CARBON TRUST

Cutting Carbon in Europe

The 2020 plans and the future of the EU ETS

Contents

Preface

The European Commission (EC) package of measures to implement Europe's climate change goals for 2020 comprises a far-reaching set of proposals that will be heavily debated throughout 2008, and probably 2009. The proposals include a wholesale revision of the EU Emissions Trading Scheme (EU ETS), intended to make it capable of driving deep emission reductions in Europe over the longer term.

Recognising the central role of the EU ETS and its importance to business in the UK and elsewhere – both for companies covered by, and those outside the scope of the scheme – the Carbon Trust has over the past few years produced several publications on its impact. These included analysis of its strengths and weaknesses in Phase II, from 2008-12. That analysis concluded that Phase II was likely to induce operational emission reductions, but not support investment in low carbon technologies unless and until Europe defined the scheme's longer term future. The proposals for doing just that are now firmly on the table.

This publication consequently sets out: to describe the EC package particularly in relation to the proposals for the future of the EU ETS; to analyse its implications for business; and to consider a range of complexities that have yet to be fully addressed. We intend it as a contribution to debate that can still help to shape the final outcome. Our overall conclusion is that the package proposals for reform of the EU ETS are a big and bold step in the right direction – but that some of the toughest roads still remain to be travelled.

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Previous publications on the EU ETS available from the Carbon Trust

The following publications are available to download from **www.carbontrust.co.uk** or by calling **0800 085 2005**:

2008 EU ETS impacts on profitability and trade: a sector by sector analysis.

2007 EU ETS Phase II allocation: implications and lessons.

2006 Allocation and competitiveness in the EU emissions trading system: options for Phase II and beyond.

2004 The European emissions trading scheme: implications for industrial competitiveness.

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Climate Strategies

This Carbon Trust report draws in part on research by Climate Strategies*, an international network organisation that develops and delivers rigorous, independent academic analysis to meet the needs of international climate change policymaking. The Carbon Trust is a founding supporter of Climate Strategies.

* This underlying research comprised several working papers brought together in Climate Strategies (2007): K. Neuhoff, M. Grubb, J.C. Hourcade, F. Matthes, *Submission to the EU ETS Review*, **www.climate-strategies.org**

Executive summary

The European Commission package represents probably the most radical development in the energy and environmental policies of the EU and its Member States since the founding Treaties of the European Community that encompassed agreements on coal, steel and nuclear power 50 years ago.

The EU ETS Phase III Proposals

On 23rd January 2008, the European Commission released a package of proposals to implement the goals for 2020 laid out earlier by the European Council of Ministers – with specific legislative proposals on how Europe should cut emissions of greenhouse gases by 20% and increase the share of renewable energy to 20% of final energy consumption.

The centrepiece of the package is the proposed design of the EU Emissions Trading Scheme from 2013 onwards (known as Phase III). To increase its effectiveness and efficiency, the proposals lay out a series of major developments and reforms as summarised in Table 1.

This is an ambitious set of objectives. The Phase III design proposals take good account of lessons learned and of developments in economic debates about how to maximise the efficiency of sequentially negotiated cap-and-trade schemes, whilst reflecting practical constraints around implementation and the incompleteness of global participation.

The proposals increase the consistency, effectiveness and efficiency of the EU ETS, across sectors and countries, and also reduce transaction costs associated with smaller installations. The move to auctioning all emissions allowances for power generation, and as the default goal for other sectors, although constrained by sunk cost and international competitiveness concerns, is grounded firmly in economic 'polluter pays' principles and greatly reduces the risk of retrospective intervention in the future.

The radical changes in the EC package represent a huge step forward towards clarifying the future and simplifying the process of allocating free emissions allowances and setting it on a more principled basis. They thus offer a rational and stable structure, as a basis for European industry to invest sensibly for a carbon constrained future.

Impact of the package proposals on UK & European business

Like any major advance, these positive developments come at a cost that will be shared between consumers and government, between different companies particularly in power generation, and between countries. However, the full consequences for who pays and how much, remain quite uncertain.

The 20% greenhouse gas reduction, 20% renewable energy and 20% energy efficiency improvement targets set by the European Council of Ministers interact in complex ways. Scenarios are possible in which continuing trends together with stronger action towards the 20% energy efficiency target and towards the renewable energy target achieve almost all the emission reductions required in EU ETS sectors. Any residual could then largely be taken up by emission credit imports, which may then define a floor price.

But radically different scenarios are possible in which a substantial gap emerges between EU ETS sector emissions and the declining cap, that can only be closed by much stronger action on industrial emissions and large-scale switching from coal to gas power generation (given that carbon capture and storage (CCS) is not likely to be widespread before 2020). Carbon prices in EU ETS Phase III could correspondingly be anywhere in the range €15-50/tCO_2, and variations outside this range in either direction cannot be entirely ruled out.

This range partly reflects political choice about the division of effort between: public expenditure and regulation on energy efficiency; targeted support for renewable energy; and the EU ETS.

Table 1 *Major developments proposed for Phase III of the EU ETS*

Objective	The proposal
Provide longer term certainty for investment.	8-year trading period, 2013-2020, with overall cap extending beyond this.
Avoid distortions and inconsistencies between Member States and reduce the burden of negotiating allocations.	Replace National Allocation Plans by harmonised rules for allocation which apply equally across the EU, thereby also avoiding the need for national EU ETS caps.
Deliver the 2020 greenhouse gas targets.	Overall cap on EU ETS sector emissions declining linearly to 21% below 2005 levels by 2020. Other sectors to reduce 10% below 2005 levels, with targets distributed between Member States. Provisions to revise both to secure 30% reductions in the event of global agreement.
Optimise coverage whilst reducing transaction costs and minimising distortions at the boundary with non-participants.	Extend EU ETS to include additional activities characterised by large industrial facilities, aviation and potentially shipping. Streamline monitoring, reporting and verification systems. Exempt very small contributors to site emissions and introduce flexibility to opt-out facilities below 25MW if they are covered by equivalent incentives.
Avoid potential windfall profits and distortions arising from repeated free allocations and new entrant provisions.	Move to no free allocation from 2013 for power generation and as the ultimate goal for other sectors – about two thirds of allowances auctioned from 2013. Allocation of free allowances will be based on 'benchmarks' to the extent possible.
Minimise international competitiveness impacts and associated carbon leakage.	Continued free allocation up to 100% of proportionate share of declining overall cap for sectors identified as exposed to significant risk of carbon leakage.
Allow appropriate recovery of historic sunk costs in carbon intensive facilities without protecting new carbon-intensive investments from the cost of their emissions.	Phase out free allocations from 80% to 0% by 2020 for other manufacturing activities. New entrant allocations to mirror this.
Contain costs and protect value of current Kyoto project mechanisms without flooding the market.	In absence of new international agreement, allow post-2012 use of international credits generated during Kyoto 1st period, within agreed caps, and continued crediting for projects in Least Developed Countries.
Address distributional and other equity concerns, within societies, between EU Countries, and globally.	Redistribute 10% of auction rights toward the poorer EU Member States; require governments to earmark 20% of auction revenues for expenditure on helping poorer consumers cope with price impacts, and a wide range of climate-related expenditures at home and abroad.
Encourage other regions and countries to develop effective trading schemes.	Potentially link EU ETS to regional and sub-regional schemes irrespective of global agreement.
Incentivise developing countries to reach a meaningful global agreement and contain costs of moving to EU 30% emission reduction target.	Confirm tougher targets for both EU ETS and other sectors in event of global agreement matched by opening up to greater international crediting.

Combined with the move to auctioning, the EU ETS will substantially and appropriately affect the relative value of different power stations and companies according to their carbon intensity. Other participating industrial sectors will have to increasingly face up to carbon costs as the scale of their free allocations decline, and must learn to handle the price uncertainties involved. All sectors will face impacts on electricity prices, with carbon costs likely to add €10-20/MWh.

The provisions to allow opt-out of smaller installations subject to demonstrating 'comparability of effort' may have interesting ramifications. In the UK, Climate Change Levy (CCL) payments alone appear insufficient to qualify as comparable effort, but the combination of CCL, carbon cost pass-through in electricity and the new Carbon Reduction Commitment (CRC) may well be sufficient. The much lower transaction costs of the CRC are likely to make it a more attractive option for many such facilities, whilst the need to demonstrate comparability of effort may well influence the future strength of the CRC caps.

The move to auctioning is likely to raise tens of billions of Euros annually across Europe, with revenues in the UK most likely in the range €4-8bn/yr averaged across Phase III. This is a substantial revenue stream and is likely to form a new focal point of debate, along with the potential impact of carbon prices and auctions on industrial competitiveness (as examined in our previous report). This points towards some of the most politically difficult issues outstanding.

Issues outstanding

Although the EU package clarifies a great deal, several types of implementation issues have yet to be resolved.

Applying categorisations. Treatment of self-production of electricity for manufacturing activities could prove thorny. However, the dominant classification dispute is likely to be deciding which sectors are at significant risk of carbon leakage. The key issue is whether the European Commission will adopt quantitative indices of this, how these might be applied and, in particular, whether classifications will be driven by aggregate impacts at EU level, or by the concerns of individual facilities and countries.

Applying allocation principles. Where free allocations are granted, the ideas underpinning 'benchmarking' of allocations based on the best available technologies are sound, but applying them in practice is likely to be very difficult. Precedents do not appear to provide a strong and compelling basis for how to do this, and the adoption of technology-based benchmarks in the EU could also have important global ramifications that have not yet been adequately considered.

Tackling carbon leakage. Free allocation can protect profitability but does not really solve the problem of carbon leakage, unless it is made conditional upon production and investment decisions, in ways which could seriously undermine the fundamental purposes of the system. The ideal 'solution' of global sectoral agreements, however, is unlikely to be realised in ways that resolve concerns about carbon leakage, at least in the next round of global negotiations.

The 'second best' option of invoking border adjustments in one form or another is legally complex and politically very delicate. If no specific action is taken (beyond free allocation), the scale of carbon leakage would not severely undermine the emission savings from the EU ETS in Phase III, but it could weaken the case for including the most exposed sectors, and undermine political support for the system through the loss of some activity in a few sectors. Deferring a specific decision on how to tackle carbon leakage until 2011 is a sensible compromise, and could be separated from the identification of a first tier of 'sectors at risk' which might be attempted earlier.

Spending the money. The Commission proposal that 20% of auction revenues should be reserved for activities associated with tackling climate change appears reasonable, and would be facilitated by proposed revisions to State Aid legislation. Such expenditures could help to reinforce the impact and political stability of the EU ETS and strengthen action around climate change more broadly, in Europe and abroad. However, such linkage is strongly opposed by several governments (including the UK), is not critical to the overall design, and may not survive the political process.

Increasing price confidence. Wide uncertainty in the carbon price may reduce the efficiency and effectiveness of the EU ETS, complicate use of auction revenues, and exacerbate some of the political and technical complexities. Establishing a reserve price on allowance auctions would support a 'floor price' that would greatly increase confidence for low carbon technology investments, and also provide a more stable base of auction revenues.

Mechanisms to lessen the risk of price spikes or unexpectedly high prices could include increasing access to external emission credits at higher prices. However, this does raise other complexities. Also, any such 'cost containment' mechanisms would need to avoid undermining the possibility for carbon prices to reach levels that would support investment in key technologies (such as CCS).

Burden sharing. Finally, there are additional, crucial 'roads not yet travelled' that lie beyond the scope of this report. These mainly concern distributional and political questions between governments. A struggle between European governments about the 'burden-sharing' dimension is likely, and the constraints on importing emission credits are already being contested. The biggest of all is the effort to secure a global agreement on post 2012 commitments, at the Copenhagen conference scheduled for December 2009. An adequate outcome would trigger a shift of the EU target from 20% to 30% below 1990 levels, and open up the EU ETS to a much wider scope of international crediting and global engagement – which is a major, deliberate and highly desirable objective of the proposals.

Conclusions and timelines

The redesign of the EU ETS offers the structural certainty that business has been asking for, with a design that offers a rational and sound basis for efficient investment towards a low carbon economy. However, this comes at a price which remains more uncertain than is generally recognised, with significant distributional impacts and important hurdles yet to be overcome.

The EU ETS proposals, as explained in this report, are but a part of the overall package of proposals for cutting carbon in Europe. There would be tremendous value in adopting the EU ETS part of the package at least (and if at all possible, the renewable energy directive) by Spring 2009, before the EU Parliament and Commission rise. This would: provide investors with early confidence about the direction of policy as a platform for investment in the EU; send a powerful marker to the new US Administration about EU commitment and expectations on the strength of industrialised country action; and form a focal point around which global negotiations up to Copenhagen could coalesce. The stakes are high; but the prize is even bigger.

Part I – The ‘EC 2020’ package and its history

On 23rd January 2008, the European Commission proposed probably the most radical development in the energy and environmental policies of the EU and its Member States since the founding Treaties of the European Community that encompassed agreements on coal, nuclear and steel 50 years ago.

1. Introduction: the 2020 targets

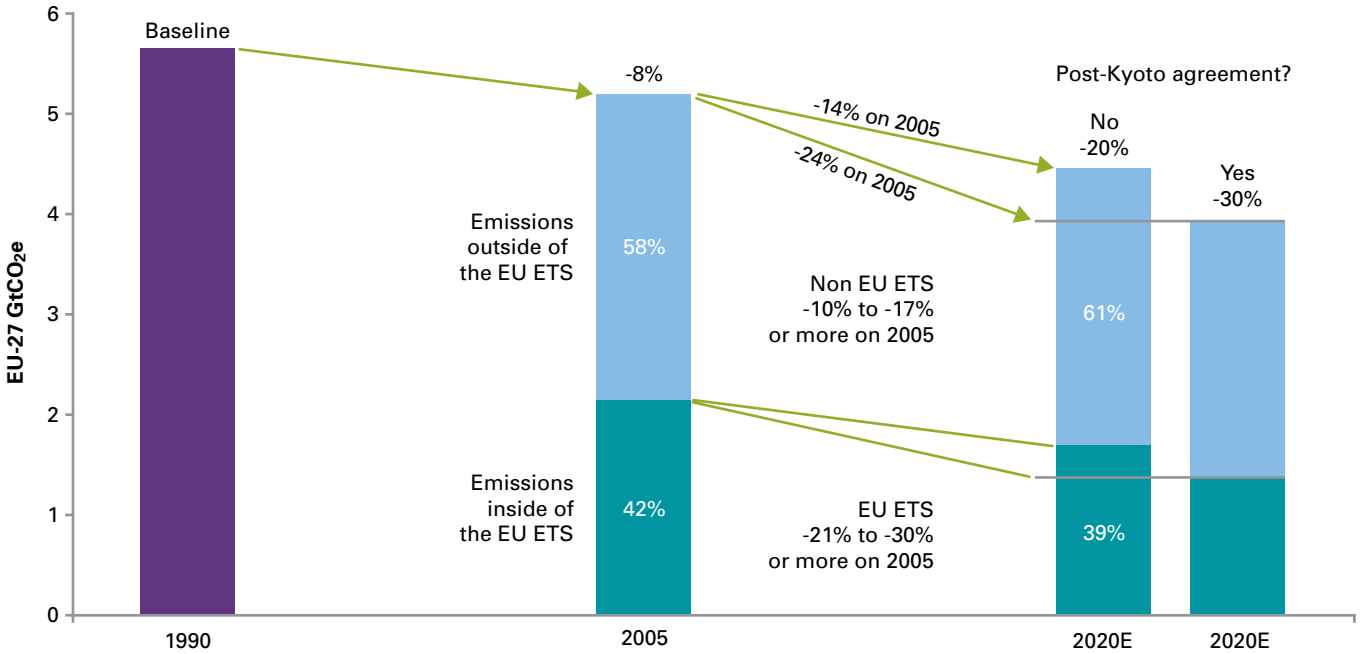
'The EC Package', as the proposal promptly became known, was the Commission's response to the Member States' request for proposals on how Europe could implement the '20:20:20' targets agreed by the Council of Ministers when they met in Spring 2007: to cut greenhouse gas emissions by 20% from 1990 levels (or by 30% in the event of an adequate international agreement), to improve energy efficiency by 20%, and to secure 20% of Europe's energy from renewable sources – all by 2020.

The Council's request was founded on conviction about the seriousness of climate change and the need for Europe to maintain a leading role in tackling it. Within this, energy efficiency and renewable energy are seen as cornerstones which can also address European concerns about energy dependence, and may carry a number of other co-benefits. The Commission's response subdivided the greenhouse gas target between the EU ETS and the non-EU ETS sectors for both the 20% and the conditional 30% target (Chart 1), and included specific legislative proposals to implement both these and the renewable energy target. The EC package also sought to accelerate progress on carbon capture and storage.

A raft of existing policies and agreements in Europe address the dimension of energy efficiency. The 20% energy efficient target has a long history associated with assessment of the potential; the target is expressed as the objective to "save 20% of the EU's energy consumption compared to projections for 2020".

This is clearly an ambitious goal, but the exact level of ambition depends upon the underlying projections and the extent to which existing policies are included in them; unlike the other two, its achievement or not will not be readily measurable and it is already more fully addressed by existing policies. It is not formulated in a legally binding way and does not have specific policy proposals attached in the January 23 proposals, other than what is implicit in other elements of the package.

Chart 1 *The EU greenhouse gas emission reduction targets and their split between EU ETS and other sectors*



Source: European Commission; Carbon Trust analysis. Note, EU ETS based on phase II scope, does not reflect proposed expansion in scope of the EU ETS. This expansion will have the effect of maintaining, or even growing the EU ETS share of emissions out to 2020.

Note: The proposals do not exactly specify how the extra abatement to reach a 30% target would be split between emissions inside and outside the EU ETS.

On renewable energy, the Commission proposed a division of the 20% target between Member States (see Table 2 and the Annex), combined with flexibility for Member States to achieve their commitments outside their borders by the exchange of certificates based on 'point of origin.' This is an ambitious target with a novel set of mechanisms attached. As we discuss in section 7 of this report, its achievement – combined with the extent of energy efficiency improvement – would also have a profound impact on GHG emissions and the EU ETS.

The primary goal of the EC package on greenhouse gases, as mandated, is to propose policies that will deliver the 20% emissions reduction target committed to by the European Council of Ministers. The policies divide into two main areas: the future of the EU ETS as a harmonised European-wide instrument; and the distribution amongst Member States of targets for emissions from other sources.

Table 2 *Proposed distribution of the 2020 targets for renewable energy and non-EU ETS greenhouse gas emissions*

	Share of final energy from renewables by 2020	Reduction in non-EU ETS emissions from 2005-2020
EU-27	**20%**	**10%**
Austria	34%	16%
Belgium	13%	15%
Bulgaria	16%	-20%
Cyprus	13%	5%
Czech Republic	13%	-9%
Denmark	30%	20%
Estonia	25%	-11%
Finland	38%	16%
France	23%	14%
Germany	18%	14%
Greece	18%	4%
Hungary	13%	-10%
Ireland	16%	20%
Italy	17%	13%
Latvia	42%	-17%
Lithuania	23%	-15%
Luxembourg	11%	20%
Malta	10%	-5%
Netherlands	14%	16%
Poland	15%	-14%
Portugal	31%	-1%
Romania	24%	-19%
Slovakia	14%	-13%
Slovenia	25%	-4%
Spain	20%	10%
Sweden	49%	17%
United Kingdom	15%	16%

This 2-tier structure is summarised in Chart 1. Since the base year of 1990, EU greenhouse gas emissions have declined by almost 8%, so that the 20% cutback from 1990 equates to 14% below 2005 levels. Within this, emissions from the EU ETS sectors overall have declined relative to those from many of the sectors outside it (such as commercial energy use and transport); moreover, reducing emissions from power generation and some parts of industry is generally assessed to be cheaper than similar cutbacks from some others, notably transport. The Commission analysis concluded that the most efficient 'division of effort' would involve the (present) EU ETS sectors cutting back 21% below 2005 levels, and this is the target proposed.

To secure the overall 20% greenhouse gas target, this would leave the other non-EU ETS sectors – mainly transport, commercial and domestic energy use – needing to cut their GHG emissions back 10% below 2005 levels. Given that emissions from all these sectors have been growing, this itself is ambitious. However, many of the policies required to reverse this trend – like public transport, building regulations, and the UK's 'carbon reduction commitment' for the commercial sector – lie appropriately in the hands of Member States. Consequently, instead of a harmonised policy approach, the Commission proposes distributing the 10% reduction as a binding commitment upon individual Member States, as summarised in Table 2 and explained further in the Annex.

The ultimate goal is even more ambitious. The Spring Council decision emphasised the global nature of the problem and committed the EU to a 30% reduction if an appropriate post-Kyoto deal is globally agreed. The 20% target, in other words, is Europe's fallback position for a failure of the global negotiating effort; the real ambition is for 30%. In accord with this commitment, the EC package contains provisions to tighten the targets in the event of a global deal.

In contrast to the distributed nature of commitment for the non-EU ETS sectors, the proposal for the EU ETS sectors takes a fully harmonised approach, proposing a centralised EU-wide design for most elements of 'Phase III' – now clarified to be the eight-year period 2013-2020.

The main focus of this report is on the plans for the future of the EU ETS. This is one of the instruments of greatest direct relevance to business, both for the participating sectors and many others potentially affected by its evolution and impact; it also has by far the greatest ramifications internationally. Other elements of the package are considered mainly insofar as they bear upon the implications of the EU ETS.

2. The EU ETS from 2013 – overview

The design of the EU ETS post 2012 subsumes three aims; to deliver European climate change goals: efficiently, effectively, and equitably. That turns out to be no small challenge, and implies big changes from the current design.

The goal of implementing greenhouse gas emission reductions efficiently has been embodied in the EU Emissions Trading Scheme since 2005 when the CO_2 emissions from power generation and five core industrial sectors were capped. The CO_2 trading market now establishes a single price of carbon across participating sectors throughout the EU-27 countries and the three countries of the European Economic Area – in principle, allowing all participants to seek the most cost-effective ways of reducing emissions anywhere in Europe that is covered by the scheme.

The EC package seeks to extend the reach of the EU ETS to additional sectors, as described in the next section, but without changing its fundamental structure as a system focused upon strictly verified emissions from large industrial installations. The major changes, reflected in the structure of the next part of this report, are summarised in Table 3.

A growing concern of industry has been the uncertainty inherent in the sequential design of the EU ETS, with the Phase II trading period ending in 2012. Seeking to balance its concern about potential competitiveness implications of continuing with unilateral action, and the increasing difficulties of making rational investment decisions without clarity post 2012, industry had increasingly accepted the need to prioritise clarity about the future – which could not await the outcome of ponderous global negotiations. The EC package addresses this by proposing design for a longer, eight-year Phase III of the EU ETS, to run from 2013 to 2020. Moreover, it sets out a default trajectory of continuing reductions at the same pace beyond this, subject to review in 2025.

Partly to address the goal of equity within the trading scheme and to avoid problems experienced in the national allocation processes of Phase I and II, the proposals aim to centralise the processes of allocating EU ETS allowances. Conversely, outside of the EU ETS most emission sources do not involve traded goods, and the tools for implementing emission reductions in these sectors lie largely in the hands of Member States: thus the package proposes a division of the 10% reduction target for other sectors between Member States, who would then largely assume responsibility for how they are delivered.

The goal of effectiveness on the larger stage of European climate change policy is addressed in two main ways in the proposals. First is the commitment to increase the EU's contribution from a 20% to a 30% reduction below 1990 levels in the event of a global agreement. More subtly, the package is carefully set in the global context through its linkages to the international project crediting mechanisms of the Kyoto Protocol. Kyoto's first commitment period provisions currently expire in 2012. If there is not an effective successor agreement, use of such emission credits in the EU ETS would be carefully circumscribed, admitting mainly credits banked forward from the existing period, with provisions for continued crediting only from the Least Developed Countries (see section 6). However, in the event of a successful global deal, along with a tightening of its targets, the EU would open its system much more extensively to international credits – reducing its internal costs, increasing the efficiency of the global effort, and also providing a strong incentive for developing countries to strike a deal that could trigger these enhanced investments.

As so often, the goal of equity is likely to prove the most thorny to realise. In the European context, the biggest issue is likely to be the distribution of revenues between Member States, in particular from the greatly increased level of auctioning envisaged in the system. By 2020, the revenue from auctioning EU ETS allowances could be more than €50bn. The package proposes that the right to auction should remain vested in the Member States, and that 90% of these rights should be distributed in proportion to 2005 verified EU ETS emission levels. Acknowledging the huge disparities in the wealth of EU Member States – by up to a factor of five in per-capita income – the remaining 10% would then be redistributed towards the poorer Member States.

All this sets the 'big picture' of the Commission's package. It defines the wider context, and the fundamental blocks upon which the details rest. This report examines the issues of greatest interest to the businesses that will have to adjust to the realities of a decarbonising European economy – and to the new design of the EU ETS as the prime mover in that effort.

Table 3 *Major changes to the EU ETS 2005-2020*

	Phase I 2005-7
Level of cap set to provide longer term certainty for investment (section 2)	Sum of caps in each country's National Allocation Plan
Coverage optimised to increase scope, reduce transaction costs and minimise distortions with non-EU ETS sectors (section 3)	CO_2 only. Power stations plus production of ferrous metals, cement, refineries, pulp and paper, glass and ceramics, and all combustion facilities > 20MW; some opt-outs
Allocation rules centralised to reduce inconsistencies between Member States (section 4)	At discretion of Member States: most incumbents allocated close to projected need; volumes and rules around New Entrant Reserves vary
Auctioning increased to reduce windfall profits, perverse incentives and competitive distortions (section 5)	Maximum 5%: only four small member states used auctioning, mostly to cover administration costs
Global linkages made to manage costs, protect the value of Kyoto project mechanisms and encourage a global deal (section 6)	Other EU ETS schemes: restricted to other Kyoto Parties Project offsets: as verified under Kyoto Mechanisms (Clean Development Mechanism and Joint Implementation) but excluding land use and 'double counting' of EU ETS-related projects in the New Member States Member States set caps on how many allowances can be imported

Phase II 2008-12	Phase III proposals 2013-2020
Sum of caps in each country's National Allocation Plans. However, these plans had to be consistent with delivering Kyoto targets and governed by EC 'anti-subsidy' rulings that prevent allocation exceeding plausible needs	Cap calculated for the EU as a whole, declining at 1.74%/yr from Phase II average annual allowances, starting from midpoint 2008-12, to deliver 21% below 2005 levels for covered installations by 2020; continue thereafter at same rate with review in 2025
As for Phase I, but without opt-outs; some Member States opted in additional activities. Air travel is proposed for inclusion from 2010/11	CO_2 and some other industrial gases.* Additional sectors: non-ferrous metals; rock wool, stone wool and gypsum; various chemicals; CCS-related emissions. Combustion facilities above 20MW with harmonised definitions and derogations below 25MW ** PFCs for aluminium: nitrous oxide for acid production*
At discretion of Member States: most cut back on power sector and allocated other incumbents close to projected need; some allocation to new entrants benchmarked	Fully harmonised across the EU. No free allocation to power generators. Other industry: 80% free in 2013 declining to zero by 2020, unless identified as "exposed to significant risk of carbon leakage", when "up to 100% of declining cap based on 2005-7 shares". 5% of the total number of allowances set aside for new entrants; allocation rules same as for incumbents
Maximum 10%: more widely used including in the biggest member states (UK: 7%; Germany: 8.8%)	After free allocation, the remaining allowances will be auctioned – estimated around three quarters of total in 2013 and rising. Auctions are to be carried out by member states, where 90% of total allowances to be auctioned are done so by countries in proportion to their verified EU ETS 2005 emissions. The final 10% to be redistributed 'for solidarity and growth' according to GDP-related schedule specified in Directive Annex IIa
As for Phase I	Other EU ETS schemes: on case-by-case basis with no restriction to sovereign governments or to Kyoto Parties Project offsets: – banked from Phase II under Phase II qualifying rules – post-2012 operation of existing projects to within remaining Phase II cap – new (i.e., post-2012) projects in Least Developed Countries up to the overall limit of the Phase II cap – qualifying projects from countries that ratify a future international agreement

Part II – Key changes to the EU ETS from 2013

The proposed changes to the EU ETS are profound. The expansion of scope, with new sectors and in some cases gases and changes to thresholds, may take the EU ETS towards the limits of such a system grounded in intensive monitoring of individual industrial facilities. The proposals for allocation amount to a revolution in the approach adopted and in the division of powers between the EU and Member States. The role of auctioning is to be dramatically extended, with consequent implications for debates around the revenues raised. And the package is carefully nested in constrained linkages to the rest of the world, and ambitions to tougher action in the context of an effective global deal. Part II of this report explains each of these four major areas of changes.

3. New sectors, gases, and thresholds

Several developments in the EU ETS Phase III proposals aim to increase the consistency and effectiveness of the EU ETS, across sectors and countries, and also to reduce transaction costs associated with smaller installations.

The package proposals for Phase III of the EU ETS, from 2013, significantly extend its reach by including a range of emitting activities beyond the original core sectors. This extension is illustrated in Table 4. The biggest set of 'new sectors' to be included are various chemical processes. In the initial development of the EU ETS, the chemicals industry successfully resisted being included as one of the mandatory sectors, citing in part the diversity of the sector and the wide range of size of facilities.

In Phase III, key specific chemical processes are included, namely the production of basic organic chemicals, and of nitric, adipic, and glyoxylic acids, including associated emissions of nitrous oxides. Ammonia too is now to be included, as are soda ash and sodium bicarbonate. Processes and combustion installations exclusively using biomass are excluded – i.e., biomass is treated as a renewable fuel for the purposes of the EU ETS, although only 'good' biomass is counted as part of the renewable energy target[1].

Table 4 *Expansion in sectors and gases*

Phase II 2008-12		
• Electricity • Refining • Pig iron & steel	• Cement including clinker • Glass & ceramics • Pulp & paper	*Proposed from 2011/12:* • Aviation (domestic; international still being contested)
Changes in Phase III 2013-2020		
Chemicals added	**Other activities added**	**Activities removed**
• Carbon black • Nitric, adipic, glyoxal and glyoxylic acid (including emissions of nitrous oxide) • Many basic organic chemicals • Hydrogen and synthesis gas • Soda ash and sodium bicarbonate	• All metals and alloys • Including emissions of perfluorocarbons from Aluminium production • Rock & stone wool • Gypsum products • Emissions from carbon capture, transport and geological storage • Possibly maritime emissions	• Combustion exclusively using biomass • Any contribution <3MW to aggregated site emissions • Opt-out provisions for facilities <25MW if subject to 'equivalent action'

[1] Good biomass is defined as having a well-to-wheel CO_2 benefit of at least 35% compared to oil and cannot involve chopping down existing forests or destroying wetlands or wilderness. The definition of 'good' and 'bad' is to be based on a life cycle analysis of the process used to grow and manufacture the fuel, any benefit if growing the fuel also produces food and the consequences of any change in land use.

Other extensions aim to increase consistency of inclusion for products that deliver similar services – for example bringing rock wool, steel wool and gypsum production within the scope of the EU ETS in part so as to 'level the playing field' with glass wool, which was already covered as part of glass production. The coverage of metals will no longer be confined to basic iron and steel production, but encompasses additional stages of metals processing and all metals production including aluminium, including its associated emissions of the potent perfluorocarbon (PFC) gases.

In addition, explicit provisions are made for the incorporation of Carbon Capture and Storage (CCS) technologies. These provisions aim to ensure that the emission-reduction benefits of such schemes would be properly accredited, whilst also taking account of the incomplete removal or incidental emissions involved in some of the proposed CCS technologies.

With these various extensions, the boundaries are drawn to try and extend the reach of the EU ETS as far as makes sense, given its fundamental design as a system focused upon fully monitored and verifiable emissions from individual facilities. In cases where production may occur at many different scales, the revisions set minimum thresholds, generally at 20MW thermal input, or in terms of minimum production throughput. Most of these changes concur with the recommendations of a substantial study, sponsored by the EC and the environment agencies of Austria, Denmark, Germany, Italy and the UK, which focused upon how the monitorability and costs of verifications might determine which sectors would be serious candidates for inclusion[2].

These extensions bring an estimated additional 100MtCO_2e within the scope of the EU ETS. In addition, the package standardises previously differing interpretations of the term 'combustion installation', so that it encompasses all stationary combustion apparatuses[3]. This is estimated to add another 40-50MtCO_2. Compared to the existing coverage of just over 2 billion tonnes of CO_2, these developments expand the coverage of the EU ETS by an estimated 6.6-7.1%[4].

In addition, earlier decisions had already established the intent to include aviation within the scope of the EU ETS. Flights are proposed for inclusion from 2011 or 2012 – though the inclusion of international flights remains contested by a number of countries outside the EU. The inclusion of aviation would expand the EU ETS by perhaps 200 MtCO_2 (10% of the Phase II cap). Also, whilst in most respects the analysis implies that further expansion of sectors would be difficult, one other sector is explicitly mentioned: the potential to include shipping, which is currently under investigation. Depending on the scope and definitions, shipping might add a further 150 MtCO_2 (8% of the Phase II cap).

Emissions from the major EU ETS industrial sectors are projected to decline compared to other sources in the European economy (notably commercial sector, domestic and transport emissions). Including the proposed new sectors and gases, but excluding the impact of aviation and shipping, the EU ETS in Phase III is still likely to cover over 40% of total EU emissions in 2020.

In addition to its mandatory sectors, the original Directive included all combustion installations greater than 20MW. This threshold proved insufficient to avoid substantial debate and complaint about the administrative burden of participation for some smaller installations, and analysis questioned the benefits of including numerous smaller sources that account for a minor fraction of the total emissions covered. Chart 2 shows that the total emissions coverage of the EU ETS is dominated by the relatively small number of large units. Out of 10,000 installations in this dataset, the smallest three quarters contributed only 5.2% of the verified emissions in 2005-6, whereas half of all emissions came from 180 – less than 2% – of the installations[5]. The biggest 500 installations (5%) emitted over 70% of all emissions, and the top 1000, over 85%.

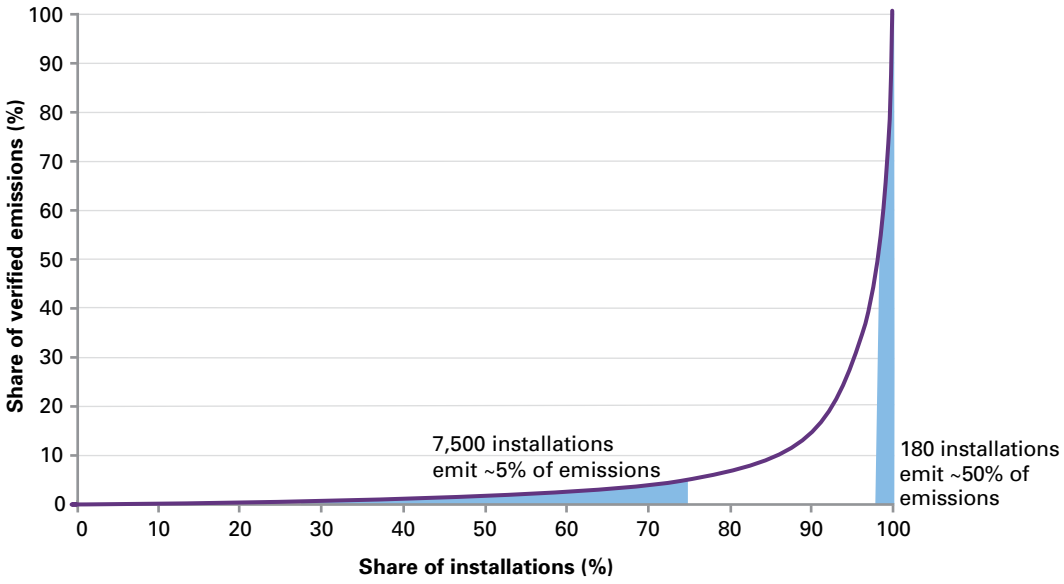
[2] LETS Update (2006), *Decision Makers Summary. LETS/LIFE Emissions Trading Scheme*, report produced for the LETS Update Partners, AEA Technology Environment and Ecofys, UK.

[3] 'Combustion installation' means any stationary technical unit in which fuels are oxidised producing heat or mechanical energy or both, and other directly associated activities including waste gas scrubbing are carried out' (Proposed addition to Article 3 of the EU ETS Directive).

[4] COM (2008) 16 final: p.4.

[5] C.Kettner, A. Köppl, S. P. Schleicher, G. Thenius: Stringency and Distribution in the EU Emissions Trading Scheme – First Evidence, *Climate Policy,* Vol.8 no.1, 2008. This dataset covered verified emissions during 2005-6 from 10,000 installations in 24 countries. The Commission source documents provide consistent but more limited data, on the extreme concentration of EU ETS emissions: 'the largest 7% of installations represent 60% of total emissions, whilst the 1,400 smallest (c.14%) only account for 0.14%' (COM (2008) 16 final p.4).

Chart 2 *Distribution and size of installations with respect to verified emissions (average 2005-2006)*



Source: C. Kettner, A. Köppl, S. P. Schleicher, G. Thenius (2008) Stringency and Distribution in the EU Emissions Trading Scheme – First Evidence, *Climate Policy* Vol 8 no 1

The revisions in the package aim to strike a balance between relieving the apparently disproportionate administrative costs on smaller installations (for minimal environmental benefit), and the risk of exacerbating distortions between participants and non-participants. The revisions allow Member States to exempt installations that are smaller than 25MW and which emit less than 10,000 tCO_2 pa from the EU ETS, provided that they are 'subject to measures that will achieve an equivalent contribution to emission reductions.' In principle this could allow over 4000 installations to be opted out while reducing the proportion of emissions covered by the EU ETS by less than 1%.

In addition, the revisions change the aggregation rules under which installations totalling over 20MW had to count all component contributions on a site; individual contributions under 3MW can now be neglected, which may lead to the exclusion of roughly 800 very small operations.

These changes in scope – and the issue of transaction costs underpinning them – have wider implications. Popular debate has seen suggestions that the EU ETS should expand its coverage widely, for example to surface transport; indeed in other fora, the basic idea of emissions trading has been proposed right down to individual 'personal carbon allowances'.

The proposals to allow exemption of 'small' installations in the range 20-25MW underline the nature of the EU ETS as a system designed primarily for substantial, energy-intensive installations – reflecting its foundation upon European systems of industrial pollution control. For such installations, detailed monitoring, reporting and verification requirements – including for non-energy related process and other emissions – justifies the transaction costs. Their size also implies some capacity to manage the system effectively.

There is no ambition to change this fundamental structural feature by extending the EU ETS to completely different types of emission sources – for which other instruments may be more appropriate. The introduction of flexibility as to exactly where Member States may choose to draw this boundary has some other important implications, considered later in looking at implications for business and the UK.

4. Allocation and harmonisation: creating a level playing field

The Phase III proposals herald the end of National Allocation Plans, with harmonisation of cap-setting and allocation rules.

The Phase III proposals also signal a fundamental shift in allocation philosophy towards auctioning of emission allowances as the 'default', with free allocation to incumbent facilities justified only on a transitional basis or as a response to proven international exposure whilst other responses are developed.

The most fundamental political deal that enabled the EU ETS to be launched as a European-wide venture was that Member States would retain the right to allocate allowances – and that they would give out most of their allowances for free. No more. Rather than 30 countries or more developing their own plans on how to distribute large volumes of valuable allowances to their industries, allocation rules are to be agreed centrally and most of the principles are laid out in the Commission's proposals.

Initial responses suggest that hardly any countries will resist the demise of the National Allocation Plans or the centralisation of power this implies. This is one of the most remarkable indications of the ability of the EU ETS to evolve in ways that vastly surpass the initial political constraints.

Quite simply, this is because the process of National Allocation Plans proved to be fraught with such difficulty that most Member States will be glad to see them fade into history. Negotiating allocations proved to be cumbersome, contentious and time-consuming, with highly unsatisfactory outcomes.

The ability of countries to impose appropriate allocations was hampered by lobbying pressures in which a powerful weapon was the claim that other Member States were giving more lenient treatment to competitors. To an extent this fuelled a 'race to the bottom', particularly outside the power sector; in most Member States, most other sectors ended up with allocations very close to their projected needs, largely negating the point of the system in terms of driving change. Moreover, the collective result of the immense negotiating effort around Phase II NAPs was failure on a scale that made Commission intervention inescapable, if the EU ETS was to provide a credible incentive.

Our previous publication chronicled the process by which the Commission ended up rejecting almost all the proposed allocation plans (the UK and Spain being the main exceptions) and imposing a largely formula-based approach rooted in Community energy projections and the constraints of the Kyoto Protocol targets[6].

The Phase III proposals codify this *de facto* harmonisation of cap-setting, and take it to the next logical step of proposing to harmonise the allocation rules themselves. In principle, this represents a huge centralisation of powers, of the sort that EU Member States have resisted for decades. However, in addition to the shambolic experience of the Phase II NAPs, two other developments have made this much more palatable: progress towards the long-sought goal of liberalising European electricity markets, and along with this, a fundamental shift in the political acceptability of auctioning.

During Phase I, it became clear that competitive electricity markets were factoring the cost of carbon into electricity prices, and that this combined with free allocation to generators was – as economists had predicted – generating large profits for generating companies. However, in negotiating Phase II allocations this was far from universally understood or accepted, and moreover, some Member States still had electricity systems in which prices were regulated in ways that prevented such pass-through.

As more countries implement the European Liberalisation Directive, the phenomenon of companies making large profits from the way the EU ETS works will spread more widely. Politically this is unacceptable – and the major power companies began to recognise this. Growing talk of imposing windfall profit taxes convinced many that a move to full auctioning would be the only stable basis for allocating allowances in the long term. That – an end to all free allocation for power generation – is what the package proposes, although with derogations related to cogeneration of heat[7].

[6] Carbon Trust (2007) *EU ETS Phase II allocation: implications and lessons*, CTC715, available from **www.carbontrust.co.uk**

[7] 'Electricity generators may receive free allowances for heat produced through high efficiency cogeneration, as defined in Directive 2004/8/EC, in the event that such heat produced by installations in other sectors were to be given free allocations, in order to avoid distortion of competition' (COM (2008) 16, p.16).

Outside the power sector, the package creates two categories for activities that may receive some free allowances, in proportion to the overall EU ETS cap. The proposals specify a "maximum … as the basis for calculating allocations" not to exceed the corresponding percentage of their emissions in the Phase I period 2005-7, which is then adjusted by a percentage factor:

- The default outside the power sector – including aviation – is a degree of free allocation that starts at 80% of their 'proportionate share' in 2013, and declines over the period of Phase III to a complete phase-out by 2020.
- Sectors that are 'exposed to a significant risk of carbon leakage' however, may receive free allocations 'up to 100%' of their proportionate share throughout Phase III.

Identifying which sectors are 'exposed to a significant risk of carbon leakage' is yet to be determined, and this contentious issue is discussed in section 13.

The underlying philosophy here represents a radical departure from the largely ad-hoc basis of allocation 'according to need' that was prevalent in most National Allocation Plans in Phases I and II. It reflects a much sharper focus upon the objectives and economic principles underpinning allocation in the EU ETS, following experience and developments in related economic debates. Early proponents of emissions trading had focused just upon the efficiency of establishing a trading market, and textbook treatments implied that the issue of how allowances were allocated (subject to an appropriate cap) was irrelevant to the efficiency of the scheme. However, this assumed allocation to be a 'once-for-ever' decision at the outset.

As the experience of Phase I, and of Phase II negotiations, pointed to the practical difficulties of getting sensible allocations, research also increasingly pinpointed the perverse incentives that could arise from repeated rounds of free allocations – for example, the 'updating' problem that higher emissions in one period could be rewarded by more allowances in the next[8].

For these reasons, auctioning has been increasingly argued to be the most efficient basis for allocation over the long term, and it avoids numerous other problems associated with continuing free allocation. The main economic justification for free allocation lies in the desire to protect the value of sunk investments, made in periods when businesses could not reasonably foresee the need to reduce CO_2 emissions (or to factor in CO_2 costs).

With rising attention to climate change during the 1990s, and the advent of the EU ETS in 2005, the Commission proposal embodies a view that such investments should have adequately recovered their investment value by 2020, from which point on the default should be no free allocation. In aggregate, sectors will maintain profits if the cost of carbon can be reflected in product prices – but anyone continuing to invest in carbon-intensive activities should not receive any protection from the full carbon cost consequences after 2020.

The other exception concerns sectors that may face a credible risk of 'carbon leakage' – domestic production or investment being replaced by imports, which constrains the ability to pass through costs. On this, the problems are not just concerns about economic competitiveness, but that such relocation of production would undermine the environmental objective itself – offshoring emissions instead of reducing them. This was a powerful argument and the Commission's proposal is that such sectors could continue to receive free allocations, potentially up to 100% of their share of the declining cap.

[8] See in particular papers from the first round of Climate Strategies studies on allocation: K. Neuhoff, K.Keats, M.Sato (2006) Allocation, incentives and distortions: the impact of EU ETS emission allowance allocations to the electricity sector, *Climate Policy,* 6(1), and the summary analysis in Carbon Trust (2006) *Allocation and competitiveness in the EU Emissions Trading Scheme: options for Phase II and beyond*, CTC609.

In either case, the proposals attempt first to forestall any perverse 'updating' incentives (to increase emissions during Phase II in the hope of receiving more allowances in Phase III) by stating that allocations should not exceed 'the percentage of the corresponding emissions in 2005-7 that those installations emitted'. The difficulty of the process however is revealed in stating that 'a correction factor shall be applied where necessary'.

The proposals also include a 'New Entrant Reserve', to total 5% of total EU ETS emissions, for allocating allowances to new entrants. The rules by which these are allocated are proposed to mirror the rules for incumbent sectors, so that new entrant allocations would be phased out completely by 2020 except for the sectors identified as being exposed to carbon leakage and given special treatment. Given the size of the new entrant reserve, and the diminishing limit of free allocation, it seems likely that a proportion of the reserve will not be used. It is not clear what will happen with the unused allowances: it is likely that they would be auctioned, but the timing of the auction may be important.

The proposals far from fully specify allocations at installation level, and instead the proposals state the principle that allocation methods should 'take account of the most greenhouse gas and energy efficient techniques, substitutes, alternative production processes, use of biomass and CCS. Any such rules must avoid perverse incentives to increase emissions'.[9]

This points clearly to a move away from allocation based on historical emissions or projected need, to the use of Community-wide benchmarks; however these remain to be determined. These interpretations are to be negotiated through the EU's Comitology procedures, by joint committees of the Commission and the EU Parliament by June 2011 and may be revisited if an appropriate international post-Kyoto agreement is reached. Thus, although the package proposals do much to clarify the basic principles of future allocation, a great deal of devil in the detail of allocation remains to be sorted out, as illustrated in section 12.

[9] COM (2008) 16 final page 9.

5. Auctioning and revenues

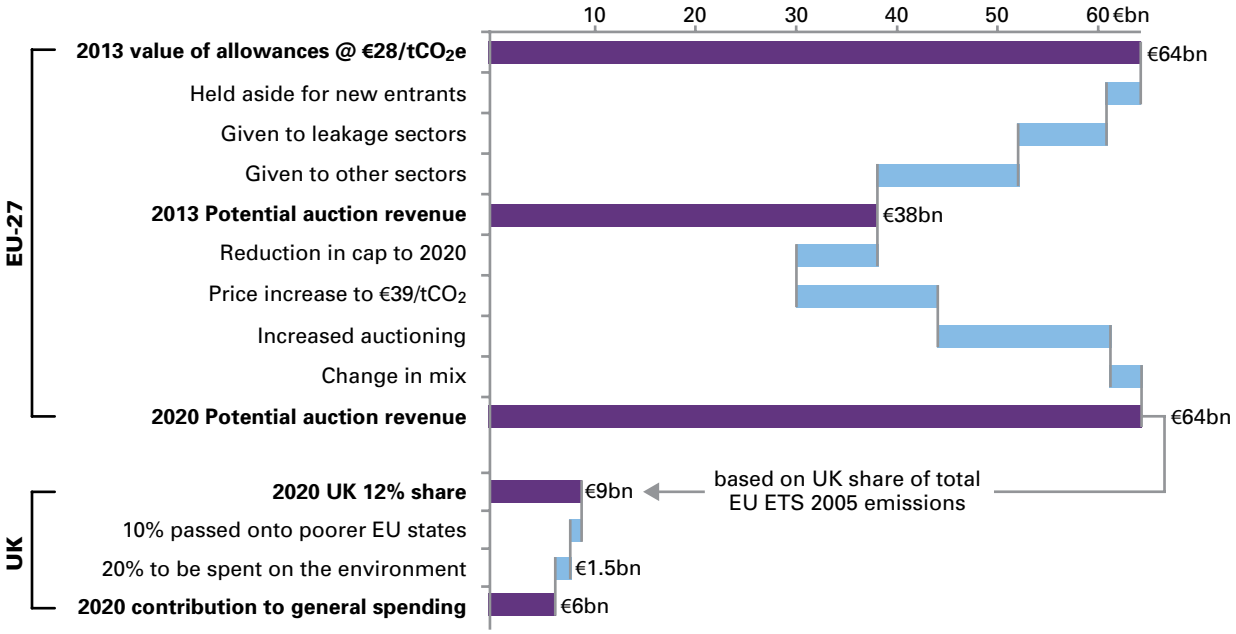
The EU ETS package establishes auctioning as an underlying principal for all sectors. This represents a radical change.

From the beginning of Phase III, 100% auctioning will be a defined objective by 2020 for most sectors and an immediate reality for power generators. This change is comparable in some ways to the failed proposal for an EU-wide carbon tax in the early 1990s. The big difference is that the package proposals sit within the context of the EU ETS and increasingly liberalised power markets, and reflect experience gained on all sides.

Tackling CO_2 emissions through an emissions trading scheme creates a carbon price. Although industries see the impact most obviously on their input costs, the reality is that with increasingly liberalised markets – notably in the power sector – the carbon cost tends to get passed through to product prices. Free allocations do not change this reality; it simply means that profit tends to accrue to companies in these markets. After the eight years' experience of Phase I and II; from 2012 governments will step in and claim the profit for the public purse.

The total revenues will be substantial. In their impact assessment the Commission estimated that if all allowances were auctioned, the income could amount to more than €70bn/yr by 2020. In practice, the revenues will increase with the carbon price, decrease with the number of installations that are given free allowances and decrease if these sectors grow faster than the power sectors. Chart 3 shows the evolution of auction revenues under a simple scenario in which the proportion of auctioning in manufacturing industry rises roughly in line with the proposals (as outlined in the previous section), and carbon prices rise from €28/tCO_2 in 2013[10] to €39/tCO_2 in 2020[11].

Chart 3 *Possible auction revenues*



Source: Carbon Trust analysis. The power sector receives no free allocation; most other sectors have free allocations falling from 80% to 0% to 2020; steel and cement receive allocations at 90% of the cap in 2013 declining to 80% by 2020. Power is assumed to deliver significantly against the renewable target and therefore allow other sectors' emissions to grow.

[10] The value of the first allowances traded on the ECX exchange for delivery in 2013.

[11] The value of EUAs as predicted by the EC impact assessment under the 'cost-efficient' scenario for meeting the 2020 targets.

In such a scenario, EU-wide auction revenues of €38bn in 2013 are dominated by power sector purchases, but revenues from other sectors rise steadily over the period; assuming that emissions are cut back from power generation faster than other sectors, and that 'internationally exposed' sectors themselves see slightly increasing auctioning over the period, revenues from these other sectors could equal those from power generation by 2020, with a total over €60bn. With money on this scale, EU ETS auctions could become a significant feature in European government finances.

The package says little about the detailed design of auctions, but specifies that they will be carried out by the Member States who will retain the right to auction (and retain the revenues). Auction design is not expected to pose any significant challenges, as experience with government auctions in other areas is readily transferable[12]. The package proposes that 90% of the total auction rights should be distributed in proportion to verified 2005 EU ETS emissions, but that the remaining 10% should be redistributed towards poorer Member States. This could mean auction revenues in the UK of between €4bn and €8bn annually. With so much at stake, the distribution of these rights is bound to be a highly political topic and this may well remain an area of negotiation.

Another contentious area will be the potential use to which auction revenues are put. Though there is no suggestion that revenues should be allocated centrally, the package does propose that Member States have to spend at least 20% of the revenues collected on climate-related purposes, both domestic and international. This would imply the UK spending an average of £1bn/yr or more on climate-related purposes over the Phase III period.

The associated documents list a wide range of possible applications, covering almost everything imaginable in terms of technology and emission reduction through energy efficiency, renewables and CCS in Europe; adaptation to climate impacts and avoided deforestation particularly in developing countries; and also to address potential social impacts upon lower and middle income households. Again, this will be a contentious area, since many governments (including the UK) resist the basic idea of earmarking specific revenues for specific purposes, arguing that decisions on expenditure should be made independently of the revenue sources. Yet, there is little doubt that tackling climate change in all these dimensions will involve expenditures potentially of tens of billions of Euros. The debate is unlikely to be simply resolved and is discussed in section 14.

Potentially reinforcing the implicit message about the need for increased government expenditure to tackle climate change, the package includes one other element from a different angle. Revisions of 'Community Guidelines On State Aid For Environmental Protection' have already sought to reduce constraints on government expenditure for environmental purposes, indicating this to be necessary for the 'common good' and thus likely to receive more favourable treatment in Member State applications for approval under European State Aid legislation. The EC package in addition proposes block exemptions (which would avoid the need for case-by-case clearance) for expenditures on energy efficiency, cogeneration, and renewable energy sources.

To an extent, a subtle shift of emphasis is emerging in European policymaking. Europe has expended considerable effort to establish a carbon price. From a pure, theoretical economic perspective, that would be all that is required to drive the required change – if the associated markets for investment in energy efficiency, low carbon supply sources, innovation and infrastructure were all perfect and other factors (such as energy security) were fully costed in. Of course this is not the case. Now in practice, it is acknowledged that considerable government expenditure will also be required to tackle the challenge fully – and that State Aid restrictions should not get in the way. As the scale of the effort intensifies, revenues from EU ETS auctions would appear to be a natural source of funding for such programmes.

The overall package for the next phase of action to tackle Europe's energy and environmental challenges is thus about far more than a few high-level targets and the detailed rules for Phase III of the EU ETS: the bigger picture is an ambition to transform the European energy economy, and also to support the global effort, with an important role accorded to the huge revenues that capping carbon inevitably generates.

[12] Felix Chr. Matthes and Karsten Neuhoff. (2007): *Auctioning in the EU ETS*. Available from **www.climate-strategies.org**

6. Global linkages

The EC package only makes sense if it is set within, and contributes to, a globalising effort – it is and it does.

Climate change is the quintessential global problem. The EU-27 countries account for less than 15% of global emissions; meeting their goals for 2020, against a backdrop of global emissions growth, could reduce that close to 10%. In doing so, they need to promote similar international movement.

The package embodies many planks to support the international effort, in addition to the potential use of auction revenues to assist developing countries as indicated above. The EU ETS has already emerged as a backbone of the Kyoto system, through its links to international project crediting under the Kyoto Protocol's Clean Development Mechanism and Joint Implementation instruments. The package sets out the terms on which such links will be extended forward after Kyoto's first commitment period expires in 2012.

Indeed, the first step is one that has immediate ramifications. The explosive growth of investments under the CDM has led to a supply of project credits projected to amount to around 2 billion tonnes of CO_2-equivalent reductions out to 2012 – with wide uncertainty – and the current rules would allow EU ETS participants to import up to 1.4 billion tonnes. This, however, is considerably larger than the total reduction effort predicted to be necessary under Phase II. Indeed without US participation, the Kyoto system overall is in surplus from project credits, even without accounting for the eastern European headroom from their Kyoto targets that might allow other forms of emissions trading.

The EC package first addresses this by specifying that valid emission reduction credits generated during 2008-12 may be banked forward and used in the subsequent period, irrespective of any global deal, within the 1400 $MtCO_2e$ Phase II limit already set. This not only addresses the problem of present over-supply; it also ensures that the European 20% target will have a ready-made, pre-specified minimum degree of international flexibility to draw on, irrespective of other developments.

Second, for emission reduction projects already established in the 2008-12 period, the EU will accept credits generated by their continuing emission savings after 2013, subject to the limits already agreed on the use of such credits during the 2008-12 period and subject to the constraint that the project type is acceptable to all member states. The Community will also negotiate the rules required to enable such crediting to continue for Joint Implementation projects in eastern Europe.

Third, the Community will accept credits from projects established after 2012 in the Least Developed Countries, once again up to the total 2008-12 limit. In the event of failure to conclude a global treaty, the package also raises the prospect of a network of bilateral agreements to establish the basis for such crediting from post-2012 projects in other developing countries, but this is not automatic.

Fourth, the potential demand for such credits is enhanced by an explicit provision that allows Member States themselves to use emission credits from any of the above routes towards delivering their non-EU ETS emission targets, up to 3% of these emissions (c. 700$MtCO_2e$)[13].

The package also lays out the ambition to allow the EU ETS to link with emerging trading schemes in a number of other developed countries, and drops the former prohibition on such linkages with countries that are not party to the Kyoto Protocol; instead it offers explicit provisions for linking with regional greenhouse gas cap-and-trade schemes such as those being developed in a number of US states. This represents an about-turn in the thinking behind such linkages.

[13] 3% of c.3000$MtCO_2e$/yr at present, declining slowly, and aggregated over the eight-year period.

The previous restriction was intended to help pressure the US Administration to ratify the Kyoto Protocol. The view now is that it is more healthy to encourage linkages with regional authorities that are prepared to implement cap-and-trade schemes, providing they take the form of absolute caps – whether or not the Federal authority ratifies the global agreement. The EU ETS, as by far the biggest emissions trading scheme under consideration, has clear ambition to become the hub of a globalising carbon market.

In this context, the real crux of the package is the incentives it offers for a global post-2012 deal – presently targeted as the core ambition for the Copenhagen Conference of Parties to the UNFCCC in December 2009. In accordance with the Council decision, a successful agreement would trigger the European 2020 greenhouse gas reduction target to be tightened to 30% below 1990 levels[14]. Given the immense difficulty of accelerating domestic reductions by this amount, this would greatly increase the EU demand for international project credits.

Under such conditions, the EU would increase its limits to accept qualifying credits from new projects established after 2012, up to a limit proposed as half of the total additional effort implicit in moving from 20% to 30%. However, the EU would only recognise credits from countries that ratify the Treaty. Developing countries would thus have a strong incentive to conclude a deal – and to ratify it as soon as possible thereafter.

The package is thus not just an EU unilateral effort in relation to its domestic emissions. To boost confidence for low carbon investments globally, it offers clear 'contingency plans' of rules for international engagement in the event of failure to reach a global deal. But the real ambition is bigger still. It offers a careful set of incentives for developing countries in particular to strive for a global agreement at the Copenhagen conference scheduled for December 2009.

[14] Specifically, the EU "is willing to commit to a reduction of 30% of greenhouse gas emissions by 2020 compared to 1990 as its contribution to a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries adequately contribute according to their responsibilities and respective capabilities." (Environment Council, Spring 2007).

Part III – Implications of the complete package

The revisions of the EU ETS, in combination with the other components of the EU package, have far-reaching but complex implications. Part III of this report explores how the different components of EU policy may interact to determine 'who bears the burden' of achieving the EU's goals; and some implications for business in particular, both inside and outside the EU ETS.

7. Implications for emissions – who 'bears the burden'?

The EC package lays to rest any lingering doubts about the determination of European policymakers to follow their commitments with actions. But it remains unclear how the targets will interact or where the main burden will fall – who will really pay and how much?

The overall GHG targets could be achieved by reducing energy consumption (at end-use or in production processes); by decarbonising energy production; or by paying developing countries to make corresponding cuts in emissions. In a pure, all-embracing and global carbon market, the balance of these actions would be defined only by what is cheapest. However, in the EU climate change package the GHG targets are nested in a wider package of targets, and global participation is uncertain and constrained.

Chart 4 underlines the potential importance of these factors, for changes relative to EU emissions in 2005 (1st bar). Typical projections of economic growth would see EU GDP grow by about 30% from 2005 to 2020 (2nd bar). The historic trend has been of a steady reduction in the ratio of energy and carbon emissions to GDP, due to both structural change (growth of light industry, services and consumption) and the efficiency improvements associated with ongoing investment in newer and better equipment (3rd and 4th bars respectively). If emissions were directly proportional to energy demand, then together with existing energy efficiency policies, the data illustrated – based on the 2006 EU Energy Efficiency Action Plan – would restrict emissions to about 0.5%/yr growth from 2005. This would bring EU GHG emissions back to just below the level of 1990[15].

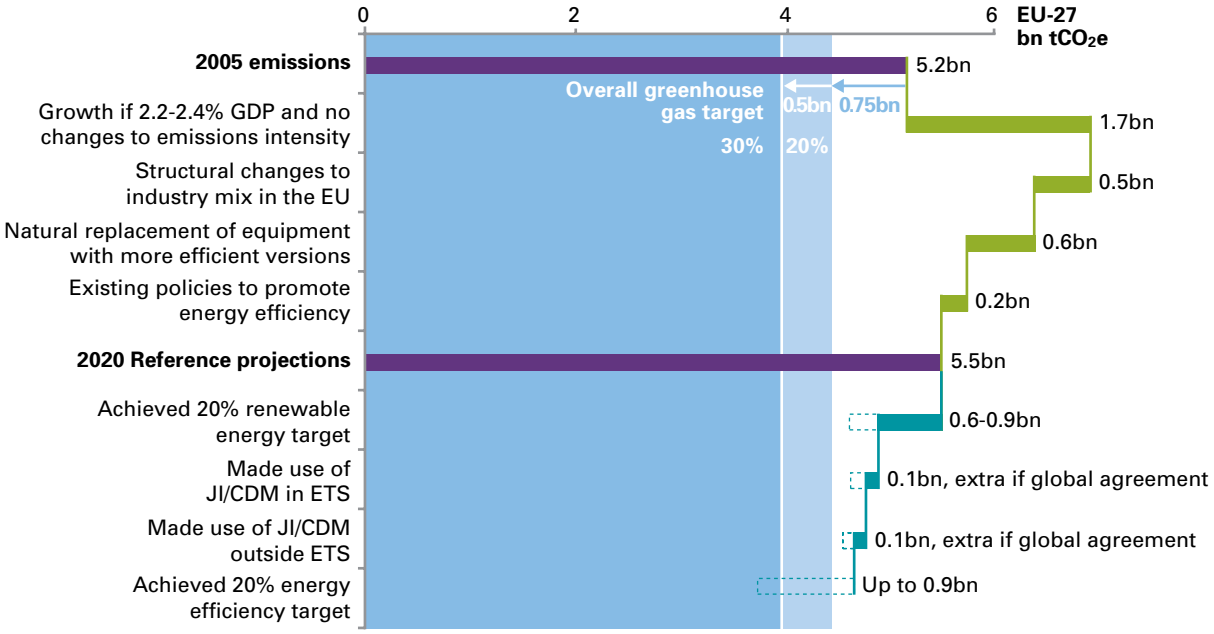
A literal interpretation of the energy efficiency target – as delivering 20% over and above existing policies – would then imply that this on its own would deliver the EU greenhouse gas target without additional renewables or the EU ETS. If the 20% renewables target is delivered in addition to this extra energy efficiency, then its consequent CO_2 emissions reduction would in principle take the EU beyond even the 30% reduction commitment it has offered if global agreement is reached.

These are not predictions, but serve to underline the importance of the other targets – interpretation of the efficiency target and the delivery of the renewables target – and the assumed 'business as usual' baseline. To put it another way: to achieve the 20% 2020 target the EU needs to abate roughly three quarters of a billion tCO_2e compared to 2005 greenhouse gas emissions. Reaching the 30% target would require an extra half billion tCO_2e.

These numbers are modest compared to the changes resulting from estimates about 'business as usual' responses (relative to GDP) over time. An additional 20% improvement in energy efficiency could deliver an additional c. 0.9 bn tCO_2 savings – as could the renewables target, depending upon how and in which sectors either were implemented. In Chart 4 we show the potential contributions from additional efficiency policies and renewables as separate rather than additive for several reasons: the large uncertainties around the additional savings that could reasonably be attributed to new energy efficiency policies; uncertainties around renewables delivery; and the interaction between these two.

[15] The decline between 1990 and 2005 was due to a combination of: structural change particularly in the UK and Germany; the incorporation of the New Member States that had undergone economic transition; the successful reduction of non-CO_2 greenhouse gases; and progress in many EU countries on energy efficiency and the growth of renewables (particularly wind energy) in some.

Chart 4 *Potential carbon impacts of the efficiency and renewable energy targets*



Notably, improved energy efficiency would make the renewable energy target easier to achieve. To ramp up from 8% of EU final energy in 2005 to 20% of a higher overall level of energy demand is a challenging target. To ramp up to 20% of a reduced energy demand is much more manageable[16]. EU modelling suggests that half of the increase would be delivered just by following the lowest cost approach to delivering the 20% total carbon reduction target. The other half, however, would be contingent upon explicit renewable energy support schemes.

Modelling by the European Commission, and other assessments, all concur that the cost of the package overall will be under 1% of GDP, which is very modest in the context of projected economic growth. It is however quite large enough that the distribution of the effort between Member States, as well as sectors and entities, is an important issue.

These distributional issues between Member States are outlined in the Annex. The proposed distribution of renewable energy targets between member states places a greater burden on countries with greater GDP per capita. The lowest increase is in Romania, which need only move from 18% in 2005 to 24% by 2020. The highest increase is required of the UK which increases from 1.3% to 15% renewable energy. In terms of the percentage of renewables, this would move the UK from having the third lowest renewables penetration across the EU to position it ninth from bottom, still below average. To facilitate the effort and increase cost-efficiency, the EU proposal allows governments to transfer 'guarantees of origin' so that renewable energy produced in one country can be counted towards another's target.

It is not clear how the overall target and the ability to transfer will be passed by the country down to final energy consumers or producers.

A subcomponent is the target for 10% of transport energy to come from biofuels. Apart from this – which is increasingly contested – member states can choose how to implement their renewable targets. The choice could have a significant impact on the EU ETS carbon price and indeed how much carbon is abated, particularly the choice as to how much of the renewable contribution comes from power generation or other sectors within the EU ETS, as compared to heating and cooling in industry or the home, or compared to transport. The EU commission scenarios project that the electricity industry will deliver 38–48% of the overall renewable energy requirement, with heating and cooling delivering 26–46% and the remainder falling on transport. The corresponding projection of CO_2 abated by renewables is 600-900 $MtCO_2$[17].

[16] For example: Renewable energy production in 2005 was equivalent to about 100 million tonnes of oil equivalent (Mtoe). If there was no growth in energy consumption, then an extra 150 Mtoe is probably required. If energy consumption grew with GDP forecasts then an extra 250 Mtoe of renewable energy capacity could be required on top of the 2005 level. If the energy efficiency target were met then overall energy demand would fall by perhaps 15%, reducing the additional capacity to perhaps 100 Mtoe on 2005 levels. This 150 Mtoe range of uncertainty is larger than the entire existing capacity.

[17] SEC(2008) 85/3 Page 82.

The relative contributions from energy efficiency policies, renewable energy support schemes, and direct responses to the EU ETS will have a strong bearing upon who pays (and who benefits), and how much. Energy efficiency policies are generally driven by government-funded programmes or standards, and frequently yield net economic benefits to business and consumers, to the extent they overcome numerous and well-document barriers or inconsistencies that impede energy efficiency. They may in some cases, however, involve significant administrative or other hidden costs, and/or impact on 'free choice' in relation to certain inefficient technologies or practices.

The dominant renewable energy policies – feed-in tariffs or renewable energy certificates – generally mandate premium payments from electricity consumers to support renewables, but the payments are targeted, limiting the scale of financial transfers. In contrast, the EU ETS provides an efficient incentive towards the single goal of reducing CO_2 using mature technologies, but levies it across all participating sectors and all electricity consumers at a single cost of carbon. For a given level of CO_2 reductions, the EU ETS offers a lower overall economic cost, but has more impact on energy prices, and may do less to accelerate the growth of key innovative sectors.

Thus, the relationship between the targets can be understood broadly as an attempt to strike a balance between three approaches. One involves more direct government intervention to improve the energy efficiency of business and consumer choices. One identifies a strategically important technology area (renewables) and channels subsidies to accelerate its growth. The third relies on market choices in response to a carbon price, which involves significant payments from consumers and/or industry, increasingly to government. The more emphasis that is placed on the first two, the lower the weight on the third – and the lower the price of carbon under the EU ETS, at a cost potentially of lower overall economic efficiency.

There is an additional dimension, which is the proportion that can be delivered by paying countries outside the EU to emit less through the Kyoto project mechanisms. Excepting some energy efficiency options, this is usually the cheapest way to abate emissions. If there was complete freedom to use JI and CDM credits then they would probably be used to achieve most of the GHG target – potentially with an increase in EU internal emissions. Instead the proposal limits the use of external credits in the way described earlier, to ensure that the majority of efforts remain focused upon getting the EU on a trajectory towards deep emission reductions.

8. Implications for business in the EU ETS

The redesign of the EU ETS offers the structural certainty that business has been asking for – at a price which remains more uncertain than is generally recognised.

A key indicator of impact on business is the carbon price. This is fundamentally set by expectations about the balance between supply and demand at an aggregate EU level. The EC's own modelling projects that the price will have to rise from €27 to reach €39/tCO_2 by 2020 to deliver the 21% EU-wide EU ETS reduction. Unfortunately, despite this and several consultant reports projecting prices in similar or higher range, in reality the price is highly uncertain for the reasons outlined in the previous section.

Chart 5 illustrates these fundamentals in terms of two scenarios of EU ETS emissions and the possible impact of the other targets within the scope of EU ETS. In the first, a literal interpretation of the efficiency target based on the assumptions of the 2006 Energy Efficiency Action Plan would on its own deliver the 20% overall GHG reduction goal; delivering the renewable energy targets in full would greatly increase the probability of this, and/or take the EU towards the 30% target, without recourse to additional savings from carbon pricing.

In practice, a zero price is implausible for several reasons: the intrinsic uncertainties around the efficiency target; the increased difficulty of delivering both efficiency and renewables at scale without a carbon price; and the scope for banking allowances to use after 2020. Still, a 'soft' price is quite plausible. A scenario with 'business as usual' projections as set out in Charts 4 and 5a, modest additional delivery from new energy efficiency policies, and delivery of most of the renewable energy targets from within EU ETS sectors driven by other, targeted instruments, could indeed yield an EU ETS price close to the cost of the (modest) degree of imported allowances. This is likely to be in the range €10-15/tCO_2[18].

But an opposite set of assumptions is also plausible. If the pace of decoupling energy from GDP growth slows, and/or if energy efficiency policies do not actually deliver beyond the (optimistic) savings in the 'baseline' scenario, and if delivery of renewables lags behind the target or is focused on sectors outside the EU ETS (e.g., for heat), then delivering the EU ETS cap could require both extensive industrial abatement and large-scale switching from coal to gas power generation, perhaps including new construction and placing additional pressure on gas supplies. The carbon price would then be driven by the cost of this switch – which could rise to €50/tCO_2 or more, depending upon notoriously uncertain projections of gas (and linked oil) prices.

Surprisingly, it is far from certain that a move to a 30% reduction target in the context of a global agreement would greatly change these conclusions about EU ETS prices. The tighter target would be accompanied by a much greater scope of access to international credits – for which the cost even at greatly expanded volumes is likely to be towards the low end of the range, assuming the concomitant boost to projects and probably the creation of more efficient international mechanisms (such as sector-level crediting)[19]. Governments might try to contain the scale of the international transfers involved by increasing efforts to avoid a high EU ETS price, by further strengthening direct programmes on energy efficiency and lower carbon sources, which could be further facilitated by a context of an enhanced global commitment.

Industry, in other words, has certainty about the existence of the EU ETS post 2012 – but not the price, which based on present evidence could be anywhere in the range €15-50/tCO_2 – or even conceivably outside this range.

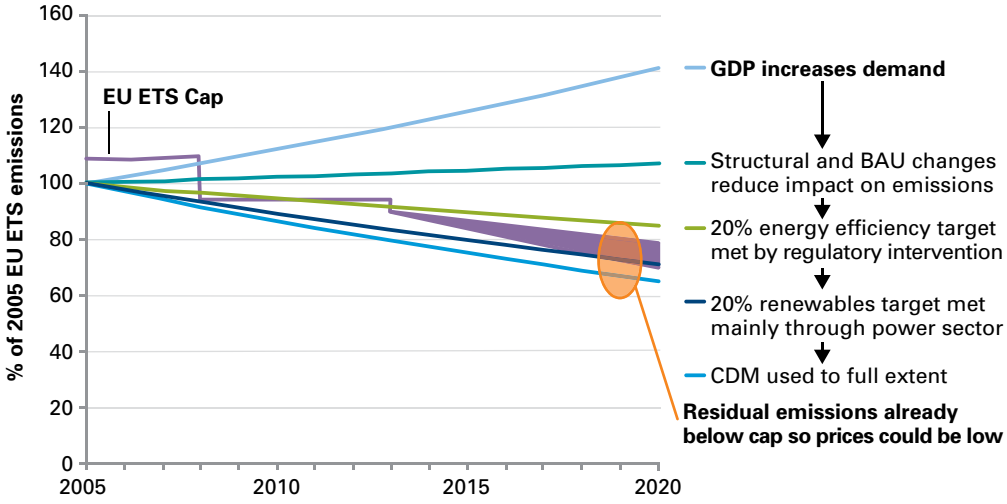
[18] EU commission modelling suggests that, if it had unlimited access to JI/CDM then actual emissions from within the EU would be expected to grow by 4% even though the EU would have nominally met its 20% target. This is a theoretical result based on global least-cost abatement curves. In practice, there are innumerable barriers to project-based transfers at such a scale (including administrative costs) and it is unlikely that anyone would in practice be willing to engage in transfers at such low costs. To date, a Chinese tax on CDM credits creates a floor price close to €10/tCO_2 and it is most unlikely that lower prices would be acceptable to any parties, given their implication of an inadequate level of both transfers and environmental ambition in the agreement.

[19] A forthcoming report by the Carbon Trust will review the experience of the Clean Development Mechanism and some of the implications for its possible future development.

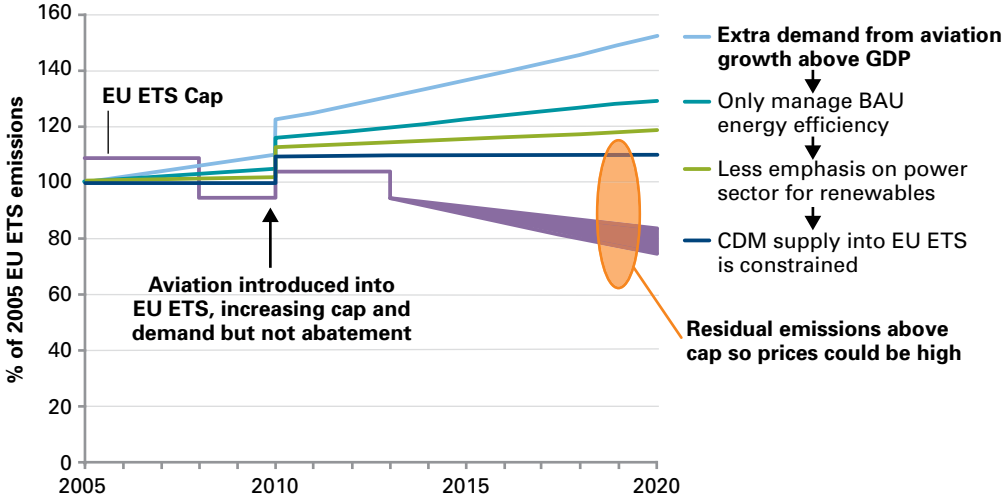
The other factor for business is the move towards auctioning: as a general principle for all sectors; as a defined objective by 2020 for most; and as an immediate reality for power generators from the beginning of Phase III. For those sectors within the EU ETS, CO_2 costs will bear upon not just their incremental production decisions, but increasingly, across the full scope of their operations. In addition more sectors – notably the specified chemical sectors and metals, together with aviation and potentially marine transport – will be drawn into its reach. The impact on competitiveness was explored in our previous report[20] and is touched upon again in section 13. Furthermore, the design and timing of the auctioning may be important: this would have some cash flow implications even where costs can be passed through, and particularly for the power sector, which will not have many credits to bank from Phase II and may be entirely dependent on auctioned credits from 2013.

Chart 5 *Two very different EU ETS sector emission projections*

a) *'Soft' market: cap mostly delivered by 'business as usual' trends plus other policies on energy efficiency, renewables and credit imports*



b) *'Tight' market: big gap between emissions that would occur if EU ETS did not exist and the cap set*



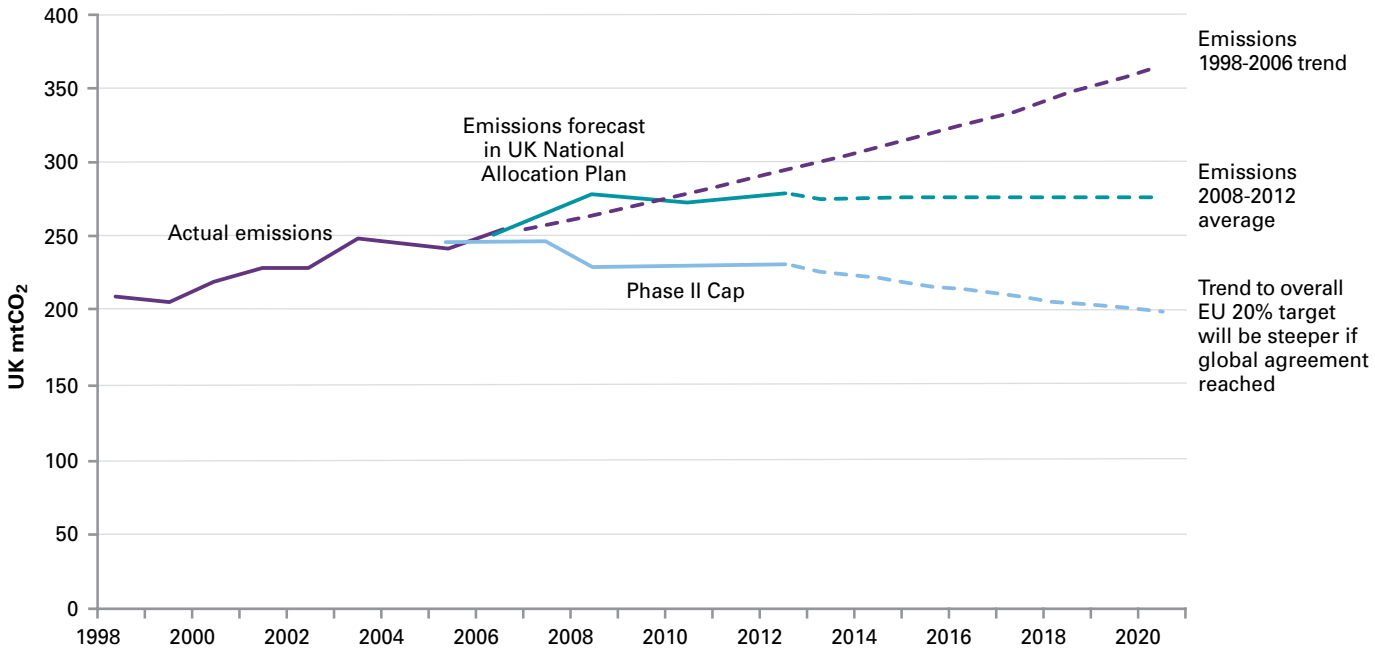
Note: The range shown for the EU ETS cap reflects the potential for a more stretching target if international agreement is reached.

[20] Carbon Trust (2008) *EU ETS impacts on profitability and trade: a sector by sector analysis*, CTC728. Available from **www.carbontrust.co.uk**

An additional factor is the new entrant reserve. The alignment of allocation rules between incumbent facilities and new entrants is intended to level the playing field between existing and new investments; however at 5% of total allocations, it seems unlikely that all the new entrant reserve will be utilised and it is unclear whether and how any remainder will be dispersed.

Finally, we emphasise that lower EU ETS price scenarios do not imply that the target itself is soft. Indeed, its strength in the UK context can be judged from Chart 6. This shows EU ETS sector emissions in the UK since 1998, which have been on a slowly rising trend. The aggregate EU ETS cap, on a trajectory to 21% below the verified 2005 levels, represents a sharp break from this. Moreover, in contrast to the more rapidly growing economies of southern and eastern Europe, the UK might be expected to deliver more than the average. The cap on EU ETS sector emissions is not easy: what is uncertain is the extent to which it is delivered through targeted programmes on energy efficiency and renewables, as opposed to being driven by the carbon price alone.

Chart 6 *UK EU ETS sector emission projections and caps*



Source: Carbon Trust analysis based on UK NAP II summary table and UK 2006 results.

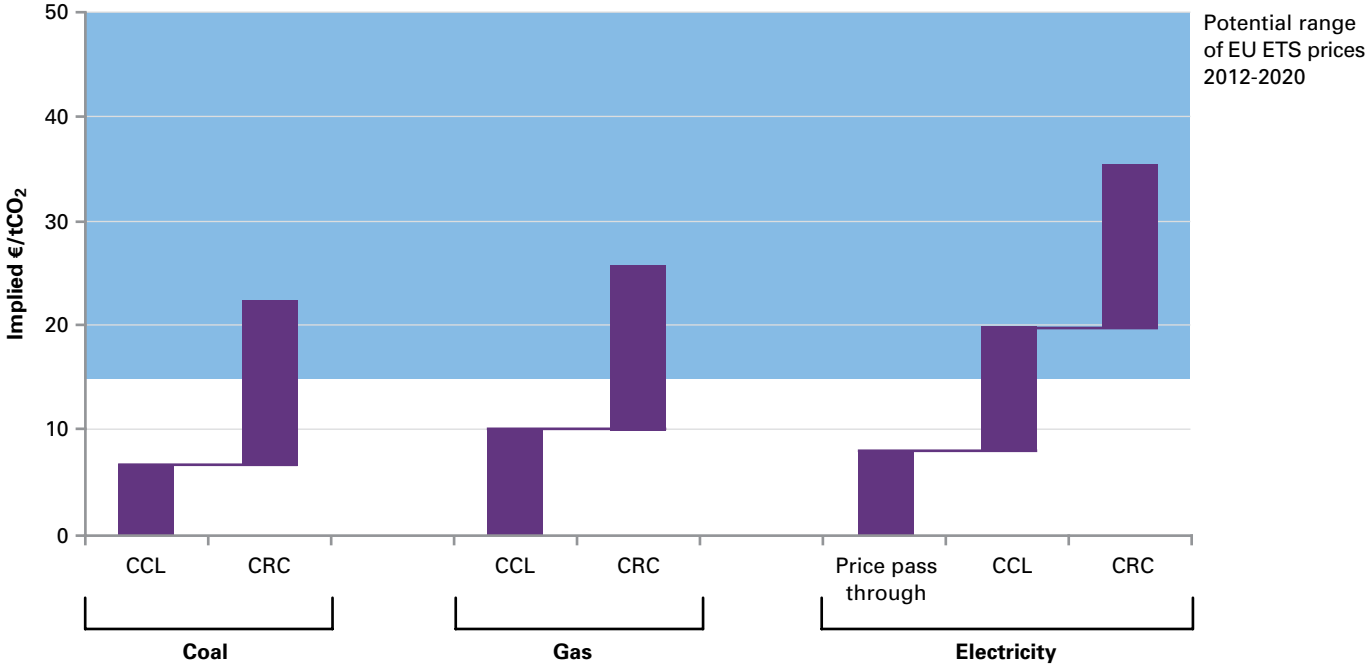
9. Implications for electricity prices and non-EU ETS businesses

The pass-through of carbon costs to electricity prices will affect all businesses and consumers. In addition, the provisions to exempt some smaller installations from the EU ETS if they are subject to 'equivalent measures' may turn out to have far wider ramifications.

In UK conditions, a carbon cost of €20/tCO_2 is likely to increase wholesale power prices by €10-14/MWh, and the impact might reasonably be expected to scale with the price[21]. By the end of the next decade, therefore, the EU ETS could be adding potentially 1-2 p/kWh to electricity prices. The era of cheap power is over: all businesses will need to factor in a rising cost of electricity – and the enhanced value of improving electricity efficiency – to their plans.

Electricity prices will also be affected by the renewables targets, which in the UK are likely to be delivered primarily through the Renewables Obligation mechanism. In the short run this adds to power prices. However, the longer-term impact is more ambiguous, since renewables have lower short-run operating costs and also 'shield' the system from the impact both of fossil fuel price uncertainties, and, (for high capacities) of carbon prices, at times when renewables displace the need for coal power generation. Decarbonising power generation as fast as possible is the surest long-term way of reducing the impact of carbon constraints on both industrial and private consumers.

Chart 7 *Price equivalence of the climate change levy (CCL) and the Carbon Reduction Commitment (CRC) to the EU ETS*



Source: Carbon Trust analysis based on currently suggested starting Carbon Reduction Commitment (CRC) price of £12/tCO_2, 2008 CCL rates, an exchange rate of 1.3 €/£, 30% electricity CO_2 price pass through and using DEFRA 2008 emissions factors.

[21] Sijm, J., Neuhoff, K., Chen, Y., (2006) CO_2 cost pass-through and windfall profits in the power sector. *Climate Policy* Volume 6 Issue 1 pages 49-72.

In addition, many smaller facilities may be able to seek exemption from the EU ETS under the proposed rules. This requires a demonstration that the activities are subject to 'equivalent measures', in terms of incentives to reduce emissions. This might be argued to include payment of the Climate Change Levy (CCL). However, if price is taken as the index of relative stringency, this would suggest the CCL incentive alone is inadequate for these purposes: even for those paying the CCL in full, current rates equate roughly to carbon prices of €7/tCO_2 for coal and €10/tCO_2 for natural gas, far below expected EU ETS prices (Chart 7)[22]. Moreover, facilities in the UK Climate Change Agreements have an 80% derogation on their CCL payments, though these were in return for commitment to emission targets that could also be considered as contributing to 'equivalent measures'.

Alternatively, many of the smaller facilities may be covered by the UK's new Carbon Reduction Commitment (CRC) for the less energy-intensive sectors. Because this instrument is based on company-level emissions and metered energy consumption, rather than facility-by-facility regulation and inspection, the administration costs are likely to be much lower, and thus moving small facilities from the EU ETS into the CRC may be particularly attractive.

The CRC starts with a fixed price phase, for which the government has proposed a flat price of £12/tCO_2 (€15/tCO_2) but will move into a capped phase post 2013. In the capped phase, CRC allowances will be auctioned and the price set by the market (with a safety valve, to avoid excessive price rises, in the form of a one-way link to the EU ETS through which allowances can be purchased but not sold). Whilst in the early fixed price learning phase of the CRC (2010-2012) the prices could be below those in the EU ETS, from 2013 when the CRC moves into its capped phase, it could also be considered an 'equivalent measure'.

Moreover in the UK context, it could be argued that some sites will see a combination of carbon costs: they will need to pay the CRC as well as the CCL and will probably be faced with increased electricity costs as power companies pass through the cost of their carbon allowances. In this situation it could reasonably be argued that some facilities do face a financial incentive in the same range as projected EU ETS prices, as illustrated in Chart 7.

Thus, the impact of introducing flexibility to exempt smaller installations will induce a fundamentally healthy debate about the comparability of effort between the EU ETS, and systems for tackling emissions in others parts of the business and public sector. One thing is certain: escaping the net of the EU ETS will not come for free. With the EC package, more generally, no sector will escape its share of the effort, and we now turn to the non-EU ETS parts of the package.

[22] See Carbon Trust 2005, *The UK Climate Change Programme: potential evolution for business and the public sector*, Table 2. The relevance of EU ETS impacts on electricity prices for this assessment could be disputed, since the EU ETS caps direct emissions and all industries experience its impact on electricity prices whether they are inside or outside the system.

10. Implications of the non-EU ETS targets

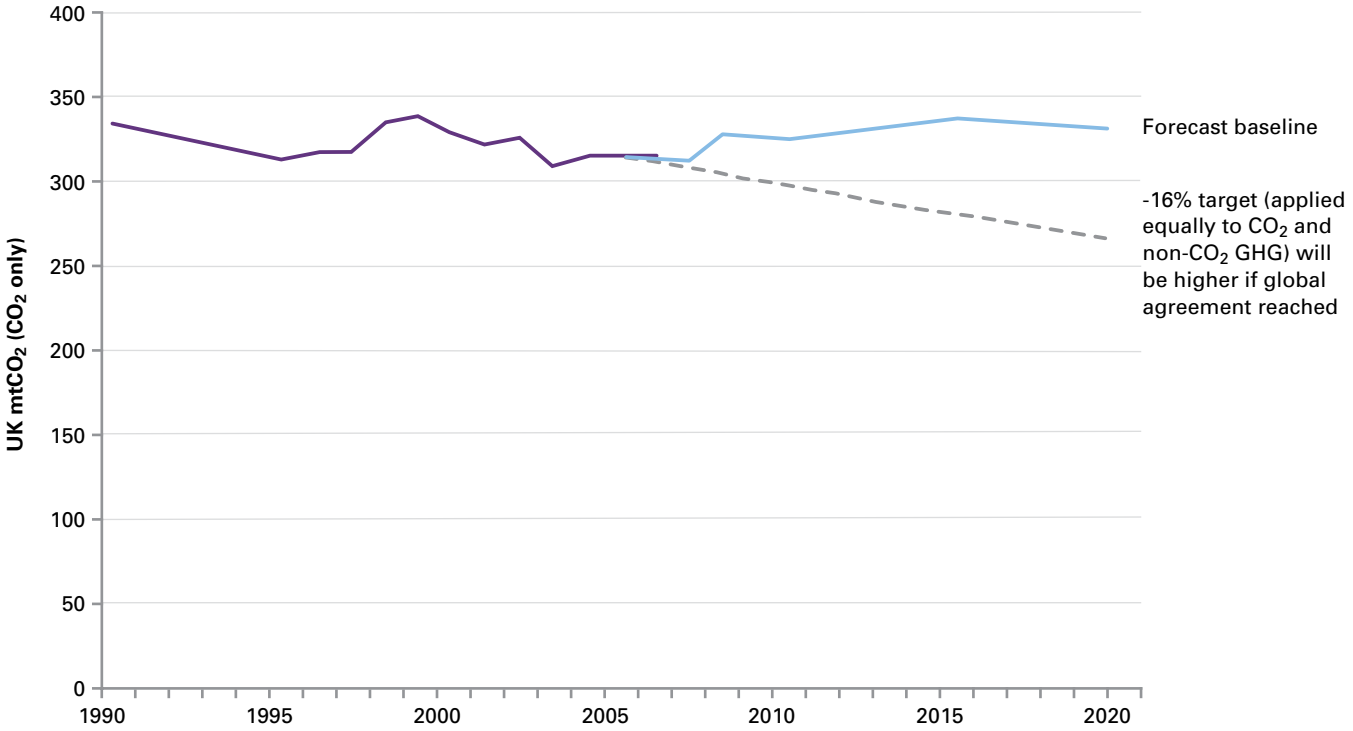
Along with the proposals to move the EU ETS to be a harmonised system across Europe – as befits a system designed to drive down emissions from products that are traded freely across the EU – the package sets out to clarify Member State responsibilities to deliver on the rest.

As indicated, alongside the basic design of Phase III of the EU ETS, the EC package proposes that the balance of the EU effort required to deliver the Council target – a 10% reduction in aggregate European non-EU ETS sector emissions from 2005 levels – should be driven by defining emission targets for these sectors for each Member State. The proposed targets are substantially differentiated between Member States, reflecting different starting points in terms of emissions levels and wealth, as illustrated in the Annex.

The proposed UK commitment is for a 16% reduction from 2005 levels. Chart 8 illustrates how this compares to current trends and forecasts.

The non-ETS sectors comprise a broad range: industrial activities outside the scope of the EU ETS; heating in buildings throughout commercial, public and domestic sectors; surface transport; agricultural emissions; etc. If emissions associated with electricity consumption are included, overall their emissions have been growing, but this is in part due to rising electricity consumption in service sectors and appliances – emissions which are covered under the EU ETS.

Chart 8 *UK non-EU ETS sector emission projections and targets*



Source: Carbon Trust analysis based on EU PRIMES UK emissions forecasts less estimates for contribution from EU ETS. The baseline does not include any initiatives established after 2006.

Emissions from direct fuel use, which forms the basis of the distributed targets, have been falling in the UK (Chart 8), but only slightly. A 16% reduction for the UK is therefore an acceleration of historical trends. Its difficulty is hard to judge but it is likely to be more complex to deliver than the EU ETS sector targets, since these emissions involve a huge range of actors, often operating in sectors replete with market failures that complicate the nature of interventions required. Many of the non-EU ETS sector emissions involve consumers, and consumer-facing organisations.

In some cases, policies are already well in train, some at European level. For example, the European Performance of Buildings Directive sets requirements for measuring and labelling energy use in buildings above a certain threshold and places a requirement on Member States to put in place building regulations. Action on vehicle efficiency is also developed at an EU level. Others' actions are squarely at national level: the implementation of standards for new buildings and refurbishment, decisions on transport infrastructure investments and a wide range of energy efficiency programmes (including new instruments like the CRC).

Despite the likely increase in energy prices, action in many of these areas will require significant funding, and dovetail with measures to help address the social impact of higher energy prices upon poor and middle income households. In this respect, the link with EU ETS auction revenues may again become a significant topic of debate. Since consumers are ultimately paying the cost of carbon constraints, consumer groups are likely to lay a claim to a share of the associated revenues. This is but one aspect of several outstanding issues in the EU ETS, which the rest of this report considers.

Part IV – Roads not (yet) travelled

The EU ETS Phase III proposals were developed through an extensive process of review and consultation and accompanied by a 250-page impact assessment detailing the options and issues considered. Despite this there are several key issues yet to be resolved.

11. Classifying activities and sectors

Classifying activities and sectors sounds innocuous. In fact it encompasses some of the most tricky issues that have yet to be tackled. Some aspects – notably treatment of different forms of on-site electricity generation – are highly technical yet crucial to individual facilities. However, the biggest battles are likely to concern the identification of whole sectors deemed to be at significant risk of carbon leakage.

As indicated in section 4, the EU ETS proposal offers a harmonised definition of a 'combustion installation', and proposes three categories of sectors for allocation purposes:

A. electricity generation, with no free allocation except for 'heat delivered to district heating or industrial installations'

B. general manufacturing, with free allocation declining from 80% in 2012 to zero by 2020, except for

C. energy intensive sectors which are 'exposed to significant risk of carbon leakage', which may receive 'up to 100% of allowances free of charge'

Defining the categories is not entirely straightforward, and a lot is at stake. One important complication concerns the generation of power mainly for on-site use in manufacturing industries (see box on page 42).

However, of all the classification issues, it is the selection of sectors 'exposed to significant risk of carbon leakage' that is likely to be the most thorny, because the stakes are so high. Chart 10 summarises five key steps from our previous publication[23]. The relative impact of carbon costs needs to be established (1), and then placed in the context of existing trade intensities (2) and barriers (3). A full assessment would also consider the scope for reducing carbon cost impacts including associated innovation (4), to reach a conclusion about the materiality of carbon-cost-induced trade impacts relative to other trends in the sector (5).

Unfortunately, few of these steps are easy or without uncertainties. For facilities in the EU ETS, sufficient data should exist by now to broadly establish the first step numerically based on EU ETS verification records, though other data sources (e.g., for additional activities) are more patchy. The carbon cost impact indicators would be bigger, more variable and less comparable if expressed relative to current profit margins rather than gross value added (GVA), but this does not change the underlying capability to establish relevant data.

Probably the biggest difficulty lies in choosing the appropriate level of disaggregation for assessment in steps (2) and (3). A given product may be produced in different ways, which may be more or less exposed to carbon leakage (production of steel by electric arc or blast furnace being one example); differentiating between them, however, would then tend to reward the more carbon-intensive (most exposed), creating a perverse incentive.

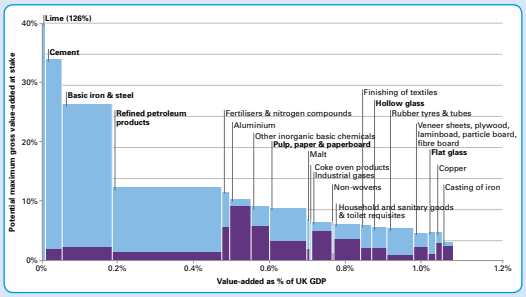
There could be big geographical differences as well. For example, exposure of a cement plant in central Europe may be radically different from a coastal plant in southern Italy. In the UK, electricity has no exposure to imports from outside the EU ETS; whereas transmission capacity across the boundary of some eastern European states with non-EU states is considerable.

Yet attempting to categorise exposure at national or facility level would make a nonsense of the drive to harmonise allocations (and would anyway simply drive the process into a cascading set of claims about different exposure in neighbouring facilities). For sectors in which coastal or other border imports are feasible, but overland transport is either costly or constrained by infrastructure, the decision is inescapably a political one about the extent of 'common European interest' in the classification decisions.

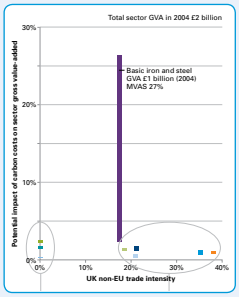
[23] Carbon Trust (2008) *EU ETS impacts on profitability and trade: a sector by sector analysis*, CTC728. Available from **www.carbontrust.co.uk**

Chart 9 *An approach to identifying sectors that face significant risk of leakage*

1 **Would CO_2 be a significant part of a sector/ activity cost?**



2 **Do we need to split out individual products/ regions, and is the product significantly traded?**



3 **To what extent may barriers to trade limit leakage?**

1. Transport costs
2. Capacity/demand balance
3. Implicit and explicit import restrictions
4. Instability
5. Product differentiation
6. Service differentiation

4 **To what extent could changes in practice/ innovations reduce carbon exposure/create long-term advantage?**

5 **Will leakage be material, reinforce, or counteract other trends in the sector?**

A further difficulty may lie in the desirability, in principle, of considering separately issues of production leakage from existing facilities, as distinct from investment leakage in terms of the location of new facilities. These involve different considerations and consequences. If an EU producer raises prices from an existing facility to reflect the 'cost of carbon', and customers react by choosing to buy from companies outside the EU ETS, the facility will operate at below capacity, and some carbon will have 'leaked'. However, because the producer will be emitting less carbon, it may have surplus allowances to sell (or will need to buy less). Depending on the price-sensitivity of their customers and the fixed/variable cost split of the facility, this may still therefore be a profitable thing to do. This is production leakage, and a fixed level of free allowances doesn't change the optimal decision, though it does alter the overall profitability of the firm, whatever choice it makes.

Investment leakage is even more complex, because it brings in issues of competition for capital within and between multinational companies, as influenced also by expectations about future trends. If companies expect a sustained carbon price differential between Europe and elsewhere, the return on investments in carbon-intensive facilities outside Europe will be increased relative to investments with Europe, at anything less than 100% free allocation. On the other hand, investing in facilities abroad specifically with the intent to import into Europe could face considerable risks, if future international agreements or other measures did compensate for carbon price differences – particularly for products (like cement) that would then face a significant transport cost penalty. Investment decisions will thus be influenced also by expectations about the measures that may be taken to tackle carbon leakage, as discussed below.

Definition of electricity generation for allocation

The definitional boundary between electricity generation and other activities is complicated by several factors.

One is the potential to use the heat from generation facilities – an issue addressed in principle by the proposal to allocate appropriate free allowances for the heat component[24].

This itself may introduce complications, but the most thorny issue concerns the generation of electricity for on-site use in manufacturing industries. Classifying any such activities as power generation, with no free allocations, could induce them to substitute this towards direct use of fossil fuels that receive free allocations under category B – eschewing electricity-based processes which might actually be more efficient. Indeed by adding to the costs of the manufacturing activity it might even strengthen their case for being considered as exposed to carbon leakage, under category C.

However, if self-generation is 'rolled in' with emissions as part of the production process to qualify for transitional free allocation under (ii), this would introduce an immediate distortion between self-generation and generation for the grid – which could only be maintained if such self-generation were prohibited from selling to the grid. This would be a potentially major distortion to the economics of power generation in Europe and could easily give rise to perverse incentives – particularly if self-generation formed part of the case for activities to be classified as 'exposed to carbon leakage' and offered ongoing free allocation.

An additional complication is that electricity at some facilities (e.g. integrated steelworks) may be generated by fuels that themselves form part of the output from the basic industrial process.

Given the wide span of on-site electricity and heat generation activities, different degrees of exchange with the grid and even different ownership patterns (some on-site generation is owned by power companies), the best solution is not obvious.

[24] 'Electricity generators may receive free allowances for heat produced through high efficiency cogeneration as defined in Directive 2004/8/EC in the event that such heat produced by installations in other sectors were to be given free allocations, in order to avoid distortion of competition' (COM (2008) 16, p.16).

For other reasons, the package proposes that new entrants be allocated on the same principles as allocation to existing facilities. The implication is that a credible case for leakage of either kind could qualify an activity overall for free allocation under category (C) above.

However, extensive free allocation has numerous drawbacks in terms of the efficiency and effectiveness of the scheme, as explained in our previous publications and acknowledged in the documents accompanying the Commission proposals. Moreover, the complexity of the scheme is potentially further amplified to the extent that allocation to such sectors may also 'take into account the electricity consumption in the production process, without changing the total quantity of allowances'[25] – a first breach in an underlying principle of allocation directly to emitting sources, and new terrain in terms of how such allocations would be determined and where the allowances would be withdrawn from.

Finally, the extent of any 'risk of carbon leakage' is highly dependent upon price expectations. Our previous publication noted that cement and lime, and blast furnace steel, stood out as being almost three times as sensitive to carbon costs (per unit value added) as any other activities. Even at a price of €20/tCO_2, they seem likely to be placed in this category, together with the special case of aluminium. At such a carbon price, the impact on other sectors is on the order of 10% of value-added or less, and for most of these, the case for 'significant risk' would be much harder to establish. However, if price expectations are closer to €40/tCO_2, a stronger case would be made for a much wider group of sectors and activities.

The Commission package proposes that sector classification will be decided by 2010, and reviewed every three years. Options for tackling leakage are then to be presented by 2011. However, there is already considerable pressure for earlier decisions on sector classification, because one of the key aims of the package is to give greater certainty about the future. This may offer the Commission a powerful card in addressing the intense lobbying pressures that are inevitable around sector classification: a manufacturing activity classified in category (B) may not be happy at the prospect of its steep decline in free allocation over 2013-2020, but at least it will know what to plan for. Those seeking special treatment in category (C) may have to wait at least another couple of years to know their operating and investment conditions.

[25] COM (2008) 16 final, paragraph 19, page 16.

12. Allocation – applying the principles

The radical changes to allocation approaches in the European package represent a huge step towards simplifying the allocation process and setting it on a more principled basis.

Like any major change with strong distributional consequences, the new allocation approaches will raise a whole new set of challenges – in terms of relative impacts on different companies particularly in power generation, and the rules by which free allowances might continue to be distributed in other sectors.

The proposal to move to full auctioning in the power sector solves at least three problems noted in our previous studies: the level of profit-making in the sector arising from the way the carbon price is passed through to power prices; the perverse incentives created by the prospect of future free allocation; and the uncertainties about future allocations that would apply to new investments that are planned to last for decades. Inevitably, all this comes at a price.

The main price is the differential impact it will have on different power generating companies, and countries. Our previous publication noted big differences in the carbon intensity between countries; this is mirrored also in big differences in the carbon intensity of different generating companies. Free allocation has protected them from the full consequences of this. The new proposals remove this protection. Low carbon generating companies will gain, substantially; carbon intensive ones will lose, at least relatively and ultimately in absolute terms. These tensions will to some extent be mirrored at the national level, though in ways that are harder to predict. This is entirely appropriate for a carbon constrained world, but it is bound to provoke strong tensions.

Moreover, since the auction rights reside (mostly) with governments – proposed in proportion to 2005 verified emissions – the governments of countries with more carbon-intensive systems will receive more revenues. The net balance between the costs imposed on industries, and the monies received by governments, will however depend upon future trends in power sector emissions by country, relative to the 2005 base.

Implementation of the Renewables Directive, that will substantially reduce CO_2 emissions particularly from power generation, will also have a strong bearing upon this. However, the general assumption is that eastern European energy demand at least will be growing from a 2005 base much more than western European countries, stoking some east-west tension. The struggle for a rational allocation system in which power generators pay the full cost of carbon may be far from over.

Other sectors have not yet approached this bridge, let alone crossed it. The challenge is still at the level of designing an improved system for allocating the allowances given out for free. Whilst the draft Directive itself embodies full auctioning for power generators, the full set of rules for allocation in other sectors is due to be worked out in Committee for final adoption by June 2011. There are two decisions required in an allocation approach: first, what the appropriate allocation per unit of production should be, and second the amount of production to give free allowances for.

The drawbacks of many allocation approaches in power generation that we described in our previous work,[26] in terms of blunting the incentives to decarbonise operations and investment, apply equally in other sectors. The draft Directive states that the details for allocation post 2012 shall be worked out according to principles that 'shall, to the extent feasible, ensure that allocation takes place in a manner that gives incentives for greenhouse gas and energy efficient techniques and for the reduction of emissions, by taking account of the most efficient techniques, substitutes, alternative production processes, … and shall not give incentives to increase emissions.'

This points clearly towards an effort to introduce allocation based upon 'benchmarks' – i.e., standardised measures of performance, probably emissions per unit of production capacity, e.g., a fixed allocation per unit of cement kiln output capacity. In principle, capacity-based benchmarks can be weighted by historic or projected output ('load factor'), but it is hard to see how this could be done at an EU level. The implication is that benchmarks would be based upon 'best available technology', chosen to reflect the state-of-the-art technology.

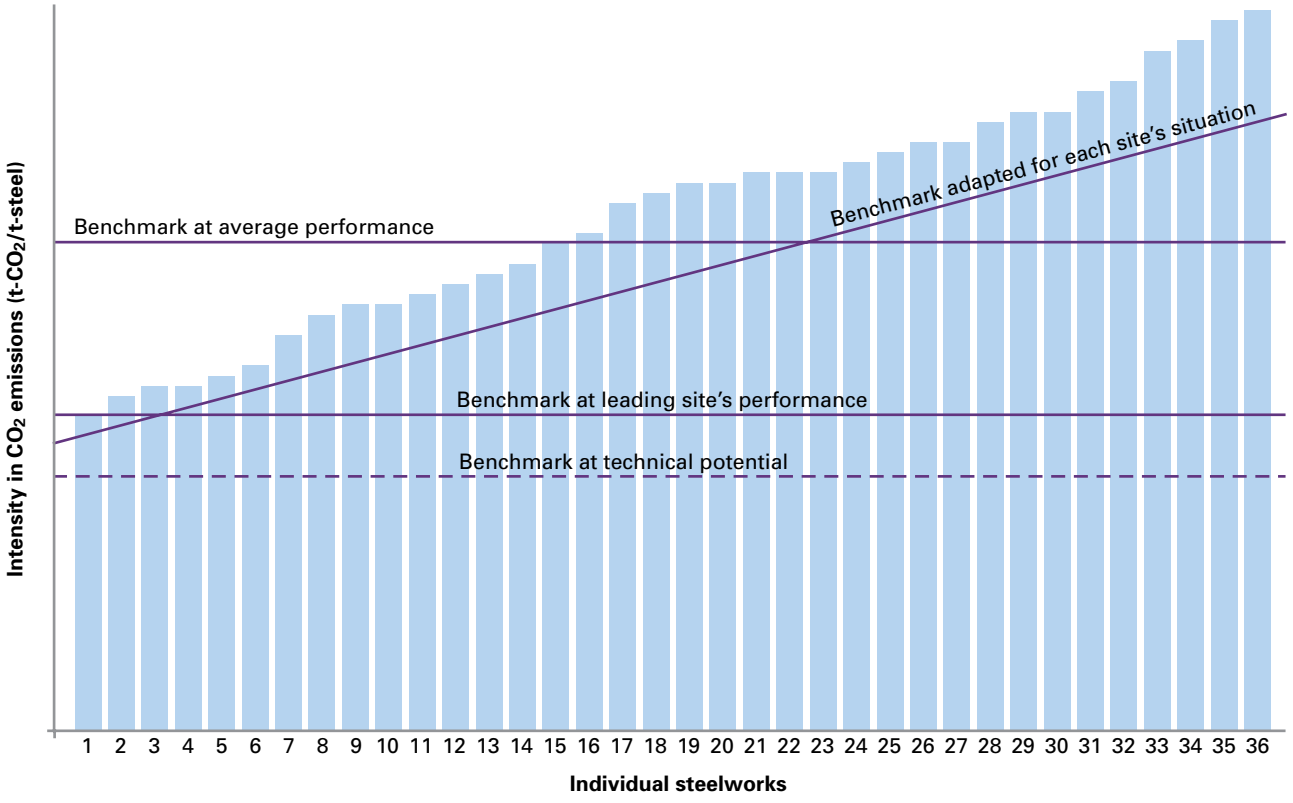
[26] Carbon Trust (2006) *Allocation and competitiveness in the EU emissions trading scheme. Options for Phase II and beyond*, CTC609, available from **www.carbontrust.co.uk**

Benchmarking is not a new idea. Indeed, benchmarking has been used and abused in many fields to compare industrial performance over the years. Benchmarking to set standards for environmental performance has also been widely attempted, and a few Member States are using benchmarks rather than historic emissions in allocation allowances in their EU ETS Phase II National Allocation Plans. The common strand of this experience is that benchmarking is not easy, particularly outside the power sector. Production technologies, operating conditions, and numerous other circumstances differ; almost every facility can offer some defence as to why its performance may fall short of 'best practice' as measured in some abstract, generalised way.

The attempt to develop EU-wide allocation principles is bound to lead to tensions between Member States, due to many differing characteristics of industrial plant – both their performance and potential exposure as indicated in the previous section. No benchmark will be accepted by all as fair. Moreover the lower efficiency of some facilities in eastern Europe inherited from the days of central planning may mean that benchmarks too become a source of east-west tension.

The choice of allocation principles may also have interesting international ramifications. For example, Chart 10 shows an international comparison of the average carbon intensity of steel production in different parts of the world. It is a chart widely used by Japanese industry to argue that they are the most efficient in the world and so need not be subject to regulation.

Chart 10 *An international comparison of the average carbon intensity of steel production*



Source: Teruo OKAZAKIEU-USA-Japan *Tri-lateral* Symposium "Post-Kyoto International Climate Framework focusing on Sectoral Approaches", *Global Steel Sectoral Approach* Monday 10 March 2008

An attempt to move towards benchmarked allocation based on 'best practice' would need to choose the level to treat as the benchmark (four choices are illustrated in Chart 10). Whatever the choice, it will inevitably attract intense international interest. It would be very hard to justify any 'benchmark' for free allocation weaker than world best practice. Conversely, use of such benchmarks internationally could offer a powerful way of extending the geographical reach of economic incentives to best practice. Of course, their application internationally would tend to favour the most efficient producers – which are not always European.

One further consideration needs to inform allocation decisions, particularly for internationally exposed sectors. Innovation is a key part of tackling climate change in the long term. Free allocations can maintain or increase profit margins, and thus capacity to invest in R&D. At the same time, excessive or distortionary free allocation may reduce the incentive for sectors to invest in low carbon R&D – particularly if they conclude that lobbying for continued free allocation is a more effective way of protecting their profitability. A degree of free allocation that can maintain a financial capability for extensive R&D whilst giving a clear incentive to direct it towards low carbon solutions will not be an easy balancing act.

If and as allocation moves towards benchmarking, this does have potential to provide a powerful focal point for efforts to improve efficiency and to seek lower carbon ways of making the same product. With allocation on these principles likely to start in 2013, there are only a few years for European industry to start making the necessary investments.

13. Tackling leakage

Of all the difficult issues raised by the measures to strengthen the EU ETS and deliver a carbon price incentive in European heavy industry, the most sensitive of all surrounds the closely entwined concerns about impacts on competitiveness and possible carbon leakage – the movement of production activities abroad.

In the proposals, the main issues and options for tackling leakage were deferred for later consideration, because the main options either look ineffective or are currently politically unacceptable.

The default approach in the Commission package is that sectors identified as 'at risk of carbon leakage' would receive 'up to 100%' free allocation. However, this is not necessarily an effective response. As our previous work underlined, leakage is tied to the profitability of increasing prices, which depends on how sensitive customers are to price and how production costs vary with volume. Free allocation does not alter this decision. However, free allocation does alter the overall profitability of the company, whatever decision about increasing prices they take. This is illustrated for the EU cement and steel industries in Chart 11 and discussed in detail in a previous report[27].

There are three main options for tackling this problem, as illustrated schematically in Chart 12 on page 49. The EU Commission intends to propose its solution by 2011.

Conditional free allocation

The first approach is to make free allocation *conditional* upon certain industrial decisions.

The EU ETS Phase III proposals already embody such an approach with respect to *investment decisions*. Special rules to withdraw allowances from plants when they close and to provide free allowances to new entrants can deter plant closure and protect new investments against the cost of carbon. Again however, this does not fully solve the problem. Capital investment could be recovered by selling either products, or allowances, so the incentive to import products and sell surplus allowances by reducing output (but not closing a plant) would remain.

Moreover, such rules reduce the efficiency of the system. They deter the closure of old, inefficient plant, and subsidise (implicitly) the construction of new carbon-intensive facilities. For a scheme intended to provide market-based incentives to help European industry decarbonise as efficiently as possible, that is a damaging compromise. Such conditional free allocation as a way of supporting competitiveness and tackling leakage is a last resort – not a first best option.

Additional complexities surround proposals to address leakage by making allocation conditional upon actual *production decisions*. This is usually termed 'intensity based', or 'output based' allocation – firms would receive free allowances in proportion to some indicator of activity levels, usually proposed to be output. Such an approach involves 'ex-post' adjustment of allowance allocations – adjustments after the initial allocations on the basis of ongoing production decisions – and is currently illegal under the EU ETS, which focuses upon absolute caps.

The environmental concern about such an approach is that it no longer sets an absolute cap on emissions – the cap grows if companies produce more goods. It is thus widely presented, and resisted, as expressing a triumph of economic over environmental considerations: of money over nature. Set out like this, it is unlikely to be acceptable as part of an environmental control instrument. In principle it is possible to engineer solutions to this – for example, the scheme overall could retain an absolute cap on emissions, but the distribution between participants would be adjusted in proportion to their output levels. However, this would make the whole system even more complex – everyone's allocation would become conditional upon the production decisions of everyone else.

[27] For analysis and discussion of both these points, see our previous publication, Carbon Trust (2008) *EU ETS Impacts on profitability and trade: A sector-by-sector analysis*, CTC728, available from **www.carbontrust.co.uk**.

Chart 11 *The interaction between free allocation, price pass through, profitability and leakage*

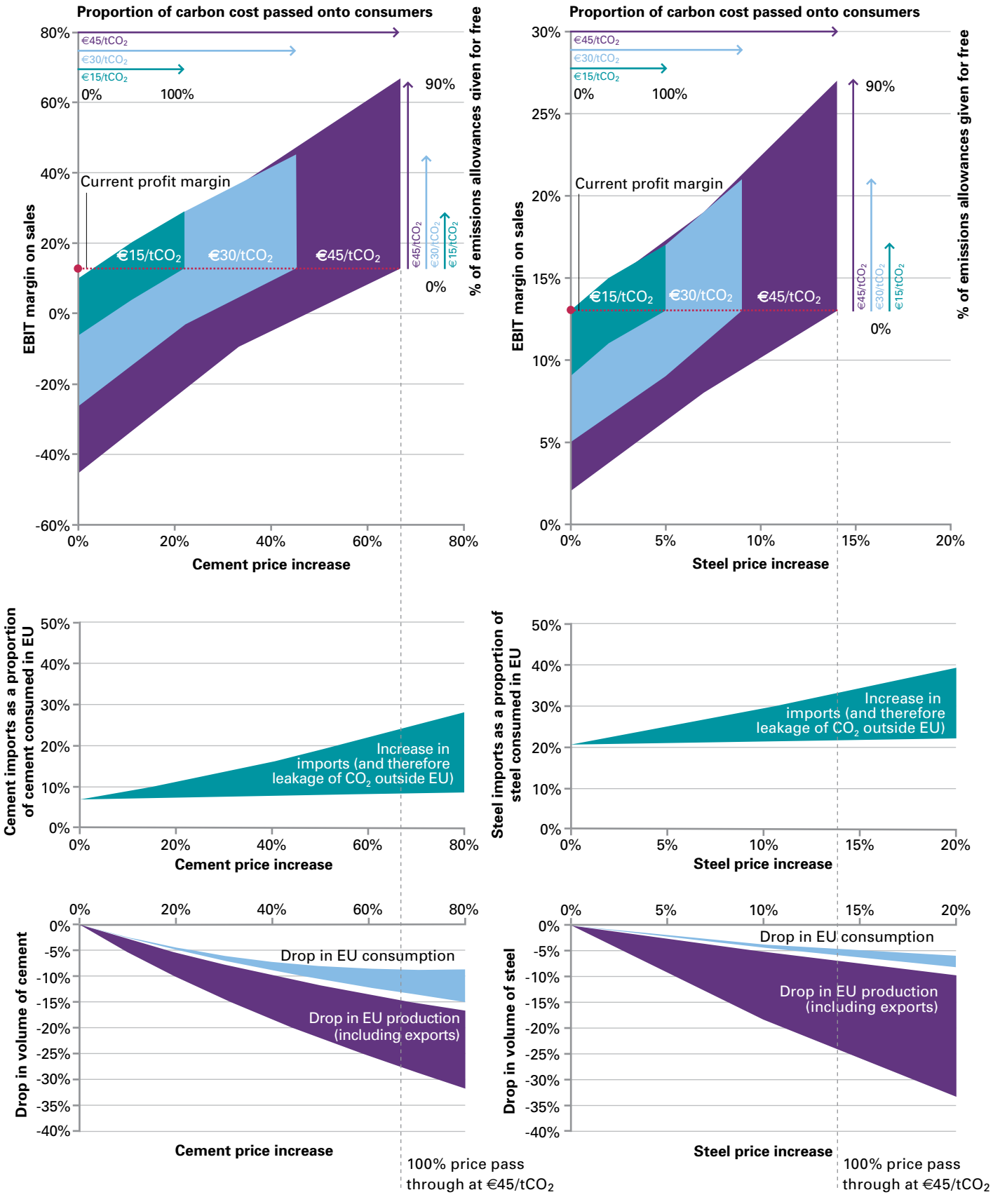
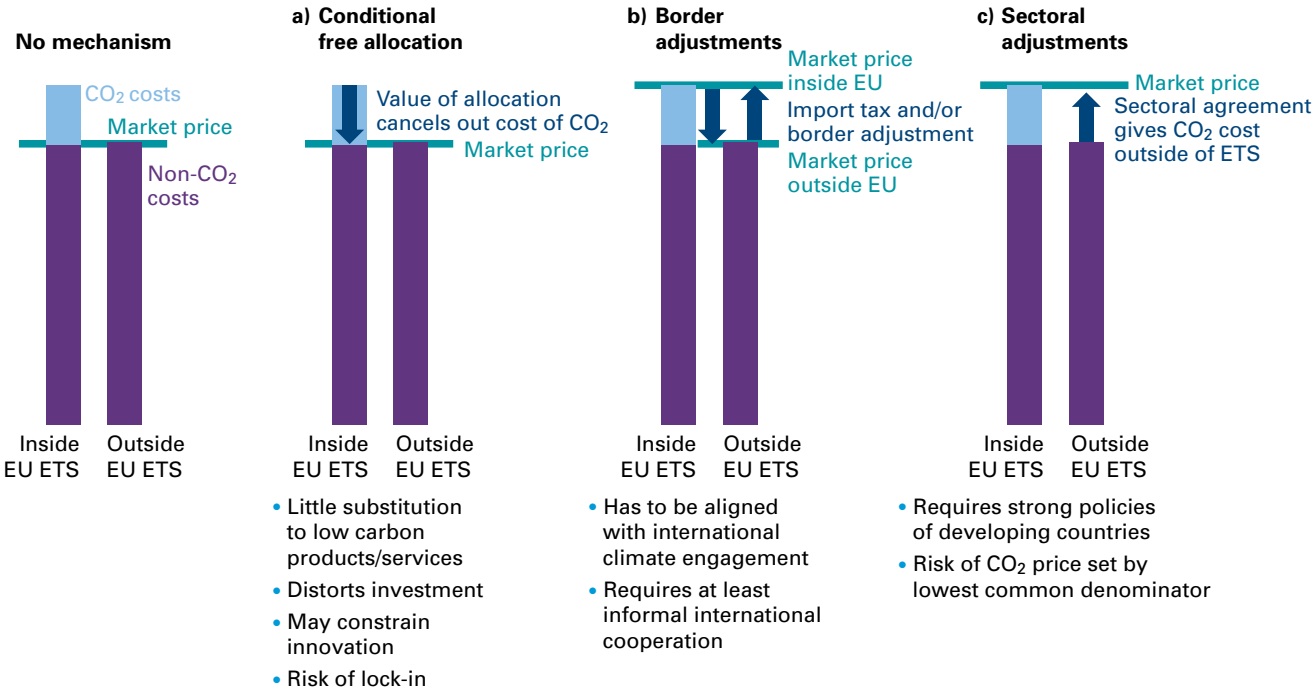


Chart 12 *Options for tackling carbon leakage*



Source: Neuhoff, K. (2008) *Tackling carbon – How to price carbon for climate policy.*

Moreover, such intensity-based allocation would remove any incentive for firms to add carbon costs to their product prices: since any change in output would be matched by a change in allowances, in effect production decisions do not face a cost of carbon. Within the context of a system designed to internalise the cost of carbon in the economy, in practice such companies would immediately subtract the carbon price from their products again (Chart 12a).

From an economic standpoint this could be considered either good or bad depending upon your perspective. Equally, it would protect consumers from seeing the carbon cost in the most carbon-intensive products of all. This is a perverse effect in the context of a challenge which requires price signals as part of a drive to secure deep emission reductions over time. Consumers should be exposed to the fact that some products are much more carbon-intensive than others, and see an economic incentive to shift away from them over time.

A final difficulty lies in the need to define very clearly what is measured as the relevant 'production'. In cement for example, giving free allocations in proportion to the volume of cement produced would not solve the leakage problem, since much of the carbon arises from the production of clinker, the most carbon-intensive part of the process. To prevent leakage, the allocations would need to be given in proportion to production of clinker, not of cement. But this would then remove any incentive for the cement companies to use less clinker – or indeed, to consider radical innovations in 'zero carbon' cement that avoided the clinker process altogether, through different chemical processes.

Consequently, free allocation – conditional or not – is very far from 'first best'. Debate on the other two options cannot sensibly be avoided.

Border adjustments

Another approach to tackling carbon leakage could be for governments to make adjustments at the EU border to compensate for differing carbon costs. Tense debates in the final stages of developing the EU package focused upon whether Europe might unilaterally adopt such border protection. Our own previous study[28] concluded that the scale of carbon leakage in the key exposed sectors did not justify urgent action – that there is time to seek multilaterally negotiated solutions. The final package defers any decision about the approach on carbon leakage to 2011, in effect giving eighteen months after the Copenhagen conference to implement a basic international agreement, to pursue additional negotiations – or to consider a unilateral response in the event of inadequate multilateral progress.

Border adjustments aim to ensure that the price of products in any given market is not distorted by the differential carbon costs that depend on where the products are manufactured. For exports from Europe to regions without equivalent carbon regulation, the costs of the EU ETS would be reimbursed at the border – effectively stripping the carbon costs out of the product upon export. For imports to Europe, carbon costs would have to be added to reflect the emissions incurred in manufacturing abroad.

One major concern is compatibility with WTO rules. In practice, this can be surprisingly ambiguous: whilst export reimbursements and import tariffs run counter to the general goals of trade liberalisation as embodied in WTO agreements, the actual GATT/WTO agreements are largely about trying to reduce rather than eliminate them and contain many clauses (including environmental protection) upon which exceptions could be based. However, almost any attempt to do so in practice would probably provoke a legal and political challenge and could run risk of retaliatory trade actions.

There could be important interactions with allocation rules. Most measures – particularly export reimbursements – would be far easier to justify in terms of *actual costs* incurred by production, even though leakage is driven at least in part by the full (opportunity/marginal) cost of carbon. For exports from Europe, with a high degree of free allocation, it would be hard if not impossible to justify compensating companies for the full carbon cost – even though that would be the cost faced by an individual production decision, once allowances have been allocated.

There is an inherent tension between the 'default' approach of free allocation, and the need for companies to incur real costs before any discussion of reimbursement upon export is either politically conceivable or legally defensible. Free allocation does not actually solve the leakage problem, and it would undermine any case for border adjustments to reflect the full cost of carbon.

For imports to Europe, the EU itself could consider two broad types of options to ensure that competing products from the exposed sectors all carry a cost of carbon in the European market.

The EU adds cost at the border – in effect an import tariff, levied on the basis of 'embodied carbon' or some benchmarked estimate of typical emissions associated with like products. In principle this could be done unilaterally, if the EU decided on typical benchmarks – which in practice, would have to reflect any internal benchmarks used in allocation decisions. For some products with relatively homogenous production processes (like cement) this might be conceivable. For others it could be highly inappropriate; for example, the carbon intensity of products produced mainly with electricity (such as aluminium) would be very dependent upon the generating source used.

Expand the scope of the EU ETS to include emissions from production irrespective of where the goods are produced, by requiring importers to surrender allowances equivalent to the emissions produced in making the products. This would require an implicit 'allocation rule' which again would have to be aligned with the EU's internal allocation rules. This would most clearly level the playing field without need to negotiate about price or benchmark levels – but it would require some degree of international cooperation and face myriad other difficulties around establishing the actual emission levels.

[28] Carbon Trust (2008) *EU ETS impacts on profitability and trade: a sector by sector analysis*, CTC728. Available from **www.carbontrust.co.uk**

The latter is more demonstrably equitable in its treatment of importers and exporters and is emerging as the approach most debated. However, almost any unilateral approach would be viewed with extreme suspicion by Europe's trade partners. Any attempt to impose border adjustments unilaterally would almost certainly be challenged.

One radical alternative, which would not face the same political reaction, would be if other *countries impose export taxes to reflect carbon content on their exports to Europe.* This is less implausible than it sounds – Egypt, for example, has already imposed taxes on cement exports to Europe, and China has restructured its tax system to increase taxes on exports, to try and slow down the explosive growth of energy-intensive, polluting industrial activities for export. The motivations are complex and politically it is an attractive approach. However, moving from unilateral decisions by some developing countries in regard to exports, to any kind of uniform treatment agreed multilaterally would be a vast undertaking – which could anyway never match the moving target of EU ETS prices and allocation rules.

Irrespective of the ultimate legal judgement, this would risk souring both trade relationships and the global climate change negotiations. Deferring difficult decisions to await the outcome of climate change negotiations, given the relatively modest levels of predicted impacts in the near term, makes sense. But solutions cannot be deferred forever, and it does not mean they will be any easier to resolve in the future[29].

Sectoral agreements

The final approach to tackling carbon leakage would be to reach an agreement on global action to be taken with respect to the particular sectors of concern. 'Sectoral agreements' have become a hot topic, and were officially proposed by the Japanese government in February 2008. The difficulty is that there is no consistent idea of what one might actually be – with respect either to basic conceptions of governance and responsibilities, or indeed the real purpose.

Corporate or governmental?

The sectors of concern are increasingly globalised. Multinational companies take an increasingly global perspective on markets, technology and investment decisions – to a point which makes nonsense of the sterilised 'north-south' differences underpinning UN politics. In a corporate world 'without borders', there is immense appeal to circumventing the whole messy business of UN, state-based politics. From this perspective, the preferred version would be some kind of agreement *with the sectors* – a kind of globalised version of the many forms of 'voluntary agreement' that have emerged in efforts to control industrial emissions in many countries – but this time at an international level.

However, there are at least three fundamental problems with this. The first is that no legal body exists to represent most of the sectors of interest; nor is it easy to see how any single sector body could reasonably exert authority over highly diverse companies that are fundamentally competing vigorously with each other.

Second, the different legal, cultural and regulatory conditions under which companies operate could render an effective agreement almost impossible. The close cultural integration between state and companies in Japan underpins so-called 'voluntary' agreements on sector contributions to their Kyoto target, which have led some companies to spend hundreds of millions of dollars on Clean Development Mechanism projects in order to comply with their agreed targets. The same level of collaboration between state and companies would be politically inconceivable in the US, with its sharp delineation of responsibilities and authorities between the state and the private sector – and the level of collaboration it would require between companies to deliver on sector commitments would probably violate much of the anti-trust legislation developed during the 21st century to prevent abuses of that system.

[29] A future Carbon Trust report, based upon an ongoing research project by Climate Strategies, will examine the practical options in much more depth.

The third obstacle is, quite simply, that sector agreements lack credibility on the international stage. The IPCC's assessment of the evidence on their effectiveness – the most hotly contested part of the policy instruments chapter in the IPCC's Fourth Assessment mitigation report – concluded that only in Japan was there clear evidence of such agreements having much impact. There is also evidence of impact from the UK's Climate Change Agreements, but these are set against the background of the Climate Change Levy, that companies must pay if a sector fails to meet its commitment – a pretty big stick. The idea of replicating the immense complexity of these agreements at the global level – and monitoring subsequent performance – is daunting, to say the least.

In fact, there are two sectors for which some of the legal and institutional basis for an international sector agreement already exists, namely ICAO and IMO, which represent global aviation and marine transport industries respectively. Both were indeed formally given authority to address their respective sector's emissions under the Kyoto Protocol, and (partly because countries could not agree on how to assign them to national inventories) their respective emissions were taken out of national inventories regulated under the Kyoto targets. The ten years since the Kyoto Protocol was adopted has seen no action of real substance by either body, despite continuing pressure – and certainly nothing that could be considered remotely close to internalising the cost of their greenhouse gas emissions. The failure of these efforts to date reinforces the presumption that sectors cannot be trusted to regulate themselves and thus undermines the whole idea of industry-based sectoral agreements.

Government-led sectoral agreements

The only option seriously in contention is thus to seek agreement between governments on how they would regulate emissions from specific sectors domestically. The most fundamental difficulty is that governments are driven by two directly conflicting motivations.

One – the environmental motivation – is to encourage globalisation of action for its own sake. If getting developing countries to adopt economy-wide commitments is too difficult (for obvious reasons), it is argued, it might still be possible to reach an agreement on actions in particular sectors. However, the most obvious way to secure global action in a particular sector is to agree either to a very different form of commitment or level of ambition in developing countries, and/or explicitly to support them through financial or technological assistance. Indeed, the final stages of the Bali negotiations, which launched the negotiations on post-2012 action that are due to culminate in Copenhagen, resulted in agreement that negotiations would include additional mitigation actions in developing countries that would be 'measurable, reportable and verifiable' – and applied the same criteria to developed countries on financial and technological assistance. In the eyes of most developing countries, these are inextricably linked – one will not happen without the other.

The other motivation is an *economic one* – to establish a 'level playing field' that can protect industrial competitiveness in the regions taking serious action and prevent carbon leakage through trade or industrial relocation. And whilst financial and technological assistance might support mitigation actions globally, it risks running directly counter to this second objective. Subsidising competing countries to take action or help them adopt leading-edge technologies is hardly the way to offset costs incurred by companies under the EU ETS, for example.

Global sectoral agreements that fully internalise carbon costs in particular sectors represent a 'first best' solution to climate change – but in a world of highly unequal levels of both economic development and environmental ambition, structuring an agreement to meet the two conflicting objectives looks, on the surface, to be almost impossible.

Overall, this suggests a clear hierarchy amongst the three main approaches to addressing competitiveness concerns and tackling carbon leakage. Free allocation is the only one that appears practical at present, but is clearly 'third best': in the form of absolute caps, it can protect profitability but not really prevent carbon leakage, whilst the various forms of conditional free allocation all undermine the basic environmental objective to some degree, and vastly complicate the system.

Border adjustments offer a complex, contentious and second-best solution: second best because they do not in themselves deliver global action and risk various unpleasant political consequences arising from potential retaliatory action by trade partners, whether or not justified.

Global sectoral agreements offer the tantalising hope of a 'first-best' solution – if only anyone had a credible, consistent idea as to who might be expected to agree to what. They pose absolutely fundamental questions either about the legal nature of relationships between government and industry at the international level (in which the only precedents have served simply to undermine the credibility of industry-led agreements), and/or face many of the same political obstacles that stand in the way of a comprehensive global agreement, namely the unacceptability of seeking equal commitments in a fundamentally unequal world. Europe has given itself three years to try and find solutions that could move us from the default third-best approach: that is not long.

14. Revenues, earmarking and price confidence

Paying the cost of CO_2 emissions will raise tens of €billions annually. The move to full auctioning in the power sector and auctioning as the default goal in other sectors means that most of this money will accrue to governments, rather than to companies. The implications could reach much further than currently foreseen.

Section 5 has illustrated that the move towards auctioning in the EU ETS could raise tens of billions of Euros annually across Europe, probably rising over time. Ultimately, this is paid by the consumers of energy-intensive products – and particularly electricity consumers. All this poses multiple challenges.

The inevitable view of most finance ministries will be that auction revenues should be considered as part of general government income, and used to help finance general government expenditures, offsetting the need for other taxes. This view has already been forcefully expressed by the Council of European Finance Ministers, which in March 2008 rejected the Commission proposal that 20% of the revenues should be earmarked for climate-related expenditures. The classic argument is that expenditure decisions should be made on the basis of need and the relative merits of different programmes, not by the source of the revenue.

Political reality is unlikely to prove so simple, for many reasons. First, with energy price increases already a source of political tension, resistance to implicit 'energy taxation' through EU ETS auctions may prove powerful, despite the clear rationale for it. In the UK, the number in 'fuel poverty' – defined as people paying more than 10% of income on energy – has risen from under two to over four million people in the past couple of years (out of a UK population of 60 million). Many of the 'fuel poor' pay high bills because they live in old, poorly insulated buildings, and the best long-term response is to target support on improving the building stock, coupled with winter fuel payments in the short term. If governments are seen to be gaining the revenues from EU ETS auctions, there is a clear case for them to use some of the money to scale up such programmes that address the social impacts of higher prices.

A second political pressure on the use of auction revenues could come from industry itself. Some recycling of revenues might be considered to help 'exposed' facilities. For example, as noted, a sector might not be considered to be at 'significant risk of carbon leakage' overall in Europe, but some individual facilities might still be; they may seek transitional support from their own government, particularly if they are paying increasing amounts through auctions over time, either to help protect their operations or to help them restructure or transition away. This obviously – and rightly – raises difficult issues around State Aid.

The fundamental purpose of EU State Aid legislation is to prevent EU governments from distorting competition by subsidising private sector activities – and in particular, preventing them yielding to political pressures to prop up failing industrial enterprises. As indicated, the new Guidelines on State Aid for Environmental Protection increase the extent of state aid permitted for environmental purposes, along with proposals to exempt energy saving measures and investment in high-efficiency cogeneration and renewable energy.

This points to some less direct but more acceptable ways in which auction revenues could be used to help industry make the transition to lower carbon operations and thus reduce its exposure to carbon controls. The Carbon Trust itself is an example of earmarking revenues (part of its finance comes from the Climate Change Levy) to fund programmes that provide targeted support for businesses to improve energy efficiency, and thus reduce their exposure to higher energy prices, and also to develop low carbon technology based industries. Since its inception, Carbon Trust operations have reduced emissions from the organisations we work with by more than 10MtCO_2 – and the associated lifetime savings in their energy bills exceed £1bn.

Another way of using auction revenues to assist the industrial transition required, equally compatible with State Aid requirements, would be to support innovation. Many of the sectors covered by the EU ETS are marked by relatively low levels of R&D investment. Using some part of the EU ETS revenues might help to change that, and focus their innovation efforts on lower carbon technologies, processes and products. Expenditure to help accelerate low carbon innovation more broadly is also a central part of the challenge. Expenditure on infrastructure – more energy-efficient commercial buildings, and transport infrastructure – can also help. Price incentives alone are clearly and demonstrably insufficient to induce adequate private investment, so again a natural link will be drawn with the use of revenues from EU ETS auctions.

Overall, the scope of expenditures required to address climate change is much broader even than this, and it includes many international dimensions. The preamble to the proposed Directive notes that uses of auction revenue could include actions '… to reduce greenhouse gas emissions, to adapt to the impacts of climate change, to fund research and development for reducing emissions and adaptation, to develop renewable energy to meet the EU's commitment.., for the capture and geological storage of greenhouse gases, to contribute to the Global Energy Efficiency and Renewable Energy Fund, for measures to avoid deforestation and facilitate adaptation in developing countries, and for addressing social aspects such as possible increases in electricity prices in lower and middle incomes'.[30] The Stern Review, and a more detailed follow-up for the UNFCCC, estimate that international support of tens of billions of Euros annually will be required to help the developing world deal with climate change – through both adaptation, and reducing the growth of its emissions, which remain far below those of the rich world in per capita terms.

One of the greatest emerging challenges in climate change is the funding gap between what has been clearly identified as necessary to help solve the problem, and the proven reluctance of governments to provide this finance from general taxation. The revenues from EU ETS auctions could be crucially important in closing this gap.

There is however another dimension of the issue on which the package is silent. The big difference between energy or carbon taxation, and auction revenues, is that uncertainty in prices makes the scale of auction revenues uncertain. This could add serious complexities to expenditure programmes funded from auction revenues – it will be difficult to design effective, stable programmes based around hugely uncertain revenues.

The effectiveness of the EU ETS as an incentive for private sector investment in low carbon solutions is similarly undermined by price uncertainty. Many companies remain unfamiliar with and sceptical about the determination of the EU to sustain carbon price incentives, and consequently remain unwilling to take substantial investment risks. Higher prices risk being quite heavily discounted by sceptical investors, who might for example fear a speculative bubble – confidence is crucial, and would be severely undermined by another price collapse.

For both these reasons there is a strong case to consider establishing a price floor. We have earlier outlined a simple mechanism for securing this, namely setting a reserve price on EU ETS auctions. With the move to auctions being the main source of allowances, this is all the more plausible as a mechanism, providing the reserve price is agreed at EU level. In terms of the impact on revenues, as illustrated in Chart 13, the 'downside' impact of selling fewer allowances is vastly outweighed by the benefit of sustaining a floor price.

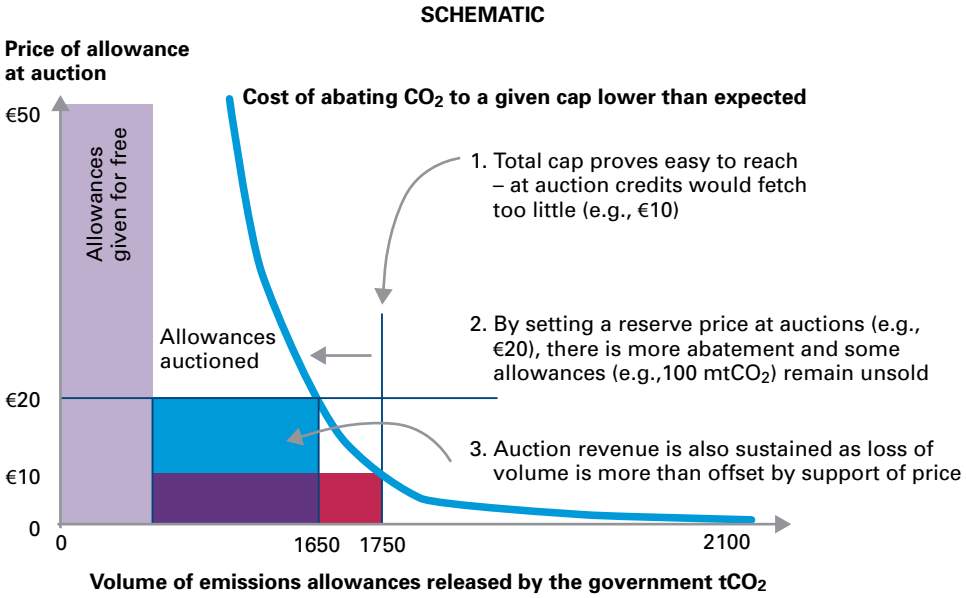
There are also several reasons to consider the opposite end of the scale – 'safety valve' mechanisms to contain the risks of unexpectedly high carbon prices[31]. A very high carbon price would stoke political opposition to the EU ETS, from both private consumers and industry. In the EU ETS, it is not hard to envisage circumstances, for example an interruption in gas supplies towards 2020, which could temporarily make prices skyrocket – with incalculable political consequences for the EU ETS if the system were not designed to cope with this. Also, as indicated in section 13, a very high carbon price – or perceived risk of it – could expand the range of sectors making a case to be at risk of carbon leakage and thus greatly complicate the task of credibly identifying these.

[30] The CCS proposal in the Commission package also notes: 'The European Council backed early action to make CCS the technology of choice for new power plants, including the setting up of up to 12 demonstration plants by 2015. … A European Industrial Initiative will be set up to bring together the key actors and provide a coherent drive for the new technology. However, ...significant investment will be essential if demonstration plants are to be financed and commercial deployment is to get under way – in the order of tens of billions of euros. Since there is no possibility of significant funding from the EU budget, the only possible sources for this investment are public-private partnerships fed predominantly by national budgets and private sector investment. For governments, the income stream provided by the auctioning of EU ETS allowances is an obvious source of revenue for this purpose.'

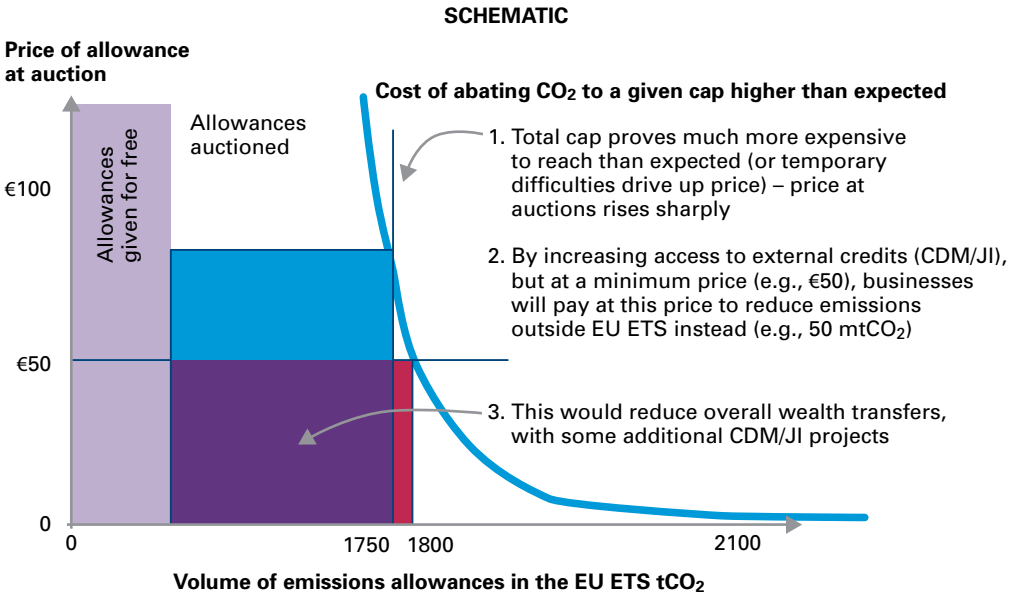
[31] Note that while the use of reserve price auctions to underpin a price floor in the EU ETS has been recommended in research by Climate Strategies, the issue of price caps/safety valve mechanisms has not been considered in their work or in other analysis of the EU ETS.

Chart 13 *Consumer expenditure and auction revenues with and without price corridor mechanisms*

a) *Potential impact of reserve auction price*



b) *Potential impact of a safety valve*



Various approaches can be considered in relation to this. Specifically concerning the issue of sectors at risk of leakage, one could be to adopt an iterative approach, focusing first on those most credibly exposed but with options to reclassify if prices prove to be much higher than originally assumed. In addition, however, mechanisms to contain prices could be considered. The US Regional Greenhouse Gas Initiative for the North East states has proposed a structure which will allow wider use of offset credits if the price rises above a certain level.

The EU ETS Phase III proposals have been criticised for the severity of their constraints on the use of international emission credits after 2012. A big reason for this constraint is the fear that opening up more widely would risk the EU ETS being swamped by cheap imported credits.

Allowing greater use of international credits at higher prices might help to address both these concerns, by ensuring that if cutting emissions in Europe proves more costly and difficult than expected, then business is given greater scope to seek opportunities abroad in a more cost-effective manner that also benefits developing countries.

There are, however, very important caveats to all this. First, it would be important to ensure that any such measures did not undermine the possibility for carbon prices to reach levels required to provide enough incentive to invest in key technologies, such as CCS, that are likely to be critical to solving the climate change problem.

In addition, unlike the simple setting of an auction reserve price, mechanisms related to 'cost containment' are complex, at risk of strong lobbying from powerful interests that seek lower prices (which could weaken the environmental objective), and largely untested. A link with credit imports, for example, raises questions about the incentive to invest in offset projects that might only have buyers under exceptional conditions. The issues are also likely to be bound up with proposals for linking different trading systems internationally. Thus, the issues and credible options (if any) may take a long time to clarify, probably after the main shape of an international treaty is agreed and other trading systems come into being.

We have argued that under the present proposals, prices for Phase III are substantially more uncertain than generally acknowledged. Designing the system to reinforce the confidence of those investing in low carbon technologies, by setting a reserve price on auctions, and considering options for reducing the risks associated with very high prices, are additional roads not yet travelled.

Part V – Conclusions

The Commission package for cutting carbon in Europe is a big, bold, stride in the right direction. The EU ETS package in particular could and should be adopted into EU legislation by Spring 2009, even if other components take longer to resolve and some of the most difficult issues of detail need to be resolved through subsequent procedures.

The proposed redesign of the EU ETS addresses well the main weaknesses in the existing scheme: in providing a longer trading period to increase investor confidence; in expanding the scope to include most activities appropriate to its core features; in moving to a harmonised set of rules for caps and allocations across Europe; in proposing that free allocations, where granted, should be benchmarked to the extent possible; and in vastly increasing the role of auctions, both to reduce profit-making and to avoid various perverse incentives and other problems associated with continuing high degrees of free allocation.

Our analysis has however pointed to a number of important issues that remain to be resolved. Treatment of self-production of electricity for manufacturing activities could prove thorny, and deciding which activities fall into which categories for allocation purposes is bound to be highly contentious.

The ideas underpinning benchmarking, where free allocations are granted, are sound; but applying them in practice is likely to be very difficult, and precedents do not provide a strong and compelling basis for how to do this.

Moreover, free allocation does not really solve the problem of carbon leakage, unless it is made conditional upon production and investment decisions in ways which would seriously undermine the fundamental purposes of the system. The ideal 'solution' of global sectoral agreements, however, is unlikely to be realised in ways that resolve concerns about carbon leakage, at least in the next round of global negotiations. The 'second best' option of invoking border adjustments in one form or another is legally complex and politically very delicate. Our assessments suggest that if there is no solution, the scale of carbon leakage would not severely undermine the emission savings from the EU ETS in Phase III, but it could greatly weaken the case for including the most exposed sectors, and undermine political support for the system through the loss of some industrial activity. The Commission proposal to address options for tackling carbon leakage in 2011 is a sensible compromise, and could be partially delinked from the identification of 'sectors at risk' which can be done earlier.

The scale of revenues raised by EU ETS auctions will provoke considerable political debate about use of these revenues. The Commission proposal that 20% of these monies should be reserved for activities associated with tackling climate change is reasonable and such expenditures could help to reinforce the impact and political stability of the EU ETS, but it is not critical to the design and may or may not survive the political process. However, volatile revenues associated with highly uncertain prices would compromise effective use of the revenues. Moreover, the extremes of price uncertainty reduce the efficiency of the scheme and pose several political risks; a 'price floor' established through a reserve price on EU ETS auctions would increase confidence for low carbon investments, and mechanisms to manage the risks of very high prices, possibly through increased access to international credits could also be considered.

Finally, there are additional, crucial 'roads not yet travelled' that lie beyond the scope of this report. The debate on how much the EU ETS post 2012 should open up to different kinds of international crediting is linked to questions about expected volumes that may be available and the quality and reliability of projects developed under the Kyoto Protocols Joint Implementation and Clean Development Mechanisms; these will be the subject of a forthcoming Carbon Trust report. Some revisions in this area might be necessary, though most of the issues would be subsumed in the event of an agreement on a global successor to the Kyoto Treaty.

There are still, unquestionably, battles to be fought over the internal distributional consequences of the EU ETS, which may acquire particular east-west sensitivity vis-à-vis the new Member States. These will need to take account not only of the distributional impacts of the EU ETS itself, but also the other parts of the package (like the Renewables Directive), and perhaps even more widely the surplus that many of the New Member States have under the Kyoto Protocol and which can if necessary be either sold through Green Investment Schemes like the Hungarian scheme which earmarks revenues to a major programme of building refurbishment, or banked forward into the post 2012 period[32].

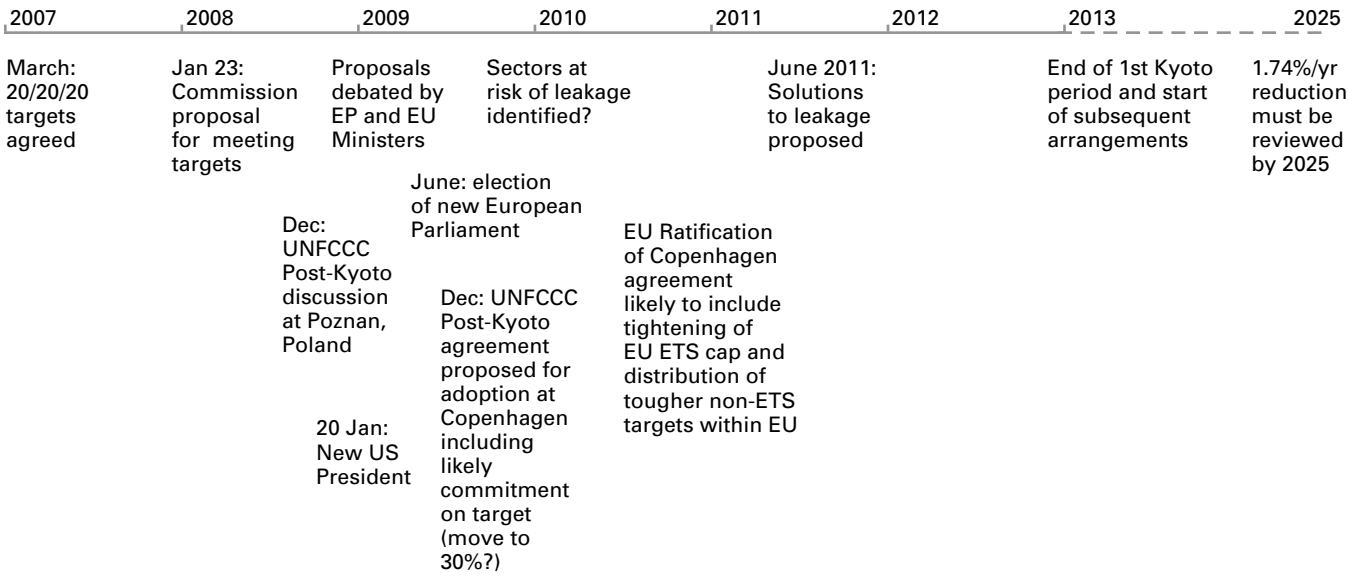
These issues in turn point to perhaps the biggest of the 'roads not yet travelled' – namely the effort to secure a global agreement on post 2012 commitments, at the Copenhagen conference scheduled for December 2009. An adequate outcome would trigger a shift of the EU target from 20% to 30% below 1990 levels, and open up the EU ETS to a much wider scope of international crediting and global engagement – which explained in section 6 is a major, deliberate and highly desirable feature of the proposals.

The EU ETS proposals, as explained in this report, are but a part of the overall package of proposals for cutting carbon in Europe. As well as ongoing policy developments associated with the energy efficiency target, the other elements include the proposals on distribution of non-EU ETS sector emissions between countries; the renewable energy targets and associated proposals for trade in 'guarantees of origin'; the proposals on CCS; and the proposed State Aid exemptions. However, although these all bear on the climate change problem, and to some degree may impact on the EU ETS market, it is possible to disentangle the components.

Important drivers of timelines internally include the desire for a basic level of investor certainty as soon as possible, and the election of a new European Parliament in summer 2009. External drivers include the US Presidential elections and the Copenhagen conference in December 2009 (which is in turn driven by the desirability of striking a global agreement that can be ratified and enter into force in time to give continuity for global carbon markets post 2012).

From these perspectives, there would be tremendous value in adopting the EU ETS part of the package at least (and if at all possible, the Renewable Energy Directive) by the end of this year, or at the latest Spring 2009. This would provide investors with early confidence about the direction of policy as a platform for investment in the EU out to 2020 and beyond; send a powerful marker to the new US Administration about EU commitment and expectations on the strength of industrialised country action; and form a focal point around which global negotiations up to Copenhagen could coalesce. The stakes are high; but the prize is even bigger.

Chart 14 *Timeline for agreement*



[32] These issues are the subject of ongoing research by Climate Strategies.

Annex: Distribution of the EC package targets between Member States

The EC Climate and Energy Package is set within the complexities of the EU, through which 27 sovereign states pool efforts towards common objectives. They do so whilst seeking to maintain sovereignty to the extent consistent with this, according the principle of subsidiarity of decision-making that seeks to devolve decisions to the lowest practicable level. In pursuit of the common good, EU policy is also concerned with the distributional impact of its main policies on the poorer Member States.

These considerations are manifest in the design of the EC package. For reasons elaborated in this report, the proposals on the design of the EU ETS represent a major step towards harmonising the design of the EU ETS as a common market; most of the rest is devolved to the EU Member States through component targets that define their contribution to the collective 2020 target. The EU ETS, the non-EU ETS, and the renewable energy components all contain elements to mitigate any adverse distributional impacts. This Annex illustrates the main themes in the distribution, and also notes the UK position in this context.

The renewable energy targets

To implement the Council target of a collective 20% contribution of renewable energy to European final energy consumption, the proposed Renewable Energy Directive sets out targets for each Member State based on two main steps:

(1) A 5.5 percentage point addition to 2005 renewable energy levels, with minor adjustments for Member States that had secured a rapid growth of renewables in the period 2000-5 to avoid penalising 'early action'.

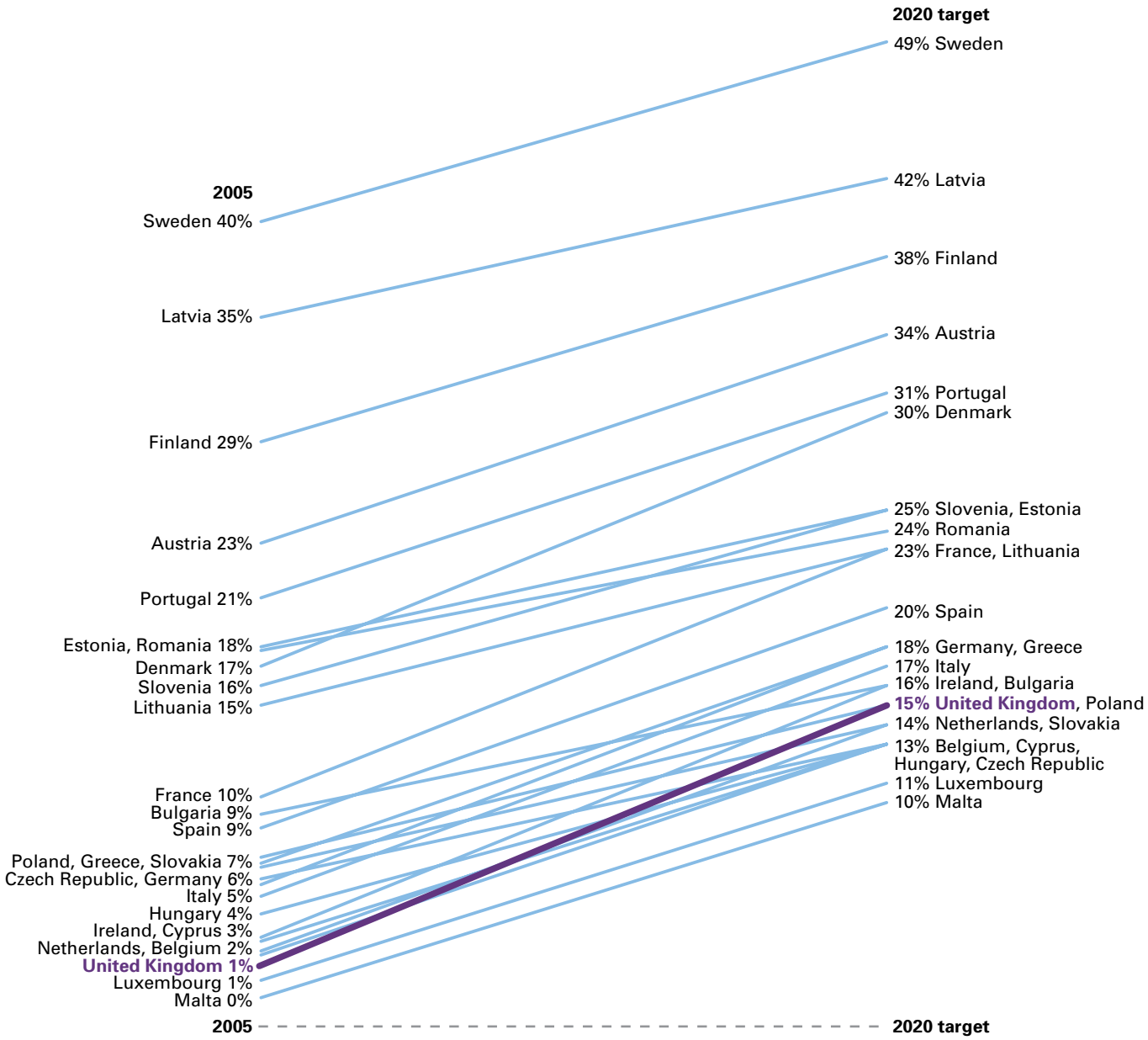
(2) The remaining shortfall from the EU target, amounting to 0.16toe per person, is weighted according to GDP per capita and added to the target from step (1).

For a few States with high renewable energy contributions an additional cap is introduced. The resulting targets, and the scale-up they represent from 2005 levels, is illustrated in Chart 15.

The relative scale-up required for the UK is striking and implies a dramatic expansion of renewable energy in the UK. Given the difficulty of rapidly increasing the renewable energy contribution in heating and transport sectors, most studies suggest that the UK target would require expansion of renewable energy to close to 40% of power generation. The prospects and implications of this will be explored in a separate report by the Carbon Trust, focusing upon the UK offshore wind energy industry.

The dramatic expansion implied by the UK target largely reflects the UK's exceptionally low starting point. The steepness of the lines in Chart 15 illustrates the way that renewable energy targets (in terms of percentage point change from 2005 levels) are modulated against wealth; the slope of the UK line sits comfortably within the norm of the richer EU countries. It is however significantly steeper than some of the changes required for New Member States. Given the proposed mechanisms to allow trade in 'guarantees of origins', it is quite possible that the UK could seek to buy in some of its renewable energy contribution from these New Member States if it struggles to meet its own target. In addition, some flexibility is introduced by special provisions relating to the timing of long-term renewable energy projects (such as tidal barrages).

Chart 15 *Renewable energy targets for each Member State*



The targets for activities outside the EU ETS

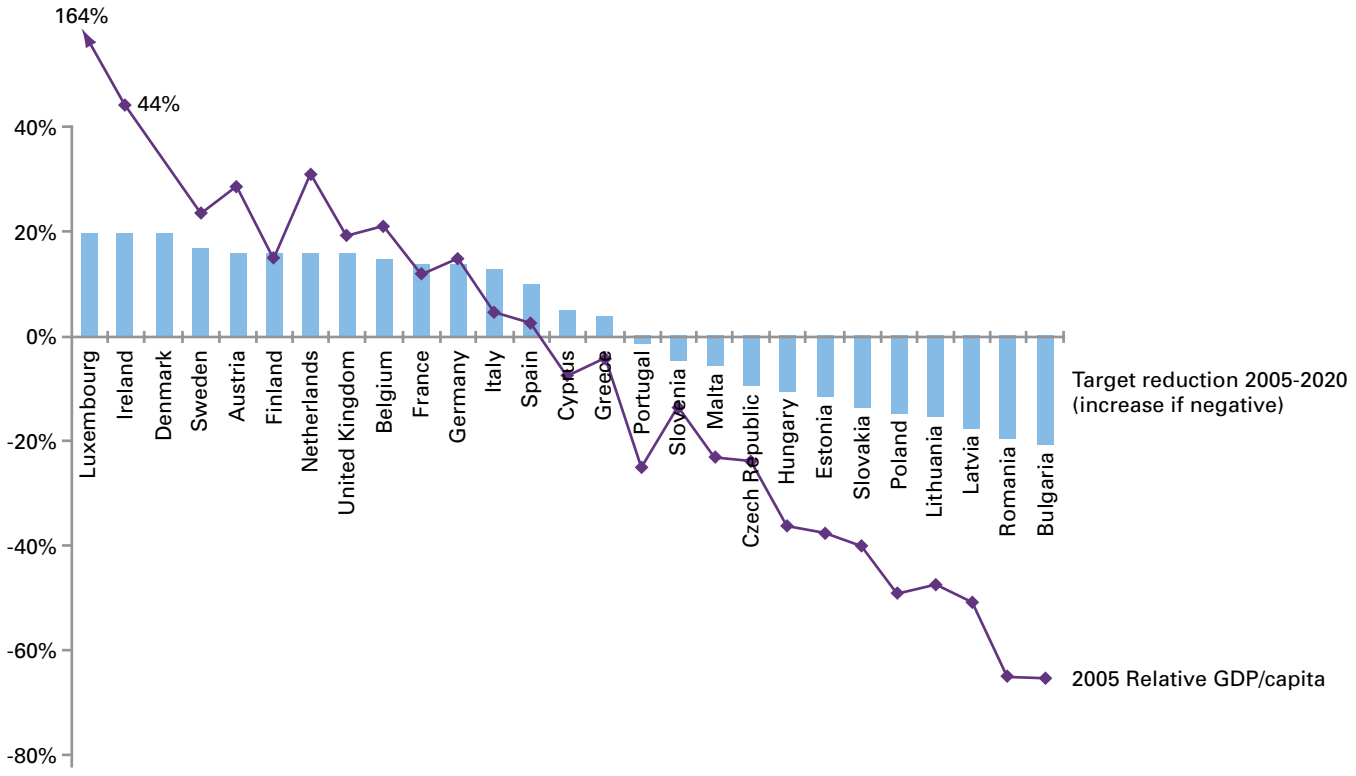
In contrast to the renewable energy targets, where the biggest single differentiating factor was the starting point and GDP was a relatively modest adjustment to the scale of increase sought, the Commission proposes to use 'GDP per capita as the main criteria' for the distribution of the aggregate 10% cut in non-EU ETS emissions. In fact, a range is proposed in which the individual national targets range from -20% to +20% relative to 2005 levels:

"Where GDP/capita exceeds the EU average, a bigger effort is required …up to a maximum figure of -20% below 2005 where GDP/capita is highest. Countries with a low GDP per capita will be allowed to emit more than they did in 2005 in sectors not covered by the EU ETS because their relatively higher economic growth will probably be accompanied by increased emissions in sectors such as transport."

The distribution of targets relative to 2005 levels is illustrated in Chart 16, together with the GDP of these countries relative to the EU average. The total adds up to a reduction of about 10% because overall emissions are dominated by the richer Member States that have to cut back by more than 10%. Again, the UK target – a 16% cutback from 2005 levels – accords with the general pattern of the richer Member States.

Regarding the growth allowance for the New Member States, the Commission states that 'these targets do however still represent a cap on their emissions, and will require some sort of reduction effort for all Member States.' This is less clear from the modelling effort, which suggests that some might remain within their cap on 'business as usual'. Whilst there is no EU trading mechanism in the case of these non-EU ETS targets, some flexibility comes from the proposals that Member States may import up to 3% of their total through international Kyoto credits.

Chart 16 *Emissions reductions targets outside the EU ETS for each Member State*



This Carbon Trust report draws upon findings of Climate Strategies research on future design options for the EU ETS. A series of technical reports are available from **www.climate-strategies.org**. Charts may be reproduced from this report on the condition that they are cited either with the full reference accompanying the chart, or in the abbreviated form as 'Source: Carbon Trust and Climate Strategies'. All other content is strictly subject to the copyright provisions on the back cover.

About Climate Strategies

Climate Strategies aims to assist governments in solving the collective action problem of climate change. It connects leading applied research on international climate change issues to the policy process and to public debate, raising the quality and coherence of advice provided on policy formation. Its programmes convene international groups of experts to provide rigorous, fact-based and independent assessment on international climate change policy.

To effectively communicate insights into climate change policy, Climate Strategies works with decision-makers in governments and business, particularly, but not restricted to, the countries of the European Union and EU institutions. In addition to the research engagement, Climate Strategies offers a professional training course and a direct link to the Climate Policy Journal.

In addition to the support of the Carbon Trust, Climate Strategies receives support from a range of government and private sector sponsors.

In February 2008, Climate Strategies established an Executive Secretariat hosted at Cambridge University. Its research programme for 2008 spans a range of topics on the future design of economic instruments in industrialised countries, strengthened engagement with developing countries, and integrated approaches to the international design of post-2012 responses, as well as international collaborations on technology and sectoral strategies.

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* Institutions directly contributing to Climate Strategies research on future design of the EU ETS

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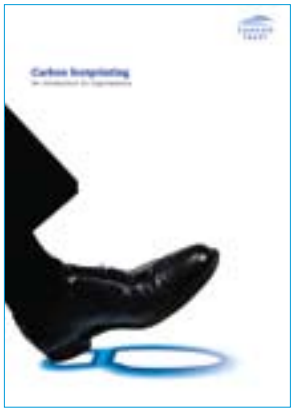

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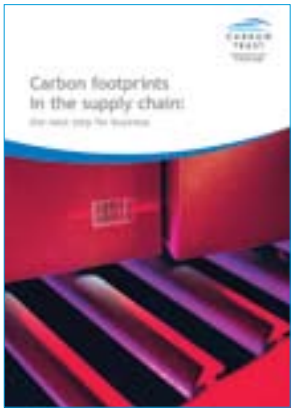

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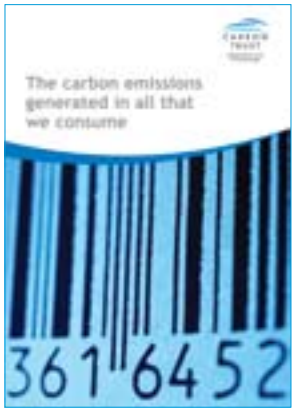

CTC603

The carbon emissions generated in all that we consume

The Carbon Trust was set up by Government in 2001 as a private company.

Our mission is to accelerate the move to a low carbon economy by working with organisations to reduce carbon emissions and develop commercial low carbon technologies.

We do this through five complementary business areas:

Insights – explains the opportunities surrounding climate change
Solutions – delivers carbon reduction solutions
Innovations – develops low carbon technologies
Enterprises – creates low carbon businesses
Investments – finances clean energy businesses.

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