



Bulletin

- Water
- Energy
- Retailing
- Transport
- Financial services
- Healthcare
- Telecoms
- Media
- Post
- Competition policy
- Policy analysis and design
- Regulation
- Strategy
- Contract design and evaluation
- Dispute support services
- Market design and auctions

SEPTEMBER 2005

Money to burn

THE PRICE OF EMISSION RIGHTS IN EU TRADING

Industry in the EU has to factor in the cost of emission allowances when making investment and trading decisions. While input prices are typically driven by market fundamentals, in the case of carbon allowances there is substantial political risk involved, as the supply of allowances is set by governments. Frontier has worked with both private companies and government in the UK to help them understand why carbon allowance prices have been so volatile.

Phase I of the European Union Emissions Trading Scheme (EU ETS) was launched on 1st January 2005. In the first few months, carbon allowances were trading at about €7 a tonne. They rose to a peak of just over €29 a tonne in July, before falling back to around €20 per tonne a month later. Fluctuations on this scale are disruptive to business planning, leading many businesses to question the causes and wish to understand whether such volatility is likely to continue. In this bulletin, we indicate how economics can help to provide some answers. →

OFF THE LAUNCH PAD

The EU ETS provides firms with a financial incentive to reduce emissions of CO₂, a greenhouse gas that is believed to be causing climate change. Firms operating in sectors included in the scheme, essentially electricity generation and heavy industry, must now surrender an allowance for every tonne of CO₂ that they emit. If they can avoid emitting some or all of the CO₂, they can instead sell some or all of their allowances, at the prevailing market price. Whether it is worth making the investment necessary to cut emissions plainly depends on the price at which allowances can be bought. If abatement is costly for a particular firm, and/or allowances are cheap, then that firm will prefer to use up its allowances and even buy more.

Each firm has been provided with an initial, free allocation of allowances per year during Phase I (2005-07). The number of allowances allocated to each firm is decided by the government of each member state, subject to the agreement of the European Commission (EC). Decisions for each country are published in a National Allocation Plan (NAP). This framework for allowance allocation was set out in European Directive 2003/87/EC.

In most cases, and particularly in electricity generation, the allocation a firm received was slightly lower than its historic level of emissions, implying that some action would be necessary. Since firms can trade allowances freely with one another within the EU, the scheme should ensure not only that overall emissions are reduced, but that the cuts are made by those firms within the EU that can do so most cheaply. Hence the economic impact of reducing emissions of CO₂ should be minimised.

As for other freely-traded goods, the price of a carbon allowance will be determined by the balance between supply and demand. This is illustrated in the graph.

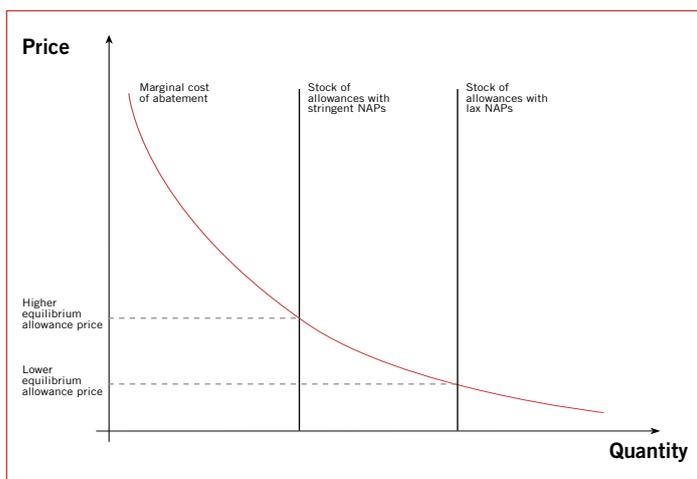


Figure 1: How market forces determine carbon allowance prices

The available stock of allowances throughout the EU is essentially fixed¹ and known once each of the 25 EU member states has finalised its NAP. Through these NAPs, member states jointly set the total abatement required from the participating sectors. Two possible levels of allowances, representing “stringent” and “lax” approaches to abatement, are illustrated by the vertical lines in the graph. The curved line represents the marginal cost of cutting emissions across the participating sectors as a whole, which determines the demand for allowances. The two points where this curve intersects with the vertical lines determine the equilibrium price of an allowance under the two scenarios. Plainly, if stringent NAPs are published, more abatement will be needed and relatively expensive abatement projects will be worthwhile, because the demand for allowances (and their price) will be higher than if governments set lax NAPs.

WHY SO VOLATILE?

So far, so simple. This economic framework can, however, help us to tackle a more complex issue: the causes of the volatility seen in emissions trading markets during their

first year. We believe that there have been two main causes of the wide variation in the prices that have emerged in the market to date arising from:

- political uncertainty, particularly about supply of allowances; and
- uncertainty about abatement costs.

Political uncertainty

Uncertainty about the supply of allowances has persisted because of:

- **Late publication of NAPs** by national governments – many member states missed the deadline for the submission of their NAP to the European Commission (EC), making it impossible to work out precisely what stock of permits would eventually be available.
- **Revision of NAPs by the EC** – several of the initial NAP proposals were rejected by the EC, which thought that the allocations were too generous.

Clearly, businesses in countries with less stringent policies would have the advantage over competitors elsewhere of being allowed a higher level of emissions (or being able to sell surplus allowances), so there was a natural tendency to err on the lax side. Early in 2005, the publication of the majority of initial national NAPs led the market to expect a large stock of allowances and low prices. Policy-wise, the risk was that Europe as a whole would fail to get on track for the Kyoto compliance period (2008-12). So the EC required several member states to think again. Shifts in the market's view of the outcome for Phase I have certainly contributed to price volatility.

But political risk does not end here. For example, if it became clear that other countries were effectively ignoring the Kyoto agreements, would the EU continue with its current scheme? Abolition would reduce the price of an allowance to zero, and this risk adds further uncertainty to carbon trading.

Uncertainty about abatement cost

The second probable cause of the volatility in prices is uncertainty over the cost of abatement – the position and shape of the curve on the graph. Costing a simple, firm-specific, abatement project is one thing. Costing the enormous range of possible types of abatement across 25 countries, and then aggregating the information into a marginal cost curve, is quite another. The market has been forming price expectations on the basis of only patchy information, with inevitable results. However, over time, as participants with a better understanding of abatement costs begin to trade, at least part of the curve should be traced in with greater certainty.

Another pressure on allowance prices in the summer of 2005 came from the increase in the price of gas relative to coal. As a result, more electricity was produced from coal-fired assets, which emit more carbon per unit of electricity generated than gas-fired assets. In addition, the dry winter of 2004-05 across much of Europe reduced electricity generation from hydro stations. This combination drove up the demand for allowances by power companies, who entered the market on a substantial scale. The recent fall in the price of an allowance probably reflects the fall in the price of gas, partially reversing one of the effects.

In summary, therefore, the market has been affected by teething troubles but also by economic and political factors that will have to be taken into account in the future as well. While abatement costs are driven by market fundamentals, the stock of allowances plainly is not. Market participants must therefore contend with inherent uncertainty over costs coupled with political risk over commitment to Kyoto and carbon abatement.

THE END GAME

However interesting this volatility may be to an economist, it is distinctly inconvenient for businesses participating in the EU ETS. The financial reward for undertaking an abatement investment depends on the allowance price. A volatile and uncertain price is a further inhibition on business development.

The bad news for business planners is that this volatility may well continue and even increase as Phase I draws to a close. This is because, under current policy, allowances from Phase I cannot be banked and carried over to Phase II (2008-12). It is also because of the way penalties for companies that fail to submit the necessary number of allowances are to be applied.

In April each year, all participating firms must submit one allowance for each tonne of CO₂ they have emitted in the previous year, as determined by an independent verifier. If a company fails to submit a sufficient number of allowances, then it is required to pay a fine of €40 a tonne (rising to €100 a tonne in Phase II). In addition, the company is required to make up its shortfall of allowances in the following year.

Details of the application of this penalty system are still to be clarified by the EC. However, what has been said so far would suggest a huge range of values for allowances on the final day of Phase I. If there is a surplus, they will be worthless – since they cannot be carried over to Phase II. If there is a deficit allowances could be worth €40 (the level of the fine a company is seeking to avoid), plus the expected price of an allowance in Phase II (which a company would have to acquire to make up its shortfall). Moreover, if NAPs for Phase II are subject to the same level of debate and revision as for Phase I, this expected price will be extremely uncertain. If it is difficult to predict whether there will be a surplus or deficit then prices could become very volatile indeed.

CONCLUSION

While the concepts that underpin carbon allowance price formation are relatively simple, there are a number of sources of uncertainty in the EU ETS. Uncertainty over the actual cost of carbon abatement will diminish over time as the actual cost of abatement is revealed. However, other inherent sources of uncertainty, such as hydrology and volatility driven by changes in the prices of primary fuels, will persist.

Analysis of the relationship between carbon prices and other variables is complex, but can help companies work out how to quantify and manage such risks. There are liquid markets in all primary fuels, and increasingly liquid markets in weather derivatives, that may allow hedging strategies to be implemented. However, it is equally important for companies to find ways in which they can cope with the political risks.

In addition to hard analysis, therefore, participating firms will need to monitor the debate over environmental protection and climate change, not only in their own countries but also across the EU, so that they can respond quickly to political decisions that may have a substantial impact on the EU ETS. A framework that enables both sets of risks to be incorporated into decision-making will be essential for those companies for whom emission allowances are now a significant business cost.

SOURCE	1. <i>In practice it is possible to create additional allowances by undertaking certain types of environmentally friendly investment in developing countries. However, in comparison with the total stock of allowances issued by all 25 Member States, this is unlikely to be substantial.</i>
CONTACT	<p>Wynne Jones wynne.jones@frontier-economics.com</p> <p>Christoph Riechmann christoph.riechmann@frontier-economics.com</p> <p>Mike Huggins mike.huggins@frontier-economics.com</p> <p>Frontier Economics Ltd 71 High Holborn London WC1V 6DA</p>
	LONDON COLOGNE MELBOURNE SYDNEY
	www.frontier-economics.com