begin the construction of the 10-12 European CCS demonstration plants, large scale funding is required. At present, different funding mechanisms are being discussed by the ZEP and the EC. It is evident that funding should involve financial contributions from both private and public sources. If the EU State Aid Guidelines for Environmental Protection do not clarify how CCS projects should be addressed, the construction of these imperative 10-12 demonstration plants will be delayed. This can become a significant obstacle; not only for achieving EU's targets on CO_2 emission reductions, but also for ensuring security in energy supply as well global competitiveness in the energy market.

State Aid Guidelines for Environmental Protection should be clarified for CCS projects

Although small scale CCS technologies are commercially available, commercialization of large scale CCS projects requires further technological development to bring down project costs [iv]. Additional technological development to achieve a significant cost reduction can best be accomplished through the construction of large scale CCS demonstration projects. Establishing large scale CCS projects is very capital-intensive, thus public funding is a prerequisite. Public funding is needed not only because these projects cost a lot, but more because they are not economically viable in themselves. The State Aid Guidelines for Environmental Protection should therefore include clear guidelines on public funding for CCS projects.

In paragraph 58 of the proposed new State Aid Guidelines for Environmental Protection, it is stated that:

> *"Some of the means to support fossil fuel power plants or other industrial installations equipped with carbon capture, transport and storage facilities, or individual elements of the CCS chain (capture, transport and storage of CO_2), envisaged by Member States could constitute State aid but, considering the lack of experience, it is too early to lay down guidelines for authorising any such aid. Considering the strategic importance of this technology for the EU in terms of energy security, reducing greenhouse gas emissions and meeting its agreed long term objective to limit climate change to 2°C above pre-industrial levels and its stated support to the construction of industrial scale demonstration plants up to 2015, provided that they are environmentally safe, projects could be assessed under Article 87.3.c of the treaty, or eligible as important projects of common European interest, under the conditions set out in paragraph 135."*

Thus, aid to carbon capture and storage as a means to reduce CO_2 emissions is not covered by the proposed guidelines. As can be seen above, decisions on state aid for CCS projects must be based directly on Article 87 (3) (c). A failure to address such state aid will result in reduced clarity and unacceptable lack of forseeability for Governments and industrial actors.

However, in paragraph 64, it is stated that investments leading to CO_2 emissions reductions in power generation by at least 50% in comparison to average specific emission levels recorded by the power plants using the same fuel, may receive aid in accordance with Article 87 (3) (c) of the EC Treaty. The proposed guidelines limits the aid intensity to large undertakings to 30% of eligible costs. The aid intensity is increased, however, to 40% in the field of eco-innovation. Even assuming that large scale CCS projects fall within the field of eco-innovation, the aid intensity is clearly insufficient to secure that capture technology will be developed and taken into use according to the EU CCS Flagship Program. In any event, the guidelines should include a specific rule regarding the identification of eligible costs for the investments mentioned in paragraph 64. The rules laid down in paragraphs 69 – 71 seems inadequate in order to deal with paragraph 64-aid.

Further, CCS projects can receive aid if they promote the realization of important projects with significant environmental benefits of common European interest, according to the EU Treaty, Article 87 (3) (b). Currently, no clear guidelines for the application of these exemptions exist, and only limited guidance can be found in the practice of the Commission and the Court.

The abovementioned legislation confirms that aid to CCS may be approved state aid pursuant to Article 87 (3), and it is up to the Commission (or the EFTA Surveillance Authority (ESA) through a separate evaluation, to decide whether state aid can be seen as compatible with the EU-Treaty Article 87 (3) (b) or (c).

However, by not sufficiently addressing aid for reduction of CO_2 emissions by carbon capture and storage within the proposed guidelines, the requirements for accepting such aid remains unclear. This is unfortunate and hampers the efforts currently being made on all levels within the Community to develop and take into use CCS technologies, especially considering the aforementioned 10-12 European demonstration plants of the EU CCS Flagship Programme. It is of critical importance for the Flagship projects that new guidelines for State Aid for Environmental Protection provide a clear long-term framework for how state aid to CCS projects can be approved. Taking into consideration the Guidelines for State Aid for Environmental Protection are only revised every fifth year, it is crucial that guidelines for such projects are included in this version to avoid any delays.

There are several CCS projects in planning across Europe, and any state aid for these projects will need to be considered by the Commission or the ESA. However, there is a lack of detailed experience associated with the legal treatment of CCS projects. Thus, a clarification of the guidelines can significantly contribute to simplify this process and also ensure equal treatment of these projects.

The Commission is currently in the process of gathering all the necessary information on CCS in multiple forums in order to design the legislative proposals on CCS, e.g. the regulatory framework. Through a widespread collaboration with the ZEP, industrial actors and governments, sufficient overview can be provided, to ensure adequate and workable guidelines are laid out without any major difficulties.

Another funding option is granting large scale CCS projects aid within the Guidelines for State aid for Research and Development and Innovation (R&D&I). Such projects can in

all probability fall under the definition of so-called "experimental development", pt. 2.2.; which consequently also influences aid intensity. The type of projects discussed here are not, however, R&D projects in the traditional sense, but rather large scale installations. CCS technologies are applicable to both existing and new plants, a common denominator being that they will be closer to the market than traditional R&D projects.

If clear guidelines for CCS state aid are not present in neither environmental protection guidelines nor the R&D&I guidelines; notified projects can end up being tossed around in the system, which again can lead to further delays of significant emission reduction projects. Finally, aid intensity is not handled the same way in all state aid guidelines, as a result, speculations regarding notification and discrimination of projects may be the result.

Investment decisions on CCS power plant constructions are taken years ahead of the actual commissioning. Without clear guidelines for which type of projects are eligible for state aid and to what extent aid is provided, investments and projects will be postponed. If the EU target of 10-12 European CCS demonstration plants by 2015 is to be reached, investment decisions need to be made within a short timeframe. By shaping clear guidelines for state aid and environmental protection, insecurities will be eliminated and projects in planning can evolve into the next phase.

Eligible costs and Aid Intensity

It is currently debated to what extent eligible costs (i.e. those covering the CCS technology only) can be financed by the state. Public investment covering costs related to capture of CO_2 should, must be permitted up to one hundred percent. This is because the capture process is the most capital-intensive in the CCS project and therefore represents a major commercial risk. In addition, there is a political risk, considering the regulatory framework for CO_2 capture is not in place. Finally, the technical risk is very much present, due to the lack of experience with capture technologies. This is indeed why funding is needed; to reveal which technologies will be more successful. For these reasons, governments should be able to bear the economic risks from CO_2 capture up to the point where risk is minimised. In addition, it should be mentioned that this aid is not expected to influence the European energy market in any significant way.

The 10-12 European CCS demonstration plants included in the EU CCS Flagship Programme will primarily be implemented by large international energy producers. Within the traditional state aid regime, aid intensity is lower for large companies than for small and medium sized enterprises. If Europe is to reduce CO_2 emissions and produce power without emitting CO_2, large scale power plants with a capture rate of approximately 85% are necessary. Such major CO_2 emission reductions can principally only be brought out by large companies. Therefore, a logical consequence would be adjusting aid intensity based on the size of the emission reduction rather than size of the company. I addition, the aid intensity threshold should not be set at a lower level than the one for renewable energies.

Conclusion

If state aid for CCS projects is not addressed during the modification of the State Aid Guidelines for Environmental Protection, multiple CCS project constructions run the risk of being delayed. This will have negative impacts on the EU strategy of reducing CO_2 emissions, considering the EU's continued dependency on fossil energy sources. The EU will also loose

its front position in developing CCS technologies, consequently damaging EU competitiveness in the energy sector. Other regions are heavily investing in CCS technologies, confirming the future significance of such technologies; hence it is of strategic importance that the development of these technologies is promoted in the EU.

To reach the EU targets for CO_2 emission reduction, it is highly recommended to address CCS issues during the modification of the State Aid Guidelines for Environmental Protection. The process should result in clear recommendations on state aid for CCS projects, leading to an acceleration of the deployment of the European CCS Flagship Programme. As a result; European CO_2 emissions can be drastically reduced; security of clean energy supply will be ensured; and the EU competitiveness on the energy marked will remain.

To promote further dialog on the new state aid guidelines for CCS technologies applied to fossil fuelled power plants and industrial installations, it is suggested that ZEP should arrange a seminar on the subject in September 2007, with participants and presentations from the Commission, Member States, the industry, and NGOs.

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i International Energy Agency (IEA), World Energy Outlook 2006, OECD and International Energy Agency report, Paris, France, 2006.

ii Intergovernmental Panel on Climate Change (IPCC), Climate Change 2007: Mitigation of Climate Change, Summary for Policymakers, May 2007, http://www.ipcc.ch/SPM040507.pdf.

iii A. Stangeland, Why Carbon Capture and Storage is an Important Strategy to Reduce Global CO_2 Emissions, Bellona Paper, Oslo, Norway, 2007, http://www.bellona.no/artikler/hvorfor_co2_handtering.

iv The EU Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP), Strategic Overview, March 2007, www.zero-emissionplatform.eu.

Annex I

Table 1: Some examples of planned demonstration power plants in Europe

Project	Country	Capacity (MWe)	Power plant capture technology[1]	Capital	Proposed start	Participants
Lacq	**France**	**50**	**Oxyfuel**	**?**	**2006**	**Total**
Schwarze Pumpe	**Germany**	**30**	**?**	**?**	**2008**	**Vattenfall**
Teeside	**UK**	**800**	**IGCC**	**$1.5bn**	**2009**	**Progressive Energy**
Peterhead Miller	**UK**	**350**	**NG to H2**	**$0.6bn**	**2010**	**BP, SSE**
Ferrybridge	**UK**	**500**	**SCPC, retrofit**	**?**	**2011**	**SSE**
Hatfield	**UK**	**900**	**IGCC**	**?**	**2010**	**Powerfuel**
Killingholme	**UK**	**450**	**IGCC**	**?**	**2011**	**E.ON**
Magnum	**Netherlands**	**1200**	**IGCC multifuel**	**1 G€**	**2011**	**Nuon**
Siemens	**Germany**	**1000**	**IGCC**	**€1.7bn**	**2011**	**Siemens**
Halten	**Norway**	**860**	**NGCC**	**?**	**2011**	**Shell, Statoil**
Kårstø	**Norway**	**385**	**NGCC**	**?**	**2012**	**Naturkraft**
Mongstad	**Norway**	**820**	**NGCC**		**2014**	**Statoil**
RWE, Germany	**Germany**	**450**	**IGCC**	**< €1bn**	**2014**	**RWE**
RWE, Tilbury	**UK**	**1000**	**SCPC**	**£0.8bn**	**2016**	**RWE**

[1] IGCC uses pre-combustion capture technology, NGCC and SCPC uses post-combustion.
Source: