

Centre for International Economics

The EU global ETS (Emissions Trading System)

The EU taking the lead on climate change

Overview

The EU has the largest ETS (Emissions Trading System) in the global economy. It was established in 2005 about the same time as initiatives in Japan and Norway. It was a little later than the more limited New South Wales (Australia) system launched in 2003, but well ahead of schemes in Canada and the RGGI (Regional Greenhouse Gas Initiative) in the north eastern United States, South Korea and New Zealand, all of which were developed in 2008/9.

The EU ETS accounts for 80% of the global trade by value and 70% by volume. It is also the most comprehensive in terms of its industrial coverage and experience of the trading of CDM (clean air development) and JI (joint implementation) credits. It covers approximately 45% of total CO₂ emissions. It ranks as the largest 'cap and trade' system in the world. The EU ETS aspires, at least, to be the global centre for **euro** denominated carbon trading¹.

The three different phases and rule changes

ETSs are subject to various development phases as foreseen by the Kyoto Protocol. In the case of the EU ETS, Phase 1 covered the past period 2005 to 2008. Phase 2 covers the period from 2008 – 2012 and will of course reflect experience gained during Phase 1. Phase 3, which is currently under review, will cover the period from 2012 to 2020².

Certain generalisations can be made about Phase 1. Perhaps the most important is that the NAPS (National Allocation Plans) on which EAUs³ allowances were distributed proved to be too generous⁴ in terms of the abatement undertakings of the EU as a whole⁵. Under Phase 1 rules, free credits were offered by member governments, at their discretion, to particular national CO₂ emitters. One adverse consequence of this was the effective glutting the market⁶. This led to weaknesses in the price signals⁷

¹ JI and CDM are foreseen under Kyoto and are created as a result of collaboration between Annex 1 (developed) countries and Annex 2 (developing) countries. The inflow of such CERs (Certified Emissions Reductions) is a factor which also has to be monitored carefully if 'oversupply' of carbon credits is to be avoided, and price levels maintained at 'efficient' levels.

² This will of course be affected by the Copenhagen Climate Change Summit in December 2009.

³ Emission Allowance Units, in Kyoto terminology.

⁴ Data on verified emissions for 2005 show that the volume of EUAs allocated exceeded real emissions by around 100 million. This discrepancy arose for a number of reasons, the most important of which was probably the 'top-down' approach adopted by the EU in calculating emission levels of designated national installations. The experience of Phase 1 will be taken into account in Phase 2.

⁵ One inference is that NAPs appeared, on the whole, to demonstrate little real commitment to substantial emissions reductions within the EU ETS.

⁶ The spot market price of EUAs crashed in May 2006.

⁷ Price weaknesses in the spot market were inevitably also reflected in the carbon forward market.

being generated. It therefore follows that pricing levels throughout this period failed to establish a realistic, reliable, benchmark price for carbon abatement.

As a result, more stringent quantitative rules for assessing NAPs have been introduced in Phase 2. The impact of these changes has yet to be assessed. Reports to date suggest that improvements that may have been achieved by the tightening up of NAPs generally have been diluted by the arrival of new member states of the EU where allocations have, again, been over-generous. In recognition of these deficiencies further tightening in the rules appears likely. During Phases 2 & 3 more ambitious targets will be set for emissions abatement and a new system of auctioning⁸ permits by member governments will be introduced in 2011⁹. The aim will be to ensure that appropriate pricing signals begin to drive BAT (best available technologies), and measureable abatements against tougher benchmarks. Only in this way can the EU's Kyoto carbon abatement objectives be attained.¹⁰

How will the Refining sector be impacted by CO2 permits?

The Refining sector is particularly complex. This is because Refining sites consist of several different process activities¹¹ where CO2 emissions can be separately identified, measured and addressed. This stands in contrast to Power where CO2 outputs of electricity generating utilities are usually from one source and can be straightforwardly measured and addressed.

The Refining sector does however offer a rich array of energy saving and CO2 abatement possibilities. Depending on the complexity of the Refinery there is wide scope to increase value-added per barrel of oil used by the use of process integration technologies.¹² These matters are otherwise extensively documented. They are also addressed in section 6 below.

The treatment of Power

Power generators are a major immediate source of CO2 emissions. They are the focus of some of the most intensive technological modifications and changes designed to mitigate the impact of CO2 emissions. This is happening in three separate though related ways.

- By way of retro-fitting, Power generators are being made more efficient through the installation of *scrubbers*. These reduce CO2 emissions amongst other pollutants. Commercial experience in this field is well documented.

⁸ Auctioning will enable governments to better operate the *polluter must pay* principle and establish more cost reflective prices in respect of carbon abatement.

⁹ According to European Commission estimates at least 2/3rds of all permits will be auctioned by 2013 affecting approximately 12,000 installations..

¹⁰ The Top Runner Programme introduced by the Japanese focuses on benchmarking the leading performing technologies thus ensuring that they are rewarded for achievement.

¹¹ New energy efficient 'integrated' refineries are not expected in Europe before 2030 hence the reliance on identifying economies in terms of different processes.

¹² The EU has assessed the potential for savings in energy in refineries in the EU27. It is estimated that by 2030 emissions can be reduced by 21% when compared with 2005 levels.

- Power generators are also being modified to use alternative fuels, including bio-mass¹³. These innovations will also reduce CO2 emissions.
- Finally Power generators are looking to exploit CCS (Carbon Capture and Storage) technologies which collect, transport and bury CO2 emissions. This technology has been pioneered by the Norwegians. Its use has yet to be finally approved by the UN climate change authorities.

How will Power plants integrated with Refiners be treated?

These developments will be handled on a case-by-case basis. Where Refiners have collaborated with Power generators in the co-generation of lower CO2 electricity, the output abatement of CO2 will be approved and the carbon offsets allocated between the parties on the basis of 'contribution'.

Whilst the procedures are more complex than in other operations the benefits can be identified as between the parties, with offsets being rewarded on the basis of measureable benefit.

Is Refining regarded as being at risk in terms of 'carbon leakage'?

The term 'carbon leakage' is used to describe a situation where CO2 abatement policies in certain regions (the EU for example) cause the migration of productive processes from the EU to other 'unconstrained' regions of the global economy where the regime imposes no penalties in terms of carbon abatement. This situation gives rise to broad concerns about the dangers of loss of competitiveness. It could, for example, result in the sourcing of carbon-intensive inputs from unconstrained regions. In turn this could cause relocation as a means of circumventing abatement costs. Aluminum, steel and cement are three sectors that might choose to avoid the direct costs of emissions abatement by migrating elsewhere.¹⁴

This highlights concerns about carbon leakage and job losses. The relocation of production facilities to non carbon-constrained regimes could have detrimental consequences. This points the need to establish, at the earliest possible time, the most inclusive global cap and trade system. The BAP (Bali Action Plan) of December 2007 sets out a roadmap for a post Kyoto international agreement. This acknowledges the mutual obligations of both developed and developing countries. It appears likely that these obligations will be discussed during the Copenhagen climate change Summit in December 2009, and will determine the shape of the post 2012 Kyoto regime.

These general observations apply to the particular circumstances of Refining though this is a sector which offers a wide range of tried and tested technological and organisational options with which to reduce CO2 outputs and through district heating by-products, for example¹⁵ reduce overall demand for power.

¹³ Bio-mass involves the cultivation and harvesting of alternative fuels where there is a 'joint' or shared claim to carbon abatement from the generator and the fuel supplier.

¹⁴ Trade statistics are constantly monitored to identify developments of this nature. From past EU experience there is no evidence to support the view that this is happening.

¹⁵ Such schemes arise where the refinery, having identified ways of capturing energy otherwise lost in the refining process, can transform this by-product into steam, for example, to support local district heating systems.

Key uncertainties

The single most important uncertainty centres of depth and duration of slowdown in the OECD sector of the global economy. It goes, almost without saying, that the technological corrections associated with carbon abatement are more easily embraced during periods of growth than during periods of recession. These considerations are likely to be of the highest importance in maintaining the momentum of commitment to the implementation of Kyoto.

Most of the evidence suggests that the major founder countries of the EU are emerging from recession - with Germany and France leading the recovery. The prospects of new-entrant eastern European members of the EU are far less certain. Some analysts see this creating tensions within the EU on the burden of abatement cost sharing. This could slow down the momentum of commitment to reduce further emissions.

The position with regard to the US and the UK is problematical. The outlook for the US is still mostly uncertain. The household sector remain weak and heavily indebted with little prospect of early recovery. The housing market remains in crisis.¹⁶ The depreciation of the dollar is of course a powerful stimulant to the US export sector. This is expected to take up some of this slack, as the current account deficit continues to improve. The US banking sector remains a continuing constraint on growth.

The case of the UK is even more uncertain. The outlook for growth is poor. The debt servicing obligations of the British government are formidable.¹⁷ The signs of recovery in economic growth are yet far from evident. Unemployment continues to rise. Despite the weakness of the pound against the euro and the dollar there is little evidence of recovery in the British export sector. British households, as with their US counterparts, remain heavily indebted. Again with the US, the British banking system has yet to return to more normal levels of *intermediation*.¹⁸ The outlook is not good.

Can the potential cost/benefit to Refiners be modelled?

There is a wealth of practical experience in the three most important areas where energy savings can be achieved

- Heat recovery from product streams
- Boiler water and free pre-heating using waste heat
- The installation of additional levels of refrigeration.

Savings are judged to be potentially very large (up to and above 50%) with payback periods at 24 months, or even less. All the major Refiners have experience of improving opportunities for energy and resource efficiency using TSPA (Total Site Pinch Analysis). These matters, and the models used are **well documented**.

¹⁶ Repossession rates remain at around the 5% level whilst house prices continue to weaken along with new mortgage approvals.

¹⁷ The borrowing requirement of the state is expected to exceed 12% of national income. This will create significant uncertainties in terms of the willingness of global debt markets to absorb this scale of issuance and the terms they will exact.

¹⁸ Bank lending remains weak despite record low Bank of England lending rates to the banking system, and massive quantitative easing.

Richard Tudway

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