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Smelters in the EU and the Challenge of the Emission Trading Scheme

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Abstract

The majority of scientists believe that the increasing amounts of CO_2 emitted into the atmosphere by mankind will have severe impacts on the world's climate. The Kyoto protocol was one of the first attempts to reduce CO_2 emissions all over the world significantly. To enforce the protocol's intention within the EU, the commission had introduced the so called "Emission Trading Scheme" (ETS). This brought the EU into a leading position regarding the reduction of CO_2 emissions. For those parties, who are already affected by the ETS, the emission of CO_2 is no longer free of charge. Although the aluminum smelting industry in the EU is exempted from the ETS, it is indirectly – but significantly – affected due to the increasing prices for electrical energy. This paper will give a brief overview about the impacts of ETS and of the national schemes for the competitiveness of the EU aluminum smelters.

Introduction

The majority of scientists believe that the increasing amounts of CO_2 emitted into the atmosphere by mankind will have severe impacts on the world's climate. The "Stern review" [1] on "The Economics of Climate Change" published in January of 2007 is one of the important studies about global warming.

Stern´s fundamental conclusion is that as far as tackling the problem of climate change is concerned; "the benefits of strong, early action outweigh the costs". This means taking action today to stabilize emissions at levels that will prevent the Earth's average temperature from increasing by more than 2°C relative to pre-industrial levels.

The problem is that: "The current level or stock of greenhouse gases in the atmosphere is equivalent to around 430 parts per million (ppm) CO_{2e}, compared with only 280ppm before the Industrial Revolution. These concentrations have already caused the world to warm by more than half a degree Celsius and will lead to at least a further half degree warming over the next few decades, because of the inertia in the climate system. […] But the annual flow of emissions is accelerating as fast-growing economies invest in high-carbon infrastructure and as demand for energy and transport increases around the world. The level of 550ppm CO_{2e} could be reached as early as 2035. At this level, there is at least a 77% chance – and perhaps up to a 99% chance, depending on the climate model used – of a global average temperature increase exceeding 2°C."

A wide range of national and international instruments are available for governments to create pressure for GHG reduction (Regulations, Standards, Taxes, Levies, Subsidies, Voluntary agreements, etc.). The Stern report sees three overriding policy objectives: "Policy to reduce emissions should be based on three essential elements: carbon pricing, technology policy, and removal of barriers to behavioral change".

Kyoto protocol and EU Emission Trading Scheme

The Kyoto protocol was one of the first attempts to reduce CO_2 emissions all over the world significantly. The Protocol to the UNFCCC mandated Annex I countries [A)] to limit their Green House Gas (GHG) emissions over the 2008-2012 period by 5.2%, in average, below their 1990 level. It does not set any targets for the rest of the countries. Australia and the United States have not ratified the Protocol.

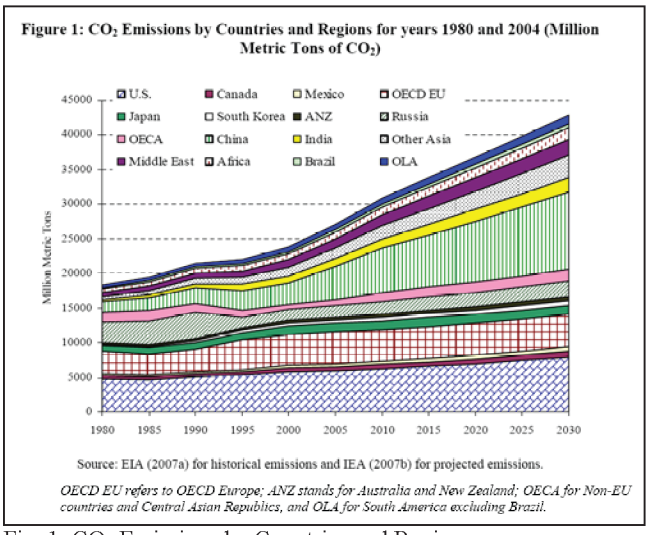

Fig. 1: CO_2 Emissions by Countries and Regions

Developing countries refused to take caps. The Clean Development Mechanism was created, to provide credits for project-based reductions.

The EU-15 accepted a legally binding reduction target of -8% over 2008-2012 versus 1990. This 8% reduction is redistributed amongst the various Member States to reflect individual circumstances.

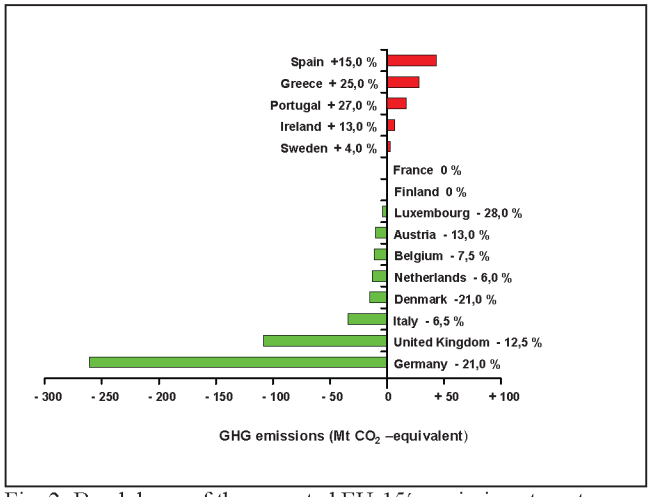

Fig. 2: Breakdown of the accepted EU-15´s emissions targets

In addition the EU is now committed to achieve a reduction of its CO2 emissions of 20% until 2020 relative to 1990 levels.

To enforce the protocol's intention and the EU own goal, the commission had introduced the so called "Emission Trading Scheme" (ETS). The EU ETS is the largest multi-national, greenhouse gas emissions trading scheme in the world. It is based on cap and trade.

Approximately 45% of the total GHG emissions are covered by the ETS sector. The remaining 55% in the non-trading sector fall under Member State competence.

Given the ambitious goal and the timeframe for achieving the emissions reductions required, the power sector will have a large share of the burden.

Power Generation in Europe

Around half of the power generation in Europe is coming from CO_2 emitting power plants. In Germany it is mainly coal (lignite and hard-coal. Nuclear still has a big share in Germany but the government in Germany has decided to phase-out the commercial use of nuclear power. The agreement with the power generators is not a contract in a legally binding sense. It is more of a so-called Gentleman's Agreement, in other words it is politically rather than legally binding for the parties. Under this agreement, the last plant will be decommissioned in the year 2021.

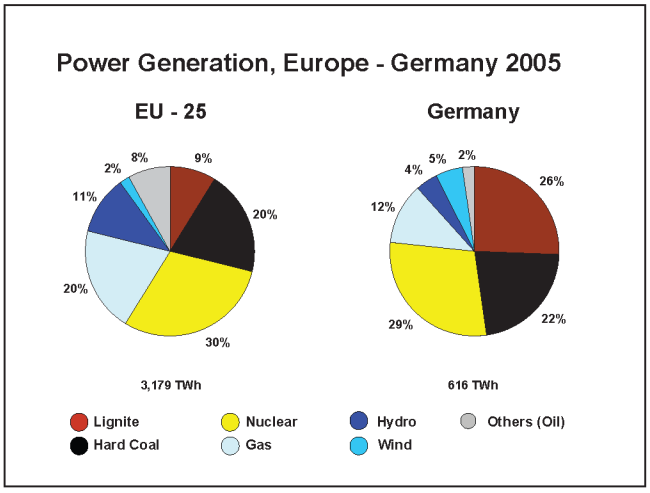

Fig 3: Power generation Europe – Germany 2005
(Source EUROSTAT)

Power price under the Emission Trading Scheme

The idea behind the ET is that for those parties, who are already affected by the ETS, the emission of CO_2 is no longer free of charge.

Even if the emission rights are given for free to the power producers, they are becoming as opportunity costs part of the electric energy price. This pricing decision is a logical consequence of power generators and is fully consistent with economic theory.

Figure 4 shows the development of the future power price (base load – without grid costs and taxes) and the price for CO_2 emission rights at the Energy Exchange (APX, EEX, Powernext) for different EU countries.

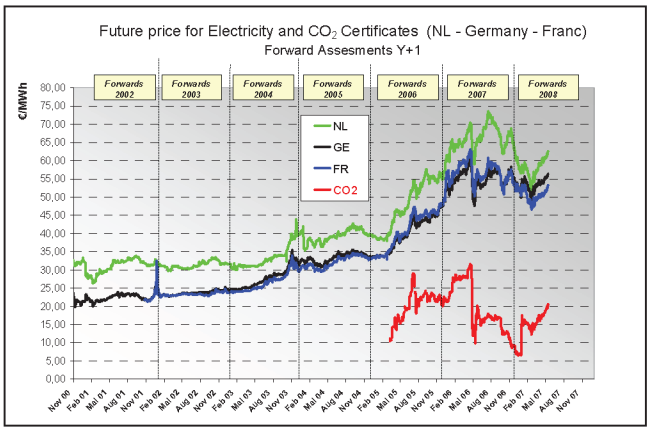

Fig. 4: Development of Electricity and CO2 Certificates price

The pass-through of CO_2 costs into the power price varies between 60 and 100% depending on the carbon intensity of the price setting installation. For example, with a price of 20 €/t for CO_2 emission rights the power price will increase by 12 to 20 €/MWh.

If the emission rights are allocated for free, the profitability of the power producers increases significantly. This wind fall profits have to be paid by the industry and consumers.

Even in countries as France with high nuclear power production a pass-through occurs due to the fact that there is a grid connection with Germany (50% coal generation).

In order to avoid these windfall profits, the EU is discussing to phase out the free allocation to power companies and instead install an auctioning system for the emission rights. For the industry this is not a solution because it will not change the power price (opportunity costs are becoming real costs).

Smelters power contract in Europe under the ETS

The sensitivity to higher power prices for the energy intensive production varies for different industries but all of them are working in a global environment.

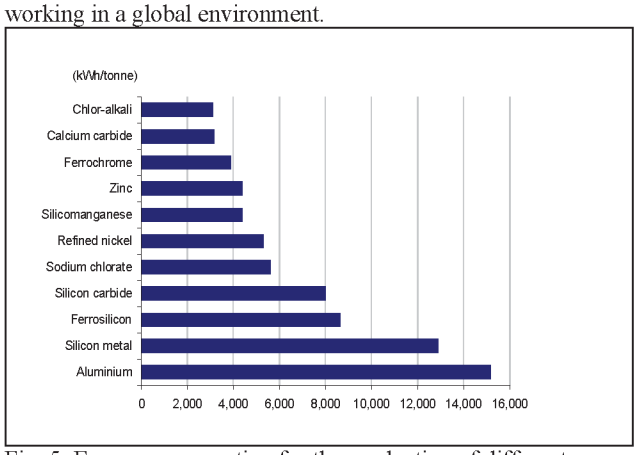

Fig. 5: Energy consumption for the production of different products

Primary aluminum production is electro-intensive. Around 15 MWh of power are necessary to produce 1 ton of aluminum. It is a globally traded metal which means that a producer cannot pass through local cost increases and therefore aluminum is a classical "price taker".

Many smelters in Europe still have a long term contract (some state granted) but more and more contracts are coming to an end. The situation is urgent as power prices have increased significantly. Production costs for primary aluminum based on actual power prices will increase by up to 300 Euro/t.

Additionally, the enactment of national schemes for the promotion of renewable energy sources, such as in Germany, resulted in further price increases for electric energy.

Figure 6 shows how CRU sees the situation in Europe with respect to the long-term contracts.

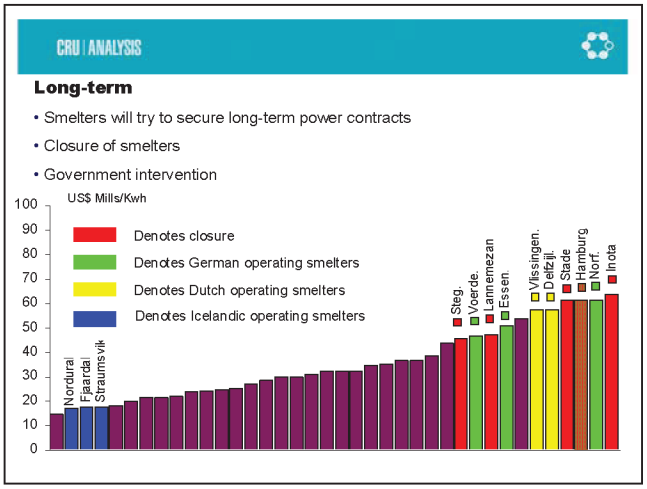

Figure 6: Al Smelter and power price in Europe

Although the aluminum smelting industry in the EU is exempted from the ETS, it is indirectly – but significantly – affected by the ETS due the increasing prices for electric energy within the EU.

Main contribution of these price increases is coming from the EU-ETS and the pass-through of the CO_2 certificate price. Under these circumstances it is very difficult for smelters to sign new long term power contracts. With respect to emission trading the problems are:

- Uncertainty on future permit allocations, methodologies and application of the CO_2 ETS, makes pricing long term power contracts very risky.
- Power generators will try to push the CO_2 price risk to buyers. If the buyer will not take this risk they will not make a contract.
- Conditions for Emission Trading after 2012 are unknown. If emissions of CO_2 will be tightened, further cost will increase.

Impact on industry if no shielding measures are taken:

- Investment in new smelters or expansion will not take place.
- Some smelters have already been closed in the last years. Overall, two third of the EU Aluminum smelters are in a precarious situation in regard to electricity supply, either paying spot market prices, or having to face the expiry of their long-term electricity supply contracts from now to 2010 (source: EAA).
- Multinational companies are investing outside of the EU in new smelters and due to that they are potentially not interested in the production in Europe anymore.
- The existing smelters are becoming old and retrofitting to new technology will most likely be not economically feasible.

How to survive?

Aluminum is part of the solution for the Climate challenge through its use in a large number of applications. An Emission Trading system should take this into account and give the appropriate recognition of such beneficial uses.

There are different possible solutions under discussion.

- Remove CO_2 pass-through cost from power price for those industries which are, due to global competition, not able to pass-through the higher power costs to their customers.
- Allocation of CO_2 emission rights shall be done for free to the Aluminum smelters in proportion of there power consumption. The smelters can give the emission rights to the power generator when they buy power.
- Installation of a "Compensation fund". If emission rights are auctioned (8% can be auctioned under the EU ETS) a part of the revenues shall be given into a "Compensation fund". Aluminum smelters could get out of this fund a compensation for the pass-through cost in the power price.
- Building of an own power plant. This solution will only be useful if the difference between LME price and power price will not exceed a defined limit. The other risk is that CO_2 emission rights will not be given for free in the future.
- Set up of a tax system for Aluminum imports to the EU which is coming from countries without a comparable ETS.

Remarks:

[A)] Annex I countries include the industrialized countries that were members of the OECD (Organization for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States

References

[1] *Stern Review: The Economics of Climate Change* – published in January 2007 available at: http://www.hm-treasury.gov.uk/independent_reviews/stern_review