



# More smoke than fire

Anyone trying to map the shape of the European energy markets a quarter century hence does not have history on his side. After all, few in 1980 would have contemplated the dramatic rise in gas-fired generation and the effective moratorium on new nuclear that has defined today's mix of electricity generation plant. Perhaps an even smaller minority would have anticipated the advent of liberalisation.

Nevertheless, some crystal-ball-gazing exercises may be fruitful, especially when, as now, a dramatic change is being imposed on the industry — namely the introduction of limitations on greenhouse gas emissions. It is certainly worth exploring whether, on account of these measures, the industry is likely to evolve slowly, with new, less greenhouse gas intensive plant replacing retiring plant and meeting demand growth; or whether we will witness dramatic change, with the early retirement of equipment and its substitution with zero, or at least, low emission technologies.

The European Emissions Trading Scheme (ETS) — *see panel overleaf* — is the principal measure that has been introduced to enable the Community to achieve its Kyoto target of reducing emissions of greenhouse gases in 2008-2012 by 8% from the 1990 level. Although there is other legislation that may reduce emissions, such as the Energy Efficiency, Renewable Energy and Bio-fuels Directives, these have different principal drivers, such as diversity and security.

The ETS has now been in operation for 18 months and, like most market-based policy measures, its impact has not been entirely as the policy-makers may have wished. In short, to date the scheme has:

- increased the price of electricity

## Anthony White

- caused limited, if any, changes in the operations of installations covered by the scheme
- increased the profitability of the electricity sector
- led to significant investment in emissions reducing projects, but in the developing world, such as China and Brazil, rather than in the EU 25.

The reasons for this behaviour are manifold. It seems that, at first, the European Allowance (EUA) price was directly linked to the 'switching price': this is the price of an allowance that would equalise the total marginal cost of generating electricity, including the EUAs, from coal and gas stations. However, although the price of EUAs reached €30/tCO<sub>2</sub> in April 2006, they never actually reached this switching price, though movements in gas prices led to changes in EUA prices. It seemed as if the market was applying a large discount to the price, possibly because:

- free allowances for 2006 are allocated before those for 2005 must be surrendered, and similarly for 2007, so there was no need for any operator to buy EUAs, or reduce emissions by fuel switching, until 2007, by which time gas prices may be lower
- operators and traders were applying a high discount rate to prices in 2007
- the industry was expecting a large number of cheap Certified Emission Reductions (CERs) to become available in late 2007. Indeed, CERs may be obtained from

reducing any greenhouse gas. Investments that reduce emissions of methane and HFCs tend to have very high returns compared to those that reduce CO<sub>2</sub>, because they are far more dangerous: a reduction of one tonne of methane, for example, generates 21 CERs (that convert into EUAs)

- the market may have anticipated that the allocations to industry were far more generous than the governments had intended. They therefore 'discounted' the price.

These results provide an insight into how the market is likely to develop under the current measures. The very nature of the ETS suggests that it is likely to be excellent at optimising the operation of existing assets. It is not likely to encourage investment. Indeed, when contemplating investment, an operator will have to take account of the vagaries of fossil fuel prices as well as the political uncertainty associated with the governments setting the size of the overall caps on emissions.

This is not to say that investments will not take place. Indeed, we have seen them, in spades, in China and Brazil. However, these have almost all involved the exotic gases, where the returns are so much faster and any financial assessment of these schemes will be based on a pessimistic assumption of the likely EUA price. It is not surprising that investment in Europe has been slow in forthcoming.

There is a parallel in the oil industry. Oil prices are currently in excess of \$70/bbl, but no field is being developed whose financial viability depends on oil remaining north of \$40/bbl, let alone \$50/bbl. These financial 'hair cuts', are sure to be applied to the



## What it means, in a nutshell



The ETS requires the operators of plant covered by the scheme (for example electricity, cement, metals, and glass) to surrender one European Allowance (EUA) for each tonne of CO<sub>2</sub> emitted. EUAs covering emissions in each calendar year must be surrendered the following March. The scheme has been defined for three phases: phase 1 2005-2007, phase 2 2008-2012 and phase 3 from 2013 with an end date yet to be defined. Failure to surrender sufficient EUAs results in a fine of €40/tCO<sub>2</sub> for phase 1 and €100/tCO<sub>2</sub> for phase 2 with a requirement to surrender a further allowance (from the next phase). In phase 1, governments have allocated EUAs free of charge to all operators in February of each year. In

most cases these allowances were intended to match expected emissions, but allocations to the utility sector were designed to be insufficient to meet their needs. Under the Linking Directive, operators are allowed to surrender Certified Emissions Reductions (CERs) in lieu of EUAs for phase 1. These CERs may be created under the Kyoto protocol when projects that reduce greenhouse gas emissions are undertaken in countries that are signatories to the Kyoto protocol but do not have emissions caps (such as China and Brazil). In phase 2 both CERs and ERUs (projects that reduce greenhouse gas emissions but are based in other Kyoto countries having caps, such as Canada) may be surrendered instead of EUAs.

greenhouse gas market but are compounded by the political uncertainty.

This is not to say that investment will not, eventually, be forthcoming. It is likely that after perhaps five or ten years of the EU ETS, with the associated setting of targets every five or so years, investors may become more comfortable with the behaviour of EUA prices, and the size of 'haircut' may reduce and investment may occur. However, this would imply that the ETS, as it stands, is likely to cause the industry to evolve into lower greenhouse gas intensive technologies, rather than undergo dramatic change.

The problem with such an evolutionary approach is that we may not have the time. The 2003 assessment of the European Energy market by the European Commission predicted that GHG emissions would be 19% higher than the 1990 levels by 2030 under the measures existing at the time. The power sector alone was forecast to increase emissions by 330mt from the 2000 level (948mt).

Clearly, this is inconsistent with the objective of avoiding the accumulation of dangerous levels of CO<sub>2</sub> (>550ppm), as agreed by the UN (including the USA). Indeed, were the EU 25 to constrain emissions to 70% of the 2000 level by 2030 — a 30% reduction — the power sector emissions would have to fall by 285mt, if the sector were to reduce in line with the whole economy, rather than assume a greater burden.

Such a level of abatement will not occur without investment in low- or zero-emitting technologies. The issue is particularly urgent in the UK as we appear to be entering a 'tipping point', on account of a large proportion of the present generating fleet approaching retirement. Decisions taken over the next few years will effectively define the generating mix for the next 30 to 40 years and thereby lock in the associated emissions.

The industry's behaviour under the ETS suggests that the carbon price signal,

as provided by the ETS is not sufficiently loud to cause the investment decisions. The companies will take EUA price into account when deciding what to build and when. However, given the EUA's price link to volatile fossil fuel prices and the exposure to political intervention, they will apply large discounts to any value created by reducing CO<sub>2</sub> emissions.

In the event, they will probably plumb for the cheapest technology to build, namely gas, even though it may be more expensive than, for example, coal with carbon capture and storage, in the longer term. Moreover, if all the companies in the market take the same decision, their profitability is unlikely to be affected.

The key task facing policy-makers is how to make the carbon price more effective. Promises by politicians that they will keep to longer-term abatement targets help, but are not too effective. After all, that still exposes investors to the risk that the EUA price falls on account of a collapse in gas prices. Plant developers need assurance that the penalty for emitting greenhouse gases will not fall below a particular floor.

If this can be achieved, then developers may be willing to consider carbon abatement investments and put a smaller discount on the value of abatement in any financial appraisal they undertake. One way of achieving this goal is to support the EU ETS with a further measure.

If, for example, the value of the EUAs were to fall below, say €15/tCO<sub>2</sub>e, then governments could introduce a 'duty' on greenhouse gas emissions to make up the difference. Thus if the EUA price averaged just €10/tCO<sub>2</sub>e over the year, the duty would be €3/tCO<sub>2</sub>e. There are a number of attractive features about such a scheme:

- it provides plant owners with the confidence that they will avoid a penalty over many years. Thus any investment they may undertake could be amortised

over a long period. With a price of around €15/tCO<sub>2</sub>, it would be cheaper to install an advanced coal gasification with sequestration (almost 100% CO<sub>2</sub> capture) than build an advanced supercritical coal station or a gas fired CCGT.

- it provides government with a source of revenue. Indeed, after 2012, it is expected that governments will no longer distribute allowances free of charge. Instead they will be auctioned to the utility sector at the very least. If the hybrid duty is introduced, governments could be confident that their revenues from emissions would not dry up were, for example, the gas and EUA prices to fall. Moreover, investors would derive some confidence concerning the duration of the scheme knowing that it supported the Exchequer.
- it could be introduced unilaterally. Indeed, it could provide UK industry with a competitive advantage. UK companies would be able to consider a range of short- and long-term options to reduce their greenhouse gas emissions. Without the adjustable levy, operators in other member states would be restricted to measures that are financially viable in the short term alone. The 'duty' would put UK industry at an advantage during periods when the EUA traded above the 'floor', but at a disadvantage when below. Such a scheme would require widespread support to succeed. However, it seems that, if we really wish to change our energy market dramatically, as the climate scientists tell us we must, an evolutionary approach will not be sufficient — we may well go the way of the dinosaurs.

*Dr Anthony White is head of advisory at Climate Change Capital. He was a founding member of the UK government's Energy Advisory Panel, a member of the National Grid's Executive Committee, and Head of the European Utility Research teams at Kleinwort Benson and Citigroup.*