Climate Change Agreements: Results of the Fifth Target Period

Report for Department of Energy & Climate Change (DECC)

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Key Results

The key results of the fifth target period assessment show:

- 28.5 million tonnes per year of CO_2 emissions were saved in total compared to sector base years (sector base years vary, depending upon the sector, and range from 1990 to 2008)
- 38 out of 54 sectors reporting met their targets outright
- In a further 15 sectors all the facilities reporting had their Climate Change Levy discounts renewed
- Over 99 per cent of facilities reporting (9,634) have had Climate Change Levy discounts renewed
- Generally, there was continued improvement across the sectors.

1 Introduction

Climate Change Agreements (CCAs) were agreed between certain energy intensive users and Government in March 2001. Being party to a CCA, and meeting targets, allows relevant facilities to claim a reduction in the Climate Change Levy, which was placed on non-domestic energy supplies from 1 April 2001. This reduction was 80% for all eligible fuels, until April 2011, when this fell to 65% reduction for all fuels. It was announced in the March 2011 budget that electricity will revert to an 80% reduction from April 2013.

The responsibility for negotiating energy efficiency and carbon savings targets, and operating the Climate Change Agreements, rests with the UK Government's Department of Energy and Climate Change (DECC). HM Revenue and Customs (HMRC) collect the levy for Government and deal with exemptions and exclusions[1]. The industrial sector associations play a pivotal role in managing the agreements for their members and others falling within the scope of the agreements. DECC engaged AEA to provide independent technical advice and facilitate the negotiations with the eligible sectors.

The Government is currently working on the shape of the new CCA scheme scheduled to start in January 2013. This is the report for the final milestone in the current CCA Scheme.

Full details of the agreements are given in a series of papers and guidance notes on the DECC website (see references section). Each CCA has a performance target for the years 2002, 2004, 2006, 2008 and 2010[2] (known as the first – fifth target periods, or TPs). The DECC website also has an analysis of the original targets, the results of each of the target periods to date and this fifth target period assessment.

The analysis of the original targets provided an estimate of the carbon savings expected from the CCAs beyond "Business As Usual" (BAU). Since the publication of that analysis, there have been widespread structural changes in UK industry, changes to products because of market forces, and entrants and exits in many sectors. Therefore, while the sectors remain, their character has often changed substantially.

Since the report of the first target period discusses the structure and operations of the agreements in detail, this information will not be repeated here.

[1] The Levy is deducted at 'source' by the facility's energy supply company and then passed to HMRC.
[2] Note that this is the case for sectors which held a CCA from the start of the Agreements; sectors which entered later have targets for all target periods subsequent to the start of their specific Agreements.

Targets were subject to review in 2004 and 2008. The report of the second target period includes the results of the 2004 target review. Version 1.1 of the fourth target period report includes the results of the 2008 review.

The results presented in this report represent the population of the CCAs as at the end of each sector's respective fifth[3] target period, as reported to DECC on 7 February 2011. This is inevitably not the same population as at the start of the agreements, or at any other target period. This, unfortunately, makes comparisons between target periods difficult. Some sector agreements may cover considerably less energy than at the start of the agreements, and some of this energy reduction may be due to exits from the scheme (facility closures), and may not be as a result of the CCA. Conversely, some sector agreements may now cover more energy than at the start of the agreements as a result of new entrants into the scheme.

The first target period report gives full details on the savings from the CCA base year[4] to that point. The reports of the subsequent target periods concentrate on the performance at the relevant latest target period, with comparisons to the equivalent base year[5] for the family of facilities reporting at that target period. They also include, for reference, selected results from earlier target periods. As already noted, the target periods are not always readily comparable because of the changing membership of the CCA sectors.

This fifth target period is the third where there is overlap with the EU Emissions Trading Scheme (EU ETS). It is the first CCA target period which covers participants in EU ETS Phase II, where there is no opt-out (as there was in Phase I). This means that all EU ETS participants in CCAs had to account for double counting between the two schemes. This is discussed further in Section 2.

Section 3 of this report presents and discusses the overall results for the fifth target period. More detailed sector summaries are included as a separate **Annex 2** to this report, with **Annex 1** giving more detail and explanation of the sector summary formats.

[3] For some sectors the CCA fifth target period may only be their first, second or third time of reporting – see note 2.
[4] In previous target period reports, the term 'baseline' has been used interchangeably with 'base year'. In order to be consistent with wider DECC terminology, base year is used in the main body of this report
[5] The equivalent base year for a sector is the aggregate performance in the base year of the sector participants that reported at the target period under consideration.

2 EU Emissions Trading Scheme and changes to sector reporting

The EU ETS came into effect in 2005, after the start of CCAs. Phase I covered the period 2005 – 2007 and the current Phase II covers 2008 – 2012.

The EU ETS covers emissions already included in Climate Change Agreements. Industry preferred to keep the existing CCA targets rather than take out the EU ETS emissions. Emissions from energy use covered by the CCA are therefore included in the EU ETS. If a Target Unit (TU) reduces emissions, then they may have a surplus of allowances for sale on EU ETS or banking for future use. This same reduction in emissions may also mean that the TU over-performs against their CCA target, which can be converted into allowances for sale on UK ETS. In other words, the TU could potentially gain allowances on both trading schemes for the same reduction in emissions. Conversely, if emissions increase, TUs may find themselves forced to obtain allowances on both EU ETS and UK ETS to meet the requirements of the different schemes.

It was necessary to avoid the situation where the TU would be able to benefit from a surplus arising from the same emission reduction in both schemes or, alternatively, be penalised in both schemes to cover the same shortfall. The methodology that was used to avoid this double counting of emissions for the third and fourth target periods is also used for the fifth target period and is described in guidance paper CCA-D06. Additional information regarding double counting of CHP emissions is contained in CCA-C04. It is not possible to implement these adjustments within EU ETS and so modifications were made to the reporting methodology for CCAs. This modification takes the form of an adjustment to the TU and sector target. There are 28 sectors that have had to apply this adjustment at the fifth target period. It should be noted that EU ETS allowances and UK ETS allowances are not interchangeable.

As mentioned above, EU ETS is now in its second phase. The definition of combustion facility has been expanded and there is now no option to opt-out of EU ETS by virtue of being in a CCA (as there was in EU ETS Phase I). Consequently, there are a larger number of cases where overlaps exist between the two schemes than at previous target periods, which coincided with EU ETS Phase I. At the fifth target period there were 242 TUs and approximately 381 facilities overlapping with EU ETS installations.

In order to demonstrate their performance against their CCA targets, some sectors have reported results before and after the EU ETS double counting adjustments and these are described in the respective sector summaries in Annex 2.

3 Commentary on the results of the Fifth Target Period

Climate Change Agreements were originally negotiated with 44 industrial sectors. Three of these, Reprotech, Vehicle Builders and Repairers Association and the Cathode Ray Tube sector have since been terminated by the sectors for business reasons. An additional 14 sectors have entered agreements under the energy intensity criteria[6]. However, one sector (silica sand) merged with its IPPC equivalent. Hence overall there are 54 sectors reported in this document[7].

Overall, 38 out of the 54 sectors have met their targets after taking the emissions trading by operators into account.

4,394 Target Units (9,634 facilities) have been re-certified.

583 Target Units left the agreements between the fourth and fifth target periods (as reported by the Sector Associations).

1 Target Unit has not been re-certified.

139 Target Units did not submit any data at the end of the target period and their agreements have been terminated.

Overall, 86% of Target Units that have been part of a CCA at some time between 2008 and 2010 have been re-certified. Of those facilities that reported at the fifth target period, over 99% have been re-certified.

The results are presented in comparison to the equivalent s of the individual sectors, both as an actual (absolute) saving, and, where production data is available, as an improvement compared to what the performance would have been if the output in the had been the same as that during the target period (relative saving). The latter gives an indication of the improvement in efficiency for those sectors where the absolute emissions may have increased as a result of increasing output.

Results are presented as tonnes of carbon dioxide equivalent. Energy is converted to carbon dioxide using the appropriate fuel mix for the sector. Some sectors have saved other greenhouse gases and there are established conversion factors to equate them to CO_2 savings.

It is possible that a sector does not meet its target at the sector level assessment either as a consequence of the methods of calculating sector targets and/or the impact of trading allowances and ring-fencing. In some cases mathematical effects mean that the sector target is not met but all the underlying Target Unit targets are met, or vice versa. This effect arises because some sectors comprise a variety of Target Units with very different specific energy consumption, SEC (energy per unit of output). If the output of Target Units with low SEC falls, whilst the output of Target Units with high SEC rises, then the sector target may not be met, even though all the individual Target Unit targets have been met. This is discussed in more detail in Annex 1 of the second target period report.

In other cases, the sale or ring-fencing of surplus allowances by operators can result in a sector not meeting its target. Again, in this instance, it is also possible that all individual underlying agreement Target Unit targets are met. In both cases, whilst mathematically the sector has not met its target, in practical terms it has effectively done so if all the constituent Target Units have met theirs. In all there were 16 sectors where the sector target was not

[6] See 'eligibility' section of DECC CCA website for further details – see References section.
[7] For the purposes of reporting the overall results in this document, the Ceramics sector is presented as one sector, even though it reports separately as five subsectors. Separate subsector reports are provided in Annex 2.

met at the sector level assessment. Within 15 of these 16 sectors all TUs met their underlying Target Unit targets.

The risk management measures available to Target Units at the fifth target period are trading, relevant constraints or the disregarding of increased use of energy due to an unforeseen disruption to supplies. The majority of Target Units requiring risk management measures used trading. There were no claims for relevant constraints and only two cases of disruption to power supply.

3.1 Results in absolute performance terms

Table 1 shows how the CCAs have performed overall. It shows the total CO_2 savings per annum at all five target periods compared to the respective sector equivalent base years.

The savings declared for a particular target period are only for the sectors that participated in that target period. Over the course of the five target periods sectors have joined and left the agreements.

The base years for sectors vary. This is a consequence of variations, between the original participating sectors, of the availability of data of sufficient quality to constitute a base year, and of some sectors joining the agreements later under the energy intensity criteria. For example, among the sectors participating in the agreements from the start, the base years vary between 1990 and 2001. Among the sectors that joined later under the energy intensive criteria, the base years vary from 2004 to 2008.

Explanation of Table 1 Actual CO_2 Savings

Mathematically, the actual CO_2 savings in **Table 1** for a particular target period are:

(Absolute CO_2 emissions in the equivalent Base Year) - (Absolute CO_2 emissions in the Target Period)

As previously mentioned, the CO_2 emissions in the base year for a particular sector are the CO_2 emissions in the base year only for the participants that reported at the target period in question. This means that as participants leave and join a sector agreement the base year CO_2 emissions are adjusted to reflect this. Consequently, the base year emissions for a particular sector may vary between different target periods.

Moreover, actual savings presented in Table 1 will include those associated with both improvements in energy efficiency, relative to the base year, and reductions in levels of activity, also relative to the base year. Savings due to improvements in energy efficiency are only explicitly stated in this report in respect of sectors with relative targets, and these are shown in **Table 2**.

Explanation of Table 1 Target CO_2 Savings

Table 1 also shows the CO_2 savings implied by the targets set for the participating sectors. In the case of sectors with absolute targets, this can be expressed mathematically:

*(Equivalent Base Year Energy Consumption – Target Energy Consumption) * CO_2/unit energy*

Where CO_2/unit energy is the CO_2 emitted per unit of energy consumed in the target period in question for each sector. The CO_2/unit energy will vary between target periods if the relative proportions of different fuel types consumed change.

In the case of sectors with relative targets, target CO_2 savings are expressed mathematically:

*(Base Year Energy Consumption – Target Energy Consumption) * CO_2/unit energy*

Where CO_2/unit energy is as described above. For a sector with a relative target expressed in terms of a Specific Energy Consumption, SEC (e.g. MWh/tonne), the Target Energy Consumption is:

*Target SEC * Target Period throughput*

The table also shows the effects of the Steel sector on the overall result. Steel represents roughly a quarter of all primary energy consumption in the CCA sectors and there have been major changes in this industry over the lifetime of the agreements. Since output in the fifth target period was lower than predicted for the agreed target, and the targets for steel are denominated in absolute energy, the targets for this sector were adjusted in proportion to the fall in output (i.e. it was reduced from 339 PJ to 231 PJ). This resulted in an increase of 7.9 Mt CO_2 in the absolute target savings for the steel sector at the fifth target period, as this adjustment led to the target energy being further lowered with respect to the base year energy consumption. The effect of the adjustment to the steel sector target for falling output is shown in the table in parentheses.

Table 1 Total absolute CO_2 savings per annum[8] at all target periods

	All Sectors		
	Actual ($MtCO_2$/year)	**Target ($MtCO_2$/year)**	**Actual minus Target ($MtCO_2$/year)**
Absolute savings from Base Year – Target Period 1 *(With adjusted Steel target)*	16.4	6.0 *(12.3)*	10.4 *(4.1)*
Absolute savings from Base Year – Target Period 2 *(With adjusted Steel target)*	14.4	5.5 *(9.3)*	8.9 *(5.1)*
Absolute savings from Base Year – Target Period 3 *(With adjusted Steel target)*	16.4	9.1 *(12.3)*	7.3 *(4.1)*
Absolute savings from Base Year – Target Period 4 *(With adjusted Steel target)*	20.3	11.1 *(16.4)*	9.2 *(4.0)*
Absolute savings from Base Year – Target Period 5 *(With adjusted Steel target)*	28.5	18.0 *(25.8)*	10.5 *(2.6)*
	All sectors excluding Steel		
	Actual ($MtCO_2$/year)	**Target ($MtCO_2$/year)**	**Actual minus Target ($MtCO_2$/year)**
Absolute savings from Base Year – Target Period 1	7.0	4.6	2.4
Absolute savings from Base Year – Target Period 2	6.9	3.1	3.8
Absolute savings from Base Year – Target Period 3	9.1	6.4	2.7
Absolute savings from Base Year – Target Period 4	12.1	8.7	3.4
Absolute savings from Base Year – Target Period 5	15.4	13.6	1.7
	Steel Only		
	Actual ($MtCO_2$/year)	**Target ($MtCO_2$/year)**	**Actual minus Target ($MtCO_2$/year)**
Absolute savings from Base Year – Target Period 1 *(With adjusted target)*	9.4	1.4 *(7.7)*	8.0 *(1.7)*
Absolute savings from Base Year – Target Period 2 *(With adjusted target)*	7.6	2.4 *(6.1)*	5.2 *(1.5)*
Absolute savings from Base Year – Target Period 3 *(With adjusted target)*	7.3	2.7 *(5.9)*	4.6 *(1.4)*
Absolute savings from Base Year – Target Period 4 *(With adjusted target)*	8.3	2.4 *(7.7)*	5.9 *(0.6)*
Absolute savings from Base Year – Target Period 5 *(With adjusted target)*	13.1	4.4 *(12.2)*	8.7 *(0.9)*

Note: Figures have been rounded for presentation. Target savings are those associated for targets unadjusted for double counting.

[8] These are the savings that occurred in the twelve month period represented by each target period compared to the emissions in the twelve month period represented by the equivalent base year. They are therefore not cumulative.

3.2 Relative performance results

For sectors with relative targets[9], AEA has computed the performance the sector would have achieved if the output in the base year had been the same as that during the target period; this is shown in **Table 2** below. The difference between this and the actual performance in the target period is a measure of improvements in energy efficiency.

Explanation of Table 2 Actual CO_2 Savings

For a sector with a target expressed in terms of an SEC, the actual CO_2 saving is:

*[(Equivalent Base Year SEC * Target Period throughput) – (Target Period Energy Consumption)] * CO_2/unit energy,*

Where CO_2/unit energy is the CO_2 emitted per unit of energy consumed in the target period in question.

Explanation of Table 2 Target CO_2 Savings

For a sector with a target expressed in terms of an SEC, the target CO_2 saving is:

*(Reference Energy – Target Energy Consumption) * CO_2/unit energy,*

Where Reference Energy is*:*

*(Base Year SEC * Target Period throughout),*

and where Target Energy Consumption is as defined earlier.

Using this approach, **Table 2** below demonstrates the relative savings made by the sectors only with relative targets.

Table 2 Total relative CO_2 savings per annum[10] at all target periods

	Relative Target Sectors		
	Actual ($MtCO_2$/year)	**Target ($MtCO_2$/year)**	**Actual minus Target ($MtCO_2$/year)**
Relative savings from Base Year – Target Period 1	10.9	8.5	2.4
Relative savings from Base Year – Target Period 2	14.2	10.5	3.7
Relative savings from Base Year – Target Period 3	15.6	12.9	2.7
Relative savings from Base Year – Target Period 4	16.1	12.8	3.3
Relative savings from Base Year – Target Period 5	14.7	12.8	1.8

The comments on sector membership and base years given for absolute performance above also apply here.

[9] This includes all sectors except Steel, Aerospace, Wallcoverings, Supermarkets, and Kaolin & Ball Clay which all have absolute targets.
[10] These are the savings that occurred in the twelve month period represented by each target period with respect to the twelve months represented by the equivalent base year. They are therefore not cumulative.

3.3 Interaction with the EU Emissions Trading Scheme

For those TUs with facilities in EU ETS, there was, in aggregate, a surplus of 13,574,234 EU ETS allowances associated with emissions common to both schemes. This surplus is considerably higher than the previous target period[11] and can be explained by the following factors applying to performance in the fifth target period:

- The economic recession resulting in lower than normal levels of activity in the overlapping EU ETS installations. This leads to a larger than normal difference between actual emissions and emissions allocation and, therefore, a larger surplus in the overlap between the two schemes.
- The end of some exemptions from EU ETS coverage if an installation is covered by a CCA (EU ETS opt out), as was applied at the third and fourth target periods (i.e. during EU ETS Phase I). This has resulted in a larger number of installations covered by EU ETS overlapping with CCA facilities.
- An expansion in the definition of combustion activities covered by EU ETS in EU ETS Phase II (2008-2012) compared to EU ETS Phase I (2005-2007). Again, this has resulted in a larger number of installations covered by EU ETS overlapping with CCA facilities.
- A desire on the part of overlapping installations not to exercise the option to cancel surplus EUAs in the overlap in order to avoid a tightening of the CCA target, as was widespread at the fourth target period. This was due to a combination of two factors. The first was the relative values of EUAs and UK ETS allowances in their respective markets at the fifth target period, with the former being higher than the latter. The second was the fact that EUAs available at the fifth target period (i.e. those issued for EU ETS Phase II) have a value out to 2012 and beyond, whereas EUAs available at the time of fourth target period (i.e. those issued for EU ETS Phase I) ceased to have a value beyond 2007.

As a result of the above mentioned surplus, the CCA targets in aggregate were tightened to prevent double benefit. This resulted in a number of TUs having to either obtain UK ETS allowances in order to bridge the gap between their actual performance and the tightened target, or their ability to ring-fence or sell over-performance was reduced or eliminated. These effects were very pronounced at the fifth target period for the first reason given above. Of the 28 CCA sectors affected by this interaction with the EU ETS only three had a net deficit of EU ETS allowances within the overlap, resulting in a slackening of the CCA sector target.

3.4 Interaction with the UK Emissions Trading Scheme

In the fifth target period 2,148 Target Units retired almost 14 million allowances to help them meet their individual targets. These allowances were either bought on the market or the result of operators verifying earlier over-performance. Other operators over-achieved against their targets by an amount equivalent to approximately 1.7 million tonnes of carbon dioxide. At the fifth target period reconciliation deadline, only approximately 94 thousand tonnes of carbon dioxide had actually been verified for sale or future use (as reported by the sectors). The remaining approximately 1.6 million tonnes of over-performance was ring-fenced.

Table 3 summarises in more detail the interaction with the UK Emissions Trading Scheme during all five target periods.

[11] At Target Period 4 there was, in aggregate, a surplus 223,285 EU ETS allowances associated with emissions common to both schemes.

Table 3 Summary of UK ETS interactions at all target periods

	No. Target Units making retirements	No. allowances retired (tCO_2)	Total overachievement (million tCO_2)	No. allowances verified for sale (million tCO_2)	No. allowances ring-fenced (million tCO_2)
TP1	1,026	578,000	3.8	0.6	3.2
TP2	1,137	905,000	6.0	0.6	5.4
TP3	1,454	2,600,000	3.9	0.4	3.5
TP4	1,438	2,060,000	5.8	0.3	5.5
TP5	2,148	13,996,000	1.7	0.1	1.6

It is noteworthy that there was a dramatic step-up in the number of allowances retired between the second and third target periods. This is consistent with targets being tightened at the 2004 review for the third, fourth and fifth target periods and an overlap between CCAs and EU ETS occurring for the first time at the third target period. In the latter case, a net surplus of allowances within the overlap between the two schemes caused a tightening of the target.

The greatly increased number of allowances retired at the fifth target period compared to previous target periods is largely due to the interaction with EU ETS as explained in Section 3.3, above, as well as other factors explored below.

3.5 External influences on company performance

During this target period there have been a number of influences on sector performance. These include the following:

- The key influence on performance during this period has been the national and international economic downturn of the last two years. Reduced output makes target achievement harder for relative targets, but easier for absolute targets[12].
- As was observed in the third and fourth target periods, raw material prices remained high and imports, particularly from outside Europe, resulted in many site closures. International competition continues to exacerbate national downturns.

The energy intensity of products produced in the UK continues to increase. Bulk products may be produced more economically outside the UK, leaving the UK manufacturers to deal with short run, quick response production which can require more energy and is more difficult to optimise. Moreover, there is a continuing move to thinner, lighter products and towards products of a higher purity or higher specification in other respects. These often involve more energy in manufacture and manufacturers need to accommodate increased energy intensity within their targets.

The price of fuels heavily influences the cost effectiveness of energy efficiency initiatives. Between the fourth and fifth target periods there was a real terms increase in the price of coal and heavy fuel oil, but a real terms decrease in the price of gas and electricity. However, the long term nature of investment decisions means that real terms changes in fuel prices should be considered over a longer period. Against this background, it is instructive to note that the real terms prices seen by industry for all of the aforementioned fuels have increased significantly over the period of the agreements. For example, between 2000 and 2010 the real terms price of gas increased by 113% and electricity by 60%[13].

[12] However, adjustments to absolute targets are made in response to falls in throughput.
[13] Table 3.3.1 Quarterly Energy Prices, DECC, March 2011. These are average prices for sales to the industrial sector.

3.6 Discussion of sector performance

The following table summarises the performance of sectors in absolute and relative terms, with respect to their equivalent base year performances. This table does not reflect whether a sector met its target or not.

Table 4 Summary of sector performance in absolute and relative terms

Improved Absolute Performance	Improved Relative Performance	Number of Sectors
✓	✓	38
×	✓	8
✓	×	2
×	×	1
✓	Data unavailable[14]	5

Of the 54 sectors considered in this report, 49 have relative targets. 46 of these 49 sectors have shown improvements in relative performance with respect to equivalent base year performance.

Of the three relative sectors failing to report a relative improvement in performance, all did so against a background of a lower throughput at the target period compared to base year – relative performance, as measured by specific energy consumption (SEC), can deteriorate as throughput falls, even though energy is used with the same or a higher level of efficiency. However, one sector with a lower level of throughput in the target period compared to base year also registered a deterioration in absolute performance. This is explained in terms of a shift towards more energy intensive products and processes driven by the market and environmental requirements (See Section 3.5).

In all 8 cases where sectors showed a relative improvement in performance, but did not show an improvement in absolute performance, this occurred against a background of throughput at the target period being higher than during the base year.

In the above paragraphs, sector performance is considered against equivalent base year performance only. Considering sector performance against the targets set for the fifth target period, it is also instructive to consider the number of sectors meeting their original targets before adjustment for trading and double counting (but after adjustments for new entrants, exits and falls in throughput), as this gives an indication of where targets, at the sector level, have been met by improvements in energy efficiency without recourse to risk management options. Of the 54 reporting sectors, 30 sectors met their targets before adjustments for trading and double counting and 18 sectors met them after the adjustment for double counting but not trading.

There were 24 sectors where performance was worse than the original targets. Of these 24 sectors, 21 met their final adjusted target either through accessing the UK ETS market or via the double counting mechanism.

As well as investments in energy efficiency projects, the recorded performance of sectors against targets can be affected by the following:

- Some sectors invested early in energy efficiency measures to meet their 2010 targets and hence earlier levels of over-performance will be eroded if no additional actions are undertaken.
- Relative target sectors experiencing a drop in throughput will automatically experience an increase in their specific energy consumption making it more difficult to meet their target.

[14] Sectors with absolute targets do not report relative performance.

- As indicated above, the product mix is generally moving to more complex, higher specification products which may require additional process energy.

3.7 Summary of performance of each sector

The following table summarises the performance of each CCA sector at each target period to date in terms of kilo-tonnes of CO_2 saved per annum. Note that in this table, a negative value implies an increase in emissions, rather than a saving.

A detailed breakdown of the performance of each sector is given in a series of summaries in **Annex 2**. **Annex 1** describes the layout of these summaries.

Table 5 Summary of performance of each sector at all target periods[15]

	Target Period 1		Target Period 2		Target Period 3		Target Period 4		Target Period 5	
Sector	**Absolute Saving $ktCO_2$/year**	**Relative Saving $ktCO_2$/year**	**Absolute Saving $ktCO_2$/year**	**Relative Saving $ktCO_2$/year**	**Absolute Saving $ktCO_2$/year**	**Relative Saving $ktCO_2$/year**	**Absolute Saving $ktCO_2$/year**	**Relative Saving $ktCO_2$/year**	**Absolute Saving $ktCO_2$/year**	**Relative Saving $ktCO_2$/year**
Aerospace	15	N/A	27	N/A	71	N/A	128	N/A	153	N/A
Agricultural Supply	23	46	1	74	24	114	24	109	24	171
Aluminium	2,000	2,600	2,227	3,409	2,323	3,378	2,772	3,874	1,827	2,346
Brewing	37	44	98	91	148	123	187	122	266	138
Calcium Carbonate	N/A	N/A	N/A	N/A	6	5	11	5	12	4
Cathode Ray Tubes	21	117	7	36	-	-	-	-	-	-
Cement	1,900	880	2,030	1,136	2,240	1,553	2,956	1,563	3,954	1,492
Ceramics										
non-fletton	71	45	74	84	162	44	229	14	563	-10
fletton	-5.9	-5.7	-20	-20	-17	-19	11	-2	22	-5
refractories	62	-7.3	89	-21	81	-36	93	-40	52	-2
whitewares	58	68	141	88	130	90	171	99	202	182
materials	3.2	12	22	28	5	14	65	40	143	77
Chemicals	2,000	2,500	1,520	3,524	2,031	2,977	2,958	2,398	3,855	2,686
Cleveland Potash	N/A	N/A	N/A	N/A	N/A	N/A	9	-9	27	-35
Coldstores	N/A	N/A	N/A	N/A	N/A	N/A	15	16	54	61
Craft Baking	-9	27	-29	52	-33	71	-44	93	-23	101
Dairy Processing	58	190	20	186	11	202	40	206	70	273
Egg Processing	1.8	7.5	0.3	4	-2	5	-2	4	-4	9
Egg Production (NFU)	10	15	4	27	4	22	15	32	16	36
Food & Drink	160	620	161	732	157	1000	30	1,102	170	1,449
Foundries	139	16	114	7	76	62	39	65	131	6
Geotextiles	N/A	N/A	N/A	N/A	0.1	0.7	6	5	8	2
Glass	39	251	-49	250	-6	226	-124	186	-6	98
Glass Manipulator	N/A	N/A	N/A	N/A	N/A	N/A	-1	1	1	1
Gypsum Products	-21	5.7	-50	1	-56	21	-45	36	72	32
Heat Treatment	N/A	N/A	N/A	N/A	5	9	2	22	68	29
Horticulture (NFU)	N/A	N/A	N/A	N/A	54	67	101	112	101	124
Industrial Gases	N/A	N/A	N/A	N/A	10	-2	22	-4	136	-15
Kaolin and Ball Clay	N/A	N/A	N/A	N/A	33	13	99	N/A	116	N/A
Laundries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14	22
Leather	6	2.9	6	0	8	4	8	4	7	5
Lime	173	51	125	91	104	99	121	64	296	73
Maltsters	7.5	22	0	36	21	42	-2	31	21	37

[15] These are the savings that occurred in the twelve month period represented by each target period with respect to the twelve months represented by the equivalent base year. They are therefore not cumulative.

Metal Forming	23	46	26	92	37	76	61	145	105	91
Metal Packaging	18	28	21	39	24	41	31	61	47	72
Mineral Wool Producers	8.9	24	-9	63	-46	94	-43	104	-44	110
Motor Manufacturers	36	185	11	398	173	554	224	1,007	333	693
Non-Ferrous Metals	130	140	78	78	183	125	158	115	193	105
Packaging and Industrial Films	N/A	N/A	N/A	N/A	-1	0	0	3	-4	9
Paper	-510	2,600	-248	2,758	577	2,683	977	2,599	1,588	2,350
Pig Farming (NFU)	14	11	13	13	11	16	15	26	9	18
Plastics	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	58	111
Poultry Meat Processing	-30	38	-40	26	-36	38	-50	29	-40	48
Poultry Meat Production (NFU)	9.7	28	17	40	18	51	51	82	16	-6
Poultry Meat Rearing	72	82	65	77	39	19	36	10	29	13
Printing	-22	-5.4	-31	52	-47	32	-27	33	-4	-24
Red Meat Processing	27	12	-16	2	-31	62	-56	57	-48	67
Renderers	14	-0.59	-15	28	-59	7	-20	18	-56	25
Rubber Tyre Manufacturing	171	49	192	131	209	131	226	113	239	104
Semi-conductor Manufacture	60	41	29	324	117	1111	153	917	43	789
Slag Grinding	3.5	6.2	-9	12	-10	16	1	18	26	10
Spirits	45	17	94	64	64	93	-4	147	94	207
Steel	9,400	N/A	7,553	N/A	7,277	N/A	8,293	N/A	13,119	N/A
Supermarkets	15	1.1	-0.95	N/A	1.5	N/A	12	N/A	4	N/A
Surface Engineering	29	75	42	119	91	108	128	160	144	150
Textiles	114	50	115	107	106	62	72	83	87	63
Textiles (Energy Intensive)	N/A	N/A	N/A	N/A	-0.4	2	18	12	26	11
Wallcoverings	28	N/A	19	N/A	8	N/A	12	N/A	12	N/A
Wood Panel Manufacture	-22	-5.5	-15	68	98	160	180	159	159	184

4 References

DECC

https://decc.gov.uk/en/content/cms/what_we_do/lc_uk/ccas/ccas.aspx

AEA's analysis of the original targets, plus results of the previous target periods:

http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/ccas/cca_analysis/cca_analysis.aspx

Definition of eligibility criteria, including the definition of Energy-intensive industries

http://decc.gov.uk/en/content/cms/emissions/ccas/eligibility/eligibility.aspx

HM Revenue and Customs

http://www.hmrc.gov.uk/climate-change-levy/index.htm

Annex 1 - Explanation of the sector summary format

Annex 2 to this document comprises a summary of the results for each sector. A brief explanation of the sections of these summaries is provided below.

In all cases, energy is expressed in primary energy terms. This means that metered grid electricity, as consumed at any installation, is multiplied by a factor (2.6 for the range of years 2000-2010) to reflect the energy required to generate, transmit and distribute the metered electricity across the grid. The agreements also work in units of carbon or carbon equivalent, and so care has to be taken when trading is involved to ensure there is a conversion to carbon dioxide, as each trading allowance is equivalent to one tonne of CO_2. One tonne of carbon is equivalent to 44/12 tonnes CO_2 (3.667 tonnes CO_2).

Targets and performance are quoted to the same level of significance as the original agreements. Carbon dioxide, energy consumption and production figures are rounded for display to the nearest integer. In general, other numbers are rounded to two significant figures. Rounding may prevent a simple addition of the numbers quoted in the summaries.

Data from previous target periods is as reported at that target period, unless a major error has been subsequently discovered.

There are three small variations in the sector summary format depending on whether the sector has members in EU ETS or not and, if so, whether the sector provided information to isolate the impact of the double trading adjustment. The different variations are discussed in the sections below using these descriptions

> Case 1 – the sector has Target Units in EU ETS as well as Climate Change Agreements, and the information presented incorporates the adjustments applied to the EU ETS overlap.
>
> Case 2 – the sector has Target Units in EU ETS as well as Climate Change Agreements, and information is available to show results with and without the adjustments applied due to EU ETS.
>
> Case 3 – sector does not have Target Units in EU ETS.

Scope and membership of the umbrella agreement

This section gives a brief statement of the membership of the agreement for the sector. This is defined more formally in clause 3 of the umbrella agreements. The umbrella agreements plus current lists of those facilities certified for the reduced rate Climate Change Levy are available at

https://decc.gov.uk/en/content/cms/what_we_do/lc_uk/ccas/ccas.aspx

This section of the sector summary also provides information on whether the sector has Target Units that also have installations in EU ETS as well as details on how the corrections for this are presented.

Targets

The table given in this section shows how the targets for the sector have changed with time, as the composition of the sector changes, due to exits and new entrants, and as a result of corrections to base year[16] data and other agreed variations. DECC has encouraged the correction of errors in base year data and basic assumptions in order to ensure the agreement targets (whose stringency is maintained) are on a sound basis for the life of the agreements.

The sector targets as originally agreed are quoted in the first row of the table and the second row shows the targets at the end of the first target period (TP1).

The row "2004 Review" shows the percentage change of targets resulting from the review of targets in 2004 required by the agreements. The percentage change is based on the population and their targets at the time of the start of the review. The targets given in the fourth row of the table ("At TP2") for the second target period take account of these adjustments to the 2006, 2008 and 2010 targets. The fifth row provides targets for the third target period ("At TP3").

The row "2008 Review" shows the percentage change of targets resulting from the review of targets in 2008. The targets given in the following rows ("At TP4" and "At TP5") for the fourth and fifth target periods take account of these adjustments to the 2010 target.

Additional adjustments to the TP5 sector target

Sector targets are adjusted for any retirement of allowances or ring-fencing that has taken place. Individual Target Units or trading groups may buy UK ETS allowances to ease targets to match their performance level. Alternatively they may sell verified allowances or retain (ring-fence) over-performance for subsequent verification and use, which has the effect of tightening the target, i.e. making the target more demanding.

Further to the above, for some specific sectors, sector level targets are varied to account for agreed sector level changes. This mechanism is described in more detail in paper CCA-D03.

Final adjusted CCA sector target for the TP5

For case 1, this section of the summary shows the sector target, as it is when all the adjustments described above have been made as well as those made for those Target Units which are part of EU ETS as well as CCAs. The actual performance of the sector is compared to this adjusted target. The adjustment due to the overlap between the two schemes is shown in the section entitled 'Adjustment for overlap with EU ETS'.

For case 2, the adjusted target only includes adjustments for the retirement of allowances, ringfencing and agreed sector-level adjustments, as described above. It does not include any adjustment for EU ETS.

For case 3, Target Units in the sector are not in EU ETS and so the adjusted target does not include any correction for this.

Sector performance recorded

The table given in this section shows the sector performance against the equivalent base year at each target period to date. The "equivalent base year" is the base year performance

[16] As explained on page 2, in previous milestone reports, the term 'baseline' has been used interchangeably with 'base year'. In order to be consistent with wider DECC terminology, Base year is used in the main document of this report but the sector summaries may still use the term 'baseline'.

for the population of the sector in the agreement at the relevant target period. This changes with time as the population of the sector changes and also due to base data corrections.

The performance figure given is simply the actual performance recorded by the sector. All adjustments are made to targets and not performance.

Adjustment for overlap with EU ETS

This section provides details on the Target Units that are in both the EU ETS and CCA schemes. This specifies the number of Target Units in the sector with an overlap between the two schemes and which therefore have had an adjustment to their target. The adjustment to the CCA target is expressed as an excess or deficit of CO_2, as well as the resultant tightening or easing of the sector target.

For case 1, this adjustment is included in the overall adjusted target in section 'Final adjusted CCA sector target for the TP5'. It is not included in the adjusted target for case 2 (as noted in the relevant report).

Commentary

For cases 1 and 3, this section summarises how the performance of the sector compared with the adjusted target, and the facilities that were certified and decertified with explanations.

For case 2, the performance of the sector is compared to the adjusted target not including adjustments for EU ETS, and then indicates how the sector target changed due to the EU ETS adjustment and what difference this made to the result.

Due to the application of ring-fencing and relevant constraints at the Target Unit level, it is quite possible for the sector as a whole not to meet its target yet for all the Target Units to meet theirs on their individual performance.

Target Units that have terminated their agreement prior to reporting for the target period or have not supplied data are excluded here from the stated number of those not being re-certified.

This section also gives a table 'Improvement in SEC compared with Equivalent Base Year at each Target Period' showing how the sector has improved relative to the equivalent base year position at each target period. The % target improvement presented here is calculated based upon the target before any adjustments. It should be noted that the figures for each target period may be for different populations.

Graph of performance and current targets relative to the base year

This graph uses the data from earlier sections and particularly illustrates the impact of trading allowances and ring-fencing on the sector target. For each sector the data has been normalised, with the base year performance set to 1.0, to give a clear visual presentation of the performance of the sector at each of the target periods to date. The graphs show both the current target profile and the original umbrella agreement target profile. For some sectors these will actually have eased slightly as a result of entrants and exits, especially where the individual Target Units have different savings profiles.

For case 1, the target after adjustments will include adjustments due to the EU ETS overlap, but in case 2 this adjustment is not included.

Impact of the sector performance

This section indicates the change in energy consumption and carbon dioxide emissions. There are a number of ways that this can be determined. The two measures presented here are straightforward to calculate.

Relative energy/ CO_2

The base year performance here is calculated by taking the membership of the agreement at the end of each target period and calculating the energy/ carbon demand at base year performance and the relevant target period throughput. The carbon/ energy conversion factor for the target period has been employed to convert the relative energy figure into carbon dioxide. The relative energy figure therefore takes account of the change in throughput and, where allowable, product mix changes and so gives an indication of the energy efficiency performance of the sector.

It should be noted that, since the sector population may have changed at each target period, the figures presented cannot necessarily be used to show how the energy/carbon demand has changed from one target period to the next.

Absolute energy/ CO_2

The base year performance here is simply the recorded summation of the base year energy/ carbon consumption at the base year for the membership of the sector at the end of each target period. The carbon/ energy conversion factor for the target period has been employed to convert the absolute energy figure into carbon dioxide. Using the reported performance figures for each target period, the absolute difference in performance between the base year and the target period is calculated.

It should be noted that, since the sector population may have changed at each target period, the figures presented cannot (in most cases) be used to show how the energy/carbon demand has changed from one target period to the next.

Where possible a simple comparison of the total sector throughput for the base year compared to the target period is given in the same table as the absolute performance. For some sectors, notably some absolute sectors and those sectors with diverse sub-sector units, it is not possible to produce one meaningful throughput measure.

Annex 2 - Summaries of individual sector performance

[Available as a separate document]

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