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Appraisal of Years 1-4 of the UK Emissions Trading Scheme

A Report by ENVIROS Consulting Limited

December 2006

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LIST OF ABBREVIATIONS

Acronym	Full term
CCA	Climate change agreement
CCL	Climate change levy
CDM	Clean development mechanism
CHP	Combined heat and power
DP	Direct participant
ECA	Enhanced capital allowance
EPC	Energy performance commitment
ETG	Emissions Trading Group
EU ETS	EU emissions trading scheme
GHG	Greenhouse gas
JI	Joint implementation
MRV	Monitoring, reporting and verification
(M)tCO ₂ e	(Million) tonnes carbon dioxide equivalent
NGO	Non governmental organisation
OMS	Other member states
UK ETR	UK emissions trading registry
UK ETS	UK emissions trading scheme

EXECUTIVE SUMMARY

Defra has commissioned Enviro Consulting to review the first four years of the UK Emission Trading Scheme (ETS). The purpose of this project is to collate the lessons learned from the voluntary UK scheme and to report those findings in a way that allows them to be applied to other policy areas, in particular, the proposed Energy Performance Commitment (EPC), should the Government decide to take this proposal forward. The project is structured around two objectives which were defined in Defra's terms of reference:

- ◆ Objective 1: establish which features could be carried over to the new EPC proposal and highlight where improvements could be made.
- ◆ Objective 2: explore any differences or similarities between the environment in which the UK ETS was developed and current circumstances.

This report has been informed by responses to a survey that was circulated to 60 organisations, ranging from Direct Participants (DPs) to non governmental organisations (NGOs). We have also participated in a range of meetings and phone calls with a cross section of stakeholders and a workshop organised by Defra/ the UK Emissions Trading Group (ETG) which explored the lessons learned. To complement the stakeholder consultation element we carried out a literature review and quantitative analysis of the first four years of UK ETS transaction log data.

These three elements of the work were drawn together to establish the lessons learned from the operation of the first four years of the scheme, summarised below. When considering these findings it is important to bear in mind the context in which the UK ETS was designed and implemented. The UK ETS was established as a five year pilot scheme, a test case to develop experience and promote understanding. However, one of its objectives was to deliver cost-effective abatement and that too should not be forgotten.

An opportunity for learning

The majority of organisations agree that the scheme has provided a valuable opportunity to learn about the way an emissions trading scheme operates and the steps required to participate. In addition to economy-wide capacity building for emissions trading, individual participants have learnt from the setting of internal targets, undertaking trades, monitoring, reporting and verifying emissions. Much of this experience has been valuable for the EU ETS and could also be carried over to policies such as the EPC scheme, if Government decides to take the proposal forward.

Potential to deliver real emissions reductions

A wide range of DPs have reported that they have either made investments to reduce emissions or changed their behaviour directly as a result of the scheme. However, there is some concern over the ease with which some participants met their targets and concern that the actual level of emissions reductions resulting from scheme participation is lower than the headline figures suggest. Some argue that not only would a tighter emissions budget have avoided the surplus (and low prices) the market experienced, it would also have avoided regulatory intervention to withdraw allowances which affected the long-term certainty of the market.

Combined with experience from Phase I of the EU ETS, where (based on emissions to date) the European market also appears long, this delivers a strong message for

future trading schemes. A key driver of the environmental benefits of any cap and trade scheme is the level of the cap. There is a strong case for ensuring that the number of allowances allocated promotes real emissions reductions.

Benefits in mandatory coverage

One of the key features of the UK ETS is voluntary participation. In some ways the self-selection of participants could be argued to have made the scheme more likely to succeed. This was particularly important for a pilot scheme. However, concerns have been raised that a larger number of participants would have made the market more efficient. In addition, only a relatively small proportion of potential emissions have been captured, limiting the potential for emissions reductions.

Simplicity – an inevitable trade-off?

Stakeholders at the Defra/ UK ETG workshop put simplicity as a top priority for the EPC proposal. However, one of the lessons learned from the UK ETS is that a degree of complexity, or at least completeness, is essential to preserve a trading scheme's environmental integrity. Experience from both the UK and EU emissions trading schemes has also shown that there is a trade-off between keeping the rules simple, effective and fair.

Balance between costs of participation and robustness

Survey respondents noted monitoring, reporting and verification as one of the most time consuming requirements of the scheme. Factors to consider in designing a new scheme include the frequency and accuracy of existing data collection and whether energy data from suppliers or other reporting programmes could eliminate the need for further data checking.

Certainty over scheme timescales

The relatively short time horizon for the scheme helped some participants in calculating their targets and in motivating behaviour change. However, others have noted that the timeframe for making and implementing investment decisions is longer than the scheme allowed. The uncertainty over the future of the UK ETS is considered by some to have hampered trading.

Provision of adequate time for understanding

Although the auction was widely considered a success, some support the view that providing participants with a longer timeframe to understand both the detailed rules and the relevance of the scheme for them could have resulted in more organisations participating. This is a useful lesson for schemes (such as the EPC proposal) that are expected to cover a wide range of organisations that have not previously been involved in emissions trading.

In summary, the UK ETS was one of the first emissions trading schemes in the world and as such stakeholders agree that it has provided valuable lessons for the design of future similar schemes. There is some consensus that the scheme provided the UK with unique experience and helped to develop a trading infrastructure which could be built on to implement the EU ETS. However, concerns have been raised about the environmental integrity of the scheme – particularly that industry was effectively allowed to set its own reductions goals at tax payers' expense. It is difficult to prove exactly which changes have occurred as a direct result of the scheme and some have argued that industry has been



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rewarded for decisions and investment that were little different to those that would have been made in its absence.

1. INTRODUCTION

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1.1 Introduction to the UK ETS

The UK Emissions Trading Scheme was launched in 2002 and was designed to run until 2006, to achieve three objectives:

- ◆ to secure cost-effective GHG emissions reductions;
- ◆ to give UK companies early experience of emissions trading, with a particular view to being ready for the European Union Emissions Trading Scheme (EU ETS); and
- ◆ to encourage the establishment of an emissions trading centre in London.

Participation was voluntary and open to both the public and private sectors. In order to establish a market for emissions allowances, the UK Government held an incentive auction in March 2002. By committing to reduce emissions of one or more of the six greenhouse gases, organisations were able to bid for a proportion of the total £215 million available as an 'incentive' payment over the lifetime of the scheme.

32 'direct participants' (or DPs) successfully bid for a proportion of the funding available, committing to a total of 3.96MtCO₂e by 2006. This implies a cost of abatement in 2006 of £54.3/tCO₂e. However, since organisations face an increasing target every year, this equates to £17.7/tCO₂e (£12.45/tCO₂e if the maximum level of corporation tax was payable on the incentive payments)¹. Each organisation's target was determined relative to its 'baseline' emissions between 1998 and 2000. In addition to calculating and verifying their initial baseline data, DPs' annual emissions are verified and reconciled to record performance against their targets.

Organisations that are part of a Climate Change Agreement (CCA) can also participate in the scheme. CCA companies are allowed to buy allowances to make

1 Source: NERA 2004

up under-achievement against their CCA targets (or to sell allowances where they generated a surplus). Some CCA targets are determined in relative rather than absolute terms. This means that the level of energy use or emissions allowed under the target can increase as output increases, or vice versa. This has the potential to increase the supply of allowances and so relax the cap imposed. A 'gateway' was therefore introduced in order to ensure that there is no net flow of allowances from the relative sector to the absolute sector. However, given the surplus of allowances generated by Direct Participants, in practice the constraint offered by the gateway has rarely, if ever, been brought into effect.

A small number of other organisations have also traded allowances in the scheme, for instance, in order to purchase emissions to become 'carbon neutral'.

Once organisations had committed to an abatement level by 2006, annual targets were calculated linearly and the corresponding number of allowances awarded each year. Each transaction, including allocations and retirements, is recorded in a transaction log managed and subsequently published by Defra. In 2004, it had become evident that the total number of allowances available on the market considerably exceeded actual emissions from DPs. Defra consulted on the most appropriate way to address this surplus and entered into a voluntary agreement with six participants to reduce their targets by 8.9MtCO₂e in total over the remaining years of the scheme.

The UK ETS is due to end in December 2006; final reconciliation of emissions against targets will take place in March 2007, illustrated in the timeline overleaf (Figure 1).

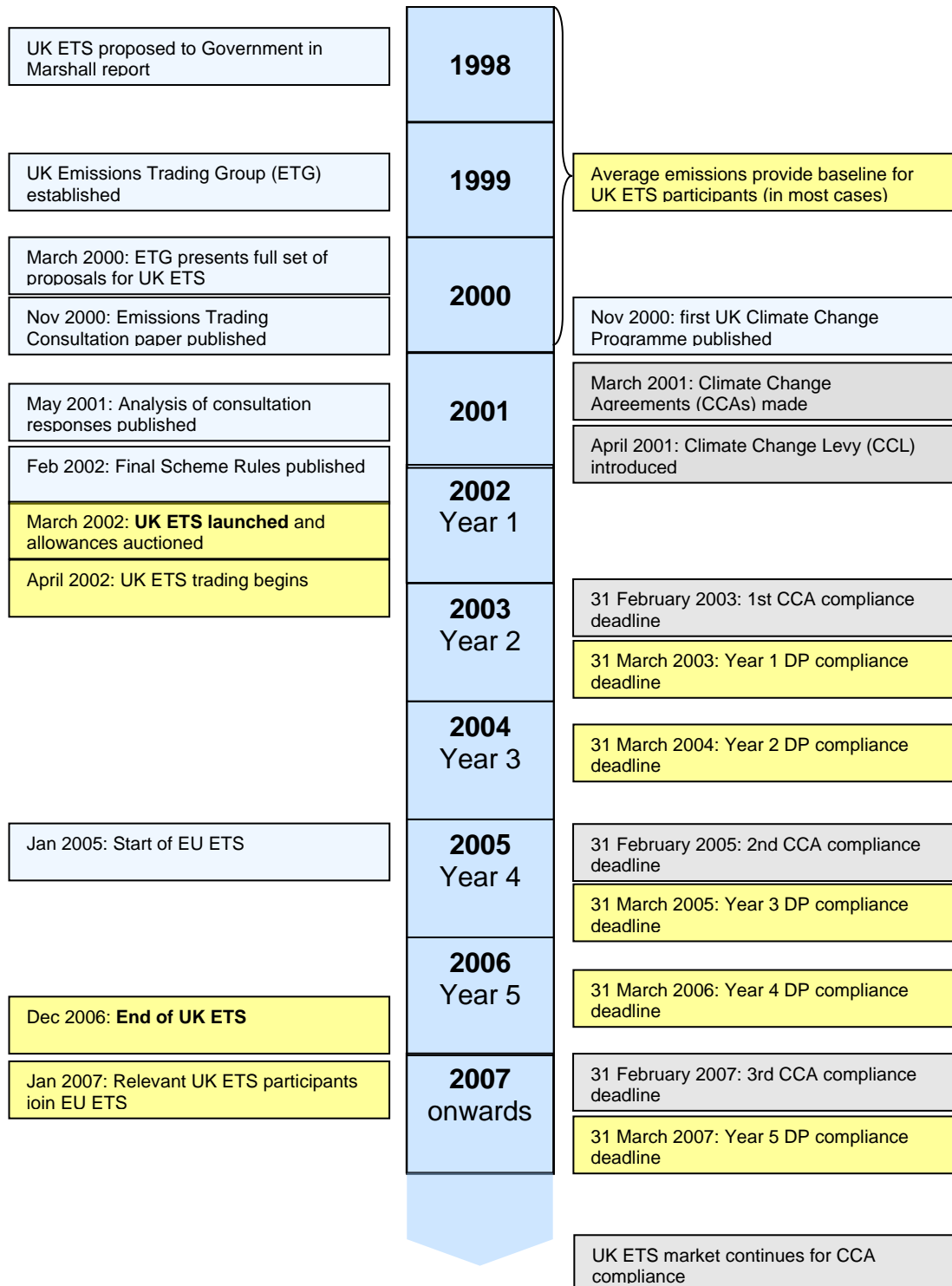
1.2 Structure of this document

The remainder of this document is structured as follows:

- ◆ section 2 highlights the types of organisation that participated in the scheme and factors that encouraged (or discouraged) participation;
- ◆ stakeholders' experience of trading and market results are presented in section 3;
- ◆ section 4 considers the monitoring, reporting and verification (MRV) of baseline data;
- ◆ stakeholders' experience of auctioning is reviewed in section 5;
- ◆ other points raised, including information provision and time commitment under the scheme, are presented in section 6;
- ◆ some of the key differences between the policy environment when the UK ETS was developed and its status today are summarised in section 7;
- ◆ section 8 highlights differences between the design of the UK ETS and proposed policies for large, non-energy intensive users; and
- ◆ the last part of the report, section 9, summarises the key lessons learned.

The detailed responses to the survey have been provided to Defra in a second volume alongside this report.

Figure 1 Key dates in the development of the UK ETS



Source: Enviro

2. STAKEHOLDER PARTICIPATION

2.1 Types of organisation that participated in the UK ETS

Various reviews of the scheme have noted that UK ETS participants are diverse in terms of organisation size, sector, national/ international status, emissions level and type. This diversity is an important characteristic to bear in mind when determining whether lessons learned from this scheme are of relevance elsewhere.

2.1.1 Direct participants

Direct participants range from energy intensive industries to the service sector and encompass both the public and private sector. The majority of respondents only included a proportion of their sites in the scheme (only one respondent to our survey included all its sites). Of the 32 organisations that successfully bid for incentive money under the scheme, nine have baseline emissions in excess of 1MtCO₂e (Table 1). The remaining 23 DPs' baseline emissions were between around 0.001MtCO₂e and 0.58MtCO₂e. The DPs that responded to the survey for this report were often, but by no means exclusively, large organisations (with more than 250 employees).

Table 1 List of DPs (with 2002 emissions over 1MtCO₂e) and their targets

Organisation	2002 Actual Emissions	2002 Baseline	2002 Annual Target	Original reduction target
	MtCO ₂ e	MtCO ₂ e	MtCO ₂ e	% of 2002 baseline
BP	6.20	6.76	0.07	-5%
UK Coal	4.49	4.51	0.07	-8%
Shell	3.92	3.81	0.09	-11%
Lafarge	3.07	3.22	0.05	-7%
Rhodia	1.47	2.10	0.09	-20%
Invista	1.28	2.63	0.10	-19%
First Hydro	1.15	1.37	0.06	-21%
British Airways	0.85	1.01	0.03	-12%
Ineos Fluor	0.65	1.86	0.16	-43%
Other smaller organisations	2.86	3.28	0.09	-13%
All DPs	25.92	30.54	0.79	-13%

Source: Defra

Around half of DP respondents are also either partly or fully covered by a CCA and around a third are also partially or fully captured by the EU ETS. Around seven or eight survey respondents (half of all DP respondents) also participate in Carbon Trust programmes, have taken advantage of enhanced capital allowances (ECAs) or have installed a combined heat and power (CHP) plant.

One DP was a 'carbon club' which operated on behalf of seven different universities under a single target. By paying an annual subscription fee, each member

channelled their data through a central agency which: ensured submissions were made to Defra when required; helped members to establish how long or short of their targets they were; and also prompted members to trade as and when necessary. In addition, the agency undertook registry transactions on behalf of its members and facilitated any transfers of allowances between members (which were conducted at the market price).

Approaches to setting targets

As shown in Table 1, the absolute and relative targets assumed by DPs varied considerably. This might be expected given the range of abatement opportunities at each site (which differ depending on the processes used, the products made and action already undertaken before the start of the scheme). However, we understand that the targets also vary due to the different approaches operators took to setting them. Whereas some DPs were prepared to assume relatively stringent cuts which they considered would focus attention better, others based their target on past experience or an understanding of economically viable abatement projects and agreed to a target which could be achieved more easily.

Of the DP respondents to our survey, over half (eight to ten) used past experience of emission reductions or cost benefit analysis to set their targets. A further third (six) used projections. Benchmarks were only used by one respondent. Around half of DP respondents (nine) stated that their aim is to over-achieve their target and sell allowances while a third (six) aim to meet their targets. This objective has only changed during the course of the scheme in five cases. Reasons for this included where an abatement project was cancelled, targets were met more easily than had been expected and allowances were banked for CCA compliance rather than sold. These comments confirm some concerns about whether the scheme went far enough to set challenging targets for DPs.

One point raised was that participants were not allowed to take credit under the scheme for sourcing green electricity; however, other organisations agreed that this would have constituted double counting and it would not have been appropriate for DPs to benefit from this choice.

2.1.2 Other participants

Other participants in the scheme included those listed below.

- ◆ CCA companies trading for compliance at milestones: they either bought or sold allowances.
- ◆ Other organisations trading on behalf of DPs and CCA organisations: in addition to the carbon club noted above, a range of other participants engaged third parties to trade on their behalf or to provide training on the way that the scheme worked and advice on how to comply with it.
- ◆ A small number of organisations that bought allowances for other reasons: e.g. to go carbon neutral.

Since the transaction log operates on an account basis and any organisation may have more than one account, it is not straightforward to establish exactly how many other participants there have been over the lifetime of the scheme. However, once recognised DP and Government accounts are excluded, we estimate that there were approximately 1,500 other trading parties, including CCA and other participants.

2.2 Factors that encouraged or discouraged participation

Given the voluntary nature of the scheme, one of the areas we have assessed is whether there were any particular factors that drove or discouraged organisations' participation. Direct participants responding to our survey noted the following as the reasons that they participated, which broadly reflect the Government's objectives for the scheme:

- ◆ motivating energy savings and or emissions reductions (this was the most common reason given);
- ◆ capitalising on the business opportunity (which could mean either to collect the incentive payment or other commercially beneficial impacts the scheme was expected to have on operations);
- ◆ improving the reputation of the business;
- ◆ preparing for the EU ETS; and
- ◆ gaining experience of emissions trading.

The majority of respondents that answered this question listed more than one driver. Other factors identified are: the flexibility to choose which of an organisation's emissions would be covered by the scheme; inclusion of all six greenhouse gases in the scheme's scope; and the incentive payment (which in some organisations was earmarked to fund energy efficiency/ emissions management projects). Around the time of the auction, Defra also reported showing 'that trading works, as an alternative to traditional command and control regulation' as a reason cited by several DPs². Survey respondents also noted that the decision to participate in the scheme was most commonly taken at the senior management level and in half of DP respondents' cases (also) at the board level. Only one DP respondent has considered withdrawing, due to economic considerations for the profitability of its operations.

However, a large number of organisations that could have been involved did not take part. Prior to the auction, 46 businesses had signed up for the scheme and we understand that the auction was postponed twice partly in order to encourage wider participation. 38 participants entered the auction and of the 34 firms that were eventually successful, two subsequently withdrew, leaving the 32 DPs described above. Various reasons have been given, including those listed below.

- ◆ There was a lack of awareness either that the scheme was relevant to a particular organisation or of the benefits that could accrue.
- ◆ The timescales within which the scheme was designed and the auction run did not give some organisations sufficient time to absorb and understand the scheme rules and implications.
- ◆ The pilot nature of the scheme meant that it was considered 'risky' by some potential participants.
 - For instance, some organisations were concerned that if the market were illiquid, it may be very costly to make up any shortfall in allowances.

2 <http://www.defra.gov.uk/environment/climatechange/trading/uk/pdf/trading-progress.pdf>



- Others were concerned that it would be difficult to achieve internal buy-in and involvement for a voluntary scheme.
- ◆ A large number of the eligible firms are not energy intensive (although a number of energy intensive industries that could have participated did not).
 - As a result, involvement was sometimes considered too costly relative to the energy efficiency gains that could be made.
- ◆ Where organisations' emissions were spread over a large number of sites, there were concerns that the costs of management time to participate would outweigh the benefits.
- ◆ (Verifiable) baseline data was not available or would be too costly to collect (particularly for small companies).
- ◆ There was concern that the emissions targets may not be met and that this would have a negative impact on an organisation's profile.
- ◆ The public profile benefits of involvement in a voluntary scheme had more importance for some businesses (for instance those with shareholders) than others.

3. TRADING AND SCHEME OUTCOMES

A liquid and efficiently functioning market is key for a trading scheme to deliver cost effective abatement. In this section of the report, we review what drove trading in the market and some of the factors behind movements in market prices.

Much of the quantitative analysis in the section relies on transaction log data which is published on the Defra website. Compliance years run from January to December (and the final reconciliation for each year is at the end of the following March). Annual market reports which also use information from the transaction log are published on a financial year basis, so in the text below, 2001 refers to 1 April 2001 to 1 March 2002 etc.

3.1 Types of transaction

We have categorised transactions into five different groups. **Allocations** record the issue of allowances either to DPs or CCA participants by Defra. **Retirements** are where participants have used their allowances to meet their target. **Cancellations** are the least common type of trade and occur when allowances are no longer eligible to be traded or used for compliance (e.g. if allowances were allocated incorrectly). **Intra-group** transfers are the transfer of allowances between different sites or accounts of the same organisations. Since all the types of transfer mentioned above are largely administrative, for the purposes of this report we have focused on **trades** or transfers between different organisations. On average, allocations, retirements, and cancellations constitute around 40% of all transfers, intra-group transfers around 20% and the remainder are trades (Table 2).

Table 2 Number of transactions

Transaction type	Compliance year				% of total
	2002	2003	2004	2005	
Allocation	219	68	220	204	8%
Retirement	1,254	76	1,492	137	32%
Cancellation	6	42	33	61	2%
Intra-group transfer	786	105	858	159	21%
Trade	1,484	222	1,304	458	38%
Total	3,749	513	3,907	1,012	100%

Source: Defra data manipulated by Enviro. Note: Transaction activity is based on transaction log data up to the 31 March 2006. An intra-group transfer is defined as a trade where both the seller and buyer have the same organisation number in the registry, i.e. a trade within the same organisation

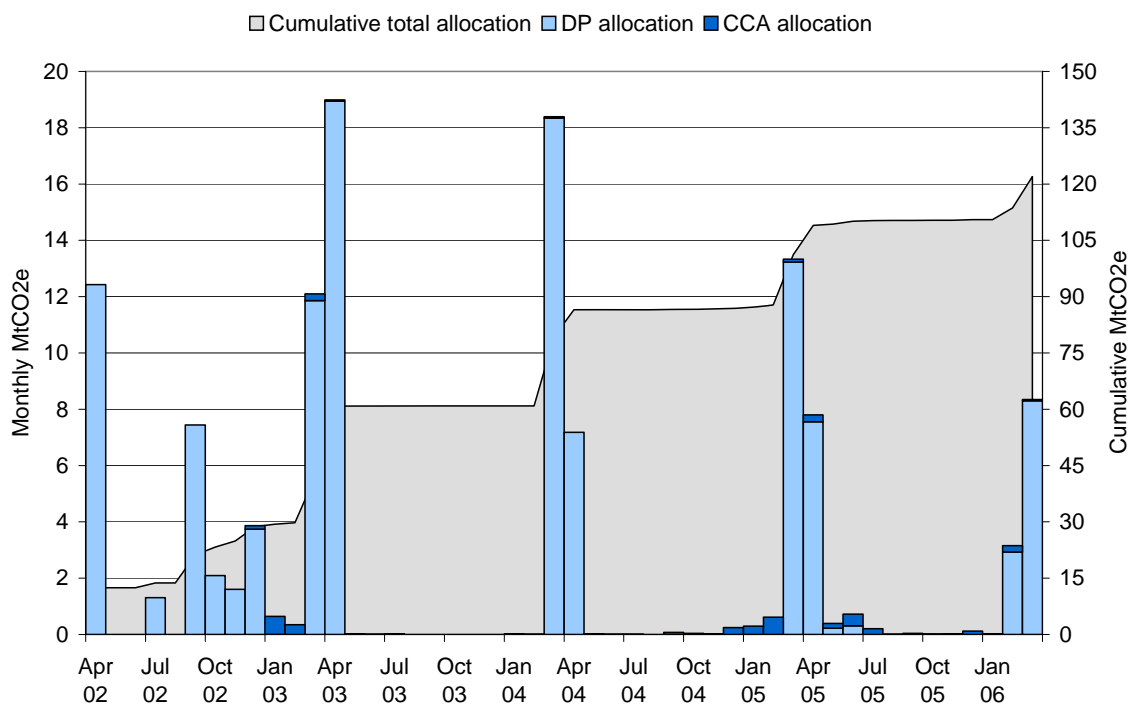
3.2 Allocation

The supply of allowances is determined by the volume of allocations by Defra. Up to the end of March 2006, around 122MtCO₂e has been allocated under the scheme³, with the volume of new allowances allocated gradually falling from year to

³ Since this includes 2006 allocations to the majority of DPs allocated in February and March 2006, this volume is not now expected to increase significantly before the scheme ends. The figure of 122MtCO₂e excludes cancellations.

year. The majority (around 96%) of allocations is awarded to Direct Participants and the remainder to CCA participants. Figure 2 below shows how the initial allocation to DPs was spread between April and December 2002 (it took some time to get all the baseline data verified and for the scheme to be fully up and running). In subsequent years, the majority of DP allocations are transferred in March and April (for the new compliance year). CCA allocations can occur at any time of year, whenever a CCA participant gets its surplus verified, but the majority occur around the biannual CCA milestone dates (illustrated by CCA allocations from December 2004 to July 2005, around CCA milestone 2 for instance).

Figure 2 Allocations to DPs and CCA participants



Source: Defra data manipulated by Enviro. Note: an allocation is assumed to be a DP allocation whenever a DP buyer organisation number is listed in the log as an allocation. Where DPs also hold a CCA, some of their allocations have been counted as CCA allocations. The chart excludes the effect of cancellations made to account for the voluntary agreement reductions and other adjustments.

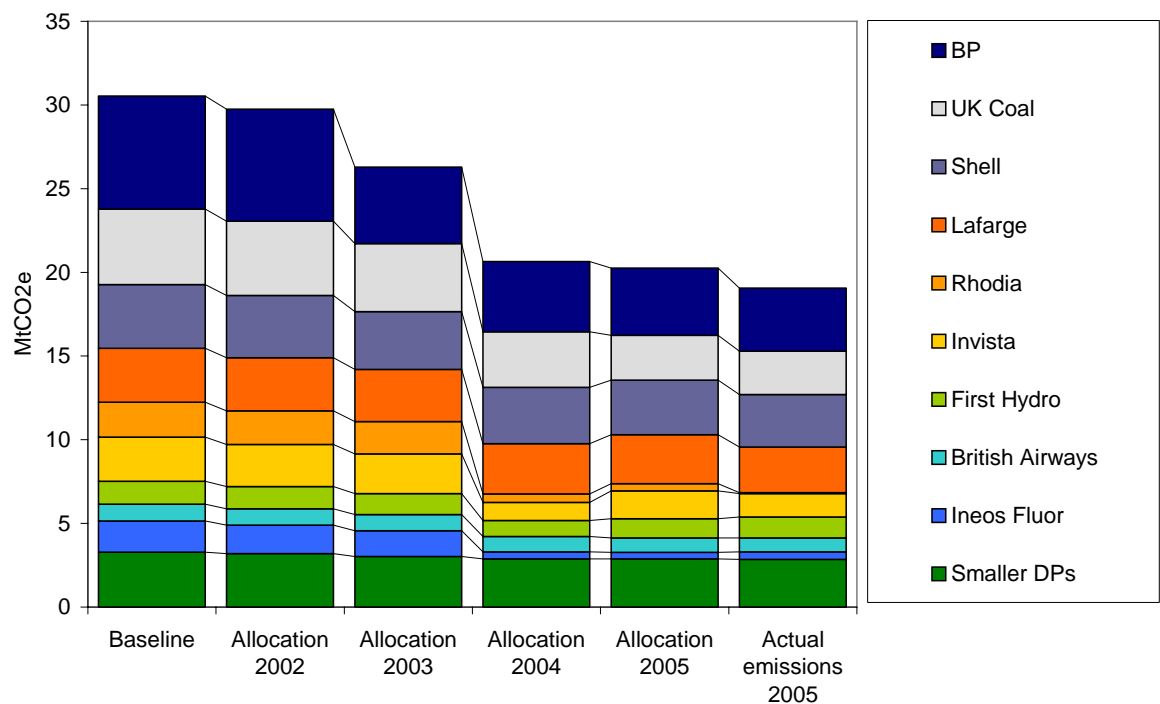
The number of allowances allocated declined considerably in 2004 following the voluntary agreement between Defra and six DPs (see section 3.4). In addition, when the EU ETS began in January 2005, some operators opted to stay in the UK ETS for the first two years of the scheme rather than participate in the EU scheme. In order to ensure that the UK ETS constituted an equivalent target, allocations to opted out participants were reduced by over 0.3MtCO₂e towards the end of 2004. No further changes were made to allocations for the 2005 compliance year (or for the 2006 compliance year).

The timing of allocations can impact on trading in a scheme such as the UK ETS. For instance, the delay in some allocations right at the start of the scheme has been cited as one of the factors for the relatively high allowance price in 2002 (see Figure 11 on page 21 below).

The distribution of allocations amongst different market participants might also be expected to affect the volume of trading in a market. Figure 3 below shows how the

largest 3 companies were allocated around 50% of allowances in each year of the scheme. Some 23 small organisations (aggregated together in Figure 3) were allocated around 12% of the total. The distribution between organisations changes somewhat after the voluntary agreement was implemented (from 2004 onwards when the allocations to six participants were reduced), however the concentration of allocations amongst the largest organisations remains.

Figure 3 Allocation to direct participants



Source: Defra data manipulated by Enviro. Excludes allocations not issued as a result of the voluntary agreement.

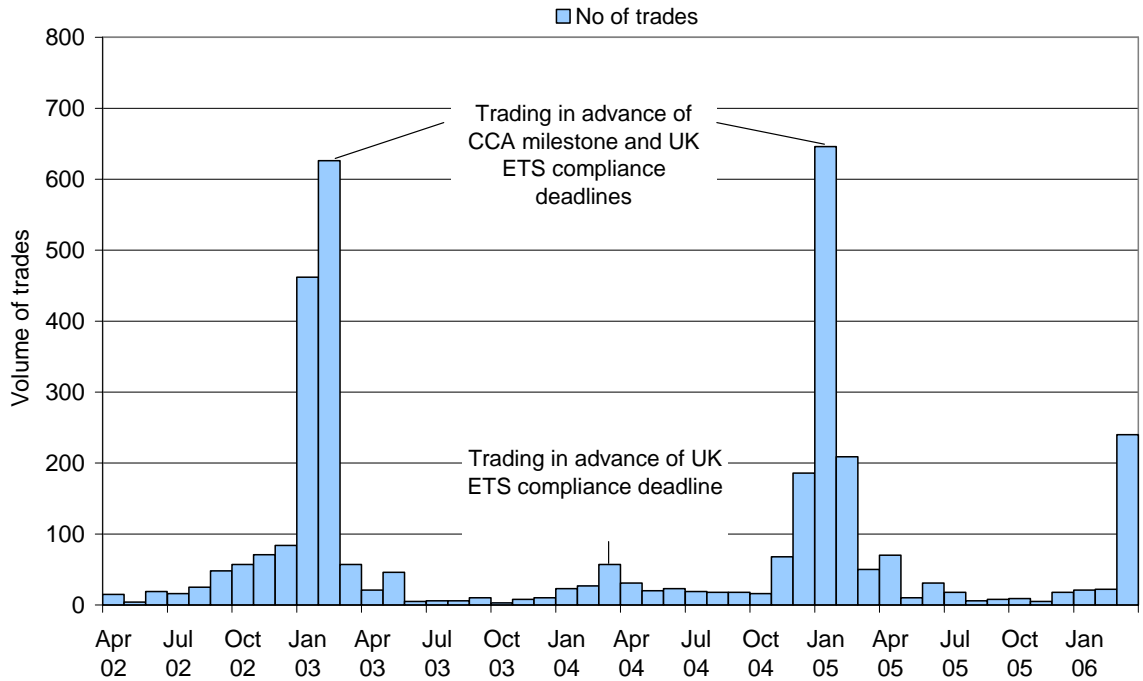
It is difficult to discern exactly how great an impact this concentration has had on the market and so the abatement delivered by the scheme. It could be one of the cases of the relatively low liquidity noted by some participants (see section 3.3.2)

3.3 Trading volumes

There have been a total of just under 3,500 trades⁴ between April 2002 and March 2006. The majority of these occur around compliance deadlines; Figure 4 illustrates how the number of trades increases significantly in the run up to the CCA milestones. The number of trades also increased significantly in March 2006. Although this was a reconciliation period for CCA organisations that have opted out of the EU ETS, the marked increase is driven primarily by a large number of trades carried out by a single participant between its own accounts. As might be expected, the volume of allowances traded also increases correspondingly around the compliance deadlines. However, it is interesting to note that since the average trade by a DP is considerably larger than that by a non-DP, the traded volume peaks annually rather than biannually (Figure 5).

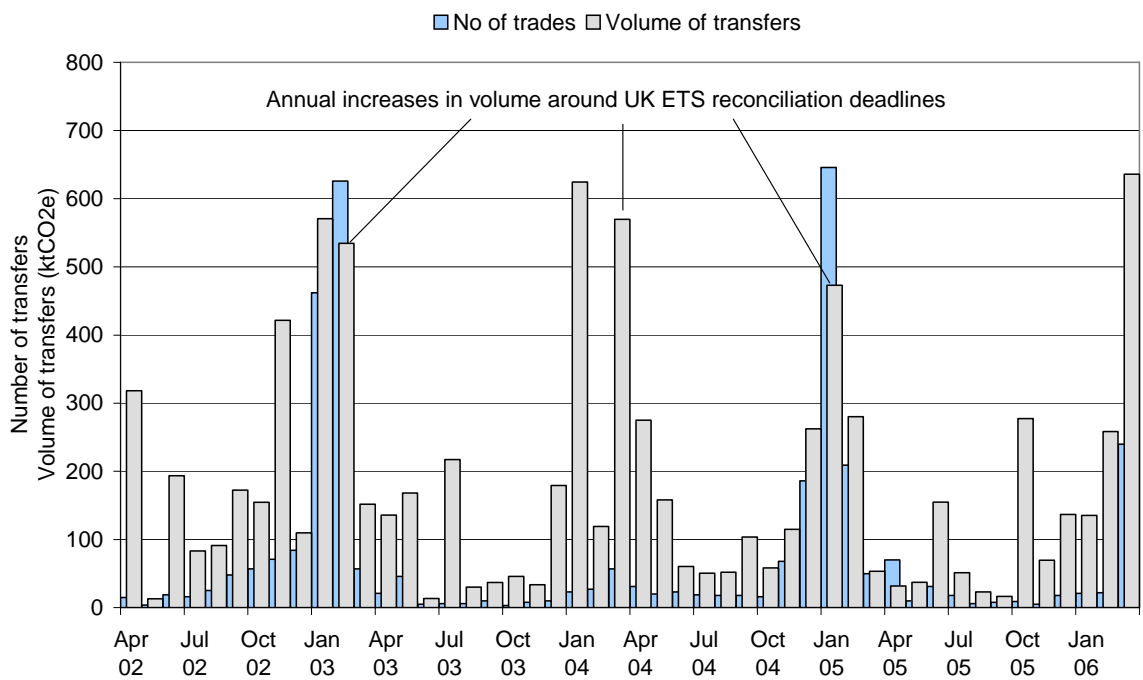
4 Using the definition of trade explained in section 3.1 above.

Figure 4 Number of trades



Source: Defra data manipulated by Enviro. Note: the chart above only includes trades where the buyer and the seller have different organisation numbers in the transaction log.

Figure 5 Volume traded and number of trades

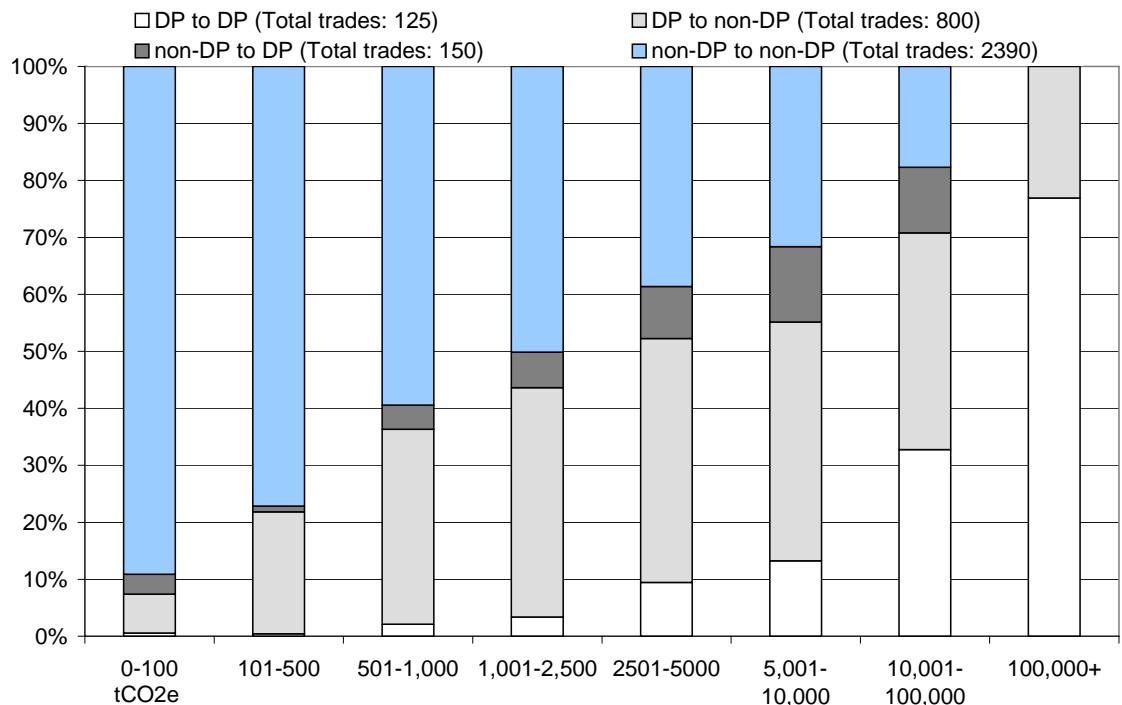


Source: Defra data manipulated by Enviro. Note: the chart above only includes trades where the buyer and the seller have different organisation numbers in the transaction log.

3.3.1 Participant involvement

This difference in average size of trades by different types of participant is highlighted in Figure 6 which shows the proportion of trades of various size bands in which a DP is either a buyer or seller. There have been around 13 trades in the largest size band and DPs have sold the allowances in all instances and bought them in all except three cases. At the other end of the spectrum, there have been just over 1,200 trades for less than 100tCO₂e and only seven of these have been from one DP to another DP. It is worth noting that brokers have minimum floors for the volume of a trade, some charging a minimum arrangement fee which could make the transaction costs of a small trade prohibitive.

Figure 6 Proportion of trades in different size groups involving DPs and non-DPs



Source: Defra data manipulated by Enviro

It is important to note that this does not necessarily mean that all DPs have traded nor that all DPs necessarily feel 'comfortable' with operating in a trading environment. Eleven respondents to our survey (40% of all respondents) had no experience of trading before the scheme began while seven (25%) did already have some experience. Around seven respondents (a quarter of all respondents) have traded themselves, eight via a third party and a further six haven't traded at all. Of those respondents that have not traded, two (7%) have not traded because allowances have been banked instead and another because they did not see any need to trade since they had met their target. This feedback is interesting; for a trading scheme to result in the most cost effective pattern of abatement, participants should evaluate whether it is cheaper to go to the market and buy (or sell) than to abate (or emit). Although in some cases, DPs do appear to have made this type of calculation, it is certainly not the driver for trading in all cases.

3.3.2 Drivers for trading

In order to better understand these trading patterns, DPs were asked how they had developed a trading strategy and what prompted them to trade. Answers rarely related to the carbon price; instead, organisations timed trades:

- ◆ to meet compliance deadlines (both for CCAs and UK ETS as evidenced by the data in section 3.3);
- ◆ when internal funding became available; and
- ◆ when prompted to do so (e.g. by Carbon Club or other third party helping the organisation to manage its exposure to either the UK ETS or CCAs).

As a rule, respondents indicated that they had chosen the most cost effective approach. Motivations for trading included: to meet targets, to sell surplus allowances and to 'stock up' on allowances to meet future targets. Although some DPs followed this strategy as the most cost effective approach, in other cases it was driven more by the level of understanding or resource available to facilitate a trade.

On the whole, DPs and other organisations that had traded to meet their own energy or emissions obligations did not rank market liquidity as a problem. The majority of buyers and sellers had found it relatively straightforward to find counterparty when they were ready to trade. However some DPs had found it more difficult to conduct larger trades, noted during the early stages of the scheme⁵.

Whether or not the low liquidity prevented the market functioning properly to set a price that truly reflected the fundamentals is a rather different. Some respondents, including brokers, have cited the low level of liquidity as a barrier to the effective operation of the scheme. In their view a combination of the surplus and the concentration of allocations has hampered the development of a traded market outside compliance deadlines. Six respondents commented that market liquidity had discouraged them from trading, compared to four who said it had encouraged them and seven who said it had had no effect. One of the main causes of the low trading volumes is considered to be the significant surplus in DP allocations over and above their actual emissions, which we discuss below.

Although not the focus of this study, it is worth noting that, by and large, the UK emissions trading registry (ETR) (the trading infrastructure to conduct a trade) has been commended for its simplicity and ease of use and is not considered to have constituted a barrier to trading.

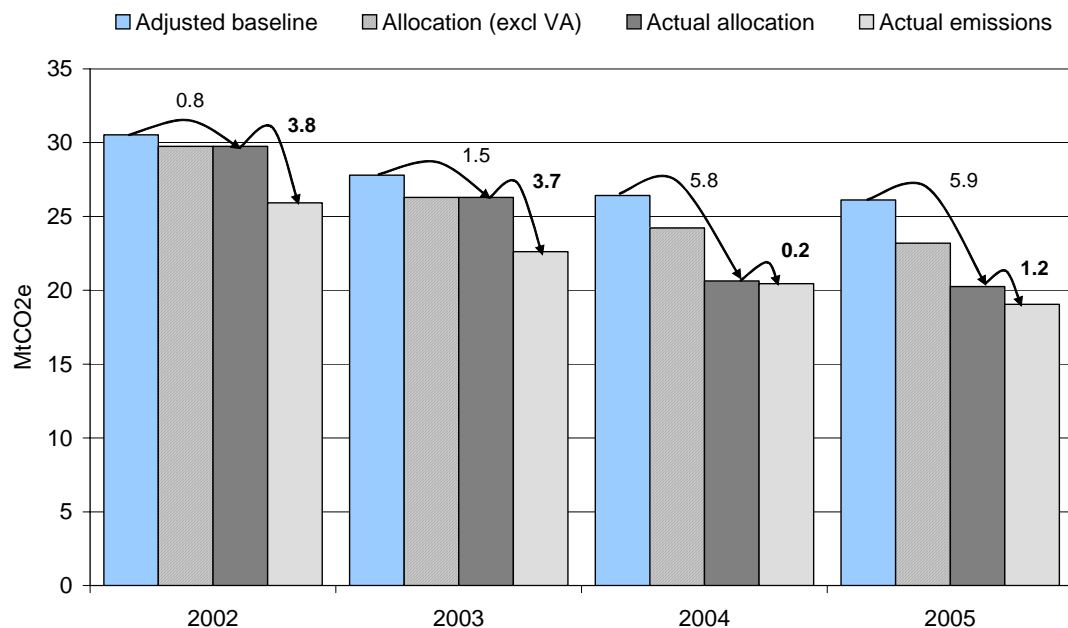
3.4 Progress to targets

Although DPs committed to a total abatement amount by 2006, each DP's target was spread equally over the five years of the scheme to monitor progress towards the final target every year. The actual level of emissions allowed was calculated by applying the target to the DPs baseline emissions. If there were significant changes at an installation (for instance, if part of an installation was closed down), the baseline was adjusted, resulting in a corresponding decrease in the organisation's absolute target level.

5 <http://www.defra.gov.uk/environment/climatechange/trading/uk/pdf/dpviews.pdf>

Figure 7 below tracks the aggregate baseline and target across all DP organisations from year to year and compares them against the actual emissions from DPs under the scheme. It shows that by 2003, a surplus of 7.5MtCO₂e had been created (since DPs had emitted significantly less than their target level). All of the participants complied with their targets either by making emissions reductions themselves or by buying allowances. 17 of the 32 DPs over-achieved their targets in 2003 through on-site emission reductions alone.

Figure 7 Baseline, targets and actual emissions



Source: Defra data manipulated by Enviro. Note: VA: voluntary agreement. The allocations in the chart above are the net allocations each year, once any cancellations have been subtracted.

This could in part have been because some participants were able to make the changes necessary to meet their 2006 targets early on in the scheme. However, concern has been raised that the surplus was more a result of unrepresentative baseline data. Some participants' emissions were lower than their baseline even before the scheme began (see Table 1). Others comment that DPs only committed to targets that they were already certain they could meet given planned investments (or changes to practices at their sites). This was raised in relation to some non-carbon dioxide projects in particular, where Environment Agency regulations already require operators to maintain emissions below specified levels at their sites. Although the rules were adapted to reflect regulatory constraints (section 4.2), in some instances the regulatory limits were higher than actual emissions at the sites and so the baseline was still relatively high.

These arguments are reinforced by around half of the DPs that responded to the survey for this project who stated that their objective was to over-achieve their target and sell surplus allowances (see section 2.1.1).

Defra consulted stakeholders on the most appropriate way to address the surplus amount. The majority of the options proposed would have required adjustments to allocations already allocated and there was limited support for such a fundamental adjustment to the market structure. Rather than implement one of the compulsory

options proposed, Defra reached a voluntary agreement with six DPs⁶ to reduce allocations by 8.9MtCO₂e over the remaining years of the scheme. This voluntary agreement (VA) is shown in Figure 7 where allocations are considerably lower from 2004 onwards than for earlier years. Although actual emissions were below allocations in the following two years of the scheme, the total surplus in 2004 and 2005 was 1.4MtCO₂e (less than 20% of that in the first two years).

3.4.1 Approach to monitoring targets

As stated above, although the target was for the full lifetime of the scheme, DPs were required to verify their data and show real progress to that target on an annual basis. In order to inform our view of the extent to which participation influenced organisations' day-to-day running, the survey for this project asked respondents how frequently they monitored that progress. The most common response was that targets were monitored quarterly, however some respondents checked progress as often as weekly, others less regularly on an ad-hoc basis (see Figure 8).

Figure 8 Frequency of target monitoring

Response	Number	% of DPs that responded	Number of respondents
Weekly	1	6%	1
Monthly	3	12%	3
Quarterly	5	23%	5
Annually	4	24%	4
Six monthly	1	3%	1
Ad hoc	2	3%	2

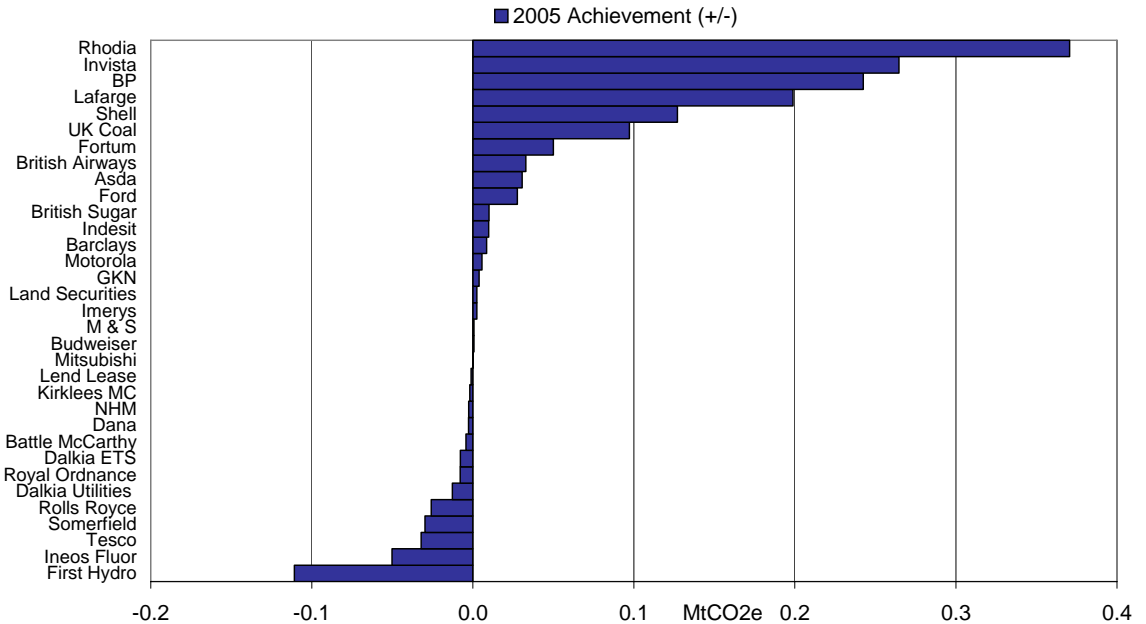
Source: EnviroS

Survey respondents commented that compliance with targets is reported to the board in five organisations (19% of all respondents) but only reaches senior management in ten cases (37% of all respondents) and the site level in one. It is interesting to note that this is similar to a survey on the EU ETS which reported that compliance is managed at board level in a fifth of organisations (LogicaCMG 2005).

3.4.2 Emissions reductions

On average, DPs committed to a 13% reduction in emissions over the lifetime of the scheme. Based on our experience, it is broadly in line with the types of level of emissions reduction that are typically identified at industrial sites as part of energy reduction or carbon management audits. Figure 9 shows the distribution of over- and under-achievement (before purchasing allowances to make up any shortfall) across the different DPs based on their 2005 emissions. 20 organisations exceeded their 2005 target through reductions in their own emission alone (one by as much as 750%, noting that they had only committed to around a 2% reduction in emissions to start with).

Figure 9 Under and over-achievement by participant



Source: Defra data manipulated by Enviros

The most common means of reducing emissions has been through reduced energy use, impacting on carbon dioxide emissions. Reductions have been made through the abatement of both indirect (electricity) and direct emissions. Four respondents estimate that between 90 and 100% of savings have come from direct reductions. Other responses were mixed, to as low as 10% from direct emissions abatement.

Reductions have been both achieved through the installation of emissions abatement equipment and also through modifications to the ways that existing pieces of kit are used (Figure 10). A small number of operators have made F-Gas reductions (however, we understand that the volume of emissions savings from these investments is considerable).

Figure 10 Investments and changes made to achieve UK ETS targets

Response	Number of respondents	% of all respondents	Number of respondents
Capital expenditure: reduce direct energy use/ emissions from combustion	7	26%	7
Capital expenditure: reduced direct energy use/ emissions from heat generation	4	15%	4
Capital expenditure: reduced direct energy use/ emissions from mechanical power	1	4%	1
Capital expenditure: reduced use of electricity	7	26%	7
Capital expenditure: emissions abatement equipment	3	11%	3
Capital expenditure: other	3	11%	3
Behavioural change: optimising energy use/ fuel mix	9	33%	9
Behavioural change: other	7	26%	7
Other (please specify)	0	0%	0
No answer	12	44%	12
Total	53		

Some respondents have commented that the incentive money from the scheme is earmarked for use for emissions reductions specifically. As a consequence, these organisations are able to track exactly which projects have been funded by the scheme (some note that it is difficult to tell with hindsight whether the projects would have been considered economically viable and have gone ahead anyway, even in the absence of the scheme). In other instances, although the funding was not put aside, participants have undertaken investment or changed operating practices deliberately to meet their UK ETS targets.

A range of other factors have impacted on operators' emissions, noted by the NAO as including those listed below.

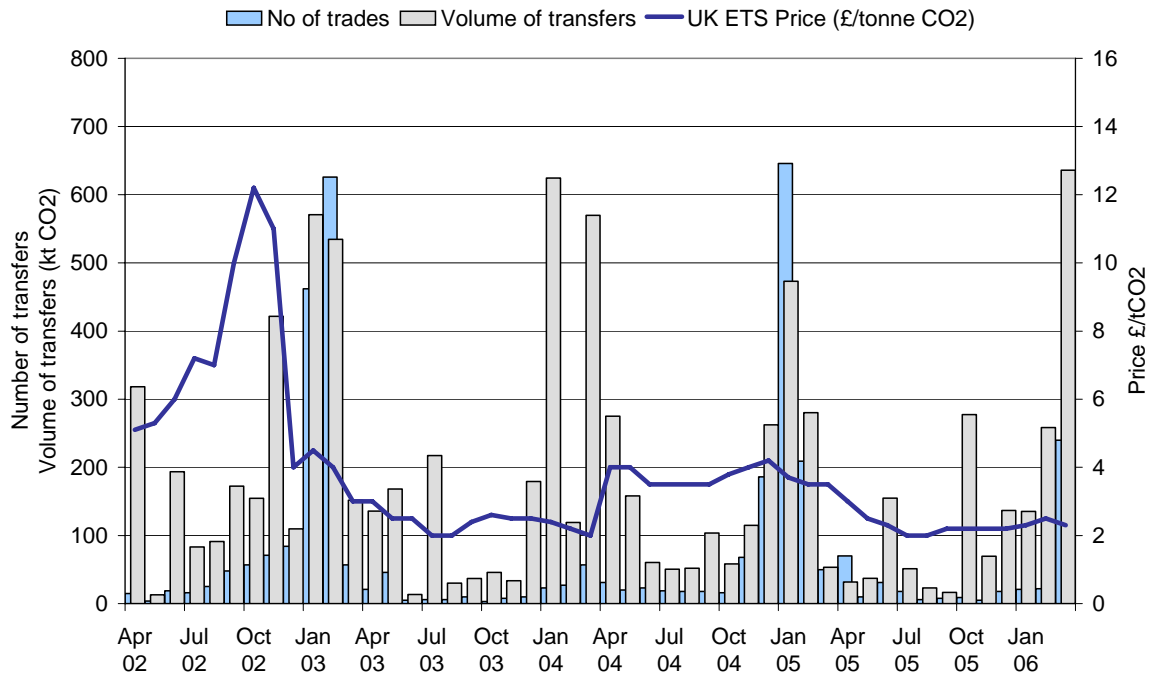
- ◆ Regulatory changes that required operators to fit emissions abatement equipment. It was decided that operators should not be able to generate surplus credits from the uptake of changes that were required, and the baseline methodology attempted to exclude these changes from companies' baselines (see section 4) for further comment.
- ◆ Organisations had internal policies to reduce emissions (some of which were up and running before the UK ETS began; in other instances the scheme prompted a focus on setting goals and targets).
- ◆ Falling output levels between the baseline period and the lifetime of the scheme have had the effect of generating a surplus allocation at some sites. Where sites have increased production, the opposite is true and rising output has made some targets more difficult to achieve.

It is also worth noting that some organisations' emissions did in fact increase between one or more years of the scheme. However, in the vast majority of cases this occurred in one or two years rather than being a consistent trend across the lifetime of the scheme.

3.5 Market prices

Trading under the UK ETS market takes place bilaterally. Various brokers and other third parties that help organisations to pool their allowances facilitate the trades. In the absence of an exchange or administered price there is no published market price to which participants can refer. In order to provide an indication of historic prices, we have compiled a regular snapshot of the price for a trade of 1,000tCO₂e, illustrated in Figure 11 below.

Figure 11 Historic market prices, trading volumes and number of trades



Source: Defra & Natsource data manipulated by Enviros.

Key points also noted in published analyses of price movements⁷ include:

- ◆ The relatively high level of prices at the start of the scheme may have resulted in part from the delay in the allocation of allowances at the start of the scheme, which could have resulted in the view that the market was tighter than it actually was.
- ◆ As demand for allowances (for CCA and UK ETS compliance) subsequently rose, the price fell sharply, likely reflecting a readjustment in participant's view of market fundamentals rather than actual shifts in demand and supply.
- ◆ Prices then remained relatively flat for a time, increasing around the time when Defra consulted on methodologies to redress the market surplus.
- ◆ It is interesting to note that the price did not increase again significantly when the voluntary agreement was implemented. This could indicate either that the magnitude of the change was insufficient to move prices or that the market had already taken the expected adjustment into account.
- ◆ Prices then fell again after compliance for 2004 in spring 2005. It may be that this was when it became evident that despite the voluntary agreement, a considerable surplus still existed.

The chart above also illustrates how in a relatively illiquid market, a small number of trades can have a significant impact on price. Current carbon prices are considerably lower than carbon prices in Phase I of the EU ETS (prices have ranged from 24€/tCO₂ to 14€/tCO₂ on the EEX exchange). Reasons given for this

⁷ For instance, NERA 2004 and Smith 2006.

include the surplus of allocations in the UK ETS market, the costs of abatement under the scheme (which includes non-carbon dioxide options that the EU ETS does not) and the relative uncertainty about what will happen at the end of the scheme (whether it will be disbanded completely, will still be open to CCA participants or will somehow be linked to the EU ETS).

Some market participants have criticised Defra's intervention in the market, commenting that it set a precedent for further regulatory intervention and so undermined the functioning of the market. Others have raised concerns about the short timescales for the scheme and the current uncertainty over whether it will continue into the future. Stakeholders have commented that the absence of a firm decision has affected operators' ability to make optimal decisions about whether to bank allowances and whether to undertake any further abatement action themselves.

It is also worth noting that the price achieved in any particular trade varies depending on its size. The transaction cost per unit is usually higher for smaller trades.

3.5.1 Impact of the carbon price

Survey respondents commented that the carbon price is taken into account, predominantly at senior and middle management levels rather than at the site or board level. However, we understand that this is more to assess the economic viability of projects rather than for day to day operational decisions. Around seven respondents (26% of all respondents) reported that a higher carbon prices would have resulted in further capital expenditure or changes to their behaviour. Five (19%) reported that it would have made no difference at all.

Decisions to trade are also generally made at senior and middle management levels. As noted above, a significant proportion of UK ETS participants did not take the carbon price into account when deciding when to buy or sell allowances. A comment made both in the survey and at the stakeholder workshop was that a key lesson from the scheme is that is important to get the timing of trades right in order to achieve the best price. Figure 11 illustrates just how big a difference choosing to buy or sell in October rather than December 2002 could have made to a company's costs or revenues. Brokers concur that the feasibility of making a transaction is often as big a consideration for clients as the carbon price.

4. MONITORING, REPORTING AND VERIFICATION (MRV)

Under the UK ETS, DPs are required to have their baseline emissions data verified by a third party before allowances were allocated. At the end of each year participants are allowed three months over which to compile their verification report and to undertake any trading necessary to meet their target. CCA participants also need to get any over-compliance verified in order to be able to sell the surplus. Lessons learnt have already been built on to develop the rules for the EU ETS.

In this section we review feedback from participants (predominantly DPs) on the process from their perspective and also comment from verifiers.

4.1 Baseline calculation and measurement

The baseline data verification process was reported to have taken longer than had initially been expected and resulted in a delay in the allocation of allowances to over half of the DPs. In a document published in October 2002⁸, Defra reported that although twelve DPs had completed the verification process, a further seventeen were in the process of having their baseline emissions verified.

Reasons given for the delays in verification included that:

- ◆ the set up of data management systems took longer than expected; and
- ◆ source lists needed to be finalised before the baseline could be confirmed.

In the early stages of the scheme, six verifiers had been accredited by the UK Accreditation Service (UKAS) and a list of the relevant companies was made available on both the UKAS and Defra websites. There was some concern about the availability of verifiers; a shortage of accredited personnel could have delayed the verification process, with a knock on impact on the allocation of allowances. Participants at the UK ETS stakeholder workshop (organised by the UK Emissions Trading Group and Defra) echoed the view that the limited availability of verifiers had caused some problems.

It has been argued that one of the factors potential DPs took into account in volunteering to participate in the scheme (or deciding not to) was whether adequate baseline data was available. It may not therefore be surprising that ten respondents to the survey for this project (60% of DP respondents) reported that they already had sufficient information available to calculate their baseline. However, five (30%) reported that further information was required.

Other surveys of the scheme (e.g. NERA 2004) have found that verifiers were generally happy with the quality of baseline data. When asked how operators could be helped to prepare for this process, comments included the provision of clearer guidance. Publications that promote best practice in emissions data management are now available; they set out the process that operators can take for efficient environmental information management⁹.

One concern that has been raised with regards to the environmental effectiveness of the scheme is that some DPs' emissions were already lower than their baselines at the start of the scheme. It appears that this is a direct result of using a historical

8 <http://www.defra.gov.uk/environment/climatechange/trading/uk/pdf/trading-progress.pdf>

9 See for example IEMA (2005) Environmental Data Management for emissions trading and other purposes.

timeframe for the baseline rather than because of inaccuracy in the baseline data or subsequent annual emissions data. However, some concerns have been raised about the timeliness with which operators notified Defra of changes to operations (see section 4.4 below).

4.2 Impact of other regulations on baseline reporting

The UK ETS interacts with a range of other policies that affect energy generation and use, including the Renewables Obligation and Energy Efficiency Commitment.

Of particular relevance for this study is its interaction with the Integrated Pollution Prevention and Control (IPPC) Directive (see appendix 2). One requirement of the Directive is that operators are required to adopt Best Available Techniques (BAT) in order to prevent or minimise pollution, including emissions. As a result, some Direct Participants were required to reduce their emissions during the lifetime of the UK ETS.

In order to avoid rewarding DPs for investment that they were already required to make, the rules included consideration of the energy efficiency and emissions measures already required under IPPC. For instance, where the Directive imposed emissions limit values (ELVs) on participants, this limit value was incorporated into the organisation's baseline calculation rather than actual emissions from the site(s). The result was that the baseline was capped at the regulated level; where operators had previously been operating above this, they would receive less allocations than if their actual emissions had been used. However, where organisations had actually managed to achieve a lower level of emissions (perhaps by using the equipment more efficiently than assumed under the regulations) they would be rewarded with a baseline above their actual emissions.

The inclusion of regulatory constraints into baselines has also been considered by the UK for the implementation of the EU ETS. For instance, sector projections of emissions used to determine the cap for both Phases I and II take into account for the impact of firm and funded policy measures. Allocations to individual installations in the large electricity producers sector in Phase II depend on whether the power station has opted into (or out of) the Large Combustion Plant Directive (LCPD). The basis for these adjustments ensuring equity in allocation.

One clear message from UK ETS and EU ETS experience is that it is important for Government to allow sufficient time to analyse the impact of such decisions both on the total cap and individual allocations.

4.3 Annual monitoring, reporting and verification

Defra provided participants with detailed guidance on the process and requirements for annual MRV. As for baseline verification and reporting, the protocols and rules were developed around five principles: faithful representation; completeness; consistency; reliability; and transparency.

The annual monitoring and reporting process takes place in two parts. First verifiers review a list of emissions sources (the 'source list') and check that all (and only) eligible sources are included. Each DP's source list must be approved by the Secretary of State. This process provides parties with an idea of how long the actual verification of data will take and the expertise verifiers will need to do it. Once the first stage has been completed, verifiers undertake the verification, using the protocols specified by Defra.

CCA participants follow the protocols agreed for their sector rather than the rules for DPs. Group verification for CCAs (facilitated by sector associations) is considered to have reduced the costs and administrative burden on individual participants and to have encouraged the participation of smaller firms. The carbon club's experience of group verification for its seven members was also largely positive.

Under the UK ETS temporary exclusion application to the European Commission, emissions from installations that have opted out of the EU ETS for 2005 and 2006 must be verified in the same way as if those installations were part of the EU ETS. Although we understand that the EU scheme took the list of UK ETS and CCA protocols as a starting point, the EU ETS approach is driven by EU legislation and so the level of stringency under the two schemes (e.g. the number of site visits required) is rather different.

A range of UK ETS stakeholders (including DPs and verifiers) have cited the scheme as a particularly useful learning experience. Learning by doing prompted some questions and provided first hand experience that a theoretical study alone is likely to have missed. For instance, it helped highlight the variation in the availability of verifiable data from company to company and readiness of different organisations for the MRV process. Other comments have included that organisations tend to be better prepared where a particular individual is tasked with the role of coordinating and actively managing the collection of the necessary data (i.e. where there is a single energy or emissions manager).

However, as set out below, there are some common ways the data quality could be improved.

- ◆ Data metering: 14 survey respondents (80% of DP respondents) already had systems in place to meter the necessary information. However, three needed to install additional equipment to participate in the scheme. Accurate metered data is one of the key components identified as helping to ensure that effort required for verification is minimised.
- ◆ Gas consumption data: inaccurate gas data has been an issue for M&R under CCAs and the EU ETS as well as the UK ETS. We understand that some progress has now been made in obtaining more accurate data from National Grid Transco.

Some organisations used (a proportion of) their incentive money to fund compliance with the scheme. The NAO report (2004) records costs for verification of around £1,000 to £1,500 per day per assessor. The report notes that the total costs depend on the size and complexity of the assignment, from around £40k to £50k for large companies and approximately £2.5k for small companies. Our own experience of verification for CCA participants indicates costs of between £1.5k and £5k depending on the volume verified and the complexity of the calculation. One respondent to the survey for this report commented that costs vary considerably between verifiers. Another commented that although the number of sites that it operates has reduced considerably over the lifetime of the scheme, verification costs had not reduced accordingly. A range of organisations (including survey respondents and participants at the stakeholder workshop) have commented that in their view verification was expensive.

Eleven respondents (41% of respondents to the survey for this report) consider the MRV burden appropriate, compared to five (19%) who consider the burden too great. Around half of respondents have had external help to compile either their

baseline emissions data or their annual submissions, while the remainder have not. Of those that have had external help, around half would need help again.

Suggestions to reduce the burden included:

- ◆ relaxing the rigidity of the verifiers' approach;
- ◆ allowing internal verification with spot checking;
- ◆ moving to automatic and/or electronic data capture and collection;
- ◆ modifying rules for the treatment of e.g. partial closure;
- ◆ allowing operators to opt in emissions sources if it would reduce the MRV burden; and
- ◆ moving to a more 'evidence based' system which could take into account whether or not companies were already complying with other regulations or protocols rather than the same information needing to be checked again.

Others have commented that verifiers did not always understand the organisation's industry, which can make the process inefficient. Another remarked that the verifier it initially engaged had shown only a limited understanding of the regulations and verification process. This highlights the need to provide all stakeholders, not just participants, with sufficient time to understand and test a scheme's rules. A number of respondents commented that the process had run smoothly when they had been able to retain the same verifier. Lastly, one respondent commented that it would have helped if the verifier had been able to provide some additional help and advice rather than being so constrained in their remit.

4.4 Changes in operations and errors in the source list

One of the comments made at the stakeholder workshop was that although the rules for the UK ETS were simple to begin with, they became more complicated over time. For instance, in order to implement the partial closure rules described below, it is necessary to measure output which participants had not necessarily envisaged when the scheme was originally established. One of the findings from the implementation of the EU ETS has been that although stakeholders often call for simplicity, additional clauses that serve to increase individual operators' allocations are often supported by the organisations that they help. The result is a tension between simplicity on the one hand and fairness on the other.

The scheme rules provide for changes to DP's baselines, targets and allocations in two instances.

- ◆ If there are changes in operations. This includes: where a DP divests or acquires management control of a source; where a source is closed; where emissions from a source increase substantially due to a force majeure event; and where production is outsourced. For the change to result in an adjustment to a DP's targets or baseline, it must trigger the 'change threshold' which is 0.025MtCO₂e or 2.5% of the DP's verified original baseline, whichever is lower.
- ◆ If an error in the source list is identified and so an additional source needs to be added in or an extra source excluded.



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Changes are back-dated to either the January or July before which they occurred and details of the changes must be provided to the verifier. Schedule 3 of the rules which details the process to be followed is around eight pages long.

In some cases, DPs volunteered changes in operation to Defra and made the appropriate submissions. In other instances, verifiers shared concerns about baseline changes with Defra which allowed them to be picked up. However, in a number of cases, changes in operations were notified late to Defra (e.g. some that occurred in 2002 or 2003 were not reported until 2004) and so penalties were imposed on those DPs. Arguably under a mandatory scheme operators would be more likely to view the rules for reporting changes as binding. However, the policing of the rules can be a time consuming; there is likely to be a trade off between the costs of close monitoring and enforcement and the benefits that it has for the robustness (and success) of the scheme.

5. AUCTIONING

August to December 2001 was the designated period for participants to pre-register for the 'incentive auction' and prepare their bids. Organisations had to ensure that any emissions sources they wished to include were eligible under the scheme rules and compile baseline emission data for 1998-2000. Defra helped companies prepare by providing an auction guidance document, briefings on the rules and how to bid, and also facilitating a mock auction.

Considerable effort was made to attract Direct Participants into the auction on 11 and 12 March 2002. Two delays from the planned January 2002 date gave participants more time to enter and 34 companies finally took part in the auction. Despite Defra being in discussion with about 80 interested organisations before the auction, the final number was considered more than enough to make it viable. Although a longer build-up time may have resulted in increased participation and thus possibly more emissions reductions at a lower price, focus was put on gaining early emissions trading experience and further delays were avoided.

A 'descending clock' auction process was used, taking place over the internet in a series of rounds. Initially the auctioneer, Defra, announced a starting price of £100/tCO₂e (the amount companies would be paid for voluntary emission reductions). The participants had to bid for the quantity of reductions they were prepared to make at that price. In order to promote liquidity in the scheme, no single participant in the auction was allowed to bid more than 20% of the total incentive money, or £43 million. A 10% limit had been proposed, but this was extended so that larger companies would not be restricted from challenging targets. The volume of reductions finally bid was 4.03 million tonnes, although this was reduced to 3.96 million when 3 auction participants later dropped out of the scheme (NAO).

The advantages of the incentive payment and descending clock approach included certainty for Defra about the costs and that it made the pilot an attractive proposition for participants who were encouraged by the provision of funding up front. Critics of the auction included MPs on the Public Accounts Committee, who suggested that the auction 'did not afford an opportunity to assess whether a better deal could have been secured at lower prices' and that the incentive funding should have been reduced to reflect the low level of involvement (ENDS report).

Although the auction's design has not been the focus of this study, we did ask survey respondents whether they had participated in it and whether they considered there were any particular pros or cons to its implementation. Around twelve respondents (71% of DP respondents) participated in the auction themselves, six did not (this includes two DP respondents which engaged third party help). Aspects that respondents noted as being particularly successful included stakeholder involvement and the opportunity for learning. The most common areas for improvement identified included making the rules more simple and providing more time to understand them/ comply with requirements for participation. Other studies (e.g. NAO 2005) have found that the costs involved in preparing for and participating in the auction itself were not significant. At the stakeholder workshop, comment was made that there was some difficulty in the pre-authorization for signing off payments in auction process.

6. OTHER POINTS RAISED

Information provision

In light of the first two reasons for non-participation listed in section 2.2 above, one of the areas addressed in the survey for this report was the extent to which stakeholders use information provided by Defra.

The majority (nineteen or 70% of all respondents) have used the Defra website as an information source. Information on the site relating to the scheme rules and FAQs were considered the most useful, followed by information on reporting and verification. Some participants have commented that it can take some time for Defra to respond to queries which has delayed participants (e.g. during the verification process). Others have noted that officials have not always been able to answer all the questions put to them (particularly during the early days of the scheme).

Other surveys (e.g. Enviro 2003) have found that, on the whole, adequate information was made available to allow firms to make a well-informed decision about whether or not to participate and to take part in the auction. However, some stakeholders have commented that longer consultation deadlines are essential if participants are to provide informed feedback and make the right decision. A two week timetable for a response on the EU ETS opt-out was provided as an example of the short timescales.

Staff and time commitment

Another area assessed in order to inform our understanding of the costs of the scheme for participants is the time commitment required to comply with the scheme.

Survey respondents were asked whether the scheme had resulted in the recruitment of additional staff. None of the respondents reported that it had. Note that this contrasts somewhat with findings from a survey on the EU ETS¹⁰ which reported that a third of companies have invested in training and recruitment as part of their preparation for trading.

However both survey respondents and workshop participants agree that the skills required to participate in the scheme are different to those of the existing staff. For instance, one respondent noted that a key difference is the broad range of understanding required, from technical issues such as metering, to the way that the rules work. Others have noted that it has been necessary for a number of colleagues with different skills from across their business to work together to meet emission goals.

In terms of the time required to engage with the scheme, eight respondents (30% of all respondents) estimate that the time required is less than half a year, but more than one month. Six (22%) estimate that it takes between one week and a month while five (19%) estimate that it only requires one week of effort or less. It is worth noting here that the time commitment is influenced to some extent by the fact that the perception that the scheme will shortly be coming to an end. As a result, not all participants consider it worthwhile devoting additional time, particularly not when other policies such as the EU ETS are expected to be in place for much longer.

10 LogicaCMG (2005) Emissions Trading Scheme research: key findings.

The majority of effort is devoted to MRV followed by internal management and keeping up to date with the rules. Although the majority of respondents to this question (44% of all respondents) indicated that the time requirement has fallen since the scheme started, around six (25% of all respondents) said that it has remained the same and a small number commented that it has increased. We understand that additional effort has been required to document changes in operations and to address the position of EU ETS sites (i.e. considering whether or not they should opt out of the EU scheme and then ensuring they are in compliance once that decision has been taken).

Outcomes of the scheme

Organisations were asked whether they had achieved their objectives for participation in the scheme. As noted in section 2.2, objectives for participation included learning, making energy and emissions reductions, raising the company's profile and preparing for the EU ETS. The majority answered that they have; only three (11% of all respondents) stated that their objectives have not been met. In one instance, internal changes resulted in an abatement project not going ahead, in another, improved data and information management would have helped for them to be met.

Outcomes reported by survey respondents and workshop participants include:

- ◆ a better understanding of emissions trading;
 - an understanding that it is important to judge the timing of trades to achieve the best price;
- ◆ a better internal profile and understanding of energy use and emissions;
 - in some instances this has been promoted through their inclusion in internal goals and targets;
 - some note that the metering and collection has improved as a result of involvement in the scheme.
- ◆ an understanding of the importance of accurate emissions forecasting (to set targets).

7. COMPARISON OF POLICY ENVIRONMENTS

In drawing on lessons learned from the UK ETS, it is important to bear in mind the factors that make the policy environment today different to that when the scheme was designed and implemented. In the text below we review some of the key differences in order to set the scene for the conclusions drawn in Section 9.

7.1 UK GHG targets and goals

The UK Kyoto commitment to reduce its greenhouse gas emissions by 12.5% below 1990 levels by 2012 became legally binding in February 2005. The UK has also retained its own short and long term targets for reducing both greenhouse gases and carbon dioxide emissions. These include the national goal of moving towards a reduction in carbon dioxide emissions of 20% below 1990 levels in 2010, to be on a path to a long term reduction of 60% by 2050.

Although the UK is projected to meet its Kyoto target, it has become clear over the last four years that significant efforts will need to be made if the UK is to meet its own national targets. Government projections indicate that the 2010 national goal will require a reduction in annual emissions of 23.5MtC (or 15%) from 2004 levels (152.5MtC) to achieve a target of 129MtC. Meeting the extended target of a reduction of 60% by 2050 would require a further reduction to around 65MtC.

Business has increasingly expressed a need to be confident in the long term framework of climate change policies if they are to respond effectively to them. Key messages have included that Government should take into account the impact of domestic policies on international competitiveness but also that many organisations now view a response to climate change as inevitable and necessary. The UK Government has recently responded that it recognises the provision of clear signals about the long term direction of climate change policy as a priority if it is to drive investment decisions.

7.2 International developments and long term goals

Global awareness of climate change as a key issue has also mounted. For instance, during the UK's G8 Presidency in 2005, climate change was one of the two key priorities. G8 leaders signed a communiqué that included a political statement on the importance of climate change and an agreement to "act with resolve and urgency now". It was the first that G8 leaders have reached an agreement on the role of human activity in global warming and the need for urgent action.

The EU Emissions Trading Scheme began in 2005, three years after the UK scheme had started. It covers carbon dioxide emissions from combustion equipment over 20MWth and a range of industrial processes and has captured over 1,000 installations in the UK. There is currently no EU legislation in place to ensure that the EU ETS runs for a third Phase. Nor is there any international agreement on the level and nature of targets for emission beyond 2012, although the focus of international negotiations does now appear to have moved to the framework for global agreements for a second Kyoto commitment period. The next Conference of the Parties to be held in Nairobi this autumn will address long term aspirations and goals.

Even in the absence of international agreements, a range of national and regional climate change initiatives have been developed in the EU and further afield. For

instance, the New Zealand Projects to Reduce Emissions scheme began in 2003 and the Canadian Domestic Offset Programme (which formed part of the federal Government's plan to implement the Kyoto Protocol) was announced in 2005. These schemes not only provide a greater impetus behind the UK's long-term targets but also provide useful experience in developing and implementing emissions trading and other types of policies to influence emissions from different target groups.

7.3 Understanding of emissions trading

One of the key objectives of the UK ETS was to develop experience of emissions trading in the UK. Some organisations have now also taken part in the EU ETS and are engaging in the Kyoto Protocol's other flexible mechanisms (Joint Implementation, JI, and the Clean Development Mechanism, CDM). UK firms have already been involved in the design, development, verification and marketing of projects under these mechanisms. As a result, a much larger number of organisations are familiar with the principles of emissions trading and the way that such schemes work today than were in 2002. As an illustration, recent consultations on Phase II of the EU ETS were circulated to around 1,000 stakeholder organisations.

However, it would be wrong to imply that all those organisations that could be covered by future emissions trading schemes are necessarily the same organisations that have been involved in these other initiatives. Although this could be the case to some extent (section 8.3 takes the EPC proposal as an example), many organisations (for instance, those in the public sector) will not have previous experience either of trading emissions or commodities of any sort. Arguably there is now a wider network of help and advice available; for instance, the activities of the Carbon Trust have increased and broadened significantly since the company was established in 2001, offering advice to both public and private sector organisations across the UK.

7.4 Infrastructure for emissions trading

One of the benefits of the UK ETS and subsequently the EU ETS for new policies involving carbon trading has been the establishment of an emissions trading infrastructure. This includes:

- ◆ the development of the software required to make trading feasible (the UK ETS software has already been adapted for the EU ETS¹¹ and so could presumably also be used for future policies with some modification);
- ◆ the establishment of standard contract forms which can help to reduce transaction costs;
- ◆ a greater understanding of the legal implications and most appropriate financial (tax) treatment of allowances; and

¹¹ The UK Emissions Trading Registry (ETR) for the UK ETS was created by Defra and has been made compatible with the EU ETS and trading under the Kyoto Protocol. The UK Government formed GRETA (Greenhouse Gases Registry for Emissions Trading Arrangements) and its software has now been shared with around 16 other countries that participate in the EU ETS. Each country has established a Memorandum of Understanding with Defra which will allow cooperation on greenhouse gas registries in the long term.

- ◆ the increased experience (and availability) of facilitators such as brokers and verifiers.

Defra (and as a result of the EU ETS, the Environment Agency and other regulators) has also gained experience of manning telephone helplines and email helpdesks to provide emission trading information to stakeholders. Another consideration for policy makers might include the timing of compliance deadlines; since the advent of the EU ETS, UK verifiers are now busy around both CCA and EU ETS deadlines so there may be some advantage in trying to ensure that the effort for any new policies requiring verification can be spread across the year¹².

7.5 Other policies impacting on energy use/ emissions

In light of the challenging emissions targets, the implementation UK climate change policy has evolved since the UK ETS was designed, addressing energy efficiency, energy security and wider environmental goals. New policy initiatives have been expressed in various policy statements, in particular the revised UK Climate Change Programme (revised in 2006). Table 3 summarises some of the key policy developments in the UK since the UK ETS began (and further detail of each is provided in appendix 2).

Table 3 Chronology of key carbon policy developments in the UK

Date (month/ year)	Development
March 2002	UK ETS began
February 2003	Energy White Paper published
September 2004	Review of Climate Change Programme launched
January 2005	EU ETS began
July 2005	G8 Summit under UK Presidency
July 2005	Stern Review announced
December 2005	Energy Efficiency Innovation Review report published
March 2006	New UK Climate Change Programme published
April 2006	Revised Building Regulations Part L came into force
July 2006	Energy Review published
September 2006	Plans for Office of Climate Change announced

Of particular relevance to the large, non energy-intensive users are measures designed to improve energy used in buildings implemented by the revised Building Regulations (in order for the UK to comply with the EU Energy Performance in Buildings Directive). In terms of forthcoming policy measures, the Energy Services Directive (ESD) (see appendix 2) will require Member State Governments to incentivise more accurate and informative information on energy use. Beyond carbon dioxide emissions from energy use, a range of regulations have come into force (or are expected shortly) which will impact on emissions of other greenhouse gases. For instance, F-Gas regulations require HCFCs to be phased out between 2009-2015, so impacting on the choice of refrigerants available to organisations and also GHG emissions from them.

¹² Although we note that the advantages of streamlining the timing of annual monitoring and reporting with other schemes might be considered to outweigh the advantages of offsetting the deadlines.

8. DIFFERENCES BETWEEN UK ETS AND PROPOSALS FOR LARGE NON-ENERGY INTENSIVE ORGANISATIONS

Government is currently considering policies to incentivise cost-effective emissions reductions in large, non-energy intensive organisations. A range of policy options have been considered, including increasing the level of the Climate Change Levy (CCL), extending CCAs to other sectors and extending the current UK ETS. Two policies have been short-listed for further consideration and consultation, summarised below.

8.1 Proposals for voluntary reporting and benchmarking of energy performance

Participation under this scheme would be voluntary; organisations could choose whether or not to report their energy use and then compare it against a benchmark level. The policy would be aimed at the same target group as the EPC proposal described below (i.e. large non-energy intensive organisations).

It is anticipated that the benchmarks would be designed specifically for (or at least tailored to) this scheme and rely on input from the covered organisations (or their representatives, such as trade associations). At this stage, it has not been decided how the benchmark level(s) would be determined; they could be based either on historic patterns at an organisation's own site(s) or at other similar (peer group) sites. The way that the benchmarks would be defined (e.g. kWh per unit output, unit floor space, employee, patient or pupil etc.) would depend to some extent on the processes the scheme covers.

The scheme would aim to change behaviour by providing organisations with additional information about their energy use and identifying relatively high energy consumption. It could help to raise participating organisations' awareness of their consumption levels and so improve their understanding of opportunities to reduce energy use (and costs). If the comparisons against the benchmarks were published, there could also be some reputational benefit to companies that performed well.

8.2 Proposals for an Energy Performance Commitment

The Energy Performance Commitment (EPC) proposal has been developed following a recommendation by the Carbon Trust and Ecofys and subsequent work by NERA/ Enviro. A consultation on the scope of the EPC proposal alongside other options was announced in the recent Energy Review (see appendix 2).

The target group is less intensive business and public sector organisations – and the scheme would focus on emissions outside the CCAs and the EU ETS. The scheme would be mandatory and, based on current proposals, could include organisations:

- ◆ whose electricity use is monitored by mandatory half-hourly meters; and
- ◆ whose half-hourly metered electricity use is over 3,000MWh per year.

The EPC would operate as a cap and trade scheme; Government would set the total number of allowances available to reflect emissions targets for the target group. Participants would need to buy all of their allocations either at sale/ auction or through subsequent trading with other participants.

8.3 Overlap of the UK ETS and the proposed schemes

If taken forward by Government, the proposals above would be implemented after the UK ETS has come to an end. As a result, while the scheme proposals specifically exclude emissions covered by the EU ETS and CCAs, some UK ETS DPs could be caught under either of the schemes proposed.

Within that group, the coverage of a voluntary scheme will depend on which installations decide to participate. For a mandatory scheme, on the basis of the provisional thresholds described above, it is estimated that around 21 of the current 32 UK ETS Direct Participants would be captured. However, it should be noted that even for these organisations, the emissions sources covered are unlikely to be exactly the same (particularly since the EPC proposal only covers carbon dioxide). On the whole, the DPs that would be involved in the proposed EPC are commercial or public sector organisations. CCA organisations tend to be more energy intensive than those expected to be covered by the EPC, should the proposal be taken forward. A similar number of UK ETS DPs are either CCA participants or EU ETS participants.

8.4 Differences between the proposals and the UK ETS

There are some differences between the proposals for schemes for large, non-energy intensive users and the UK ETS (summarised in Table 4). These differences mean that some of the lessons learned from the UK ETS may not be directly applicable were either of the proposed schemes implemented.

Although participants in either scheme would be less diverse than UK ETS direct participants (both due to the focus on carbon dioxide and to the definition of the target group), there would still be some differences between the processes and sources of emissions between different organisations. Although questions over the scope of emissions covered would be reduced by the focus on energy use, there would still be a need to determine which point sources were captured at each site for each organisation under either scheme.

Under a voluntary scheme, some of the concerns regarding self-selection (i.e. that participation is more likely amongst those organisations that are already expected to make considerable energy savings) raised by the UK ETS may be applicable. A benchmarking approach that sets targets would rely on organisations' baselines being set at a representative level and the targets being set at a level that required real action beyond business as usual, as was the case for the UK ETS. It would also be necessary to consider how to treat changes in operations and whether to alter the target levels to reflect emissions reductions that result from factors other than more efficient energy use.

A mandatory scheme, the EPC proposal as currently defined could help to ensure that even companies that would find it more difficult or costly to undertake abatement would be involved in the scheme (even if they decided to buy allowances rather than undertake abatement themselves).

It is also currently proposed that the Government would calculate and determine the total number of allowances available under the cap and so would determine operators' targets. If the baseline and credit approach is avoided, and participants are required to buy all their allowances, some of the concerns around equity and the additionality of emissions reductions under the UK ETS could be avoided. On the other hand, the EPC proposals would still require the collection of baseline



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data, and so some of the issues regarding information availability, collection and verification would continue to be relevant.

Table 4 Summary of design features of the UK ETS and current proposals for schemes to cover large, non-energy intensive organisations

Feature	Current Voluntary UK ETS	Proposed voluntary reporting & benchmarking	Proposed EPC
Target group	Voluntary entry to scheme	Voluntary entry to scheme	Mandatory entry with energy threshold and half-hourly meter
	33 organisations direct participants	Participant numbers would depend on level of participation (unlikely to exceed number under EPC)	5,000 organisations covered (even with threshold)
	Diverse organisations across many sectors	Large non-energy intensive organisations (possibly subject to other criteria for inclusion)	Large non-energy intensive organisations with half hourly electricity metering
	Some participants new to trading	Majority of participants new to trading	Majority of participants new to trading
Emissions	Range of greenhouse gases	Only carbon dioxide	Only carbon dioxide
	Varied energy intensity – energy only a small share of turnover for some participants	Energy a small share of organisation costs for the majority of participants	Energy a small share of organisation costs for the majority of participants
	Savings estimated at 7MtCO ₂ e in total from 2002 to 2005	Savings depend on level of participation and uptake of opportunities participants identify; likely to be lower than EPC	Savings estimated at 1.2MtC delivered annually by 2020
	Threshold for non qualifying emissions was set at 1% total site emissions or 10,000 tCO ₂	Self-selection; threshold could be applied but no proposals for level	Threshold approach proposed based on presence of mandatory half-hourly (mHH) electricity meter, with annual mHH electricity consumption threshold
Policy overlap	Some of target group also covered by CCAs and EU ETS	Participants outside CCAs and EU ETS	Participants outside CCAs and EU ETS
Scheme design	Incentive payment and reduction commitments determined ex-ante	-	Introductory phase with cap after 1-3 years
	Emissions allocations set relative to the 1998-2000 base year	Benchmarking comparisons against own or similar sites	Benchmarking approach proposed in reporting requirements
	Descending clock auctioning of allowances	n/a	Auctioning mechanism for allowances yet to be decided
	Allowances banked during lifetime of scheme	n/a	Role for banking allowances to be confirmed
Operation	Companies encouraged to have a monitoring and reporting plan	Participation requires operators to report and compare emissions against a benchmark level	Compliance requires maintenance of energy use records and associated emissions.

Feature	Current Voluntary UK ETS	Proposed voluntary reporting & benchmarking	Proposed EPC
	Reporting guidance published for CO ₂ & non-CO ₂ Monitoring protocols submitted by participants e.g. UK COAL also approved	To be decided	'Lighter touch' MRV approach compared to EU ETS Standardised emissions factors for all fuels
	Verifier visits the company annually to audit data	To be decided	Simple schemes may have self certification and evidence pack
	Conversion factors defined at outset	To be decided	Conversion factors defined and units agreed at outset
	During scheme's 1 st year allocations spread over whole year (baseline data gathering difficulties)	To be decided	Encourage advanced data preparation so sectors have emissions data ready

Source: Enviro

Feedback on the role of auctioning for future policies has been mixed. Some organisations at the stakeholder event voiced the opinion that it would have considerable advantages:

- ◆ avoiding the equity issues that increasing or decreasing output can cause in a scheme that relies on a historic baseline;
- ◆ potentially meaning that the verification of baseline data could be eliminated or at least the stringency of it reduced¹³;
- ◆ obviating the need for rules to take account of changes in operations;
- ◆ encouraging organisations to take into account the cost of carbon right from day one.

However, concern was expressed that auctioning could increase the costs of the scheme to some participants (depending on the way that revenue is recycled). There were also concerns that the rules might be difficult to understand and that organisations not used to trading would be at a disadvantage to those that have participated in other auctions. In this context, the proposed introductory phase with a simple fixed price sale of allowances is an important feature of the EPC proposal. There was also some concern about whether organisations (e.g. public bodies) would have sufficient funding available up front to participate in an auction.

8.5 Considerations for the design of a new scheme raised by stakeholders

The tables below present the summary points made by survey respondents that were not confidential, which echo a cross section of the views reflected throughout this document. Note that the survey referred to the EPC, in order to help focus respondents' comments.

¹³ Although whether this is the case will depend on whether baseline data is required by Defra to set the cap.

Table 5 Which elements of the historic UK ETS would you like to see incorporated into the Energy Performance Commitment (EPC) proposal?

Survey responses

Targeting large energy users to reduce emissions over a fixed period; instead of incentivising them penalise them.

Defining baseline and monitoring performance to help raise awareness.

Simplicity

Depending on installation threshold criteria - cover both direct and indirect emissions within calculations.

Ensure emissions calculation methodology is kept simple as per UKETS and not as onerous as EU ETS M&R requirements

Incentive payments were an essential part of our decision to participate in the UK ETS. We would be unlikely to participate in a future scheme which did not provide such incentives.

Voluntary inclusion. A simple means of trading

The requirement for someone within a company to take ownership for process and that person having the opportunity (dependant upon achieving results) of obtaining incentive payments for the company.

If this does not happen business will always consider energy efficiency as a 'nice to do' which in reality means it never gets done!

We would like to see historic UKETS permits from overachievement carried on into the new scheme. Without this companies like ours will feel that early voluntary action on energy efficiency is being penalised, as our current baseline already includes most of the efficiency improvements that we may have been better leaving until forced by legislation to undertake.

Don't know - need more information on the proposed EPC

Infrastructure created - registry, monitoring and verification - has been excellent.

Table 6 Which elements of the historic UK ETS would you not like to see incorporated into the Energy Performance Commitment (EPC) proposal?

Survey responses

Protracted verification of emissions by awkward verifiers who offer very little value to the process.

External verification

Linking emissions to production because for many companies finding an unambiguous way to measure production is very difficult and time consuming.

I'd like to see a collaborative approach from the Government to encourage more companies to use energy saving equipment i.e. by removing VAT for instance.

Obviously this type of decision requires input from a number of Government departments.

Also like to see very simple rules as people in business's change and it needs simple means of passing this on as these schemes tend to run for years. Ensure it is simple to operate and that there are no overlaps between schemes i.e. no CCA schemes if the EPC is in place so that the administrative burden is only required for a single scheme.

Survey responses

Simpler rules and fewer changes to rules.

Account being taken of evidence of energy efficiency; last year we spent £70k on new boiler plant and significantly reduced our process heating gas consumption. In the present scheme this was not brought to anyone's attention. However, during the same year we scrapped an old power press (energy consumption negligible) and we are expected to carry out a full monitoring exercise because it is covered by the new rules.

Unrealistic timetable for reporting changes in operation.

As above

Vague monitoring and reporting requirements.

Defined templates for reporting would reduce variability

Better effort to create an effective market if that is the approach wanted by Government.

Should be annual targets Need to create demand not oversupply

Rules need to be clear and consistent - no changes in targets by government during the scheme

Oversupply of allowances due to relatively soft reduction commitments

Table 7 Are there any additional comments that you would like to make?

Survey responses

The UKETS has been invaluable as a 'learning by doing' process and HMG should be congratulated in adopting the initiative. It was a pity that so few companies engaged with the scheme, as they have missed out.

A new voluntary ET schemes for sectors not in the EU scheme needs more consideration. It is not an appropriate value for money option, for example, in the commercial property sector

It was clear from the auction that the majority of participants did not have a ranked series of projects which would gradually fall away as the price fell.

We had a single price that we were prepared to go down to after which we would have pulled out completely. It would appear that the majority of bidders had a similar strategy.

It has been a valuable experience and as a local authority we have gained an enormous amount of knowledge.

It has been a platform to address areas where we have not been quite so effective.

As verifiers, we did not notice any significant behavioural changes or implementation of programmes specifically triggered by the organisation's participation in the scheme.

The vast majority of participants had predicted a decrease in emissions as a result of planned business modifications and the emission reductions occurred in the first years of the scheme.

The organisations could be said to have benefited from taxpayer's money for activities changes which would have taken place in any event.

Source: Enviro UK ETS Survey 2006

9. SUMMARY OF LESSONS LEARNED

In reviewing the lessons summarised below it is important to remember the context in which the UK ETS was designed and implemented. The UK ETS was a pilot, a test case to develop experience and promote understanding. However, one of its objectives was to deliver cost-effective abatement and that too should not be forgotten.

An opportunity for learning

The majority of organisations agree that the scheme has provided a valuable opportunity to learn about the way an emissions trading scheme operates and the steps required to participate. Some areas where this has been valuable economy-wide include for auctioning, for the development of trading software and for the development of the capacity and rules to undertake both baseline and annual monitoring, reporting and verification. Individual participants have learnt from the setting of internal targets, undertaking trades, monitoring, reporting and verifying emissions. Much of this experience has been valuable for the EU ETS and could also be carried over to policies such as the EPC proposal.

Potential to deliver real emissions reductions

A wide range of DPs across the different sectors represented have reported that they have either made investments to reduce emissions or changed their behaviour directly as a result of the scheme. However, there is some concern over the ease with which some participants met their targets and that the level of emissions additional reductions that the scheme has achieved (i.e. beyond the reductions that would have happened anyway) is lower than the headline figures suggest. Some argue that a tighter emissions budget under the UK ETS could have avoided regulatory intervention and the setting of a precedent that affected the development of the market.

Combined with experience from Phase I of the EU ETS, where (based on emissions to date) the European market also appears long, this delivers a strong message for future trading schemes. A key driver of the environmental benefits of any cap and trade scheme is the level of the cap. There is a strong case for ensuring that the number of allowances allocated promotes real emissions reductions.

Benefits in mandatory coverage

One of the key features of the UK ETS is voluntary participation. In some ways the self-selection of participants could be argued to have made the scheme more likely to succeed (those firms that did participate supported the policy from the outset). This was particularly important for a pilot scheme. Voluntary inclusion also resulted in a broad range of participant organisations which a more targeted scheme may not have done.

However, concerns have been raised that a larger number of participants would have made the market more efficient and that those that did take part were those that were confident that they could make significant emissions cuts. In addition, only a relatively small proportion of potential emissions have been captured, limiting the potential for emissions reductions.

Simplicity – an inevitable trade-off?

Although some aspects of the scheme (e.g. the registry) have been commended for their simplicity, others have been criticised for being over complicated (e.g. the

detailed rules). Stakeholders at a Defra/ UK Emissions Trading Group organised workshop put simplicity as a top priority for the EPC proposal. Indeed it is essential that a scheme is practical if it is to function at all.

However, one of the lessons learned from the UK ETS is that a degree of complexity, or at least completeness, is essential to preserve a trading scheme's environmental integrity. For instance, in the absence of rules for changes in operations, organisations could have benefited considerably from the closure of sources. Similarly, additional rules are sometimes necessary to deal with 'special' cases if equity is considered a parallel goal. Experience from both the UK and EU emissions trading schemes has shown that there is a trade-off between keeping the rules simple, effective and fair.

Balance between costs of participation and robustness

Survey respondents noted monitoring, reporting and verification as one of the most time consuming requirements of the scheme. Although some participants commented that the external verification process is costly, others consider that it sets roughly the right balance between cost and stringency. UK policy makers can influence MRV costs significantly, particularly in a domestic scheme (the costs of UK ETS verification are largely viewed to be lower than those under the EU ETS).

For instance, it has been suggested that for the proposed EPC, the current data collection and metering processes of the target group should be assessed to establish how MRV rules can build on work currently undertaken to avoid creating an additional burden. Factors to consider include the frequency and accuracy of existing data collection and whether energy data from suppliers or other reporting programmes could eliminate the need for further data checking.

Certainty over scheme timescales

Some participants have praised the initial certainty of the timescales for the scheme. The relatively short time horizon for the scheme helped some participants in calculating their targets. For others, the timescales were short enough to prompt action and changes in behaviour that a longer scheme might not have incentivised as successfully. However, others have noted that the timeframe for making and implementing investment decisions is longer than the scheme allowed. There has been some uncertainty towards the end of the scheme over whether the UK ETS will continue in some form or whether it will be subsumed into the EU ETS. This is considered by some to have hampered trading and by others to have prevented participants from going any further than they absolutely need in the final years of the scheme.

Provision of adequate time for understanding

Although the auction was widely considered a success, some support the view that providing participants with a longer timeframe to understand both the detailed rules and the relevance of the scheme for them could have resulted in more organisations participating. This is a useful lesson for schemes (such as the EPC proposal) that are expected to cover a wide range of organisations that have not previously been involved in emissions trading.

In summary, the UK ETS was one of the first emissions trading schemes in the world and as such stakeholders agree that it has provided valuable lessons for the design of future similar schemes. There is some consensus that the scheme



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provided the UK with unique experience and helped to develop a trading infrastructure which could be built on to implement the EU ETS. However, concerns have been raised about the environmental integrity of the scheme – particularly that industry was effectively allowed to set its own reductions goals at tax payers' expense. It is difficult to prove exactly which changes have occurred as a direct result of the scheme and some have argued that industry has been rewarded for decisions and investment that were little different to those that would have been made in its absence.



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APPENDICES



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1. LIST OF REFERENCES

LIST OF REFERENCES

In addition to documents and information published by Defra, we have referred to the other publications on the UK ETS listed below.

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2. SUMMARY OF OTHER POLICIES IMPACTING ON ENERGY USE AND EMISSIONS FROM TARGET GROUP

SUMMARY OF OTHER POLICIES IMPACTING ON ENERGY USE AND EMISSIONS FROM TARGET GROUP

This appendix presents the UK policy developments listed in section 7 (see Table 3 on page 33).

Policy developments in the UK

Energy White Paper In February 2003 the government's Energy White Paper entitled 'Our Energy Future – Creating a Low Carbon Economy' was published. It defined a long-term strategic vision for energy policy combining environmental, security of supply, competitiveness and social goals. The Energy White Paper initiated an emphasis on energy efficiency and was followed up a year later by the Energy Efficiency Action Plan. This emphasis has been incorporated into the latest Climate Change Programme.

Climate Change Programme (CCP) The UK Climate Change Programme was published in November 2000 and sets out plans to achieve the UK's greenhouse gas emission reduction targets. One of its outcomes was the UK ETS. A review of the CCP was launched in September 2004 and the revised plans were published in March 2006. The new Programme also sets out policies and priorities for action across the all sectors of the UK economy and will affect: energy supply; business; transport; domestic; agriculture, forestry and land use; public sector and; individuals. There is a strong focus on the importance of increasing energy efficiency: 10.2MtC per year will be saved by 2010 through energy efficiency measures, of which 5.3MtC will be come from the business sector.

EC Emissions Trading Directive (EU ETS) The EU emissions trading scheme began on 1 January 2005 for an initial three year pilot phase and subsequently phases of five years. It captures carbon dioxide emissions from combustion equipment above a capacity threshold of 20MWth and emissions from a list of industrial activities. The thresholds have captured energy users from hospitals and universities to large power stations. For Phases I and II of the scheme, participants are allocated the majority of their allowances for free. However, some work has been done into the most appropriate method of selling or auctioning any surplus from the New Entrant Reserve in Phase I and in for Phase II, the UK has announced plans to set aside allowances specifically for auction.

G8 As noted in section 7.2 above, at the G8 Summit in July 2005, G8 leaders signed a communiqué that included a political statement on the importance of climate change and an agreement to "act with resolve and urgency now". The communiqué also included an action plan that covered climate change, clean energy and sustainable development. For example the G8 engaged with the International Energy Agency (IEA), asking them to undertake further work on actions to reduce emissions, and agreement for the G8 to engage with the World Bank and other Multilateral Development Banks, to improve the harnessing of funding for clean technology in developing countries, was made. Some disappointment was expressed at the limited nature of the agreement; critics found that ambitions were set too low and real progress was lacking.

Stern Review In July 2005 the Chancellor announced that he had asked Sir Nick Stern to lead a major review of the economics of climate change, in order to understand more comprehensively the nature of the economic challenges and how they can be met, in the UK and globally. The subsequent Stern Review consultation has generated a significant amount of interest with many formal submissions received.



These responses are currently being considered by the Review team from the Cabinet Office and HM Treasury, who are expected to report to the Prime Minister and Chancellor in autumn 2006.

Energy Efficiency Innovation Review (EEIR) An Energy Efficiency Innovation Review was announced in 2004 as part of the ongoing Climate Change Programme Review. A summary report of the report was published in December 2005 in which the Carbon Trust suggested the introduction of a new instrument to promote energy efficiency in the rapidly growing less-energy-intensive business sector. A full study supporting this recommendation was also published separately by the Carbon Trust. It concluded that an option worth exploring would be a new, simple, mandatory UK ETS, which has since become known as the Energy Performance Commitment (EPC).

Building Regulations (Part L) These form the UK's response to the EU Directive on Energy Performance of Buildings (see below). Part L of the Building Regulations relate to the conservation of fuel and power. The last revision came into force in April 2006 with the aim of improving the energy efficiency of all buildings through new energy performance requirements and amendments to building regulations. These changes are expected to impact on large, non-energy intensive users where much of their energy use is related to buildings.

Energy Review In November 2005 a review of progress made towards objectives set out in the 2003 Energy White Paper was announced. The Energy Review consultation, launched in January 2006, was a stakeholder consultation that sought views on the measures needed for 2020 and beyond to meet the energy goals the White Paper set out. It prompted over 5,300 written responses and at least 1,000 stakeholders were also involved in activities such as a programme of stakeholder seminars and round table discussions across the country. Government published its report on the review (entitled 'The Energy Challenge') in July 2006. It sets out the detail of government's proposals for meeting carbon and energy targets. Measures of particular relevance include maintaining the EU ETS and CCL, improving the energy efficiency of energy use for government buildings, goods and services, and consultation on a mandatory emissions trading scheme.

International initiatives

Kyoto flexible mechanisms The Kyoto Protocol allows three cooperative mechanisms to help Annex 1 countries reduce the cost of meeting their legally binding emissions targets. This includes: international emissions trading (and is the mechanism via which the EU ETS has been facilitated); Joint Implementation (JI): where Annex 1 countries can claim credit for qualifying emissions reductions in other Annex 1 countries; and the Clean Development Mechanism (CDM) which relates to emissions reductions in non-Annex 1 countries. Various UK companies have been involved in the identification, development and implementation of projects to date. The UK Climate Change Project Office (CCPO) database lists over 120 firms able to assist UK firms.

EC Energy Services Directive (ESD) Directive 2006/32/EC was adopted in 2005 and requires Member States to draw up national action plans to reduce energy use from 2008 onwards over nine years. The Directive covers electricity, natural gas urban heating and other energy products. The method of implementation is largely left to the discretion of the Member State, but encourages action in the following areas:

- ◆ Billing: Member States are required to ensure that energy bills are based on actual (rather than estimated) energy consumption.

- ◆ Metering: This aims to ensure that (where feasible) Member States provide consumers with access to individual meters providing information about actual levels and time of final energy use.
- ◆ Benchmarking. Member states are required to ensure that customers are helped to compare their energy use against that of other through either internal or external benchmarks (where relevant comparators available).

EC Energy Performance of Buildings Directive (EPBD) Since the building sector accounts for 40% of the EU's energy requirements, the aim of improved energy efficiency in buildings has been targeted by various EU Directives. Most recently the Directive on the Energy Performance of Buildings was adopted in 2002 and came into force in January 2003. It aims to increase the energy performance of public, commercial and private buildings in all Member States. Measures include harmonising energy calculation methods, setting minimum energy standards for new buildings and large refurbishments, a mandatory energy certificate for new buildings and those that are sold or rented. Energy certificates will need to be displayed on public buildings.

EC Low Sulphur Fuels Directive 2003/17/EC further amended directive 98/70/EC on the quality of petrol and diesel fuels. The directive's primary objective is to implement a staged introduction of sulphur-free road fuels, which started in 2005. Subject to review by the EC in the case of diesel fuel, 100% use of sulphur-free road fuels will be required by 2009. The directive additionally introduced limits on sulphur levels in fuel used by agricultural tractors and non-road mobile machinery. Manufacturing experience has shown that sulphur-free fuel is necessary to maximise the carbon dioxide reduction potential of new fuel-efficient engine technology, so the underlying purpose of this directive is to enable optimisation of such technology in order to help reduce carbon dioxide emissions from road transport.

EC Regulations on Certain Fluorinated Greenhouse Gases HCFCs are ozone depleting substances (ODS) that are being phased out under EU Regulation 2037/2000. Regulations that aim to contain, prevent and thereby reduce emissions of the fluorinated greenhouse gases listed in Annex A of the Kyoto Protocol (HFCs, PFCs and SF₆) have been adopted by the EU and will come into force in July 2007. These fluorinated gases currently account for 2% of total EU greenhouse gas emissions and if no measures were taken the EC estimates that their emissions would increase to 50% above 1995 levels by 2010. The F-Gas regulation will affect emissions from refrigeration systems, including those used by organisations that fall under the EU ETS, CCAs and large, non-energy intensive users. The regulations address handling during use, control, end of life recovery and recycling plus a range of issues regarding training, reporting and labelling.

EC Integrated Pollution Prevention and Control (IPPC) Directive This 1996 Directive must be implemented in all EU Member States by October 2007 and seeks to improve environmental protection by introducing measures to reduce or prevent emissions to air, land and water from industrial installations. In GB, IPPC operates under three regulations for each of England and Wales, Scotland and Offshore. Around 50,000 installations are covered by the Directive in the EU. They are required to obtain an environmental permit from the Member States' authorities and the permit conditions include emission limit values (ELVs). The permits must take into account the whole environmental performance of the plant, including emissions to air and energy efficiency. The impact of IPPC regulations was taken into account in the UK ETS in order to avoid the double counting of emissions reductions already required by existing regulations.



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3. APPROACH TO GATHERING INFORMATION

APPROACH TO GATHERING INFORMATION

A web survey was circulated by email to 60 different organisations (the list was identified and agreed with Defra). We also participated in a series of face-to-face meetings or telephone calls with a cross section of respondents and attended two emissions trading group (ETG) meetings plus the Defra/ UK Emissions Trading Group workshop on the UK ETS. Table 8 summarises the types of organisation from which we received feedback, the majority of whom

Table 8 Summary of organisations contacted

	Number of organisations contacted	Number that responded by survey, email or telephone	Survey complete (% of survey respondents)	Requested for information to remain confidential
Direct Participants	32	17	17 (74%)	4
Other UK ETR users	7	1	1(4%)	1
Verifiers	4	2	2 (9%)	0
Broker	3	1	1 (4%)	0
Other	14	6	2 (9%)	1
Total	60	27	23 (100%)	6

The table below provides the full list of organisations contacted by survey or for an interview.

Table 9 List of organisations contacted

Type	Company name	Feedback received
Direct participants		
	Asda Stores Ltd	Yes
	Barclays Bank plc	No
	Battle McCarthy	Yes
	BP (Britoil)	Yes
	British Airways plc	Yes
	British Sugar plc	No
	Budweiser Stag Brewing Company Ltd	Yes
	Dalkia Utility Services Ltd	Yes
	Dana Spicer Europe Ltd	Yes
	First Hydro Company	No
	Ford Motor Company Ltd	Yes
	Fortum O&M (UK) Ltd	No
	GKN (United Kingdom) Ltd	Yes
	Imerys Minerals Ltd	No



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Type	Company name	Feedback received
	The Indesit Company	Yes
	Ineos Fluor Ltd	No
	Invista Textiles (UK) Ltd	No
	Kirklees Metropolitan Council	Yes
	Lafarge Cement UK	No
	Land Securities	Yes
	Lend Lease Real Estate IS Ltd	No
	Marks & Spencers plc	Yes
	Mitsubishi Corporation (UK) plc	No
	Motorola	Yes
	Natural History Museum Trading Co	No
	Rhodia UK Ltd	Yes
	Rolls Royce	No
	Royal Ordnance plc (BAE)	Yes
	Shell UK Ltd	Yes
	Somerfield Stores Ltd	No
	Tesco Stores Ltd	No
	UK Coal Mining Ltd	No
Other UK ETR users		
	Dairy Crest	No
	Nestle UK Ltd	Yes
	Heinz	No
	Hanson Brick Ltd	No
	Sainsburys	No
	Total	No
	Caterpillar	No
Verifiers		
	CICS	No
	DNV Certification	Yes
	SGS	No
	BSI	Yes
Brokers		
	Natsource	Yes
	CO2e	No
	Shell Trading	No
Other		
	Carbon Trust	No



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Type	Company name	Feedback received
	WWF	Yes
	Green Alliance	Yes
	Association for the Conservation of Energy (ACE)	No
	Emissions Trading Group (ETG)	Yes
	Confederation of British Industry (CBI)	No
	Environmental Audit Committee (EAC)	No
	London Climate Change Services (LCCS)	No
	Centre for Sustainable Development University of Westminster	No
	UCL Department of Economics	Yes
	Environment Agency	No
	Climate Group	Yes
	DTI	Yes
	HMT	No

