

# A lot of hot air?

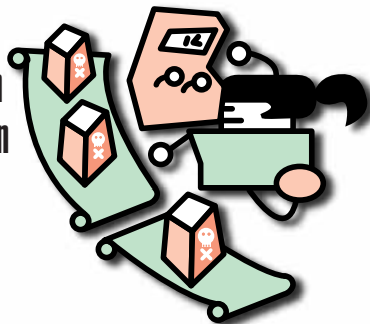
## The Kyoto deal and emissions trading

**Negotiators are hard at work trying to turn the Kyoto Protocol agreed last December into an effective means for reducing greenhouse gas emissions and so halt the process of global warming. The central feature of the deal was the – controversial – introduction of a scheme for emissions trading. Daniel Sturm of the CEP assesses new evidence which the negotiators should draw on to make a global trading scheme a success.**

**E**ven by the standards of international summitry it was a nail-biting finish. Not until the final hours of the Kyoto Summit could anyone be certain that an agreement on greenhouse gas emissions would be reached. The arguments – especially between the industrial countries on the one hand and the developing countries on the other – were bitter. They were also plagued by confusion, particularly about the difference between the reducing *global* cost of cutting emissions and the way the burden of these costs were *shared*. Central to the dispute was American insistence that any deal to cut greenhouse gas emissions should be accompanied by a new scheme of global trading in emission permits.

The American view prevailed: the Kyoto deal made provision for a trading scheme central to the strategy for overall cuts in emissions. But ratification of the agreement by all the signatories is still some way off, and depends crucially

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on the creation of a workable scheme for emissions trading. The accumulating evidence about the extent to which such schemes have been successful in the US underlines the extent to which agreement in principle is only half the battle. It's the details of any scheme which can make or break it – and the Kyoto negotiators must ensure they learn the right lessons from past experience.

### The problem's familiar...

The worries about the impact of global warming are all too familiar. The growing emission of greenhouse gases into the atmosphere concern scientists who fear that the subsequent build-up of these gases – of which carbon dioxide is the main one – will raise global temperatures significantly. *Emissions* themselves don't directly cause the problem, rather the *concentration* of gases in the atmosphere. Such concentrations have already increased by about 30% since the middle of the last century. The Intergovernmental Panel on Climate Change has predicted that if no action were taken to limit emissions, concentrations of carbon dioxide could increase by a further 6% by 2010.

### ...as is the solution

Much more difficult to predict, of course, is the impact of these expected climatic changes, and their economic conse-

quences. Such uncertainties have been seized on by those resistant to the need for big global reductions in greenhouse gas emissions. But contrary to the perception of some people, this was not the source of the disagreements at Kyoto. Indeed, the Protocol signed last December has been seen as an important step in creating a global response to the problems of climate change. The industrial countries and those economies classed as being in transition have accepted a legally binding commitment to reduce their emissions by about 5% from 1990 levels by the period 2008-2012. (The Protocol places no limits on emissions from developing countries.) These new limits on emissions are expected to have a small but significant impact on concentrations by 2010.

Although it's the concentration levels which matter in climatic terms, emission levels are the means by which these can be controlled in future; and controlling emissions is hugely expensive. Estimates of the annual cost simply of stabilising emissions at 1990 levels currently range from 0.4% to 1.3% of world GDP in 2010. The search is therefore on for ways to limit these costs. Kyoto broke new ground in this search by introducing provisions for trading in emission rights. Indeed, these provisions are crucial to the success of the deal: not only should they help reduce the cost of emission controls, but the United States has refused to ratify the Kyoto Protocol without a satisfactory trading scheme.

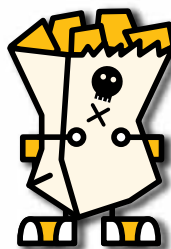
### The economic rationale

Environmental policymaking in the past has been dominated by the *command and control* approach: this has specified

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either the control technologies to be used or set the emission limits to be attained for specific pollution sources. Economists, however, have long advocated a *market-based* approach to pollution control: so that emission reductions are achieved by altering the price incentives polluters face rather than by direct regulation. Tradeable emission permits are a good example of this market-based approach.

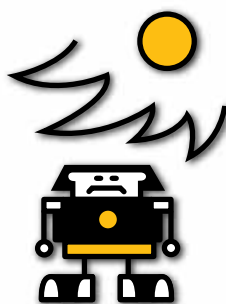
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The basic structure of such a scheme is simple enough. The first step is to agree on the total reduction in emissions (5% for the countries covered by the Kyoto Protocol). Then the total amount of emissions permitted after the reductions have been made is divided up into allowances – for example, one allowance might

mean a permit to emit say one tonne of CO<sub>2</sub> each year. These allowances are then shared out among the participants of the scheme, according to a pre-arranged formula. The idea is that these allowances, or permits, can be traded on a market: essentially allowing permits to pollute to be bought and sold. Then at the end of each year, an independent regulator compares the actual emissions of each polluter with the size of the allowances held. Any individual, company or country which generates more emissions than their permits entitle them to will be penalised, just as they would under the traditional regulatory approach.

But why would such a scheme be expected to reduce the cost of implementing overall reductions in emissions? The answer lies in the fact that the costs of reducing emissions is likely to vary across companies and countries. If everyone had to reduce their total emissions by a certain amount some would find it easy and therefore cheap to meet the target; others would find it very expensive indeed. Trading permits for emissions enables parties with very different costs to engage in a mutually beneficial exchange. Those with low costs will find it attractive to reduce their emissions even further than the target reduction and then profit from the sale of the excess permits they don't need. But those for whom any emissions reduction would be expensive could find it cheaper to buy someone else's permits instead.



Provided the transactions costs of this trade in emission permits is kept small, the result will be that emission reductions are made wherever it's cheapest to do so. Eventually trading will equalise the marginal cost of emission reductions for everyone and so ensure that the global costs are kept to the minimum.

But these benefits are likely, if anything, to understate the cost savings to be had from emission trading. Consider a polluter who is forced to use a specific pollution control technology. He has clearly little incentive to find new and cheaper ways of controlling pollution. But under a tradeable permit scheme, each polluter would be free to choose any means of keeping emissions in line with the permits held. There is then an incentive to cut the cost of reducing emissions, because that would then provide the opportunity to sell unused permits on the market.

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Attempts have been made to quantify these potential savings. In 1995 the Intergovernmental Panel on Climate Change examined models which try to simulate the savings from a trading scheme compared with a system of uniform reductions in emissions across countries. Such models don't take account of the benefits from technological innovation which might flow from a tradable scheme. And the Panel found huge variations in the estimates of savings to be had: from 10% to 50% of the total cost of making emission reductions. But it's significant that *all* the current models agree that there would be savings under such a scheme. It's also worth remembering that given the scale of the costs involved, even a 10% reduction amounts to a huge amount of money.

Moreover, all these savings can be achieved without any reduction in the environmental benefits to be gained from emission reduction. Greenhouse gases inflict the same global damage no matter where on the planet they were originally released. Changes in the way emission reductions are made – cutting them in one part of the world, raising them in another – can have no negative impact on climate change.

### But is it fair?

It's the arguments about *equity* that have muddled the debate about emissions trading. Critics argue that it lets the industrial countries, and in particular the United States, buy their way out of their responsibility to reduce emissions. It's clear from the nature of the discussions

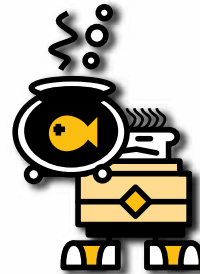
**The purpose of emissions trading is to keep the global costs of reducing emissions as low as possible; such schemes are not about how the burden of reduction is shared.**



both in Rio and Kyoto that the equitable distribution of the burden of reducing greenhouse gas emissions is an important and a contentious issue. The Rio Convention of 1992 incorporates the now famous principle that all countries have a *common but differentiated* responsibility for protection of the climate system.

The concept of equity is important because of the huge discrepancies in greenhouse gas emissions between the industrial and the developing countries. In 1990, the US alone accounted for about 35% of total CO<sub>2</sub> emissions, and the European Union countries for another 23%. Emissions per head show an even starker contrast with the developing countries: in the latter, CO<sub>2</sub> emissions currently average 0.5 tonnes a year, compared with an average of 3 tonnes a year in the industrial world. Many people, and especially those in the developing countries, argue that these figures make it imperative for the industrial countries to take the lead in reducing emissions.

This is where the confusion is at its greatest. The purpose of emissions trading is to keep the *global* costs of reducing emissions as low as possible; such schemes are not about how the burden of reduction is shared. It's the initial



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distribution of allowances which determines how such responsibility is divided up. Giving a larger allocation of permits to developing countries, for instance, would raise the cost of emission reductions to industrial countries because they would end up having to buy more emission permits on the market. By doing so, they would shoulder more of the financial burden of emission reduction, while trading ensures that emissions are reduced wherever this can be done most cheaply.

### Putting theory into practice

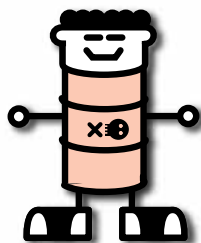
The negotiators now drawing up a trading scheme know how much is riding on the plan they come up with. New data on the way such schemes have been operating offer important indicators for developing a successful scheme. Virtually all such schemes are in the US, where experience shows that the details can make the difference between success and complete failure.

In the early seventies the very first trading provisions were introduced into the American Clean Air Act, which covers several pollutants, including sulphur dioxide, nitrous oxide

and lead. This early trading differed substantially from a full-blown trading scheme. Trade had to be approved on a case-by-case basis with expensive approval procedures that could take up to two years. The performance of the market was very disappointing with much fewer transactions taking place than expected. Although annual cost savings were estimated at anywhere between \$100m and \$1400m this represented only a small percentage of total expenditure on air pollution control. Most observers agree that the central problem was the enormous complexity of the original regulations – these just prevented many cost saving trades from taking place.

In 1990 the trading provisions were fundamentally reformed. A market close to the textbook ideal was intro-

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duced to combat acid rain from sulphur dioxide emissions. The scheme, which is still the largest pollution market, in operation, is targeted at the electric utilities which account for over two thirds of total sulphur dioxide emissions. By 2000, the aim is to reduce emissions by a very ambitious 50% compared with 1980 levels. There is minimal interference with permit trading, with the role of the regulator limited to recording transfers and determining compliance at the end of each year.

After a cautious start to trading in 1993, activity under this programme has picked up remarkably, with trades doubling on average every year since 1993. With such large trading volumes the market is expected to generate savings of around 50% compared with the traditional approach to emission reductions. The US General Accounting Office is now projecting savings of around \$3 billion annually by 2000. Compare this with a different scheme, to reduce pollution from pulp manufacturers in the Fox River. This could bring savings of around \$7 billion, said the scheme's architects. In fact, the rules were so complex, that only one trade was ever recorded.

### Transaction costs are what really matter

The key lesson that emerges from the American experience is overwhelming: keeping transaction costs low is much the most important requirement for a successful trading scheme. If the rules aren't as simple as possible, most of the incentives for engaging in trading will be removed – and

at least a significant portion of trades won't take place. The Kyoto Protocol is worryingly unclear in this area. Of the provisions that deal with trading among the industrial countries, one seems to envisage a case-by-case approach similar to the original US scheme, along with the complicated rules likely to deter trading. But other parts of the Protocol seem to envisage a scheme on the lines of that operating successfully in the American sulphur dioxide market. Which of these options is pursued further will be crucial in determining whether or not a greenhouse gas trading scheme is successful.

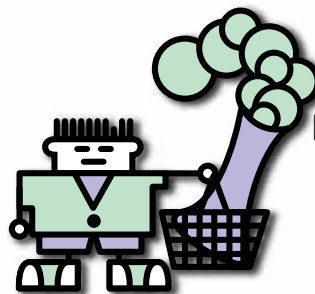
Since developing countries have no emission limits set under the Kyoto agreement, trading between them and the industrial countries will have to be on a case-by-case basis.

The Protocol provides for the industrial countries to acquire extra emission permits by financing projects to reduce emissions in developing countries below what they would otherwise have been. This last definition is, of course, highly contentious in the absence of agreed emission limits for the developing world. Nevertheless, transparent and simple rules will be crucial if excessive transaction costs are to be avoided, and trading encouraged.

### The jury's still out

It's an old cliché to say that the devil is in the detail. In this case, however, it's true. Much of this detail will be high on the agenda of the next meeting of the parties to the Protocol in Buenos Aires in November this year. The Kyoto Protocol does offer the prospect of a workable deal on controlling greenhouse gas emissions. Limiting rather than halting the build-up of greenhouse gases may seem a modest achievement, but it's one which seemed likely to prove elusive a year ago. The negotiators know they still have a long way to go.

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