CLIMATE CHANGE AGREEMENTS –

RESULTS OF THE SECOND TARGET PERIOD ASSESSMENT

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CLIMATE CHANGE AGREEMENTS – RESULTS OF THE SECOND TARGET PERIOD ASSESSMENT

KEY RESULTS

The key results of the second target period assessment show:

- 14.4m tonnes of CO_2 per annum emissions were saved in total
- 21 out of 42 sectors met their targets outright
- In a further 17 sectors all the facilities had their Climate Change Levy discounts renewed
- 98 per cent of facilities (10,111) have had Climate Change Levy discounts renewed
- There was continued improvement across all sectors.

1. INTRODUCTION

Climate Change Agreements (CCA) 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 up to an 80% reduction in the Climate Change Levy, which was placed on non-domestic energy supplies from 1 April 2001.

The responsibility for negotiating energy efficiency and carbon savings targets, and operating the Climate Change Agreements rests with the UK Government's Department for Environment, Food & Rural Affairs (Defra). HM Revenue and Customs 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. Defra engaged Future Energy Solutions (FES) (then known as ETSU) to provide independent technical advice and facilitate the negotiations with the energy intensive sectors. FES is part of AEA Technology Environment, a business of AEA Technology plc.

Full details on the agreements are given in a series of papers and guidance notes on the Defra website (see references section). Each CCA has a performance target for the years 2002, 2004, 2006, 2008 and 2010. The Defra website also has an analysis of the original targets and of the results of the first target period assessment. Since the latter report 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.

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, the character has often changed substantially, and we are not comparing like with like when comparing energy use in base-years with energy use in 2002 and 2004. The assumptions of growth and energy prices on which the original BAU forecasts were made are now outdated and of limited relevance. It is therefore not possible to compare directly current forecasts of savings with the original forecasts made when the agreements were first signed. Thus the results here are just presented in terms of overall savings from the base-years.

The first target period report gives full details on the savings from the CCA baseline to that point. This report concentrates on the performance at the second target period and includes, for reference, selected results from the first target period. Because of the changing membership of the CCA sectors, the two target periods are not always readily comparable.

2. THE 2004 REVIEW OF TARGETS

The Agreements provide for a review of the final three targets (2006, 2008 and 2010) in 2004 to ensure that the targets continue to represent the potential for cost-effective energy savings, taking account of any changes in technical or market circumstances. This gave an opportunity for both industry and government to re-examine the assumptions behind the setting of targets and to see if they were set too low or too high.

The review was a joint exercise between Defra and the sector associations and took into account the better than expected performance for the majority of sectors in 2002. In order to set allocations for the European Union Emissions Trading Scheme (EU ETS), that started on 1 January 2005, the review was carried out for the sectors affected by this scheme before the results of the second target period were known.

For the majority of sectors the review is now complete and the results are reflected in the sector summaries in Annex 3 to this report. The remaining sectors will be completed shortly and the results will be provided in an updated report to be published later.

In the majority of cases the review has resulted in a tightening of targets for the final three target periods compared to the original agreements. This reflects the success industry has had in making energy savings since the inception of the CCAs and the increasing options for making further savings in future. In three cases, where the sector did not meet the 2002 target, there have been no changes to targets. In one case, Defra agreed

that the original targets were not realistic and agreed to a slight slackening.

3. EU EMISSIONS TRADING SCHEME

From January 2005, the European Union Emissions Trading Scheme (EU ETS) came into effect. Approximately 500 installations covered by EU ETS are also covered by CCAs. This has had no effect on the second CCA target period, but it will affect future target periods and procedures are being developed to handle this interaction. It should be noted that EU ETS allowances and UK ETS allowances are not interchangeable.

4. COMMENTARY ON THE RESULTS OF THE SECOND TARGET PERIOD

Climate Change Agreements were originally negotiated with 44 industrial sectors. Two of these, Reprotech and Vehicle Builders and Repairers, have since been terminated by the sectors for business reasons. It is possible for individual target units[2] within a sector to be re-certified even if the sector as a whole does not meet its target.

Overall 21 out of 42 sectors have met their targets after taking the emissions trading by operators into account. In effect, however, 38 of the 42 sectors met their targets as all the target units within them have been re-certified (see 4.3 below).

4420 target units (10,111 facilities) have been re-certified.
228 target units have left the agreements.
23 target units have not been re-certified.
4 target units did not submit any data at the end of the target period and their agreements have been terminated.

Overall, 95% of target units (98% of facilities) have been re-certified.

The results are presented in comparison to the base years of the individual sectors, both as an actual (absolute) saving, and, where possible, as an improvement compared to what the performance would have been, if the output in the base year 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.

[2] A target unit is a facility or group of facilities sharing a target.

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.

4.1. Results in absolute performance terms

The table below shows how the CCAs have performed overall. It shows the total CO_2 savings per annum at both the first and second target periods compared to the respective base year. It also shows what savings the sector targets represent. These savings are net figures across the sectors. Some sectors with relative targets may have validly increased energy consumption, whilst at the same time improving energy efficiency.

The table also shows the effects of the Steel sector on the overall result. Steel represents roughly a quarter of all primary energy in the CCA sectors and there have been major changes in this industry over the lifetime of the agreements. In 2002, severe operational difficulties and major structural changes in the steel sector meant that output and CO_2 emissions were significantly reduced, so that the first target period results overall were heavily influenced by this sector. Steel accounted for 9.4m of the 15.8m tonnes of CO_2 savings per annum. As a result of this decline in output, the targets for this sector were adjusted and the effect of this adjustment is shown in the table in parentheses. To aid comparison of the 2002 and 2004 results we again show the effect that the steel sector has had on results. The fortunes of the industry have recovered well and output has risen by 28% from the first target period and is forecast to rise further up to 2010. However, over the same period, energy use has only gone up by around 10%, reflecting the fact that the Steel sector is continuing to improve its energy efficiency.

The different sectors have a range of baseline years, ranging from 1990 to 2001. The figures for absolute savings given below are for the savings by all sectors from their relevant baselines, they are not the savings from a single point in time.

	All Sectors		
	Actual ($mtCO_2$ pa)	**Target ($mtCO_2$ pa)**	**Actual minus Target ($mtCO_2$ pa)**
Absolute savings from baseline - Target Period 1 *(With adjusted Steel target)*	15.8	6.0 *(12.3)*	9.8 *(3.5)*
Absolute savings from baseline - Target Period 2 *(With adjusted Steel target)*	14.4	5.5 *(9.3)*	8.9 *(5.1)*
	All sectors excluding Steel		
	Actual ($mtCO_2$ pa)	**Target ($mtCO_2$ pa)**	**Actual minus Target ($mtCO_2$ pa)**
Absolute savings from baseline - Target Period 1	6.4	4.6	1.8
Absolute savings from baseline - Target Period 2	6.9	3.1	3.8
	Steel Only		
	Actual ($mtCO_2$ pa)	**Target ($mtCO_2$ pa)**	**Actual minus Target ($mtCO_2$ pa)**
Absolute savings from baseline - Target Period 1 *(With adjusted target)*	9.4	1.4 *(7.7)*	8.0 *(1.7)*
Absolute savings from baseline - Target Period 2 *(With adjusted target)*	7.6	2.4 *(6.1)*	5.2 *(1.5)*

Points to note:

- There has been a continued improvement in the overall performance across all sectors.
- The Steel sector has continued to outperform its target (including the adjusted target) in spite of a significant increase in output from the first target period to the second.
- The largest absolute savings were in the Steel, Aluminium, Cement and Chemicals sectors.

- The overall target saving at the second target period is less than at the first because of the increased output across sectors.
- The membership of the agreements at the end of each target period is not the same as that at the start of the agreements or at the first target period. In virtually all sectors there have been a number of exits and entrants. Some sector agreements may cover considerably less energy than at the start of the agreements, but some of this energy reduction may be due to exits where the facility has not been closed, 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, notably the aerospace sector.

4.2. Relative performance results

For sectors with relative targets[3], FES 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. The difference between this and the actual performance in the target period is a measure of improvements in energy efficiency.

Using this approach, the table below demonstrates the relative savings made by the sectors with relative targets.

	Relative Target Sectors		
	Actual ($mtCO_2$ pa)	**Target ($mtCO_2$ pa)**	**Actual minus Target ($mtCO_2$ pa)**
Relative savings from baseline - Target Period 1	10.4	8.5	1.9
Relative savings from baseline - Target Period 2	14.2	10.5	3.7

- There has been a continued improvement in relative performance and therefore energy efficiency for these sectors in total.
- The comments on sector membership and baselines given for absolute performance above also apply here.

[3] This includes all sectors except Steel, Aerospace, Wallcoverings and Supermarkets, which all have absolute targets.

4.3. Results in context

The performance of the CCAs at the second target period comes against a background of significant market changes in many UK industries. The effect of increased international competition for raw materials has affected all sectors. For some sectors, such as Steel, this has led to a sharp increase in demand for products. For others, the increase in raw material prices has led to shortages of capital for investment.

At the same time, UK industry has worked hard to compete with low-wage economies by moving to more value-added products, which inevitably tend to be more energy intensive to manufacture. This has led to difficulties in some CCAs with relative targets, where the absolute energy consumption has fallen, but the relative consumption has increased.

Output levels have an impact (which may be temporary) on relative energy performance. In declining markets, relative targets are harder to meet because baseload energy is spread over a smaller number of units of output, unless rationalisation takes place quickly across the sector. However, the absolute amount of energy used is smaller and therefore the carbon saving may still be positive. In growing markets, relative targets are easier to meet as the baseload is spread over a larger number of units of output. If growth continues to the point where new capacity is brought on line, the effect is cancelled and again the baseload will be spread over fewer units whilst spare capacity exists. Absolute emissions may rise in growing sectors, but out of 27 sectors who reported growth, 16 had not increased their absolute use of energy.

The following table summarises the performance of sectors in absolute and relative terms, relative to their baseline performances.

Improved Absolute Performance	Improved Relative Performance	Number of Sectors
✓	✓	24
×	✓	13
✓	×	4
×	×	1

4.4. Sector target issues

As a consequence of the methods of calculating sector targets and the impact of trading allowances and ring-fencing, it is possible that a sector does not meet its target at the sector level assessment. However, because of the risk management issues that come in to play **after** the sector or sub-sector test, it is possible that all individual underlying agreement target unit targets are met. 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. This was the case for 17 of the sectors.

The risk management measures available to target units comprise trading, product mix and output algorithms, tolerance bands and relevant constraints. At the second target period the most common method was trading. No tolerance bands were used; only 105 product mix/output algorithms (apart from those sectors where the Novem method is used to aggregate the range of products into the sector total) and only 3 claims for relevant constraints were agreed.

There are also some cases where mathematical effects mean that the sector target is not met but all the underlying target unit targets are met or vice versa. Some sectors comprise a variety of target units with very different specific energy consumption, SEC (energy per unit of output). If the production of those target units with low SEC falls, but that the target units with high SEC rises, then the sector target may not be met, even though all the individual target unit targets are. This is discussed in more detail in Annex 1.

4.5. Interaction with the UK - Emissions Trading Scheme

In the second target period, overall 1137 target units retired 905,000 allowances to help them meet their individual targets. These allowances were either bought on the market or the result of operators verifying earlier over-achievement. Operators over-achieved against their targets by an amount equivalent to approximately 6 million tonnes of carbon dioxide. To date, the majority of this remains unverified and has simply been ring-fenced. Only 0.6 million tonnes of carbon dioxide has actually been verified for sale; much of the remaining 5.4 million tonnes of ring-fenced over-achievement may never be realised as tradable allowances.

These figures compare to a total of 1026 target units which retired 578,000 allowances at the first target period. Over-achievement equivalent to approximately 3.8 million tonnes of carbon dioxide was allocated as allowances or ring-fenced (0.6 $mtCO_2$ was verified for sale, 3.2 $mtCO_2$ was ring-fenced).

There is no evidence that large numbers of operators used the trading mechanism as an alternative to implementing their own energy efficiency measures. Indeed, even though the price of allowances has been relatively low, sectors and operators continued to perform well against second target period targets.

4.6. Summary of performance of each sector

The following table summarises the performance of each CCA sector at the first and second target periods in terms of millions of 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 3. Annex 2 describes the layout of these summaries.

Summary Table

	Target Period 1		Target Period 2	
Sector	**Absolute Saving $ktCO_2$ pa**	**Relative Saving $ktCO_2$ pa**	**Absolute Saving $ktCO_2$ pa**	**Relative Saving $ktCO_2$ pa**
Aerospace	15	N/A	27	N/A
Aluminium	2,000	2,600	2,227	3,409
Craft Baking	-9	27	-29	52
Brewing	37	44	98	91
Cement	1,900	880	2,030	1136
Ceramics				
non-fletton	71	45	74	84
fletton	-5.9	-5.7	-20	-20
refractories	62	-7.3	89	-21
whitewares	58	68	141	88
materials	3.2	12	22	28
Chemicals	2,000	2,500	1,520	3,524
Cathode Ray Tubes	21	117	7	36
Dairy Industry	58	190	20	186
Egg Processing	1.8	7.5	0.3	4
NFU - Eggs	10	15	4	27
Eurisol (Mineral Wool)	8.9	24	-9	63
Food & Drink	160	620	161	732
Foundries	139	16	114	7
Glass	39	251	-49	250
Gypsum Products	-21	5.7	-50	1
Leather	6	2.9	6	0
Lime	173	51	125	91
Malting	7.5	22	0	36
Poultry Meat Processing/Feed	-30	38	-40	26
British Meat Fedtn	27	12	-16	2
Metal Forming	23	46	26	92
Metal Packaging	18	28	21	39
Motor Manufacturers	36	185	11	398
NFU - Pigs	14	11	13	13
Non-Ferrous	130	140	78	78
Paper	-510	2,600	-248	2,758
NFU - Poultry Meat	9.7	28	17	40
Poultry Meat Rearing	72	82	65	77
Printing	-22	-5.4	-31	52
Rendering	14	-0.59	-15	28
Rubber	171	49	192	131
Semiconductors	60	41	29	324
Slag Grinders	3.5	6.2	-9	12
Spirits	45	17	94	64
Steel	9,400	N/A	7,553	N/A
Supermarkets	15	1.1	-0.95	N/A
Surface Engineering	29	75	42	119
Textiles	114	50	115	107
Agricultural Supply	23	46	1	74
Wallcoverings	28	N/A	19	N/A
Wood Panel	-22	-5.5	-15	68

5. REFERENCES

Defra

General - www.defra.gov.uk/environment/ccl/index.htm
ETSU's analysis of the original targets - www.defra.gov.uk/environment/ccl/analyses.htm
Results of the first target period - www.defra.gov.uk/environment/ccl/results.htm

HM Revenue and Customs

General - http://www.hmrc.gov.uk/ - details under 'Excise & Other', 'Improving our Environment'

ANNEX 1 – EXAMPLES OF TARGET ADJUSTMENT AND MATHEMATICAL EFFECTS

This annex provides examples on how the targets for sectors are constructed and how they are adjusted for the effects of carbon trading. It also shows examples of the way in which mathematical effects can appear to distort the performance of sectors.

Spreadsheets showing the derivation of all the numbers in this Annex are available from Future Energy Solutions.

A1-1. TARGET ADJUSTMENTS

This section provides an example demonstrating how a sector's CCA target is adjusted to allow for the effects of carbon trading on the UK Emissions Trading Scheme.

Table 1 below shows data for a hypothetical sector. This data is fictitious but serves to show how a sector target is constructed and how the actual performance of the sector is measured against this target. At this point it is assumed that no adjustments are made for trading and that the only energy sources are gas and electricity.

The first few columns of the table show how the sector and target unit targets are put together, using the predicted energy and throughput for the target period. In this case all the targets are in SEC (Specific Energy Consumption) form, i.e. kWh/tonne. The sector target is given by the total predicted energy divided by the total predicted throughput.

Similarly the actual sector and target unit performance SEC values are calculated from the actual energy and throughput values for the target period. In this example the sector target has been met and all the target units would be re-certified, even though two of them have failed to meet their individual targets.

Table 1 also shows the factors to convert between energy in kWh and tonnes CO_2 for each target unit and for the sector as a whole. These are calculated using the conversion factors for gas and electricity, which are based on the standard factors in the CCAs:

$$\text{Target unit kWh/tCO}_2 = \frac{(\text{kWh gas} \times \text{gas kWh/tCO}_2 + \text{kWh electricity} \times \text{electricity kWh/tCO}_2)}{(\text{kWh gas} + \text{kWh electricity})}$$

Table 2 considers the same sector, but now the target units have traded on UK ETS at the end of the target period and the targets need to be adjusted.

The first part of the table shows how two of the target units have bought allowances, two have verified and sold allowances and three have ring-fenced surplus CO_2. The column headed "Net CO_2 Traded/Ring-fenced" shows the total adjustment in tonnes of CO_2 that needs to be made to each target. A negative value (i.e. purchase) will result in an increase (easing) of the target and a positive value (sale or ring-fencing) will result in a decrease (tightening) of the target.

For each target unit, the Net CO_2 figure is converted to kWh using the conversion factor for the target unit shown in Table 1, i.e. based on the actual fuel mix in the target period. This kWh figure is converted into SEC terms by dividing it by the actual target period throughput and is then subtracted from the original target value to produce the adjusted target unit target.

For example, for the first target unit in the table:

- The original target value is 2,000 kWh/tonne
- The target unit has purchased 35 tCO_2
- This is equivalent to 190,150 kWh
- The actual target period throughput is 900 tonnes
- The target adjustment is 190,150/900 = 211 kWh/tonne
- Since the carbon was purchased this adjustment is **added** to the original target: 2,000 + 211 = 2,211 kWh/tonne.

By comparing the actual target period SEC for each target unit with the adjusted target we can see that all of them meet their targets as adjusted for trading.

To calculate the adjustment to the Sector target for this trading, we sum the "kWh reduction in target" figures and divide this total by the total sector throughput in the target period, i.e. 84,199,324 kWh/71,040 tonnes = 1,185 kWh/tonne. This figure is then subtracted from the original sector target to give: 13,016-1,185 = 11,831 kWh/tonne.

When we compare the actual sector performance at the target period with this value we see that the sector has failed to meet its adjusted target.

In determining whether target units should be re-certified the sector performance is considered first and then the performance of the individual target units. In this example, because the sector target has not been met, we have to consider every target unit. It should

be noted that target units 1 and 3 have met their targets because they bought carbon. If they had not done this, but had relied on the sector performance (as in Table 1) they would have been decertified.

Table 1: Construction of sector target and measurement of performance

	Data used to set the target			Actual performance data in the target period						
Target Unit	**Predicted Throughput (tonnes)**	**Predicted Energy (kWh)**	**Target SEC**	Actual Throughput	**Actual Gas Use (kWh)**	**Actual Primary Electricity Use (kWh)**	**Actual Energy**	**Actual SEC**	**Initial Result**	**Target Unit tCO_2/kwh**
1	3,000	6,000,000	2,000	900	1,500,000	490,000	1,990,000	2,211	FAIL	0.0001841
2	5,000	75,000,000	15,000	6,000	45,000,000	29,000,000	74,000,000	12,333	PASS	0.0001806
3	200	500,000	2,500	150	400,000	89,500	489,500	3,263	FAIL	0.0001856
4	10,000	17,000,000	1,700	12,000	11,000,000	7,000,000	18,000,000	1,500	PASS	0.0001807
5	1,000	2,200,000	2,200	990	1,800,000	200,000	2,000,000	2,020	PASS	0.0001876
6	50,000	800,000,000	16,000	51,000	500,000,000	250,000,000	750,000,000	14,706	PASS	0.0001820
Sector Total	**69,200**	**900,700,000**		**71,040**	**559,700,000**	**286,779,500**	**846,479,500**			
	(A)	(B)		(C)	(D)	(E)	(F) = (D+E)			

Gas tCO_2/kWh 0.0001899
Electricity tCO_2/kWh 0.0001661

Sector Target	13,016	(B/A)	**Sector Actual**	11,916	(F/C)	**Result**	PASS
Sector tCO_2/kWh	0.0001819					

Note: The values in cells with a grey background have been calculated from other values in the table.

Table 2: Trading adjustments to targets

	CO_2 Trading on UK ETS				Adjusting targets for Trading				
Target Unit	**Tonnes CO_2 bought**	**Tonnes CO_2 sold**	**Tonnes CO_2 ring-fenced**	**Net CO_2 Traded / Ring-fenced**	**kWh reduction in target**	**Reduction in target SEC**	**Revised TU SEC**	**Result after trading**	**Margin**
1	35			-35	-190,150	-211	2,211	PASS	0
2		2,800	89	2,889	15,997,276	2,666	12,334	PASS	0
3	22			-22	-118,550	-790	3,290	PASS	27
4			433	433	2,396,704	200	1,500	PASS	0
5			33	33	175,953	178	2,022	PASS	2
6		12,000		12,000	65,938,091	1,293	14,707	PASS	1
Total	**57**	**14,800**	**555**						

Net CO_2 traded / ring-fenced by sector by summation	15,298		
Net energy reduction in sector target	84,199,324	**As increment to sector target**	1,185
Revised sector target	11,831	**Result**	FAIL

Note: The values in cells with a grey background have been calculated from other values in the table.

A1-2. MATHEMATICAL EFFECTS ON SECTOR PERFORMANCE

As has been explained in section 2.4, the mathematical effects associated with the construction of sector targets and performance can result in differences between the overall sector performance and the sum of the individual under- and over-performance of target units.

This annex demonstrates these effects through two example scenarios. The numbers used in these examples are fictitious but serve to demonstrate the real effects in certain cases. They also show how the 'equivalent baseline' for a sector can change significantly over time. SEC is Specific Energy Consumption, i.e. energy divided by throughput. Experience has shown that it is unreasonable to assume that companies in the same sector necessarily have similar SECs, due to the diversity of products and processes.

Example 1 – All target units pass but sector fails

For this example we will consider a sector that originally started their agreement with five target units. The original baseline data and second target period targets for the sector and the target units are shown below.

Table 3: Example 1 Original Baseline

	Base year data (1996)			**TP2**
Target Unit	**Throughput**	**Energy**	**SEC**	**Target SEC***
1	100	1000	10	8
2	1000	5000	5	4.5
3	500	10000	20	18
4	2000	100000	50	45
5	200	20000	100	96
SECTOR	**3800**	**136000**	**35.8**	**32.5**

*In this example the targets assume that the throughput remains level between the baseline and the second target period.

By the time of the second target period, the sector has had one exit and one new entrant. The effect of this is to change the baseline data for the sector as shown in Table 4. This data shows the 'equivalent baseline' for the second target period population.

Table 4: Example 1 Equivalent baseline for TP2 population

	Base year data (1996)			TP2
Target Unit	**Throughput**	**Energy**	**SEC**	**Target SEC**
1	100	1000	10	8
2	1000	5000	5	4.5
3	500	10000	20	18
4 (exit)	0	0		
5	200	20000	100	96
6 (entrant)	300	1500	5	4.6
SECTOR	**2100**	**37500**	**17.9**	**16.6**

It can be seen from Table 4 that the effect of the exit and entrant is to significantly change the sector baseline SEC and target.

Table 5 shows the actual second target period performance for Example 1. In this case all of the target units have met their targets, but the sector has failed.

Table 5: Example 1 Actual TP2 performance

	Target Period 2			Target	
Target Unit	**Throughput**	**Energy**	**SEC**	**SEC**	**Pass / Fail**
1	100	790	7.9	8	Pass
2	1000	4500	4.5	4.5	Pass
3	500	8900	17.8	18	Pass
4 (exit)					
5	250	23750	95	96	Pass
6 (entrant)	300	1350	4.5	4.6	Pass
SECTOR	**2150**	**39290**	**18.3**	**16.6**	**Fail**

In this example the target units have all passed but none of them have passed by a huge margin (the best performer is number 6, which is 2.2% ahead of target). However, the sector has failed (approximately 10% behind target).

The reason this has happened is the wide range of SEC values at the baseline (between 5 and 100) and the change in throughput of each target unit over time. The throughput of the highest SEC target unit (number 5) has increased by 25%, but the throughput of the other units has stood still. As a result, the overall sector SEC has increased.

Table 6 below shows how the sector energy consumption has changed in this example.

Table 6: Example 1 Change to Sector Energy

Original baseline energy (Table 3)	136000
Equivalent baseline energy at TP2 (Table 4)	37500
Actual energy consumed at TP2 (Table 5)	39290
TP2 change in energy from original baseline	-96710
TP2 change in energy from equivalent baseline	1790

This demonstrates that the sector has used more energy in the second target period than in the equivalent baseline.

Example 2 – Target units just pass, but the sector does really well

The baseline data for this example is exactly the same as for example 1 above. The only difference is the performance at the target period (marked with a grey background). This is shown in Table 7 below.

Table 7: Example 2 Actual TP2 performance

	Target Period 2			**Target**	
Target Unit	**Throughput**	**Energy**	**SEC**	**SEC**	**Pass / Fail**
1	100	790	7.9	8	Pass
2	1000	4500	4.5	4.5	Pass
3	500	8900	17.8	18	Pass
4 (exit)					
5	200	19000	95	96	Pass
6 (entrant)	700	3150	4.5	4.6	Pass
SECTOR	**2500**	**36340**	**14.5**	**16.6**	**Pass**

In this case the target units have all performed exactly the same way in SEC terms as for example 1. However, the sector has now passed its target by a wide margin (over 12% ahead of target). This is, indeed, a much wider margin than for any of the target units.

The reason for this is the very different throughput profile of the sector to that for example 1. In this example one of the low SEC target units (number 6) has had a significant increase in throughput but the high SEC target unit (number 5) has kept its throughput the same as at the baseline. As a result, the overall sector SEC has fallen.

Table 8 below shows how the sector energy consumption has changed in this example.

Table 8: Example 2 Change to Sector Energy

Original baseline energy (Table 3)	136000
Equivalent baseline energy at TP2 (Table 4)	37500
Actual energy consumed at TP2 (Table 7)	36340
TP2 change in energy from original baseline	-99660
TP2 change in energy from equivalent baseline	-1160

This demonstrates that the sector has used less energy in the second target period than in the equivalent baseline.

This annex exemplifies some of the basic targeting and performance calculations used within the CCAs. It also demonstrates the somewhat unavoidable anomalous mathematical effects, which can occur within the performance assessment process, particularly the relationship between performance at sector and underlying agreement levels. It should be noted however that, whilst such effects exist, they do not affect the integrity of the agreements.

ANNEX 2 - EXPLANATION OF THE SECTOR SUMMARY FORMAT

Annex 3 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 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 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. All other numbers are rounded for display to the nearest integer, or to two significant figures if they are less than 1. Rounding may prevent a simple addition of the numbers quoted in the summaries.

A2-1. 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 are available at www.defra.gov.uk/environment/ccl/index.htm and will be updated from time to time. The list of those facilities certified for the reduced rate climate change levy is given by sector on the Revenue and Customs web site, currently at http://www.hmrc.gov.uk, details under 'Excise & Other', 'Improving our Environment'.

A2-2. 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 baseline data and other agreed variations. Defra has encouraged the correction of errors in baseline 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 (where this is complete). The percentage change is based on the population at the time of the review. The targets given for the second target period (TP2, in the final row of the table) take account of these adjustments to the 2006, 2008 and 2010 targets, where finalised.

Annex 1 gives an example to demonstrate how sector targets are constructed and how they are adjusted for different reasons.

A2-3. ADDITIONAL ADJUSTMENTS TO THE SECTOR TARGET FOR THE SECOND TARGET PERIOD

Finally sector targets are adjusted for any net retirement of UK-ETS allowances or ring-fencing that has taken place. Individual target units or trading groups may buy carbon dioxide 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 may be varied to account for sector level changes in product mix and/ or throughput of the individual target units. This mechanism is described in more detail in paper CCA08.

A2-4. FINAL ADJUSTED SECTOR TARGET FOR THE SECOND TARGET PERIOD

This section of the summary shows the final sector target, as it is when all the adjustments described above have been made. The actual performance of the sector is compared to this adjusted target.

A2-5. SECTOR PERFORMANCE RECORDED

The table given in this section shows the sector performance against the equivalent baseline at the first and second target periods. The “equivalent baseline” is the baseline performance 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 (an example is given in Annex 1) 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.

A2-6. COMMENTARY

This section gives a table showing how the sector has improved relative to the equivalent base year position at each target period. It should be noted that the figures for each target period may be for different populations.

A note may also be given here specifying whether the targets agreed allow for any changes to throughput over the period of the agreement.

Due to the application of ring-fencing, product mix, tolerance bands 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 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. Those not re-certified can maintain their agreement and work to meet their next target with a view to subsequently regaining certification.

A2-7. 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.

A2-8. 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.

A2-8.1. Relative

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. Where possible, the carbon/ energy conversion factors for both the base year and the target period have been employed. Where the former is not readily available, the relevant target period conversion factor is used. This 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.

A2-8.2. Absolute

The base year performance here is simply the recorded summation of the base year energy/ carbon consumption at the baseline for the membership of the sector at the end of each target period. Where possible, the carbon/ energy conversion factors for both the base year and the relevant target period have been employed. Where the former is not readily available, the relevant target period conversion factor is used. 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.

A2-8.3. Production

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.