SHOW ME THE MONEY

BY LIZ BOSSLEY

Spices on sale in Georgia. September 2005

Technology aside, CCS projects will stand or fall on the price of carbon. Liz Bossley, *Petroleum Economist*, examines the international regulatory framework that has given rise to the emissions market and that determines the carbon price.

Investment in CCS should be, in theory, an easy decision for the oil industry. By delaying the decommissioning of facilities associated with depleted oil and gas fields, CCS projects can benefit from the re-investment of funds set aside to meet imminent decommissioning costs. But unless there is some certainty that a carbon market will exist over the life of the CCS project and that the market will generate a carbon price that provides a positive net present value, funds will be allocated to alternative projects with a more reliable rate of return.

EACH INSTALLATION IS REQUIRED TO MEASURE ITS CO_2 EMISSIONS AND SURRENDER SUFFICIENT ALLOWANCES TO ITS NATIONAL ENVIRONMENTAL REGULATOR

Three regulatory instruments must be considered when evaluating the market for CO_2 and the price of carbon:

- The UN Framework Convention on Climate Change (UNFCCC);
- The Kyoto Protocol; and
- The European Emissions Directive (EED).

The UNFCCC was signed by 166 countries at the Rio Earth Summit in June 1992. The Convention is a statement of intent to reduce global warming by stabilising greenhouse-gas (GHG) emissions and to assist developing countries in adapting to temperature increases that scientists consider to be inevitable and unavoidable. This convention has been signed and adopted by, among others, the US and Australia – two countries renowned for their refusal to adopt the Kyoto Protocol method of achieving the objectives of the UNFCCC.

The Kyoto Protocol to the UNFCCC commits 38 countries (excluding the US and Australia) to reduce their GHG emissions to an average of 5.2% below 1990 levels during the period 2008-12 – the so-called first commitment period. One of these 38 countries is the European Community – the original 15 members of which have agreed to reduce their joint emissions to 8% below 1990 levels during the first commitment period. To achieve this objective the European Union (EU) adopted the EED in 2003.

Kyoto and the EED are cap-and-trade mechanisms that gave rise to the emergence of the market for carbon that is trading today.

THE CONCEPT OF CAP-AND-TRADE

- A central authority sets a limit on permitted emissions level (cap);
- The central authority allocates rights to emit (allowances) either free or by auction below the capped level to generate a shortage of allowances and to engender a positive carbon price;
- The emitter must surrender sufficient allowances back to the central authority at the end of the specified period to cover its actual emissions. Therefore the emitter must:
- Cut production of goods and services to reduce emissions;
- Invest in clean technology that emits less carbon per unit of production; or
- Buy in the market sufficient allowances to cover the shortfall of allowances given to it by the central authority compared with the cap on the emitter's GHG output set by the central authority.

The EED is now enshrined in European law and, regardless of what happens in Kyoto, the EU is committed to a cap-and-trade scheme beyond 2012, unless steps are taken to dismantle it. Kyoto ceases at the end of 2012 unless steps are taken to extend it. The next forum for agreeing an extension is the 13th Conference of Parties (COP) to the UNFCCC (3rd Meeting of Parties to the Kyoto Protocol) in Bali in December 2007. The US is unlikely to join the Kyoto process at the next COP, but may be included in an international, post-Kyoto scheme from 2013 – if China agrees to a cap of its own, or if there is a change in the political mood in the US.

The market in Kyoto allowances, so-called Assigned Amount Units (AAUs), has not yet started to trade. This is because the 38 countries that have agreed a Kyoto cap, expressed as a percentage of 1990 emissions, are still going through the process of converting these percentage-reduction caps into emissions limits expressed in tonnes of CO_2 – the so-called initial reports. This process should be completed in time to deliver emissions allowances – rights to emit GHGs – into the registry accounts of the countries concerned in 2008.

These AAUs can be traded only by governments, unless the country concerned has devised a domestic emissions-trading scheme that devolves the responsibility for complying with the UN cap and for trading surplus and deficit allowances in the market down to companies or industrial facilities.

The EED devised such an emissions-trading scheme – the EU ETS. Under the terms of the EU ETS, each of the 27 member countries has been required to submit a national allocation plan (NAP) showing, broadly:

- A total national emissions cap;
- A cap for each installation – each site responsible for emitting CO_2; and
- The allocation of free allowances to installations covering 95% of their expected 2005-07 (phase one) emissions and 90% of their 2008-12 (phase two) emissions.

Since 2005, each installation has been required to measure its CO_2 emissions and surrender sufficient allowances to its national environmental regulator by 30 April in each year to cover its actual emissions in the previous year. It was expected that by setting allowance allocations at 95% and 90% respectively in phase one and phase two of the EU ETS that the market would be short of European allowances (EUAs) and that a price high enough to encourage investment in green technology and fuel efficiency would emerge.

SUPPLY AND DEMAND

It is now a matter of record that there was a substantial over-estimation of caps in phase one of the EU ETS, which led to a surplus allocation of EUAs in

CARBON CAPTURE AND STORAGE

the NAPs. The price of EUAs fell from over Euro30/a tonne to less than Euro0.25/t when this became clear, following the publication of 2005 emissions levels in May 2006, (see Figure 1).

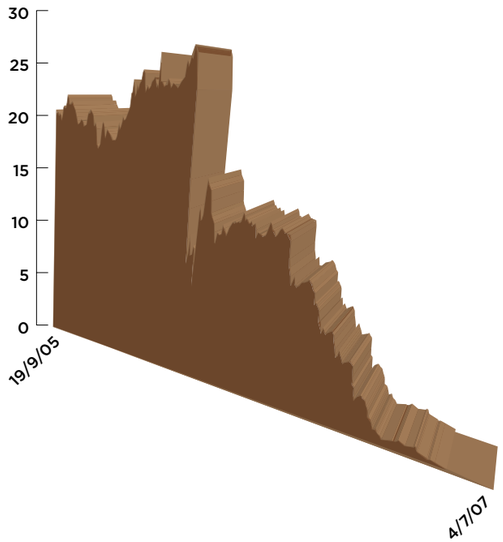
The surplus of EUAs in phase one was an embarrassment to the EU ETS, although it has at least proved that the concept of cap-and-trade is workable. The price of Euro0.10/t is a reasonable reflection of the supply and demand parameters in the carbon commodity market and the market instruments that produced this price trade quite efficiently.

If the EU wishes to achieve a carbon price high enough to encourage green behaviour then it will have to set the emissions caps at much lower levels and allocate many fewer EUAs. This is a stated priority of the EU in agreeing phase-two NAPs and individual EU member states now face substantial cap reductions in phase two.

Based on the negotiation of phase-two NAPs so far, the price of EUAs in the 2008-12 period are trading at a greater than Euro20/t premium to phase-one EUAs – at Euro22/t (see Figure 2).

The phase-one EU ETS price reflected only the EC phase-one NAPs. The factors that will influence the price

FIGURE 1: Spot price of EUA's Euro/t



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of phase-two EUAs and first-commitment period AAUs – and, by extension, the profitability of CCS projects – are complex and not transparent.

Phase-two EUAs will, in practice, be Kyoto AAUs that have been allocated to Europe by the UN in accordance with the 8% reduction cap agreed by Europe under the Kyoto Protocol. These European AAUs will be converted to EUAs by the EU and delegated to EU member states, which will then delegate them to installations under the NAPs – AAUs are emissions allowances that can only be traded by governments. EUAs are allowances delegated to European installations, but which can be traded by any individual or company whether or not they are based in a Kyoto-signatory country and whether or not they are a European installation.

Imtiaz Ahmad, vice-president of fixed income at Morgan Stanley, says the initial reports submitted to the UN to date will result in the first commitment period being over-supplied. Russia – and to a lesser extent Ukraine – has a large surplus of allowances from the Kyoto process because the Kyoto commitment is to cut emissions to 5.2% below 1990 levels during the 2008-12 period. But the Russian economy and the emissions associated with that level of output is now about 30% below what it was in 1990.

However, the effect on prices will depend on how governments behave in respect of surplus AAUs. "This need not lead to a price collapse because first commitment period AAUs are bankable, are in government hands and might only be brought to market through investment in green projects. It may well not be in the interest of the governments holding the surplus to see the AAU price as low as the first-phase EUA price."

There are three ways in which the price of AAUs and EUAs will be linked directly:

- Kyoto-capped countries, called Annex B countries, can buy or sell and convert AAUs and EUAs to make up a shortfall versus a Kyoto cap or dispose of a surplus versus a Kyoto cap;
- Annex B countries, or companies within Kyoto-capped countries, can invest in green projects in developing countries that do not have a Kyoto cap, through Clean Development Mechanism (CDM) projects. For every tonne of CO_2, or its equivalent, that the CDM project saves, the UN issues an additional allowance, called a Certified Emissions Reduction (CER) to the project participants. CERs can be sold in the market for money or used to surrender to the UN at the end of the first commitment period to cover emissions by the

WITHOUT CERS, IF THE EU WERE TO HAVE RELIED ON INTERNAL ABATEMENT ALONE, THE PRICE OF AN EUA COULD HAVE RISEN TO A CRIPPLING LEVEL

Annex B country concerned. CERs can also be used by installations in the EU ETS to meet domestic emissions caps, subject to limits set by each EU member state under its NAP; and

- Annex B countries, or companies within Kyoto-capped countries, can invest in green projects in other Annex B countries, through Joint Implementation (JI) projects. For every tonne of CO_2, or its equivalent, that the JI project saves, the host JI country converts one of its own AAUs to an alternative form of allowance, called an Emissions Reduction Unit (ERU) and hands this ERU to the project participants.

CERs and ERUs can be sold in the market for money or used to surrender to the UN at the end of the first commitment period to cover emissions by the Annex B country concerned. These CERs and ERUs can also be used by installations in the EU ETS to meet domestic emissions caps, subject to limits set by each EU member state under its NAP.

AAUs, EUAs, CERs and ERUs can also be banked into the second Kyoto commitment period and beyond, when it is hoped that emissions caps will be ratcheted down to progressively lower levels, creating an increasing deficit of emissions allowances and, hopefully, a higher and higher carbon price.

The price of EUAs in phase two will only be part of a much larger market that will be heavily influenced by:
On the demand side:

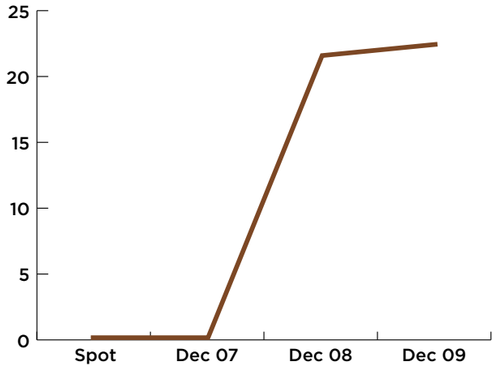
- The cost of GHG-abatement measures, such as CCS projects;
- International competition in the industrial sectors targeted by the EED – if installations cannot pass on carbon costs to their customers the investment in abatement technology will be higher; and
- The inclusion of new countries, regions and sectors, such as air and surface transport and the household sector, within the scope of the EU ETS.

On the supply side:

- The final allocation of AAUs to the non-European countries that have agreed to Kyoto caps for the first commitment period by the agreement of the initial report of each country;
- The allocation of EUAs to European installations under EU NAPs; and
- The creation of new CER allowances by the CDM executive board.

According to Morgan Stanley's Ahmad, forecasts of the number of CERs issued vary widely, from as low as 1.3bn by 2012 to as high as 3bn. The UNFCCC and market analysts tend to converge on an forcast of between 1.9bn and 2.1bn. Uncertainty on price and demand later in phase two will depend on the participation of Canada in terms of attainment of Kyoto targets, the realisation of the credit volumes, the performance by governments in relation to attainment of national targets and whether or not governments decide to enable banking of CERs post 2012 in relation to the 2.5% rule (Decision 13 of COP12/MOP 1 in Montreal in 2005 allows countries to bank an amount equivalent to 2.5% of their AAUs in CERs and 2.5% in ERUs. AAUs can be carried over without limitation). The ability to bank EUAs after 2012 should ensure there is a floor price for EUAs in phase two relating to phase-three targets given that the EU Council of Ministers has stated a public target of 20-30% GHG reductions by 2020.

FIGURE 2: Forward emissions-price curve 22.06.07, Euro/t



Chris Leeds, director of emissions trading at Merrill Lynch, is also optimistic about the EUA price: "Without CERs, if the EU were to have relied on internal abatement alone, the price of an EUA could have risen to a crippling level. As it is, the dysfunctional nature of the market means that not all the CERs that could be imported into the EU will be and EUAs will trade at a premium to CERs for sometime." He expects the price of JI ERUs to be more problematic. "The slow pace of establishing JI regulations in Russia and transforming them into practical rules has meant the potential of Russian JI is unlikely to be realised in the first commitment period. Even after that, most people realise that issuance of ERUs may well be more uncertain than CERs because of the involvement of government."

THE MARKET PROSPECTS FOR CCS

The whole Kyoto edifice rests on the premise that the concept of cap-and-trade will be extended beyond 2012, which is likely, but by no means certain.

THE MARKET INSTRUMENTS

There are four markets for emissions allowances:

1. **The spot market.** This is a market in EUAs only because the UN electronic infrastructure, the International Transaction Log (ITL) to allow the delivery of CERs and ERUs, is not yet in place and no AAUs have yet been issued by the UN. In the over-the-counter (OTC) spot market, deals are transacted by two counterparties known to each other and the physical transfer of allowances happens almost immediately on agreement of the deal. Payment is made typically within five to 10 days under a very short form contract;
2. **The OTC forward market.** EUA deals are transacted by two counterparties known to each other and the physical transfer of allowances happens usually on 1 December of the specified year. Payment is made typically within five to 10 days of delivery. Three sets of general terms and conditions are used in this market, based on the terms published by either the International Emissions Trading Association, the International Swaps and Derivatives Association or the European Federation of Energy Traders.
3. **The regulated exchanges.** There are a number of regulated exchanges on which EUAs can be traded. These are:
   - European Climate Exchange (ECX);
   - European Energy Exchange;
   - Energy Exchange Austria;
   - Powernext;
   - Nordpool; and
   - Sendeco2/New Values.

   So far, only the ECX is transacting significant volumes. This futures contract allows for anonymous dealing through the ICE trading platform with credit security provided by LCH. Clearnet. The contract expires and delivery is made on a monthly cycle, although trading activity concentrates in the December contract when delivery in the OTC contract takes place, up to March 2008 and then annually.

   The Asian Carbon Exchange, which launched an unsuccessful first auction of CERs in March 2007, concluded its first transaction by auction on 17 April 2007, when 0.7m CERs traded.
4. **The long-term CER market.** There is an active OTC market in CERs based on the forward delivery of CERs under Emissions Reduction Purchase Agreements. No CERS have yet been delivered because of the late start-up of the ITL, although about 62m CERs had already been issued by the CDM executive board by end-June 2007.

IN THE ABSENCE OF A REGULATORY REWARD FOR GEO-SEQUESTERING CO_2, THE INCENTIVE TO INVEST IN SUCH PROJECTS IS FAR FROM OBVIOUS

Project-based allowances such as CERs and ERUs that will be issued after 2012 run the risk of being issued in a period when they have ceased to have any value because the Kyoto caps with which they were designed will have expired.

The EU ETS will continue beyond 2012, but the price of EUAs beyond 2012 will be depressed if burgeoning, but stranded, quantities of CERs and ERUs can only find value in the market for EUAs. This is because many of the CDM and JI projects being agreed will result in the issuance of CERs and ERUs after 2012. But if Kyoto is not extended beyond 2012 there will be no AAU-based market for them and they will be sold in the smaller EU ETS market.

Tony White, executive director of Climate Change Capital, an investment bank specialising in the low-carbon sector, is optimistic: “Trades have been recorded for delivery in 2013. Our company would be happy to purchase allowances in this time frame, but only if the price is right.”

Nevertheless, it is against this uncertain backdrop that the investment decisions for CCS projects must be made. This carbon-market price uncertainty is further compounded by the questionable status of CCS projects under the Kyoto Protocol. So far, CCS projects have not been accepted by the UN to qualify for CDM or JI project status. Most CCS projects are expected to be based in developing countries and the economics could be improved substantially by project finance in the form of CDM CERs, if the UN agrees to accept geo-sequestration projects. At the moment it does not.

In the absence of a regulatory reward for geo-sequestering CO_2, the incentive to invest in such projects is far from obvious. Even if such a reward is granted, it relies on a positive carbon price to provide a positive rate of return. ❖

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