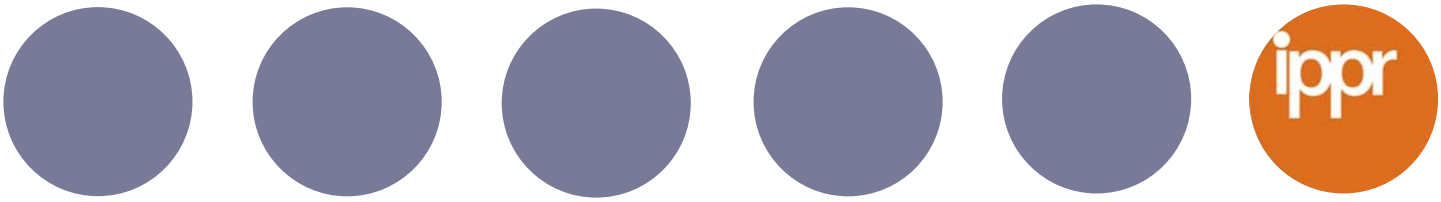


Trading Up:

Reforming the European Union's Emissions Trading Scheme

Tim Gibbs and Simon Retallack

DECEMBER 2006

Institute for Public Policy Research
www.ippr.org

The Institute for Public Policy Research (ippr) is the UK's leading progressive think tank and was established in 1988. Its role is to bridge the political divide between the social democratic and liberal traditions, the intellectual divide between academia and the policy making establishment and the cultural divide between government and civil society. It is first and foremost a research institute, aiming to provide innovative and credible policy solutions. Its work, the questions its research poses, and the methods it uses are driven by the belief that the journey to a good society is one that places social justice, democratic participation, economic and environmental sustainability at its core.

This paper was first published in December 2006.

30-32 Southampton Street, London WC2E 7RA
Tel: 020 7470 6100 Fax: 020 7470 6111 www.ippr.org
Registered Charity No. 800065

Contents

Acknowledgements

We would like to thank the following for their advice and assistance during the course of writing this paper: James Wilde, The Carbon Trust; Christian Egenhofer, Centre for European Policy Studies; Matthias Duwe, Climate Action Network – Europe; Kate Hampton, Climate Change Capital; Beth Child and David Willis, Defra; Laura Fellowes, DfT; Iain Morrow, DTI; Molly Anderson, Environment Agency; Brian Seabourne, E.ON UK; Brian Samuel, EST; Doug Parr, Greenpeace; Rebecca Lawrence, HMT; Jason Anderson, Institute for European Environmental Policy; Caroline Lucas, MEP; Garth Edward, Shell; Keith Allot and Kirsty Clough, WWF UK; and Kirsty Hamilton, UKBCSE. Special thanks to Tony Grayling, Defra.

We would also like to thank E.ON UK, the Greenpeace Trust and WWF UK for their generous financial support of this project and Shell UK and the Esmee Fairbairn Foundation for their support of the ippr Low Carbon Programme.

Georgina Kyriacou, ippr, steered the report towards publication. Thanks, too, to Natasha Comber, Corinna Kendell and Gouri Nambudripad who provided first-rate research and administrative assistance.

The opinions expressed in this report are solely those of the authors.

About the authors

Tim Gibbs is a researcher in the climate change team at ippr. Prior to that, Tim worked for the press office of the International Labour Organisation in Geneva.

Simon Retallack is head of the climate change team at ippr. He is also co-director of the Climate Initiatives Fund, a grant-making programme established to help accelerate action to address climate change.

Abbreviations and definitions

CDM	Clean Development Mechanism
CER	Certified Emissions Reductions
CH_4	Methane
CO_2	Carbon dioxide
ERU	Emission Reduction Units
EU15/EU25	The European Union was enlarged in 2004 to include 10 new member states, bringing total membership from 15 to 25 countries. 'EU15' refers to the 15 member states; 'EU25' refers to the expanded European Union.
EU ETS	European Union Emissions Trading Scheme
EUA	European Union Allowance
ETS	Emissions Trading Scheme
F-gas	Fluorinated gases
GGAS	Greenhouse Gas Abatement Scheme
JI	Joint Initiative
LFG	Land fill gas
LULUCF	Land use, land use change and forestry
MtC	Million tonnes carbon
$MtCO_2$	Million tonnes CO_2
$MtCO_2e$	Million tonnes CO_2 equivalent
NAP	National Allocation Plan
N0x	Nitrous oxide
PFC	per fluorocarbon
RGGI	Regional Greenhouse Gas Initiative
UNFCCC	United Nations Framework Convention on Climate Change

Executive summary

Tackling climate change is one of the highest priorities of the European Union (EU). The centrepiece of its response has been the development of the European Union Emissions Trading Scheme (EU ETS). Almost half the European economy is covered by the EU ETS, which provides companies within the scheme with a cost-effective means of abating their carbon dioxide (CO_2) emissions.

The first phase of the EU ETS runs from 2005 to 2007, and the second phase, running from 2008 to 2012, coincides with the first commitment period of the Kyoto Protocol. Phase III of the trading scheme will follow thereafter.

There have been difficulties during Phase I, but there are clear opportunities to improve the workings of the EU ETS. In 2006 the European Commission starts a review of the EU ETS, with a view to improve the trading scheme beyond Phase II. Specific legislative proposals for Phase III are likely to follow in 2007.

Since spring 2006, the Institute for Public Policy Research (ippr) has been conducting a research project, *Building on the European Emissions Trading Scheme*. The project examines the role that the EU ETS can play in the longer term, as part of a European and global effort to cut greenhouse gas emissions. It focuses in particular on three strategic issues, which will be central to the future of the EU ETS:

- Ensuring that the EU ETS delivers emissions reductions in line with the EU's climate targets.
- Establishing the extent to which expanding the EU ETS to include new sectors of the economy can drive emissions reductions within the trading scheme.
- Exploring the role the EU ETS can play in establishing a global carbon market.

It is important to note at the outset that although the report discusses the inclusion of aviation and road transport sectors in the EU ETS, it does so from the perspective of what would be best for the effectiveness of the trading scheme itself. This report does not seek to offer a comprehensive analysis of measures required to reduce emissions in these two important sectors.

Ensuring emissions reductions

In the first year of trading, 2005, the EU ETS did not yield any emissions reductions. Indeed, it is likely that there will be few reductions in the first phase of trading. Member states themselves decide the emissions reductions they will take. Many are anxious to avoid making more effort then their neighbours. Such a 'race to the bottom' can only lead to failure.

The process of setting National Allocation Plans (NAPs) has to be improved so that the EU ETS results in definite emissions reductions.

In the medium term, the NAP setting process must be harmonised across the EU. A level playing field will encourage member states to make emissions reductions because it will be easier to evaluate whether countries are making comparable emissions reductions efforts. It is necessary for member states to:

- Give the European Commission the data to determine whether their NAPs are consistent with EU-wide agreements made by member states and national targets set by individual member states.
- Provide the Commission with more technical and diplomatic support so that the Commission is further empowered to reject NAPs that are found wanting.

In the longer term, the process of setting NAPs should be centralised, with the Commission setting emissions limits that are consistent with emissions reductions agreements made collectively by EU member states. This would offer assured emissions reductions.

Methods of allocating emissions allowances have to incentivise carbon abatement – too often member states do the opposite. The European Commission and member states should vastly increase the proportion of allowances that they allocate by auctioning, a system that fully takes into account the cost of carbon:

- The Commission should set out a timetable that will rapidly move the trading scheme towards 100 per cent auctioning.
- The Commission currently sets an upper limit of allowances that can be allocated by auction; instead, it

should set a lower limit that increases in each trading phase, rapidly moving towards the target of auctioning all allowances.

While the free allocation of emissions credits continues, great improvements could be made here:

- The European Commission should work towards developing common allocation methodologies based on best available technologies.
- Rules that govern the emissions allocations given when power stations and industrial plants are commissioned and decommissioned (so-called 'entrance and closure rules') have to be harmonised at a European level so as to incentivise the replacement of dirty technologies.

The European Commission should also consider how the EU ETS can provide greater long-term predictability so that businesses invest in low-carbon technologies.

Expanding emissions trading to new sectors

There are major sectors of the economy that fall outside the EU ETS that should be included in the trading scheme:

- The EU ETS should include more energy-intensive industries and activities, such as semi-conductor and refrigeration manufacturers, in the trading scheme. These inclusions could increase the size of the EU ETS by around 9 per cent.
- At the same time, however, the European Commission should stipulate that small emitters are excluded from the scheme – provided that alternative policies are put in place to address their emissions. Currently 50 per cent of the installations in the EU ETS account for only 0.8 per cent of emissions.

There are also moves to include transport sectors in the EU ETS. Proposals to include the aviation industry are well underway. Whether or not the inclusion of aviation leads to success in reducing emissions depends on the extent to which the sector is required to address the full impact of flying on climate change. The devil lies in the details:

- The scheme should cover as many flights as is legally possible – ideally covering all flights to and from EU airports, even intercontinental flights crossing EU airspace.
- Currently, it is only practicable for emissions trading to cover CO_2. However, the total climate impact of aviation is approximately two to five times greater than the impact of CO_2 emissions alone. This should be factored into the scheme through 'flanking measures', such as emissions charges.
- Emissions allowances for the aviation sector should be auctioned. Free allowances allocated to airline companies could result in windfall profts of up to Eur 4 billion.

The impact of including the aviation sector in the EU ETS also depends on how the trading system handles the expected rapid growth of the sector. The sector has few opportunities to abate its emissions, so would have to buy in emissions credits from elsewhere in the EU ETS to cover its impact on the environment. At the moment, the aviation sector is relatively small and would only buy in around 1 per cent of the credits available under the present scheme. However, projections suggest that the growth of the aviation industry might cause the overall allowance price to rise, as the sector buys in more and more credits. This could lead to substantial political pressures to reduce the environmental stringency of the EU ETS.

To ensure that inclusion of the aviation sector does not undermine the trading scheme itself the European Parliament voted in July 2006 in favour of creating a separate closed scheme or semi-open trading scheme for aviation, in which airlines bought credits from the EU ETS on a carefully limited basis.

However, the European Commission proposal, due at the end of 2006, seems likely to include aviation in a fully open trading scheme. Should this occur, at the very least:

- The Commission should regularly review the impact that fully open trading has on the carbon price and the environmental integrity of the EU ETS.

There is also the possibility that the aviation industry will argue it 'has done its bit' by joining the Emissions Trading Scheme. However, that may not be sufficient to address the problem of growing emissions from aviation. The inclusion of aviation in the EU ETS should be accompanied by the introduction of a broader package of measures to reduce the climatic impact of aviation and the growing

demand for air travel. The aviation industry currently enjoys tax breaks and subsidies that are not available to more environmentally friendly forms of transport. These loopholes should be closed.

A number of member states have also proposed that the European Commission's review should consider whether it would be efficacious to include road transport in later phases of the EU ETS. Any such proposals should not be an alternative to more targeted policies and measures that could offer definite emissions reductions from road transport.

Although the road transport sector has many emissions abatement options, these are costly and in an open market the sector would probably buy emissions credits to cover the cost of its environmental damage. If the sector becomes a significant net buyer of emissions credits, this will raise EU ETS market prices, and this might lead, for example, to higher consumer heating bills – a politically difficult issue. This in turn might lead to substantial pressures to dilute the EU ETS. Were this likely, policymakers should review the efficacy of including road transport in the EU ETS.

It is likely that the obligation to account for road transport emissions will fall on fuel suppliers; they should not be granted free emissions allowances. It is likely that fuel suppliers might pass the carbon costs onto consumers. In this instance it would be politically contentious if these companies were granted free allowances and a windfall profit – as has been the experience of the energy companies.

We recommend that:

- Policies such as mandatory fuel-efficiency requirements, road user charging schemes, and road fuel and motoring taxes can significantly reduce road transport emissions. Priority should be given to these measures; including road transport in the EU ETS should not be pursued at their expense.
- A semi-open trading scheme, which carefully limited the credits bought in by the road transport sector, might guard against this outcome.
- Including the road transport sector in the EU ETS may well raise the cost of transport fuels. It is imperative that politicians do not offset any price rises – by cutting other fuel taxes, for instance – and weaken incentives for motorists to reduce their fuel consumption.
- All allowances should be auctioned.

The maritime sector has not been included in international emissions trading because UN parties have been unable to agree on who should take responsibility for the sector's emissions. Yet the maritime industry accounts for 4 per cent of the EU's CO_2 emissions and there are significant opportunities to reduce its climatic footprint: the European Commission should actively consider including the maritime sector in later phases of the EU ETS., and it could start the debate by commissioning a detailed study of the sector.

Establishing a global emissions market

For a long time, EU policymakers have wanted to develop a global emissions market by linking together individual trading schemes. This offers a number of opportunities. It can increase economic efficiency, as it often costs less to invest in emissions abatement projects outside the EU, and thus the same environmental goal can be achieved at a lower cost. These emissions abatement projects can sometimes support developing countries' sustainable development goals – for instance providing finance for investments in wind power in India. Engaging companies in developing countries in emissions trading through these mechanisms also fosters cooperation, thus creating diplomatic impetus for governments to discuss the further development of international emissions trading.

Achieving these goals, however, is not straightforward. It is imperative that the EU ETS is not undermined when linking to other trading schemes. Trading schemes should only be linked together in so far as this supports and encourages the development of a robust system of international emissions trading.

The EU ETS Linking Directive makes it possible for operators to acquire emissions credits from emissions reductions projects outside the EU, established under the Kyoto Protocol. The EU can make an important contribution to the debate on the future of the Kyoto mechanisms, the Clean Development Mechanism (CDM) and Joint Implementation (JI), after 2012:

- The EU must ensure that its use of these external credits in the EU ETS is supplementary to domestic actions that reduce CO_2 emissions.

- The European Commission should set caps on the use of JI/CDM so that action within the EU becomes the main means through which emissions reductions are achieved.

The European Union has also begun discussions as to how the EU ETS might link to emerging regional, national and sub-national emissions trading schemes around the world.

In the coming years the EU faces a difficult political judgment as to whether it would be beneficial to link to trading schemes in developed countries that have very different features to the EU ETS. Although some economists have proposed technical fixes that would manage the process of linking together trading schemes that have very different features, there have been doubts expressed about the efficacy of such 'fixes'. Although the perfect should not be the enemy of the good, caution should be exercised, in particular in regard to:

- If the EU ETS directly or indirectly has links with trading schemes that allow nuclear or land-use change projects, which the EU ETS currently forbids, credits from this will enter the EU ETS market. The EU should not rush into linking arrangements that would water-down the hard-won environmental features of the EU's scheme.
- The EU ETS should not buy in emissions credits from a trading scheme in a developed country that does not have absolute caps. Linking the EU ETS to a trading scheme with relative targets might lead to lesser emissions reductions overall. Linking to a domestic trading scheme in a developed country that only took on relative targets would also undermine the important political principle that developed countries must make absolute emissions reductions.
- The EU ETS should not buy in credits from voluntary emissions trading schemes in developed countries. Nor should it link to a scheme that has such weak compliance rules that emissions credits lose economic and environmental value.
- If the EU ETS links to a scheme with price caps, then these caps will hold down the price of emissions credits across all linked trading systems. Decision makers should be very wary of linking the EU ETS to trading schemes that have price caps, particularly if this would dramatically lower EU ETS market prices.

1. Introduction

European emissions trading

The European Union Emissions Trading Scheme (EU ETS) is Europe's most important initiative for curbing greenhouse gas emissions and averting dangerous climate change. Human-induced climate change, caused by emissions of CO_2 and other greenhouse gases (GHG), mainly from burning fossil fuels and deforestation, is a serious long-term global environmental threat to human and ecological welfare (Baer 2006). To avoid dangerous climate change, global greenhouse gas emissions must be reduced very significantly.

The European Union Emissions Trading Scheme is potentially the most efficient means by which the EU can meet its own emissions reductions targets under both the Kyoto Protocol and the European Council. Also, as the world's first major trading scheme to be up and running, its success is crucial for the future of international emissions trading.

Box 1: How does the EU ETS work?

The EU ETS currently covers carbon dioxide (CO_2) emissions from power stations and energy-intensive industries, such as steel, cement, paper and oil refining, throughout the EU. The first phase of the scheme (Phase I) runs from 2005 to 2007 and the second from 2008 to 2012 (Phase II). Phase II of the EU ETS runs concurrently with the first commitment period of the Kyoto Protocol, the international emissions reduction and trading treaty negotiated under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC). Phase III of the EU ETS will follow thereafter.

Currently, each member state in the EU ETS devises a National Allocation Plan (NAP) for each phase. Each state's NAP specifies the total emissions that are permitted for each phase, and sets out how allowances are to be allocated to the installations (such as power stations and factories) that are included in the scheme. In Phase I, governments have the discretion to auction or sell up to 5 per cent of their allowances. Meanwhile, the other 95 per cent must be allocated free of charge. In Phase II, they can auction or sell up to 10 per cent.

Each installation is allocated a quota of allowances, each of which permits the installation to emit 1 tonne of carbon dioxide (tCO_2). These European Union Allowances (EUAs) can be 'traded' between installations, and intermediaries, across the EU. This means that if an installation produces more emissions than its quota, it must pay the cost of additional allowances from installations emitting less than their quota. The penalty for producing more emissions than allowances is Eur40 per allowance in the first phase, and Eur100 per allowance in the second phase. The excess emissions must also be covered by allowances surrendered by the installation in the following year, so that the environmental integrity of the scheme is not compromised.

Installations are also allowed to buy emissions credits through Kyoto's Clean Development Mechanism (CDM) and Joint Implementation (JI), in which investments in emissions-saving projects abroad, in developing countries and industrialised countries respectively, earn 'emissions reduction units' (ERUs) or 'certified emissions reductions' (CERs), which are equivalent to EUAs.

Reforming the EU ETS in Phase III

There are still fundamental weaknesses in the design of the EU ETS and therefore opportunities to improve its workings. Phase III of the trading scheme provides an opportunity to address these concerns; indeed, the European Commission will review the EU ETS in the next year. The Commission set out the terms of reference for the review in November 2006 (European Commission 2006). A working group will carry out the review, and specific legislative proposals are likely to follow in autumn 2007.

The working group's terms of reference state that it will focus on four strategic issues:

- Further harmonisation and increased predictability in the trading scheme (so that emissions reductions can be made)
- The scope of the directive (that is, whether the trading scheme should be expanded to include new sectors)
- Linking with emissions trading schemes in other countries
- Robust compliance and enforcement.

This paper focuses particularly on the first three of these strategic issues.

Ensuring emissions reductions

The EU ETS plays a central role in the EU's efforts to reduce carbon emissions. For a start, it is an integral means of meeting emissions reductions targets agreed under the UN Kyoto Protocol. These obligations are to reduce greenhouse gas emissions from 2008 to 2012 by 8 per cent from 1990 levels.

The EU ETS is also likely to become a keystone of European emissions reduction efforts after 2012. The EU Environment Council has set ambitious greenhouse gas emissions targets of 15-30 per cent reductions from 1990 levels by 2020, and 60-80 per cent reductions by 2050 (Commission of the European Communities 2005). Indeed, the UK Government recently noted that the 2007 European Spring Council should agree options for reaching a post-2012 framework of commitments as a matter of urgency. It stated that, 'as an interim step, the EU [should] commit to reducing greenhouse gas emissions across the EU as a whole to 30 per cent below 1990 levels by 2020' (HM Treasury 2006: 1).

Up till now, however, the EU ETS has not yet achieved significant emissions reductions. Member states have shied away from setting bold emissions reductions targets for industry. In the first year of trading, 1829.5 million tonnes of emissions allowances were allocated by member states; yet in the first year of trading (2005), participants only emitted 1785.3 million tonnes (European Union 2006). The methods member states use to allocate emissions credits also do not incentivise efficient CO_2 reductions and encourage long-term investment in low-carbon technologies.

Expanding the scheme

The EU ETS is wide in scope, covering around half the carbon dioxide emissions in the EU (excluding emissions from international shipping and aviation). Nevertheless, many activities and gases that significantly contribute to global warming lie outside the scheme – for instance transport accounts for around one-fifth of the EU's emissions. This report considers arguments for expanding the EU ETS so that it includes not only additional gases and activities in energy-intensive industries, but also the aviation and maritime industries, and road transport.

Including completely new transport sectors in the EU ETS has to be handled carefully. Important questions need to be answered. Will new sectors be expected to make proportionate emissions reduction efforts? If the newly included sectors become net buyers of emissions credits, will this raise market prices; and would this lead to political pressure to set less bold emissions reductions targets?

Establishing a global carbon market

The EU ETS is also integral to the future of international emissions trading worldwide. First, the EU ETS is the largest and most important emissions trading scheme that is already running. Its success, or otherwise, will influence perceptions of the efficacy of international emissions trading during the first Kyoto phase (2008-2012), and opinions of what is possible afterwards.

Second, the EU ETS also has a facility to buy in trading credits from greenhouse gas abatement projects in developing countries. (See page 29 boxed text for a fuller explanation of this facility.) Depending on the projects that are invested in, this can help to finance low-carbon, sustainable development in developing countries, while providing the EU with low-cost greenhouse gas abatement options. Third, there may also be opportunities for the EU to lead the way in establishing global emissions trading by linking its scheme to other emerging national and regional schemes.

Of course, linking trading schemes together has to be done in such a way as to foster absolute emissions reductions at home and abroad, as well as supporting and encouraging the development of a global carbon market. If these issues are not correctly handled, the EU ETS and international emissions trading itself could be undermined.

These issues are discussed in the following three sections, with recommendations drawn together in a final concluding section.

2. Ensuring emissions reductions

The EU ETS is a vital policy tool for reducing carbon emissions. First, trading is an essential method by which the EU intends to meet its Kyoto targets. Indeed, the EU ETS Directive states: 'The total quantity of allowances [issued under the European trading scheme…] shall be consistent with the Member State's obligations to limit its emissions pursuant to […] the Kyoto Protocol' (European Union 2003: 1). These obligations are to reduce greenhouse gas emissions from 2008 to 2012 by 8 per cent below 1990 levels.

Second, the EU ETS should be a keystone of European emissions reduction efforts after 2012. Stringent NAP-setting processes will be necessary to reach the EU Environment Council's ambitious greenhouse gas emissions targets of 15-30 per cent reductions from 1990 levels by 2020, and 60-80 per cent reductions by 2050 (Commission of the European Communities 2005). Indeed, the UK Government recently stated that the European Union should commit to the upper limits of these targets (HM Treasury 2006).

Third, the EU ETS is also plays a crucial part in the future of international emissions trading worldwide. EU ETS trading will dominate the international investment flows under the Kyoto mechanisms (see Table 2.1). Its success, or otherwise, will influence perceptions of the efficacy of international emissions trading during the Kyoto phase, and opinions of what is possible after 2012.

Table 2.1 Financial size of the international carbon markets

	2004		2005	
	MtC	Eur million	MtC	Eur million
EU ETS	17	127	362	7218
CDM	60	188	401	2035
JI	9	27	28	96
Other	7.9	34	7.8	52
Total	94	377	799	9401

Note: MtC = million tonnes carbon
Source: Point Carbon (2006: iii)

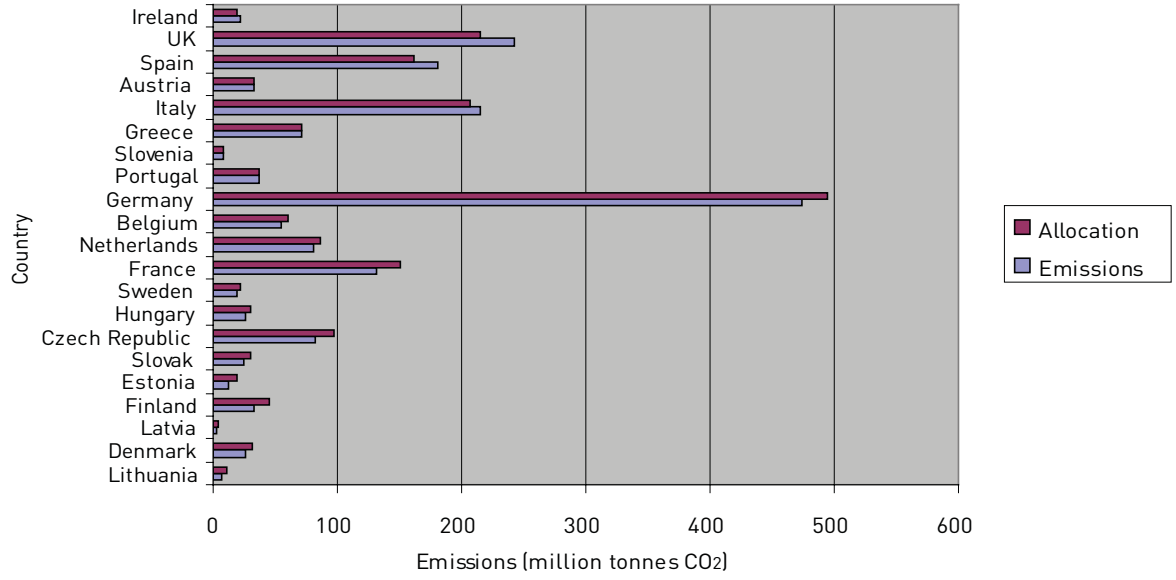
However, the trading scheme is still a long way from meeting these ambitions. Currently, the NAP-setting process is opaque and decentralised. Also, member states have often shied away from setting bold emissions reductions targets. In Phase I, 1829.5 million tonnes of emissions allowances are allocated per year, yet in the first year of trading (2005), participants only emitted 1785.3 million tonnes (European Union 2006). Figure 2.1 (next page) provides a detailed breakdown of these figures, showing that only Ireland, UK, Spain, Austria and Italy set tough targets that were less than business emissions. Discovery of this over-allocation of allowances caused the price of carbon to crash by 65 per cent in May 2006, undermining confidence in the market.

The primary task of the EU ETS review is to rebalance the trading scheme in order to increase the levels of coordination and transparency within the decentralised scheme. However, beyond this task lies a fundamental challenge. Using the EU ETS to stimulate low-carbon investment in the longer term requires stronger price signals and more market predictability. This means that the EU will have to take bold action, while addressing the concerns of EU ETS operators about the effects of the scheme's costs on their competitiveness. The EU will also have to ensure that the trading scheme remains in step with the international policies after 2012.

National Allocation Plans in Phase I and II

In its 2000 EU Green Paper (European Union 2000a), the European Commission suggested two possible models of emissions trading: a centralised, common community scheme, and a more decentralised, harmonised, coordinated community scheme, which allowed greater member state autonomy. A decentralised, coordinated model was eventually adopted. The Green Paper noted that if a coordinated scheme were to ensure a level playing field, the European Commission would need to play 'an active role in overseeing what the Member States were doing, and in evaluating the effects on competition between

Figure 2.1 Member states' emissions allocations compared to actual emissions in 2005



Source: European Commission (2006)

comparable companies in different Member States' (European Union 2000a: 15). However, such a coordinated scheme did not emerge in Phase I of the EU ETS. Annex III of the EU ETS Directive allowed member states to use policies and measures outside the EU ETS to meet their national emissions-reduction targets, which could not be easily monitored (European Union 2003).

Thus, many countries set weak caps and NAPs in Phase I, using a wide range of complex methodologies. Some, such as the UK and Italy, calculated the emissions expected under Business As Usual projections, then emissions reductions caps were made against these projections. Business As Usual projections were often inflated and emissions reductions caps were correspondingly weak. Others, such as Germany, set caps simply through a bargaining process between ministries and industry. Others still, such as the Netherlands, took the view that CO_2 abatement will be delivered by mechanisms other than the EU ETS, and targets have been correspondingly lax (Ilex Energy Consulting 2005a).

The process of setting Phase II NAPs has been more transparent and could lead to definite emissions reductions in this phase of the trading scheme. The European Commission has had more information than in Phase I, which has allowed it to assess whether NAPs are consistent with countries' Kyoto commitments, their historic emissions trends and their emissions reduction potential. On this basis the European Commission rejected nine out of the first ten NAPs submitted by EU member states because they were not in line with these criteria. Unless the European Commission had shown its teeth, the credibility of the EU ETS would have been fatally undermined. In this first round of assessments the European Commission has insisted that European governments make CO_2 emissions reductions that are 7 per cent below levels agreed for Phase I of the scheme (European Commission 2006).

However, there is still much work to be done to ensure the EU scheme delivers. At the time this report was published, the Commission had yet to examine NAPs of other EU countries that have large emissions. Also, analysis by Deutsche Bank showed that the EU could make even deeper cuts of around 11 per cent (Deutsche Bank 2006).

The means by which allowances are allocated also plays a significant role in determining the effectiveness of the trading scheme. In phase II of the trading scheme countries can only sell up to 10 per cent of allowances and many have chosen to auction even less. Repeated free allocations of carbon credits often distort incentives for emissions reductions (Stern 2006a):

- If there is an expectation that the baseline year upon which free allocations are based will be updated, participants have incentives to invest in dirty infrastructure and emit more emissions now to get more free allowances in the future.
- Investment in clean technologies can be delayed if current participants receive more free allowances than new entrants.

- Dirty technologies will not be phased out under some methods of allocating free allowances – for instance, under 'use it or lose it' closure rules, which give operators incentives to keep plants running.

Ensuring member states make agreed emissions reductions

An immediate task for the EU ETS review is to ensure that the trading scheme delivers emissions reductions that are in line with the EU's climate goals. One crucial issue concerns the number of allowances distributed within the scheme. Given that many member states inflated their Business As Usual projections and over-allocated their emissions allowances, the European Commission has to ensure that NAPs are more realistic and transparent. It would be disastrous if the EU ETS turned out to be like the European fishing quotas: with science and long-term self-interest requiring reductions, but overwhelming short-term political considerations leading member states to over-allocate permits to national industries.

Ultimately, this is an issue of political will. The Commission must be given further powers to rigorously scrutinise and reject NAPs, and its efforts must be supported by member states. However, politicians should also be given additional policy tools that allow them to drive down emissions in the EU ETS. Two policy options that would achieve this task.

Immediate priority: A coordinated trading scheme

In the short term, there are means of monitoring NAPs better, thus ensuring that these are congruent with emissions reductions targets agreed by EU member states. A recent study conducted by the environmental protection agencies of five member states (Environment Agency 2006a) suggests that member states' Business As Usual projections should contain specified information, which allows accurate assessment of their growth rates. It also calls for the European Commission to use a standardised assessment tool to evaluate these calculations. This data could allow a realistic evaluation of the extent to which each member state was using the EU ETS to contribute towards meeting Kyoto targets. This information could also allow each sector's emission-reduction contribution to be better evaluated, providing information on whether comparable effort is being made across sectors and countries (Environment Agency 2006a, Centre for European Policy Studies 2005).

Medium term priority: setting an EU-wide emissions cap

Assuming that a 'Kyoto-plus' agreement, building on the current Kyoto Protocol, emerges from international negotiations, a bold approach that would lead to definite emissions reductions would be to set a top-down, EU-wide ETS cap that contributes proportionately to post-Kyoto targets. Determining the total number of allowances that fall within the EU ETS cap would require a complex calculation, made at European Union level, of how Kyoto targets, which cover six gases across all sectors of the economy, could be translated into a European-wide cap for the EU ETS. This fixed number of allowances could then be distributed among member states.

It would be politically difficult to move away from the current, decentralised process of determining the overall EU cap towards a scheme in which the total number of allowances was centrally decided. However, the EU has concluded a burden-sharing agreement whereby the EU's 8 per cent emissions-reduction target under the Kyoto Protocol was divided up – with, for example, the UK agreeing to a 12.5 per cent greenhouse gas reduction while Spain was permitted a 15 per cent increase. This agreement was informed by a 'triptych' methodology that equitably shares emissions. The triptych approach distinguishes between three broad emissions sectors – the power sector, energy-intensive industries, and residential and transport emissions – with allowance made for the need for economic development (Sugiyama 2005). It is possible that EU ETS emissions reductions caps could be derived from post-Kyoto targets using similar methodologies.

The working group reviewing the EU ETS does have scope to consider these bold, but necessary options. The group 'will explore the option of a single EU-wide cap' as well as the possibility of setting member states' emissions reductions targets upfront in a revised EU ETS Directive (European Commission 2006: 12).

Better allocation methodologies

Apart from setting tighter caps, it is imperative that emissions are allocated in a better way so as to increase market predictability and incentivise emissions reductions. There are major problems with current methods of allocating free allowances.

More auctioning

The most effective system in which the carbon price is taken fully into account is one in which member states would allocate all their emissions allowances by auctioning. In Phase I of the EU ETS, governments only had discretion to auction up to 5 per cent of their allowances. Only four member states (Denmark, Hungary, Ireland and Lithuania) auctioned part of their emissions allowances in Phase I, accounting for 0.2 per cent of the entire EU emissions budget (Schleich and Betz 2005). Auctioning looks set to slightly increase in Phase II; but many member states still allocate all their emissions free of charge, when countries can auction up to 10 per cent of allowances in this phase.

In subsequent phases, the European Commission and member states need to increase the proportion of allowances that are auctioned. The European Commission currently sets a maximum limit of allowances that can be allocated by auction; instead, it should set a minimum limit. In the meantime, member states should auction the maximum possible number of allowances – starting with auctioning in sectors that have made windfall profits from the EU ETS (Ilex Energy Consulting 2005b, IPA Energy Consulting 2005). (Companies make windfall profits if: they are given free allowances that are in excess of their business as usual emissions; or if companies receive free allowances but consumers pay the cost of making emissions reductions.)

It is likely that a proportion of allowances will continue to be allocated free of charge after Phase II. However, here too, improvements can be made, as discussed below.

Benchmarks

A major step forward would be for the European Commission to develop common allowance allocation methods that use benchmarks based on production capacity and best available technology. This would be a substantial undertaking, requiring extensive data processing and difficult negotiations. Nevertheless, once industry benchmarks had been agreed, it might be relatively easy to tighten them (Centre for European Policy Studies 2005).

Entrance and closure rules

According to the European Commission Green Paper on the security of energy supply, around 300 Giga Watts of electrical energy (GWe) of existing capacity will have to be replaced over the next 20 years to take the place of old power stations (European Union 2000b). Rules determining the allocation of free emissions allowances when plants are opened and closed (so called entrance and closure rules) had to guarantee long term predictability and incentivise the replacement of dirty technologies.

Long-term predictability on emissions trading

Without a clear sense of the future of the EU ETS in Phase III and beyond, the scheme incentivises only short-term operational adjustments, rather than acting as an investment driver (Blyth 2005). This issue has to be addressed at a number of different levels.

Embedding predictability in EU ETS architecture

Suggestions have been made that the EU ETS could be reformed so that it aligns with long-term investment decisions about generating power. Alterations to the architecture of the EU ETS will be difficult; nevertheless the European Commission should consider these issues. Options that have been mooted include:

Lengthening phase periods

In the McKinsey review of the EU ETS, 86 per cent of companies said they thought trading periods should be extended, most requesting that it should be lengthened from five years to a period of more than 10 years. Likewise, most companies believed that emissions allocations should be decided two, or even three years in advance of the trading period (McKinsey and Co 2005).

However, there are many risks in lengthening allocation periods. As levels of political ambition do not yet match the scale of the climate challenge, the EU ETS still requires a large degree of flexibility so that the carbon price is not locked into levels that are too low. Also, the EU ETS is very much built on Kyoto architecture. Both share common features (such as phase lengths), so it may be difficult unilaterally to find a way to fundamentally overhaul the architecture of the European scheme. Furthermore, if trading periods

were lengthened and NAPs continued to be calculated using Business As Usual methodologies, it could be very difficult to make accurate growth projections.

Long-term indicative targets

Another idea has been to develop long-term indicative targets that extend beyond shorter-term allocation phases. However, non-binding targets often have little practical effect (Centre for European Policy Studies 2006).

Price caps

A 'safety valve' would better inform companies' long-term investment decisions. The guarantee that prices would not go above a certain level might also encourage member states to make more ambitious emissions reductions (Philibert 2006).

Yet there are also risks. The price cap could reduce the effectiveness of carbon pricing. Politically, the key issue is whether the European Commission would have the power to set a sufficiently ambitious price cap. If the price cap was very low and the price cap mechanism regularly used, then the EU ETS would not secure the emissions reductions that had been agreed by the Commission and member states.

Furthermore, there are many ways to set a price cap. Some methodologies, for instance, the US Regional Greenhouse Gas Initiative, allow participants to buy in cheap credits from Land Use Change projects if prices rise above a threshold. But these arguably might compromise the integrity of the EU ETS. There are also concerns that price caps could introduce distortions when trading schemes are linked to each other (see page 32).

Addressing competitiveness concerns

Concern about competitiveness has been a factor in holding back emissions reductions efforts, which require tighter targets and higher carbon prices within the EU ETS for a number of decades.

Overall, such concern should not be overplayed. First, at present, the EU ETS is delivering few emissions reductions. Second, research by the Carbon Trust and others shows that competitiveness turns on many factors, including:

- whether industry product prices are dependent on fuel input prices
- whether industries are able to pass through costs in different product markets
- the proximity and responsiveness of competitors who do not bear the costs of emissions trading
- whether the structure of regional power markets holds down energy prices – especially as not all member states have liberalised electricity markets.
  (Centre for European Policy Studies 2006, Carbon Trust 2004)

There are many sectors included in the EU ETS that are relatively unaffected by carbon costs. Nevertheless, for a few industrial sectors that are heavily dependent on electricity inputs, unable to pass through costs to customers, and subject to global competition, most notably aluminium and steel, these issues are a genuine concern. For instance, steel accounts for approximately 10 per cent of emissions in the EU ETS, and studies have indicated that if CO_2 were traded at Eur 25 per tonne, this might lead to product price rises of 7.3 per cent (Carbon Trust 2004). It would be both environmentally and economically counterproductive if such industries relocated to other areas of the world that did not have stringent climate change policies.

For those sectors whose competitiveness is affected by price rises, the challenge is to coordinate collective action and share the costs of carbon abatement. It is worth considering whether the EU and its member states can address these concerns in a manner that does not undermine the environmental integrity of the EU ETS.

Compensation and alleviation measures that have been mooted include:

- auctioning allowances used by the power sector and recycling a proportion of these revenues to industries severely affected by the rising price of electricity
- allocating free allowances to sectors severely affected by competitiveness concerns
- setting price caps (also see page 32).
  (Centre for European Policy Studies 2005)

Admittedly, implementing these policies would be problematic, not least because of the risk that government interference could distort the EU ETS market in ways that are informed by short-term self-interest rather than long-term considerations. For instance, 'a price cap falling far below the level of [abatement] costs would act as a carbon tax entirely cancelling out any ambition in the [emissions reductions] targets' (Philibert 2006: 18).

The EU ETS and international policy after 2012

In the longer term, emissions reductions within the EU ETS will only be achieved and competitiveness concerns allayed within the context of a renewed global commitment to international emissions trading.

The future of the EU ETS is bound up in United Nations negotiations to determine what follows the first phase of trading under the Kyoto Protocol, which ends in 2012. In one sense, Phase III of the EU ETS is guaranteed: the Kyoto parties have agreed that the second phase of Kyoto trading will immediately follow the first period of trading. Nevertheless, business people have expressed justifiable concerns that they are uncertain as to the future of emissions trading (Hamilton and Kenber 2006). This is because the post-2012 Kyoto deal is subject to long torturous negotiations, which have an uncertain outcome. The ideal outcome of negotiations would see the USA, Australia and some of the emerging economies taking on commitments to reduce GHG emissions. However, US attitudes towards emissions trading will be unknown until the outcome of the 2008 presidential election is decided; this leaves limited time for negotiations.

Until international negotiations have been concluded, the EU should make clear its continued commitment to the EU ETS. One option worth serious consideration would be for the EU to commit to an emissions reductions target, regardless of the outcome of international negotiations (Sugiyama 2005).

Ensuring emissions reductions: conclusions

The EU ETS is a real achievement, unprecedented in its scale and scope. Yet the sheer size of the EU ETS has provoked the devolution of allocation responsibilities to member states, with a large proportion of emissions credit given away by free allocation through methodologies that have great scope for distortion. The scheme also suffers from multi-period allocations, which makes it dependent on international emissions trading decisions after 2012 (Grubb and Karsten 2006).

Thus in the first year of trading the EU ETS did not produce any emissions reductions. Indeed, it is likely that there will be few reductions in the first phase of trading. Countries decide the emissions reductions they will take and many are nervous of making more effort than their neighbours. This approach can only lead to failure.

The process of setting National Allocation Plans (NAPs) has to be improved so that the EU ETS delivers definite emissions reductions:

- In the short term, the NAP setting process must be harmonised across the EU. A level playing field will encourage member states to make emissions reductions because member states will be more easily able to evaluate whether other countries are making comparable emissions reductions efforts.

Member states should give the European Commission the data to determine whether their NAPs are consistent with EU-wide agreements made by member states and national targets set by individual member states.

Member states must provide the European Commission with more technical and diplomatic support so that the Commission is further empowered to reject inadequate NAPs. In the longer term, the process of setting NAPs should be centralised, with the Commission setting emissions limits that are consistent with agreements made collectively by EU member states. This would offer assured emissions reductions.

Methods of allocating emissions allowances have to incentivise carbon abatement – too often member states do the opposite. Therefore:

- The European Commission and member states should vastly increase the proportion of allowances that they allocate by auctioning, a system that fully takes into account the cost of carbon.

The European Commission should set out a timetable that will rapidly move the trading scheme towards 100 per cent auctioning.

The European Commission currently sets a maximum limit of allowances that can be allocated by auction;

instead, it should set a minimum limit that increases in each trading phase towards the target of auctioning all allowances.

While the free allocation of emissions credits continues, great improvements could be made here:

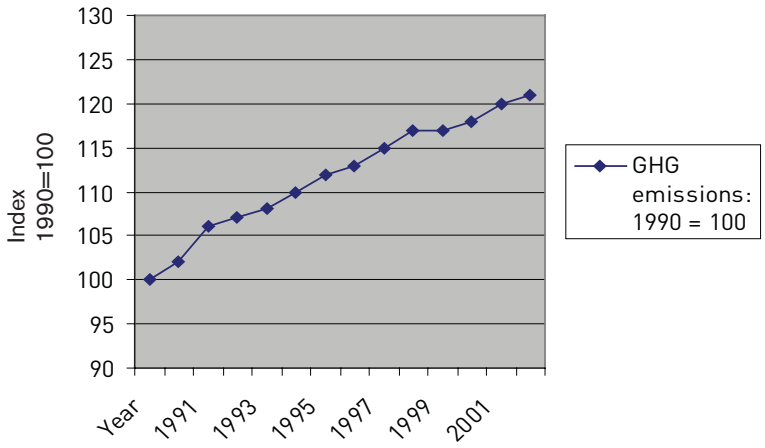
- The European Commission should work towards developing common allocation methodologies based on best available technologies.
- Rules that govern the emissions allocations given when power plants are commissioned and decommissioned (so called 'entrance and closure rules') have to be harmonised at a European level so as to incentivise the replacement of dirty technologies.

The European Commission should also consider how the EU ETS can provide greater long-term predictability so that businesses invest in low-carbon technologies.

3. Expanding the EU Emissions Trading Scheme to new sectors

Although the EU ETS covers a substantial proportion of the economy, many major sectors fall outside the trading scheme. A number of energy-intensive industries currently lie outside the EU ETS, as do the commercial, household and transport sectors, which together accounted for 34 per cent of EU greenhouse gas emissions in 2003 (Environment Agency 2006a). In some of these sectors, particularly transport, emissions are rising (see Figure 3.1).

Figure 3.1: EU15* surface transport emission trends (1990 is the base year = 100)



Source: European Environment Agency (2005: 41)

*The European Union was enlarged in 2004 to include 10 new member states, bringing total membership from 15 to 25 countries. 'EU15' refers to the 15 member states, and 'EU25' refers to the expanded European Union.

One means of cutting emissions might be to bring more of the economy under the EU ETS in Phase III and beyond. This section discusses the arguments for expanding the trading scheme, highlighting the political and policy ramifications of including the following sectors in the EU ETS:

- Additional gases and activities in the energy-intensive industry sector
- The aviation industry
- Road transport
- Maritime transport

Extending the EU ETS to new energy-intensive industries and gases

In 2003, the energy-intensive industries and power stations sectors included in the EU ETS accounted for around 46 per cent of total CO_2 emissions, both in the UK and in the EU. This included sectors involved in:

- energy activities, such as mineral oil refineries
- the production and processing of ferrous metals
- the mineral industry, including glass and ceramic manufacture
- other activities, such as the production of wood pulp.

Phase II will already see some expansion of the EU ETS to new energy-intensive industries. In Phase I, the section of the EU ETS Directive that listed the industries that should participate in trading has been interpreted in different ways. For instance, the UK took a 'medium' approach to its definition of the combustion installations that were to be included in the trading scheme, allowing some combustion installations to remain outside the scheme in Phase I. Also, the UK included some industries in the trading scheme while excluding others producing very similar products. Following further guidance from the European Commission, many of these anomalies will be addressed in Phase II with, for instance, the UK including additional glass, mineral wool, and gypsum, as well as flaring from offshore oil and gas

production, petrochemical crackers, integrated steelworks, and installations producing carbon black (Defra 2006b, European Union 2005).

A number of studies have also recommended that the EU ETS should be further consolidated beyond 2012, including more gases and activities of the energy-intensive industry sector. These studies suggest that the EU ETS should continue as a scheme that facilitates efficient trading for industrial installations that emit large amounts of greenhouse gases, and that sectors that are included in the scheme should be able to abate carbon relatively cost-effectively (Environment Agency 2006c).

This approach of consolidating the EU ETS has the potential to include some significant new sectors and gases in Phase III. For instance, a cross-Europe project on the future of the EU ETS (Environment Agency 2006b) recommended that numerous additional industrial activities might be included in the trading scheme, including the production of chemicals, aluminium or non-metallic minerals, coal mining, natural gas leaks, refrigeration and air conditioning, semi-conductor manufacture, food and drink, as well as oil and gas flaring. In 2003, these sectors accounted for 205 million tonnes of carbon dioxide equivalent ($MtCO_2e$) – around 9 per cent of total EU ETS greenhouse gas emissions (see Table 3.1 for details).

Table 3.1: Greenhouse gas emissions from sectors recommended for inclusion in Phase III

Sectors recommended for inclusion	**EU25 current emissions 2003 ($MtCO_2e$)**
Aluminium (Perflurorcarbons [PFCs])	4
Aluminium (CO_2)	8
Chemicals (N_2O)	54
Chemicals (CO_2)	111
Coalmine methane	29
Total of sectors recommended for inclusion	**205**
Percentage increase in coverage of EU ETS as a percentage of current coverage	**9%**
Source: Environment Agency (2006b)	

The Commission could also simplify the scheme and reduce bureaucratic costs, particularly for smaller operators. For instance, 50 per cent of installations currently included in the EU ETS account for only 0.8 per cent of the emissions. There are thus strong arguments in favour of addressing these installations' emissions through a policy mechanism other than the EU ETS (Environment Agency 2006c).

Extending the EU ETS to aviation

The case for inclusion

There are moves to include the aviation sector in the trading scheme. In 2004, the contribution of aviation to EU25 CO_2 emissions was around 3 per cent, with its total climate impact (that is, including NO_x emissions, condensation trails and cirrus clouds) in the region of 5-12 per cent (Transport and Environment 2006).

Including the aviation sector would radically change the nature of emissions trading. Currently the EU ETS is only for large, stationary, energy-intensive industries and power producers because they can abate carbon cost-effectively. By contrast, there are fewer measures available to cheaply abate aviation emissions; also, its emissions come from numerous, mobile sources.

Consultations about including aviation in the EU ETS are already underway in a process that runs outside the European Commission's review of the EU ETS. The EU's *6th Environment Action Programme,* published in 2001, called for specific action to reduce aviation's GHG emissions in the absence of action agreed at the UN level. In September 2005, the Commission adopted a Communication, *Reducing the Climate Change Impact of Aviation*, which discussed including the sector in the EU ETS. In December of that year, the EU Environment Council urged the Commission to bring forward a legislative proposal by the end of 2006. The European Parliament adopted a resolution on reducing the climate change impact of aviation in July 2006 –

a significant move because Parliament has co-decisionmaking powers[1] on environmental issues.

We are discussing aviation here because the success or otherwise of bringing it into the trading scheme will be highly pertinent to other issues being looked at in the Commission's review, such as the inclusion of surface and maritime transport, which are discussed in the following sections.

The policy impact of including aviation

Bringing aviation into the EU ETS will reshape the architecture and purposes of emissions trading. Whether or not it proves a success lies in the detail of the scheme:

Scope of the scheme: It is desirable that the scheme covers as many flights as possible – ideally covering all flights to and from EU airports, even intercontinental flights crossing EU airspace. Covering all flights to and from the EU, as opposed to only intra-EU flights, would increase the emissions covered by the trading scheme by a factor of more than three. This would not only maximise environmental effectiveness, but would also guard against fears about loss of competitiveness. It would avoid distortion of the market in favour of flights to destinations outside the EU and prevent airlines with routes outside the EU cross-subsidising intra-EU flights. Covering a large section of the airline industry would also strongly influence improvements in aircraft design (European Parliament 2006).

Trading entity: The CE Delft consultancy report (2005) recommended that aircraft operators should be included in the trading scheme because they have easy access to monitoring data and greatest control over abatement measures. This would require the EU ETS Directive to be amended, as it is currently a trading scheme that covers industrial installations. Depending on how the Directive is reformulated, this could pave the way for the inclusion of other sectors in the EU ETS.

Allocation level: One of the most important issues is the level at which the total amount of allowances allocated to the aviation industry is decided – whether it is at EU level or by individual member states. Currently, member states draw up individual National Allocation Plans. However, the consultancy report recommends that the amount of allowances should be decided at EU level. Also identical allowance distribution rules should be used across Europe. This would prevent competitive distortions (CE Delft 2005).

Allocation methodology: Allowances should be auctioned. If EU ETS market prices were between Eur 10 and 30 per tonne of CO_2, auctioning might raise revenues of between Eur1.34bn and Eur4bn. These revenues could be used to fund low carbon transport projects. Conversely, if 100 per cent of allowances were given away for free, the airline industry would make windfall profits of a similar scale. 'Economic theory suggests that companies would pass on the bulk of the marginal cost in [air ticket] prices... It is very likely that in the case of air carriers operating on competitive markets, at least a significant part of these profits will be relasied by aircraft operators' (CE Delft 2005: 163).

Including more GHG gases: The total climate impact of aviation, including nitrogen oxide (NO_x) emissions, contrails and cirrus clouds, is approximately two to five times greater than the impact of CO_2 alone. Thus the exchange of one tonne of CO_2 from aviation for one tonne of CO_2 from another source does not have equal value. Calculating environmental effects requires sophisticated modelling because emission factors and climatic impacts vary according to flight routes. Nevertheless, it is imperative to find policy mechanisms – perhaps flanking measures – that account for the full impact of aviation on the climate (Transport and Environment 2006).

Flanking measures: All parties agree that it is possible to pursue a range of non-fiscal measures, such as better air traffic management, which would result in emissions reductions and also cost savings.

However, stronger arguments have also been made in favour of using other fiscal measures to reduce the impacts of climate change. The European Commission intends to pursue the introduction of kerosene taxes. The European Parliament has also urged that a range of other measures be considered. This includes ending VAT exemption on international air tickets and introducing charges – for instance airport charges could be made to cover NOx emissions (European Parliament 2006, CE Delft 2005).

Environmental groups also argue that there is unfair competition between aviation and other transport sectors, because aviation receives a range of subsidies and support such as investment grants and operating-cost subsidies. For instance, one campaign group quotes a Deutsche Bank research report as

1. In the co-decision procedure, the European Parliament does not merely give its opinion: it shares legislative power equally with the European Council. If Council and Parliament cannot agree on a piece of proposed legislation, it is put before a conciliation committee, composed of equal numbers of Council and Parliament representatives. Once this committee has reached an agreement, the text is sent once again to Parliament and the Council so that they can finally adopt it as law.

stating, 'small airports receive an average of Eur3.30 [per passenger] for operating-cost subsidies and also Eur5.90 for investment grants' (Transport and Environment 2006: 12).

Handling the growth of the aviation industry

Above all, there is great uncertainty as to whether the EU ETS will be able to cope with the long-term growth of the aviation industry. The nub of the issue is that the aviation sector is growing rapidly and will account for an increasing proportion of emissions. As the sector has relatively few opportunities to abate carbon, it may become, in the long run, a significant net buyer of emissions allowances, driving up EU ETS prices to levels that become politically unsustainable.

In the immediate term, the aviation sector has a relatively small emissions impact and will not significantly impact on the EU ETS. Aviation currently accounts for around 3 per cent of EU25 CO_2 emissions. The Commission's feasibility study indicates that, if aviation was included in an open trading scheme, the burden of reduction will fall on other sectors. Indicative figures suggest that around 15 per cent of reductions will come from within the aviation industry and 85 per cent from other industries. Thus aviation might buy in around 1 per cent of the allowances available under the present EU ETS in 2012. This would cause air ticket prices rises ranging between Eur0.2–9, which would cause an air transport volume decrease of between 0.1 and 1.4 per cent. There would be no significant rise in allowance prices (CE Delft 2005: 12-18; House of Lords 2006).

However, the studies caution that 'continued growth of aviation might cause the allowance price to rise' in Phase III and beyond (CE Delft 2005: 14). According to all projections, the European airline industry is set to rapidly grow in the next decades. Across the EU25, growth is expected to be at 4-5 per cent per year until 2020, with some countries growing as fast as 14 per cent (Bows *et al* 2006). Efficiency savings will offset this growth somewhat, but this might only reduce emissions by around 1-2 per cent per year at the most (House of Lords 2006). Yet EU emission reductions in the order of 60-80 per cent will be necessary by 2050. If aviation continues to grow rapidly it will eventually account for a large proportion of permitted emissions (Bows *et al* 2006).

If the aviation sector is fully included into the EU ETS and becomes a significant net buyer of EU ETS emissions allowances, in turn raising carbon prices, a couple of scenarios are possible. Energy-intensive industries might lobby for emissions reductions caps to be relaxed. There would also be pressure to make available cheap sources of credits such as Clean Development Mechanism/Joint Implementation (CDM/JI).

The European Parliament, concerned about both these scenarios, has therefore argued that 'a separate closed [trading] scheme for aviation is a serious option' (European Parliament 2006: 4). The Parliament also considered a semi-open system with restrictions placed on trading between an aviation scheme and the main EU ETS. However, drafts of the European Commission proposal argue in favour of fully open trading. If aviation is to be successfully included in the EU ETS, resolving these issues will be of fundamental importance.

Road transport

The UK Government has written to the European Commission asking that the inclusion of the road transport sector be considered as part of the review of the EU ETS (Darling *et al* 2006). Other countries have also expressed preliminary interest in this issue. The governments of both Sweden and Germany have commissioned studies on the subject of including road transport in the EU ETS (CE Delft 2006).

One of the main reasons for government interest in including road transport in the EU ETS is that the GHG emissions produced by road transport are of serious concern. Today, transport accounts for around one fifth of the EU25's GHG emissions, and this is set to rise in the next decade, with road transport accounting for the vast majority of these emissions. Transport's GHG emissions are also projected to increase in the next decades. While fuel efficiency has improved in the past decades, vehicle kilometres have increased. In the EU15 there were 469 private cars per 1,000 persons in the year 2000, compared to only 232 in 1975 and the distance travelled by all road vehicles has tripled over the last three decades (European Union 2004b).

Bringing road transport into the EU ETS

Proposals for the inclusion of road transport should demonstrate that it offers added value above and beyond more targeted policies and measures that could offer definite emissions reductions from road transport. At the very least, if this proposed policy is pursued, it is important that it supports, not

undermines, the whole array of policies that can reduce emissions across the European economy. It cannot be assumed that including road transport in the EU ETS offers a simple panacea. Therefore it is important that the key factors that would influence the inclusion of road transport in the trading scheme are clearly set out and debated.

Open or semi-open trading?

The most difficult question is whether the trading scheme should be designed so that the road transport sector itself takes on a proportionate share of emissions reductions. On the one hand, a trading scheme is not designed to ensure that each sector reduces its emissions through internal measures alone, merely to ensure that an emissions target is achieved with emissions abatement occurring where it is most economic to do so. However, although the road transport sector has many emissions abatement options, these are costly. For instance, switching to biofuels is expensive: each tonne of carbon saved costs from £138-900 (Department for Transport 2004). In an open emissions trading market the road transport sector would probably buy carbon credits to cover its emission reduction obligations. This would lead to emissions credits prices rising and, possibly, political pressures to reduce the ambition of the EU ETS targets.

In an *open scheme*, road transport would be directly included in the EU ETS. Under this arrangement, the sector would be able to freely trade with other sectors. As road transport's marginal costs of abatement are higher than average, it might become a net buyer of emissions credits and would not reduce emissions within the sector.

However, in a *semi-open scheme* a separate transport trading scheme would be designed that was not embedded in the EU ETS. Instead, there would be limited trading between the EU ETS and the road transport trading scheme. Here, definite emissions reductions within the road transport sector might be guaranteed.

Trading upstream, midstream or downstream?

The choice of whether consumers, motor manufacturers or fuel suppliers are included in the EU ETS affects the workability of the scheme.

One option would be to design a *downstream scheme* for end consumers (vehicle drivers). For example, when paying for fuel, motorists would also be made responsible for handing over emissions allowances. However, a number of studies commissioned by member state governments have identified severe operational, economic and thus political difficulties in this course of action (Environment Agency 2006c). There are more than 200 million vehicles in the EU25, the majority of which are owned by private users (European Union 2004b). The operational difficulties and risks in implementing a major IT project would be great, especially if free emissions allowances were allocated. Transaction costs would be high and the principle of personal carbon allowances would have to be explained to consumers. Indeed, the complexities may well lead to market intermediaries (most likely fuel suppliers that run petrol stations) trading on behalf of the motorists, a situation that would undermine the purpose of such a scheme.

Another suggestion is for a midstream scheme in which motor vehicle manufacturers are the trading entity. The great difficulty with this course of action is that the EU ETS trades in volumetric measures of GHG emissions, yet manufacturers are not directly responsible for lifetime carbon emissions of the cars that they produce. A number of studies have argued that it would be possible to calculate manufacturers' GHG emissions, and the following is an example of how to do this:

> Emissions allocated = vehicles sold * average mileage per vehicle * percentage fossil fuel supply
>
> (Rabinowitz 2006: p. 9)

But producing these estimates would be a fraught process because there would be significant uncertainties in many of these figures. For instance it would be very difficult to agree the average emissions produced by a flex-fuelled car that could consume biofuels or conventional petrol. Overall, it would seem there might be simpler and more practical policy instruments to improve the fuel efficiency of vehicles – for instance, EU-wide mandatory vehicle fuel efficiency policies.

Instead, the option of including road transport CO_2 emissions in an *upstream scheme* through fuel suppliers seems the most feasible means of including road transport in the EU ETS. This would be relatively simple and cheap to administer and is much more politically feasible. A UK Government study indicated that just 20 companies (eight oil refiners and a dozen other major companies) dominate the supply of road fuels in

the UK, paying more than 99 per cent of all road fuel duties (Department for Transport 2005). Extrapolating to the European level, there are currently about 102 oil refineries in the 25 EU countries plus two in Norway and two in Switzerland. These are owned by 31 companies, including 23 who are members of the European petroleum industry association, EUROPIA. In addition, there will be a number of other companies importing road fuels into the EU (Grayling *et al* 2006).

The duty point would be most convenient place at which to administer an upstream obligation. For instance, every litre of fuel supplied in the UK is already accounted for, for the purpose of fuel duty by HM Revenue & Customs. The cost of administrating a tradable obligation on fuel suppliers in the UK is estimated to be in the order of £1 million per year for the Government and around £2 million per year for the industry – tiny in comparison to the industry's turnover (Department for Transport 2005). Extrapolating again to an EU level, every member state has its own system of fuel duty that would provide the administrative foundation for including road transport fuels in the EU ETS. Hence the administration of the scheme would be likely to be relatively straightforward and cost effective. Fears about loss of competitiveness would also be avoided because fuel imported into member states is taxed at the duty point when it crosses national borders.

Reducing emissions in the road transport sector

Discussing the efficacy of including road transport in the EU ETS as a means of reducing CO_2 emissions is a more difficult issue. There are a number of variables that affect the level of CO_2 emissions from transport, which include the mode of transport chosen, the fuel efficiency of the vehicle, the distance travelled and the fossil carbon content of the fuel consumed by the vehicle. And the related decisions are taken by many actors (CE Delft 2006):

- Motorists can decide to drive less, to drive moderately in a manner that saves fuel, to keep up tyre pressure etc. At the point of purchase, they also have an indirect influence over manufacturers in that they can choose low-carbon vehicles.
- Vehicle manufacturers have several ways to improve the fuel efficiency of the vehicles they sell, through:
    - technological fuel efficiency improvements to engines
    - shifting production to vehicles that emit less CO_2
    - influencing consumer choice, encouraging the sale of more fuel efficient vehicles.
- Fuel suppliers can promote low-carbon fuels, such as biofuels and hydrogen.

As discussed above, it seems that, in the immediate term, upstream trading is most practical. Yet there is a difficult debate as to whether upstream trading is the most effective means of reducing road transport emissions. For fuel suppliers, free emissions allowances could partially subsidise and stimulate the take-up of low-carbon fuels. However, the cost of low-carbon fuels is currently much higher than the EU ETS market price. Therefore including road transport in the EU ETS will not be a substitute for other programmes designed to encourage the introduction of low-carbon fuels.

Fuel suppliers are therefore most likely to buy in credits to cover their emissions, which is likely to raise the cost of fuel. Fuel suppliers are likely to directly pass costs through to consumers[2]. It could be argued that this price signal will ripple through the market, changing the behaviour of manufacturers and motorists. Indeed, most studies agree that there is demand elasticity for road transport – one study noting that a 10 per cent increase in fuel prices leads to a 3 per cent fall in fuel consumption in the short run and a 7 per cent fall in the longer term (Goodwin *et al* 2003). However, while motorists' behaviour will respond to fuel price rises, manufacturer's behaviour may only be altered in the long run.

Using trading to supplement taxation

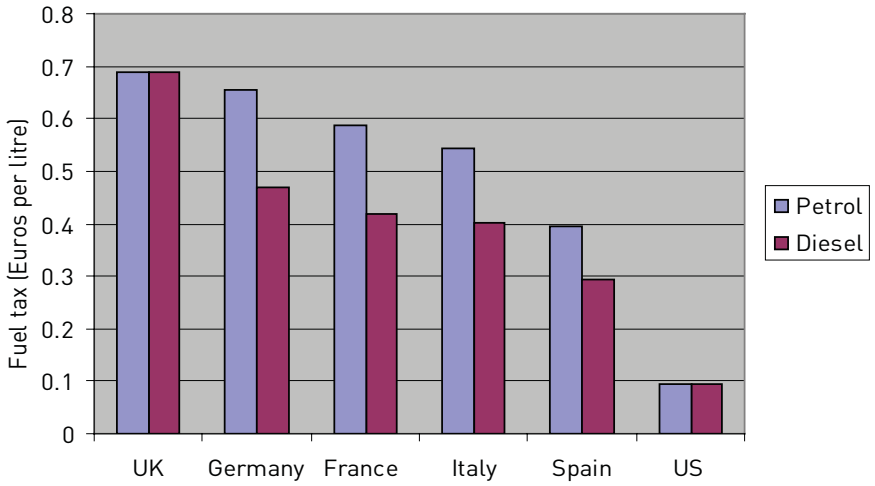
If including the road transport sector in the EU ETS would result in higher petrol pump prices, it would be

2. Fuel imported into the EU faces the same fuel taxes as fuel provided by domestic suppliers, and imported fuel could easily be included in the EU ETS (Grayling 2006). Therefore EU fuel producers and suppliers would not face additional carbon costs compared to fuel producers and suppliers outside the EU. They could therefore probably pass additional carbon costs onto the consumer. This has been the experience of a number of industries in the EU ETS such as print manufacture. By contrast, the aluminium industry is a globally competitive industry in which aluminium plants outside the EU have not had to face additional carbon costs or border tax adjustments. Thus aluminium plants in the EU have had to absorb the extra carbon costs rather than pass them onto the consumer (Carbon Trust 2004).

necessary to unpick whether trading were preferable to taxing.

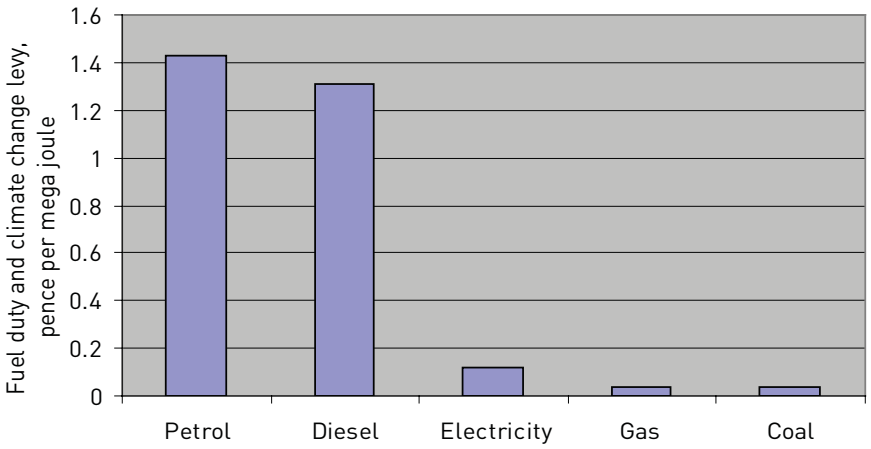
It is possible that emissions trading could be used to supplement pre-existing taxation policies. European road fuel taxes are relatively high compared to those in the US, and road fuel is often taxed higher than other energy products (see Figures 3.2 and 3.3). Therefore, increasing road fuel taxes might be politically problematic. Also, individual governments' attempts to set long-term tax rates are at the mercy of changeable political weather, so trading may provide an element of long-term predictability.

Figure 3.2: Fuel taxation in the US and selected EU countries



Source: ACEA (2005)

Figure 3.3: Fuel taxes in the UK



Source: ACEA (2005)

Using trading to raise revenue

Trading will become politically difficult if free emissions allocations are given to fuel suppliers. Assuming that fuel suppliers are likely to pass on extra costs to consumers, free allocations would provide companies with a windfall profit – a contentious issue during periods of high petrol prices. Auctioning is probably the most equitable means of distributing permits.

Theoretically, quantity and price instruments can deliver equivalent outcomes; but practically speaking, the market price of carbon in the EU ETS is likely to significantly fluctuate. As Table 3.1 (next page) shows, fluctuating carbon prices could hit pump prices, a politically difficult issue. Similarly, trading also provides an inconstant source of revenue if it is used by governments as a revenue-raising instrument. Nevertheless,

Table 3.1: The impact of emissions trading on fuel prices

Cost of permit (Eur/tCO_2)	Impact on pump prices, before taxation (Eur/l)*	Impact on pump prices, after VAT (pence/l)*
16	3.8	3.1
20	4.8	3.8
24	5.8	4.6
28	6.7	5.3
32	7.7	6.1
36	8.7	6.9
40	9.6	7.6

Calculations based on 2003 UK average fuel densities.
*Note: Calculations assume that all costs are passed through to the consumer

trading will reduce emissions to agreed levels, clearly contributing towards climate change goals.

Would inclusion align with other policy objectives?

It would be counterproductive if efforts to include road transport in the EU ETS crowded out other important policy initiatives that would reduce road transport's emissions. For instance, the European Commission has negotiated voluntary fuel efficiency commitments with car manufacturers that, if achieved, will play an important role in reducing road transport's climate impact. In future, the Commission may look towards new mandatory ways of improving fuel efficiency, especially if the voluntary targets are missed. It would be a mistake if attempts to include road transport in the EU ETS diverted attention away from other important policy mechanisms.

The inclusion of road transport in the EU ETS, which has a high carbon-abatement cost, may also cause the market price to rise. This is quite likely because the road transport sector is fairly large, accounting for one fifth of EU CO_2 emissions. To offset these market price rises, politicians might face pressures to undertake a number of actions, including:

- bringing road transport into the EU ETS under a restricted trading scheme
- bringing the transport sectors into the EU ETS under a weak cap
- increasing the availability of cheap credits, such as CDM/JI
- weakening the cap for the entire EU ETS scheme.

Including road transport in the EU ETS should not lead to other policy decisions that undermine the trading scheme.

Including maritime transport

Maritime shipping contributes significantly to climate change. In 2002, 4 per cent of EU25 CO_2 emissions were attributable to the sector. Yet parties to the United Nations Framework Convention on Climate Change (UNFCCC) have been unable to agree on who should take responsibility for these emissions. Thus, as with aviation, including the maritime sector in the EU ETS could be an important step towards tackling the climatic impacts of the industry.

Preliminary research indicates that fuel suppliers for shipping have very few options to promote low-carbon fuels. It may instead be better for shipping companies to engage in emissions trading. Shipping companies have opportunities to purchase and use more fuel-efficient ships and engines. These purchasing opportunities are available in the long term: the lifetime of ships is 30-40 years. In the short and medium term, shipping companies may be able to find efficiencies through better fleet management.

Very little research and data exists on this area – which is perhaps why the issue has received less attention by policymakers compared to road transport and aviation. Monitoring shipping companies' CO_2 emissions

will be an important first step in opening up a debate on whether and how we can include shipping in the EU ETS (CE Delft 2006).

Expanding to new sectors: conclusions

Currently, the EU ETS covers 46 per cent of CO_2 emissions. Nevertheless, there are major areas of the economy that fall outside the EU ETS. Therefore, we recommend:

- The EU ETS should include more energy-intensive industries in the trading scheme. These inclusions could increase the size of the EU ETS by around 9 per cent.
- At the same time, however, the European Commission should stipulate that small emitters are excluded from the scheme. Fifty per cent of the installations currently in the EU ETS account for only 0.8 per cent of emissions.

There are also moves to include transport sectors in the EU ETS. Proposals to include the aviation industry in the EU ETS are well underway. The success of aviation's inclusion depends on the extent to which the sector is required to address the full climatic impacts of flying. The devil lies in the details:

- The scheme should cover as many flights as is legally possible – ideally covering all flights to and from EU airports, even intercontinental flights crossing EU airspace.
- Currently, it is only practicable for emissions trading to cover CO_2. However, the total climate impact of aviation is approximately two to five times greater than the impact of CO_2 alone. These effects should be factored into the scheme through 'flanking measures' such as emissions charges.
- Emissions allowances for the aviation sector should be auctioned.

The **aviation sector** has few emissions abatement opportunities so would buy in emissions credits to cover its environmental impacts. At the moment, the aviation sector is relatively small and would only buy in around 1 per cent of the credits available under the present scheme. However, projections suggest that the growth of the aviation industry might cause the allowance price to rise, as the sector buys in more credits. This could lead to substantial political pressures to reduce the environmental stringency of the EU ETS. Ultimately, the greenhouse gas emissions produced by the rapid growth of the aviation industry might even derail the emissions reductions efforts made by the EU in other sectors of the economy. Therefore:

- A trial scheme should be set up for the aviation sector, and if successful it should only be fully included in the EU ETS in Phase III.
- If aviation is included in the EU ETS, it should at the very least be under a semi-open scheme, in which a gateway allows airlines to buy credits from the EU ETS on a carefully limited basis. The European Parliament has voted in favour of creating a separate closed scheme for aviation. We should not include aviation in a totally open way.
- Including aviation in the EU ETS should be accompanied by the introduction of other fiscal measures that could reduce the climatic impacts of aviation. The aviation industry currently enjoys tax breaks and subsidies. These loopholes should be closed.

A number of member states have also proposed that the European Commission review should consider whether it would be efficacious to include **road transport** in later phases of the EU ETS. Proposals for its inclusion should demonstrate that it offers greater added value than any more targeted policies and measures that could offer definite emissions reductions from road transport. At the very least, it is important that this proposed policy supports, not undermines, a whole raft of possible measures that could address the climatic impacts of road transport.

Policies such as mandatory fuel-efficiency requirements, road user charging schemes, and road fuel and motoring taxes can significantly reduce road transport emissions. Therefore:

- Including road transport in the EU ETS should not be pursued at the expense of developing these important policies.

Although the road transport sector has many emissions abatement options, these are costly and in an open market the sector would probably buy emissions credits to cover the cost of its environmental damage. If the sector was a significant net buyer of emissions credits, this would raise EU ETS market prices, and this

might lead, for example, to higher consumer heating bills – a difficult issue politically. This in turn might lead to substantial pressures to dilute the environmental stringency of the EU ETS. Were this likely:

- Policymakers should review the efficacy of including road transport in the EU ETS.

A semi-open trading scheme, which carefully limited the credits bought-in by the road transport sector, might guard against this outcome.

Given that including road transport in the EU ETS is likely to raise the fuel price, it is imperative that politicians do not offset these price rises – by cutting other fuel taxes, for instance – and weaken incentives for motorists to reduce their fuel consumption.

It is likely that the obligation to account for road transport emissions will fall on fuel suppliers. Free emissions allowances should not be granted to fuel suppliers. Given that fuel suppliers are likely to pass on costs of compliance to consumers, it would be politically contentious if these companies were provided with an opportunity to make a windfall profit.

The **maritime sector** has not been included in international emissions trading because UN parties to the relevant UN agreement that might have covered this were unable to agree on who should take responsibility for the sector's emissions. Yet the maritime industry accounts for 4 per cent of the EU's CO_2 emissions and there are significant opportunities to reduce its climatic footprint:

- The European Commission should actively consider including the maritime sector in later phases of the EU ETS.
- It could start the debate by commissioning a detailed study of the sector.

4. Establishing a global emissions market

Developing a global emissions market by linking together individual trading schemes has been a long-held ambition of EU policymakers. Linking together trading schemes offers a number of opportunities, including:

- *Increasing economic efficiency*
  Successful linking can increase the availability of options for cost-effective emissions abatement. The EU has led the way in developing emissions trading, so it would be well positioned as the financial centre of an international market.
- *Increasing low-carbon investment in developing countries*
  Linking the EU ETS to Kyoto's flexible mechanisms is a means of mobilising capital to invest in low-carbon development in low and middle income countries, whose rapid economic growth is exponentially increasing global greenhouse gas emissions. For instance, European companies could buy emissions reduction credits from wind power projects in India.
- *Supporting international emissions trading*
  Linking trading schemes could support and embed a multilateral approach to dealing with climate change. Clean Development Mechanism (CDM) and Joint Initiative (JI) investments encourage developing countries to take further action to combat climate change. Linking with sub-national trading schemes, such as the Regional Greenhouse Gas Initiative (RGGI) scheme in the United States and Greenhouse Gas Abatement Scheme (GGAS) scheme in Australia (both of these national governments did not ratify the Kyoto Protocol), may build political support for international emissions trading. These putative sub-national trading schemes also cover large economies – for instance, only eight nations have economies larger than that of California, which has recently announced its plans to adopt a cap and trade scheme.

However, achieving these goals will not be straightforward. There is a significant debate around how international emissions trading can better support sustainable economic growth in developing countries. This report focuses more on EU concerns because if linking is not correctly handled, the EU ETS could be undermined. Debates have primarily focused on the EU ETS Linking Directive, which allows EU ETS operators to buy in credits acquired through the Kyoto Protocol's CDM and JI. There is also the possibility that the EU ETS could be linked to other emerging national and regional emissions trading schemes.

Linking to Kyoto CDM and JI mechanisms

The financial size of CDM/JI markets has grown exponentially in the few years that it has been running. In 2004, 69 $MtCO_2e$-worth of CDM and JI credits were traded, worth Eur215 million; this rose to 429 $MtCO_2e$ in 2005, worth Eur2.1 billion. Nevertheless, the role that CDM/JI trading plays in the EU ETS has been hotly debated.

Box 4.1: CDM and JI Explained

The Kyoto Protocol establishes that developing and industrialised countries can, respectively, invest in Clean Development Mechanism (CDM) and Joint Initiative (JI) projects. These projects reduce emissions below Business As Usual projections.

Each avoided emission under a CDM project earns an Emissions Reduction Unit (ERU). Emissions avoided under JI projects earn Certified Emissions Reductions (CER). For instance, in South Africa, Durban Municipality has established a CDM project whereby methane from a waste dump, which was previously being emitted into the atmosphere, is now used as a power source to produce electricity. Each unit of methane producing electricity earns an ERU.

The EU ETS Linking Directive establishes that installations included in the European trading scheme can buy in such ERU and CER emissions credits, in lieu of making emissions reductions themselves. The European Commission has placed some restrictions on the type of CDM/JI credits that can enter the EU ETS. Credits from Land Use, Land Use Change and Forestry (LULUCF) projects are forbidden (for example, a CDM project that stopped deforestation); so too are nuclear projects. Hydropower projects have to comply with the recommendations made by the World Commission on Dams (European Union 2004a: Article 14).

The most contentious issue has been the extent to which the EU ETS can trade with other emissions trading systems. Rhetorically, the EU has noted that the use of credits from CDM/JI projects, should be supplementary to domestic action.

There are good reasons for this stipulation. Firstly, the EU ETS caps and reduces emissions, therefore each EUA represents an absolute emissions reduction. By contrast, CDM/JI projects give credit for emissions that are avoided, against Business As Usual projections. Second, if a surfeit of low-cost, CDM/JI emissions credits were released into the market, this might well collapse EU ETS prices. Third, if the EU is to exert leadership, it has to set an example and undertake significant decarbonisation at home; it cannot buy in all its emissions reductions from abroad.

To a certain extent, the EU has committed itself to ensuing that emissions reductions are made at home as well as abroad. During the Marrakech negotiations in 2004, which determined the use of flexible mechanisms in Kyoto trading, the EU submitted that each party should impose quite stringent limits. In one proposal, the EU suggested that 50 per cent emissions reductions had to be made domestically within the EU.

Subsequently, in determining the Phase II EU ETS National Allocation Plans, the European Commission has watered down this proposal. Although it still stipulates that 50 per cent of emissions reductions should be made within the EU, the baseline against which this effort is calculated is defined extremely generously, therefore allowing CDM/JI credits to make the majority of emissions reductions (European Commission 2006). For example, the UK has set one of the more ambitious CDM/JI limits, but project credits could be used to make up to two-thirds of reductions efforts (see Table 4.1). Nevertheless, a number of countries' draft NAPs were rejected by the European Commission for using too many CDM/JI credits.

Table 4.1: Evaluation of the UK's use of project credits in Phase II

UK's total cap	= 238 $MtCO_2$
Reductions below Business As Usual emissions projections	= 29.3$MtCO_2$
2/3 of reductions are made using project credits. Therefore project credits permitted =(29.3/3)*2	= 19.5 $MtCO_2$
Project Credits as percentage of total cap = (19.5/238) * 100	= 8%

Source: Miliband (2006)

Table 4.2: Evaluation of selected countries proposed use of project credits in Phase II[3]

Country	Percentage of allowances covered by credits from Kyoto flexible mechanisms	Reduction/increase in emissions between Phases I and II
UK	Up to 8% of total cap	2.9% reduction
Italy	Up to 10% of total cap	13% reduction
Germany	Up to 12% of allocations for each installation	3.4% reduction
Poland	Up to 25% of total cap	17% increase
Spain	Up to 50% of allocations for each installation	16% reduction

Source: WWF (2006b: 3, 4)

In Phase III it is important that the EU should better regulate the use of CDM/JI project credits, reviving proposals that were made when the Linking Directive was originally discussed. The European Commission should ensure that member states set caps on Kyoto credits low enough so that domestic action in the EU continues to be the main means through which reductions are achieved (Climate Action Network 2006).

3. These figures are taken from countries' draft NAPs and could have been subsequently revised after this report was published.

Linking to national and sub-national emissions trading schemes

Emissions trading schemes are emerging across the world. Other emerging schemes include:

- Norwegian and Swiss national emissions trading schemes (both designed very similarly to the EU ETS)
- the Canadian emissions trading scheme
- the Japanese Emissions Trading System (JETS)
- the Regional Greenhouse Gas Initiative (RGGI), involving North East and Mid-Atlantic States of the US
- the Greenhouse Gas Abatement Scheme (GGAS) of New South Wales, Australia
- the California Climate Action Registry.

The EU initially envisaged that the European trading scheme would link with trading schemes established by other signatories to the Kyoto Protocol. Article 25 of the original EU ETS Directive stated that: 'Agreements should be concluded with third countries listed in Annex B […] to provide for the mutual recognition of allowances between the Community scheme and other greenhouse gas emissions trading systems' (European Union 2003: 25).

Subsequently, the European Commission has left open the prospect that the EU ETS could link to trading schemes established within countries that have not ratified the Kyoto Protocol. Paragraph 18 of the EU ETS Linking Directive notes, 'The [European] Commission should examine whether it could be possible to conclude agreements with countries listed in Annex B to the Kyoto Protocol which have yet to ratify it' (European Union 2004a).

Participants in emerging sub-national emissions trading schemes in the USA and Australia have also expressed an interest in linking to the EU ETS, noting: 'While mandatory schemes in the US and Australia would not be able to sell allowances into the EU Scheme until those countries ratify [the Kyoto Protocol], the [EU ETS] Linking Directive introduces the potential one-way flow of allowances from the EU ETS to US and Australian systems' (Greenhouse Gas Coalition 2004: 1). And in July 2006, the United Kingdom and California announced a partnership to 'explore the potential for linkages between our market-based mechanisms' (United Kingdom-California 2006).

We are already seeing trading schemes being linked together. The Norwegian and Swiss trading schemes have been designed to be similar to the EU ETS. Indeed, it is likely that the Swiss trading scheme could be linked to the EU ETS by 2008. It is important to emphasise at this early stage that differences in the design of trading schemes do matter. As matters currently stand, it is difficult to see how the EU ETS could link with New South Wales's GGAS or the Canadian trading schemes, for instance.

Successfully linking trading schemes

A discussion about exactly how individual emissions trading schemes can be linked together is slowly gathering pace. Many believe that a global carbon market will emerge bottom-up, as trading schemes conclude bilateral linking agreements with each other. For example, if trading scheme A is linked to scheme B and scheme B also links to scheme C, A will effectively end up trading with C even there is not a formal linking agreement between them (Egenhofer 2006).

Nevertheless, it is essential that key design features are compatible in different emissions trading schemes (Blyth and Bosi 2004; Sterk 2006), for example:

- *Monitoring, Reporting and Verification (MRV):* Strict standards are crucial in ensuring confidence and underpinning value in traded units. National-level guidelines and guidance offered by the Intergovernmental Panel on Climate Change (IPCC) could provide the foundations for developing emissions trading schemes, even though MRV will differ from country to country.
- *Recognition of trading units:* The EU ETS Linking Directive places restrictions on the use of trading credits generated by LULUCF and nuclear projects. It does not mention the possibility of installations using Kyoto Protocol credits, Assigned Amount Units (AAUs), to cover their emissions. However, the EU ETS is considering linking to other schemes, which will themselves allow the use of these trading units. Even if such credits do not directly enter the European trading scheme, they will still influence EU ETS prices. The EU should not rush into linking arrangements that would water-down the hard-won environmental features of the European scheme.

- *Absolute and relative targets:* Whereas the EU ETS sets absolute emissions targets, other trading schemes, notably the Canadian trading scheme, only set relative targets.

It is unclear, however, whether linking the EU ETS to trading schemes with relative targets will actually achieve absolute emissions reductions. There is a possibility that linking a trading scheme with an absolute cap to one with relative targets will cause both schemes to emit more emissions than if they had not been linked (Blyth and Bosi 2004). Policy solutions to deal with this possible problem include taxing emissions trading between the schemes and introducing an exchange rate to allow for relative allowance values. But these measures would introduce administrative burdens and make trading between linked schemes a less attractive option – thus undermining the purpose of linking trading schemes in the first place.

Linking the EU ETS to trading schemes in developed countries which have relative targets also touches on issues of political principles. It can be argued that, by linking to CDM/JI projects, the EU ETS is already linked to a trading scheme that achieves relative emissions reductions against a Business As Usual baseline. However, CDM/JI projects play an important political role in encouraging developing countries to combat climate change, while acknowledging the important principle that these countries have less capability to respond to climate change and are not historically responsible for this crisis. By contrast, it is imperative that the industrialised countries that are most capable of making absolute emissions reductions do so, and that national and sub-national trading schemes reflect these principles.

Likewise, it might prove politically difficult for one trading scheme with higher emissions reductions targets, which had higher allowance prices, to link to another emissions reductions scheme with much lower targets and prices. Countries in the trading scheme that had much higher ambitions would be likely to be net buyers of emissions credits, subsidising the emissions reductions efforts of the trading scheme which had the lower ambition. This could lead to a situation in which it was politically difficult for one trading scheme to set much more stringent emissions reductions targets than another (Pershing 2004).

- *Compliance framework:* Traded units only have a value in the context of a compliance framework. In the EU ETS, trading entities that choose to pay a penalty rather than comply with their emissions allowance will pay a penalty of Eur40 per allowance in Phase I, and Eur100 per allowance in Phase II. The excess emissions must also be covered by allowances surrendered by the installation in the following year.

Linking to another scheme with a similar penalty regime should be straightforward. Indeed, it would not matter if penalty regimes were different so long as they ensured overall compliance. However, it would be very difficult for the EU ETS to link to a voluntary emissions trading scheme where units of trade were not guaranteed by a compliance framework.

- *Price caps:* A number of emissions trading schemes that the EU ETS might link with cap permit prices. For instance, the Canadian final emitters scheme sets a cap at C$15. If trading schemes were linked together, the lowest price cap used by any individual trading scheme would carry across the entire market.

A global emissions market: conclusions

Linking together trading schemes offers a number of advantages, including:

- increasing economic efficiency
- increasing low-carbon investment in developing countries
- supporting international emissions trading.

Achieving these goals, however, is not straightforward. It is imperative that the EU ETS is not undermined by being linked to other trading schemes. Trading schemes should only be linked together if this supports and encourages the development of a robust system of international emissions trading.

The EU ETS Linking Directive establishes that it will be possible for operators to acquire emissions credits outside the EU, from emissions reductions projects established under the Kyoto Protocol. The EU can make an important contribution to the debate on the future after 2012, of the Kyoto mechanisms, the Clean Development Mechamism (CDM) and Joint Implementation (JI). Therefore:

- The European Union must ensure that its use of these external credits in the EU ETS is supplementary to domestic actions that reduce CO_2 emissions.

- The European Commission should set caps on the use of JI/CDM so that domestic action becomes the main means through which emissions reductions are achieved.

The European Union has also begun discussions as to how the EU ETS might link to emerging regional, national and sub-national emissions trading schemes around the world.

The EU faces a difficult political judgment in the coming years over whether it would be beneficial to link to developed countries' trading schemes that have very different features to the EU ETS. Although economists have proposed technical fixes that would manage the process of linking together trading schemes with very different features, others express doubt about the efficacy of these 'fixes'. While the perfect should not be the enemy of the good, caution should be exercised, with particular regard to:

- The EU should not rush into linking arrangements that would water down the hard-won environmental features of the European scheme. If the EU ETS directly or indirectly has links with trading schemes that allow nuclear or land-use change projects – which the EU ETS currently forbids – these credits will enter the EU ETS market.
- The EU ETS should not buy in emissions credits from a trading scheme in a developed country that does not have absolute caps. Linking the EU ETS to a trading scheme with relative targets might lead to less absolute emissions reductions. Linking to a domestic trading scheme in a developed country that only took on relative targets would also undermine the important political principle that developed countries must make absolute emissions reductions.
- The EU ETS should not buy in credits from voluntary emissions trading schemes in developed countries. Nor should it link to a scheme that compliance rules that are so weak that they result in emissions credits losing economic and environmental value.

If the EU ETS links to a scheme with price caps, then these caps will hold down the price of emissions credits across all linked trading systems. Decision-makers should be very careful of linking the EU ETS to trading schemes that have price caps, particularly if this would dramatically lower EU ETS market prices.

5. Conclusions

The establishment of the EU ETS has been a landmark in climate policy. The scheme is potentially the most efficient means by which the EU can meet its emissions reductions targets under the Kyoto Protocol and the European Council. Also, as the first major trading scheme that is operational, its success is crucial for the future of international emissions trading.

Nevertheless, the European Commission must ask fundamental questions about how the trading scheme can be restructured and improved. The Commission's review of the EU ETS provides a vital opportunity to do this and must be supported by member states.

Achieving the goals we highlight in this report – ensuring emissions reductions, expanding the EU ETS and establishing a global carbon market – is, however, not straightforward. It is imperative that the EU ETS is not undermined when linking to other trading schemes. Buying-in credits from other trading schemes has to be supplemental to making emissions reductions in the EU ETS. Trading schemes should only be linked together in so far as this supports and encourages the development of a robust system of international emissions trading.

The EU ETS is an integral means of meeting the EU's Kyoto targets. It will be a keystone of European emissions reduction efforts after 2012 and is integral to the future of international emissions trading worldwide. The importance of the European Commission's review cannot be understated -- it is an opportunity to define the future of emissions trading that cannot be missed.

References

Note: web references correct at December 2006

ACEA (2005) *Tax Guide* European Automobile Manufacturers Association: Brussels, available at: http://www.acea.be/ASB20/axidownloads20s.nsf/Category0ACEA/F54353A5D585D264C12570680043F632/$File/2005ACEATaxGuide~Introduction.pdf

Baer P (2006) *High Stakes: Designing emissions pathways to reduce the risk of dangerous climate change*, London: Institute for Public Policy Research

Baumert K, Bradley R, Dubash N, *et al* (2006) *Growing in the Greenhouse: Protecting the climate by putting development first* Washington DC: World Resources Institute

Blyth W (2005) *Impact of Climate Change Policy Uncertainty on Energy Sector Investments* London: Chatham House

Blyth W and Bosi M (2004) *Linking Non-EU Domestic Emissions Trading Schemes with EU Emissions Trading Scheme* Paris: International Energy Agency

Bows A, Anderson K, and Upham P (2006) *Contraction and Convergence: UK carbon emissions and the implications for UK air traffic* Manchester: Tyndall Centre

Brown G (2006) 'We Must Match Growth and Justice with Environmental Care', Speech by the Rt Hon Gordon Brown MP, UK Chancellor of the Exchequer, to United Nations Ambassadors, New York City, USA, 20 April

Carbon Trust (2005) *The UK Climate Change Programme: Potential evolution for business and the public sector* London: Carbon Trust

Carbon Trust (2004) *The European Emissions Trading Scheme: Implications for industrial competitiveness* London: Carbon Trust

CE Delft (2006) *Dealing with Transport Emissions: An emission trading system for the transport sector, a viable solution?* Stockholm: Swedish Environmental Protection Agency

CE Delft (2005) *Giving Wings to Emissions Trading: Inclusion of aviation under the European Trading System: Design and impacts* Brussels: European Commission

Center for Clean Air Policy (1998) *US Carbon Emissions Trading: Description of an upstream approach* Warrenton: Center for Clean Air Policy

Centre for European Policy Studies (2005) *Reviewing the EU Emissions trading Scheme: Priorities for short term implementation of the second round of allocation, part I* Brussels: Centre for European Policy Studies

Centre for European Policy Studies (2006) *Reviewing the EU Emissions trading Scheme: Priorities for short term implementation of the second round of allocation, part II* Brussels: Centre for European Policy Studies

Climate Action Network Europe (2004) *Proposed Amendment to the EU Emission Trading Scheme – Linking the Kyoto project based mechanisms with the EU Emissions Trading Scheme* Brussels: Climate Action Network, accessed at www.climnet.org/EUenergy/pubs/GP_Position_CDMJILink.pdf (page no longer available)

Climate Action Network (2006) *National Allocation Plans 2005 -7: Do they deliver? Key lessons to member states for 2008-12*, Brussels: Climate Action Network

Commission of the European Communities (2005) *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Winning the battle against climate change* Brussels: Commission of the European Communities

Council of the European Union (2005) *Presidency Conclusions* Brussels: Council of the European Union

Darling A, Beckett M, and Johnson A (2006) *Surface Transport and CO_2 Emissions Trading*, Letter written to Stavros Dimas, EU Commissioner for the Environment London: House of Commons Library

Department for Environment, Food and Rural Affairs (Defra) (2006a) *Climate Change: The UK programme 2006* London: Defra

Defra (2006b) *EU Emissions Trading scheme Phase II: Expansion – explanatory note* London: Defra

Defra (2005) *Linking Directive – Consultation paper* London: Defra

Department for Transport (DfT) (2006) *Road Transport and Emissions Trading* London: Unpublished power point

DfT (2005) *Renewable Transport Fuels Obligation Feasibility Report* London: Department for Transport

DfT (2004) *Towards a UK Strategy for Biofuels – Public consultation* London: Department for Transport

Deutsche Bank (2006) *EU Emissions Trading: Phase 2 NAPs under scrutiny*, London: Deutsche Bank

Dimas S (2005) 'The EU Emissions Trading Scheme – Looking Back and Forward', Speech at Green Week debate on Emissions Trading Scheme, Brussels, 2 June, available at: http://europa.eu.int/rapid/pressReleasesAction.do?reference=SPEECH/05/317&format=HTML&aged=0&language=EN&guiLanguage=en

Dimas S (2006) 'Europe's emissions trading is a model for the world' *Financial Times*, June 8 2006

Egenhofer C (2006) *The EU Emissions Trading Scheme – One year on*, Presentation at Catholic University of Leuven, Belgium, 8 February, available at: www.ceps.be/files/Egenhofer_Leuven_8Feb06.pdf

Ellis J and Levina E (2005) *The Developing CDM Market* Paris: International Energy Agency

Ellis J and Winkler H (2004) *Taking Stock of Progress under the Clean Development Mechanism* Paris: International Energy Agency

Energy Information Administration (2006) *International Energy Outlook 2006*, Washington DC: Energy Information Administration, available at www.eia.doe.gov/oiaf/ieo/emissions.html

Environment Agency (2006a) *LETS Update: Working groups A and B report* Bristol: Environment Agency

Environment Agency (2006b) *LETS Update: Decision makers summary* Bristol: Environment Agency

Environment Agency (2006c) *LETS Update: Scoping phase report* Bristol: Environment Agency

Environment Agency (2006d) *LETS Update: Working group C report* Bristol: Environment Agency

European Commission (2006) *Building a Global Carbon Market: Report pursuant to Article 30 of Directive 2003/87/EC* Brussels: European Commission

European Environment Agency (2005) *Greenhouse gas emissions trends and projections in Europe* Copenhagen: European Environment Agency

European Parliament (2006) *Motion for a European Parliament Resolution on Reducing the Climate Change Impact of Aviation (2005/000INI)*, Brussels: European Parliament

European Union (2006) 'European Emissions Trading Scheme delivers first verified emissions data for installations', Press release, 15 May, available at http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/612&format=HTML&aged=0&language=EN&guiLanguage=en and http://ec.europa.eu/environment/climat/emission/pdf/citl_pr.pdf

European Union (2005) *Further Guidance on Allocation Plans for the 2008 to 2012 Trading Period of the EU Emission Trading Scheme* Brussels: European Union

European Union (2004a) *Directive 2004/101/EC of the European Parliament and of the Council* Brussels: European Union

European Union (2004b) *Energy and Transport in Figures* Brussels: European Union

European Union (2003) *Directive 2003/87/EC of the European Parliament and of the Council* Brussels: European Union

European Union (2000a) *Green Paper on Greenhouse Gas Emissions Trading Within the European Union*, Brussels: European Union

European Union (2000b) *Green Paper: Towards a European strategy for the security of energy supply*, Brussels: European Union

Figueres C (2006 forthcoming) 'Sectoral CDM: Opening the CDM to the yet unrealised goal of sustainable development', *International Journal of Sustainable Development and Policy* Montreal: McGill University

Foley J and Fergusson M (2003) *Putting the Brakes on Climate Change: A policy report on road transport and climate change* London: Institute for Public Policy Research

Goodwin P, Dargay J, and Hanly M (2003) 'Elasticises of Road Traffic and Fuel Consumption with Respect to Price and Income: A review', *Transport Reviews,* London: Taylor and Francis

Grayling T, Gibbs T, and Castle B (2006) *Tailpipe Trading: How to include transport in the EU emissions trading scheme* London: Institute for Public Policy Research

Greenhouse Gas Coalition (2004) *Comments on RGGI Draft Discussion Piece on Offsets*, Memo to RGGI Staff Working Group, available at www.rggi.org/docs/rggi_offsets.pdf

Greenpeace (2003) 'Seven Reasons to Reject the Linking Directive', Press release, 24 October, Brussels, available at: http://eu.greenpeace.org/downloads/climate/PRon7ReasonsToRejectLinkingDir.pdf

Grubb M (2006) *Carbon Confusion – the EU ETS and the future* Unpublished PowerPoint

Grubb M and Neuhoff K (2006) 'Allocation and Competitiveness in the EU Emissions Trading Scheme: Policy overview', *Climate Policy* vol 6, no. 1

Hamilton K and Kenber M (2006) *Business Views on International Climate and Energy Policy* London: UK Business Council for Sustainable Energy

Harmon J, Maurer C, Sohn J, *et al* (2005) *Diverging Paths: What future for export credit agencies in development finance*, Washington DC: World Resources Institute

Heller T and Shukla P (2003) 'Development and Climate: Engaging developing countries' in Diringer E (ed) *Beyond Kyoto: Advancing the international effort against climate change* Arlington: Pew Center on Global Climate Change

Her Majesty's Treasury (2006) *Emissions Trading: UK Government Vision*, London: Her Majesty's Treasury

House of Lords (2006) *Including the Aviation Sector in the European Union Emissions Trading Scheme*, London: The Stationery Office

Ilex Energy Consulting (2005a) *The Environmental Effectiveness of the EU ETS: Analysis of the caps – a final report to WWF*, London: WWF

Ilex Energy Consulting (2005b) *The Environmental Effectiveness and Economic Efficiency of the EU ETS: Structural aspects of allocation – a final report to WWF* London: WWF

International Energy Agency (2004) *Biofuels for Transport – An international perspective* Paris: International Energy Agency

IPA Energy Consulting (2005) I*mplications of the EU Emissions Trading Scheme for the UK Power Generation Sector – Final report to the Department of Trade and Industry* London: Department of Trade and Industry

Langrock, T and Sterk W (2004) *Policy Brief for the EP Environment Committee EP/IV/A/2003/09/01: Linking CDM and JI with the EU emissions allowance trading* Berlin: Wuppertal Institute

McKinsey and Company (2005) *Review of the EU Trading Scheme: Survey highlights* Brussels: European Commission

Miliband D (2006) 'Statement to the House of Commons', 30 June 2006 Hansard, London: The Stationery Office

NERA Economic Consulting and Enviros (2006) *Energy Efficiency and Trading Part II: Options for the implementation of a new mandatory UK emissions trading scheme – report for Defra* London: Defra

Pershing J (2004) *Linking Trading Schemes: Dealing with non-parties*, Presentation to the International Energy Agency 4th annual Workshop on GHG Trading, 4 October, Paris, www.wri.org

Philibert C (2006) *Certainty versus ambition* Paris: International Energy Agency

Point Carbon (2006) *Carbon 2006: Towards a truly global market* London: Point Carbon

Rabinowitz R (2006) 'Using Carbon Markets to Encourage the Introduction of Low Carbon Vehicles' *Low Carbon Road Transport Challenge* London: Low Carbon Vehicle Partnership

Schleich J and Betz R (2005) *Incentives for Energy Efficiency and Innovation in the European Emission Trading System* Stockholm: European Council for an Energy Efficient Economy

Sterk W (2006) *Ready to Link Up? Implications of design differences for linking domestic emission trading schemes*, Presentation at Linking the EU ETS with emerging carbon markets in other countries Conference, 29 May, available at: www.wupperinst.org/download/3214/conf/11-Sterk.pdf

Sterk W, Bunse M, Volner J *et al* (2005) *The EU Linking Directive and its Impact on the Potential for JI Projects in the New EU Member States and EU Accession Countries* Tokyo: Institute for Global Environmental Strategies

Stern N (2006) *The Stern Review: The Economics of Climate Change* London: Cabinet Office

Stern N (2006) Remarks by Sir Nicholas Stern at Delhi-India Sustainable Development Summit on 3rd February, London: HM Treasury

Sugiyama T ed (2005) *Governing Climate: The struggle for a global framework beyond Kyoto* Winnipeg: International Institute for Sustainable Development

Transport and Environment (2006) *Clearing the Air: The myth and reality of aviation and climate change* Brussels: Transport and Environment

United Kingdom-California (2006) Announcement on Climate Change and Clean Energy Collaboration available at: www.theclimategroup.org/assets/UK%20CA%20Agreement%2025-7-06.pdf#search=%22United%20Kingdom%20and%20California%20Announcement%20on%20Climate%20Change%20and%20Clean%20Energy%20Collaboration%20%22

United Nations Framework Convention on Climate Change (2004) *Marrakech Accords and Marrakech Declaration* Bonn: United Nations Framework Convention on Climate Change

WWF (2006a) *Crunch Time on Carbon: Getting it right in ETS Phase II* Unpublished

WWF (2006b) *Weak caps, little auctioning, flexmex overdose: WWF analysis of NAPs for ETS phase II* Brussels: WWF