The EU Emissions Trading Scheme in numbers

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Jakob Graichen, Verena Graichen

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Front page photo: Sunset in the Ruhr
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Author affiliation:
Jakob Graichen, Verena Graichen: Öko-Institut e.V., Berlin, Germany

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Executive Summary

The EU Emissions Trading Scheme is one of the main and most prominent measures of the EU for reducing greenhouse gas emissions and reaching its Kyoto target. One of the main sources for information on the scheme is the community independent transaction log (CITL). This report provides an overview on the information contained in the CITL for the first two years of the trading scheme as well as an assessment of the Commission Decisions for the second trading period from 2008-12.

Objective of the CITL viewer and this report

The data contained in the CITL is not accessible in a user-friendly format. Öko-Institut as part of the European Topic Centre on Air and Climate Change of the European Environment Agency developed the CITL viewer, an analysis tool to explore to the information contained in the CITL. The CITL viewer enables users to assess the data on installations and emissions contained in the CITL by Member State, sector, size and year. The intention is to support governments, market players and other stakeholders in their assessment of the European Emissions Trading Scheme.

Results of the first two years

In the 25 Member States participating in the first two years of the ETS; 10 800 installations fall under the scope of the Emissions Trading Scheme. In each of the years 2005 and 2006, over 2 000 Megatons (Mt) of CO_2 were emitted in the Emissions Trading Scheme annually. The allocation to installations in the trading sector exceeded actual emissions by 60 Mt, corresponding to 3 % of the total amount allocated.

Comparison by sector

The biggest group of installations are combustion installations (sector 1) for the production of electricity and heat. Two thirds of all installations belong to this sector, causing 70 % of the total emissions of the trading sector. Allocation to all installations in sector 1 is slightly below verified emissions (5 Mt CO_2 or 0.4 %). The allocation rules in the first set of national allocation plans tended to favour industrial sectors (on average the allocation exceeded the verified emissions by 11%); the most favoured are installations producing iron and steel (18 % long), manufacturing ceramics (18 % long) or producing pulp, paper and board (19 % long).

Comparison by Member State

There is a difference between the allocation in new Member States and the EU-15. Although many Member States in the EU 15 are currently above their Kyoto targets and therefore have to reduce their emissions further, the situation in the EU 10 is different. In the EU-15, the combustion installation sector was short in terms of allocation in both 2005 and 2006. In 2005, this is chiefly the case because eight combustion installations received between three and six million EUAs less than was necessary. This corresponds to approx. 90 % of the total under-allocation of the sector. In the EU 10, all sectors were long in terms of allocation in both 2005 and 2006. It is striking that in Denmark as well

as in Finland the allocation to combustion installations was in excess of the verified emissions in 2005, whereas in 2006 the case was vice versa. The main reason for this is the role of hydroelectric power plants in the Scandinavian countries: conventional power stations are only used to fill a gap between electricity production from hydro and energy demand. The rainy summer of 2005 was the reason for the increased usage of hydro power and operators of thermal power plants having excess allowances. However, 2006 was a hot year with a very dry summer and electricity generation from conventional power plants was required. For this reason, there was a shortage of allowances and operators had to purchase allowances on the market. On average the sector was long in Denmark and Finland over the two years.

Comparison by size

75 % of all installations covered by the scheme emit less than 50 kt CO_2 per year; their share in overall emissions constitutes only 5 %. 1 282 installations emit less than 0.5 kt CO_2; these installations comprise a share of 0.01 % of the overall emissions. The opposite situation can be found in the group of installations emitting annually over 500 kt CO_2: even though only 758 installations fall into this category (7 %), their share of the total emissions is 80 %.

The second trading period

On average the Commission reduced the proposed caps of the 27 Member States by 10.5 %; with the exception of Denmark, France, Slovenia and the UK all proposed caps had to be reduced. Overall, the proposed caps are 49 Mt CO_2 lower than the average verified emissions in 2005/06. Several Member States also either extended the scope of the trading scheme in their countries or will include installations which were temporarily opted out of the scheme in 2005 and 2006. Together with additional installations which will enter the scheme in 2008 the difference between the annual cap for 2008-2012 and the average verified emissions for 2005/2006 increases to approximately 133 Mt CO_2/yr.

Use of CDM and JI in the second trading period

In total, up to 278 million allowances from project based mechanisms per year may be used in the second trading period by ETS installations. This corresponds to 13.4 % of the cap for the second trading period. If CDM and JI were used up to the allowed cap, CO_2 emissions by ETS installations could increase in the second trading period by 6.5 % or 145 Mt CO_2/yr above the verified emissions in 2005/2006.

Effect of the EU ETS 2008-12

Different approaches exist for the assessment of the effectiveness of the EU ETS but there is not enough data for a consistent and accurate assessment in all EU Member States. Based on the information in the CITL, information on projections reported by member States and the Commission Decisions on the second national allocation plan different estimates have been calculated. For the EU 15, the lower boundary for the impact of the Emissions Trading Scheme on annual emissions is estimated at 150 Mt CO_2, or 3.4 % of the base year emissions.

1 Introduction

The EU Emissions Trading Scheme is one of the main and most prominent measures of the EU for reducing greenhouse gas emissions and reaching its Kyoto target. One of the main sources for information on the scheme is the community independent transaction log (CITL), the registry run by the European Commission. It contains information on all installations covered by the scheme including their activity, allocation and verified emissions on an annual basis; however, the data is not accessible in a user-friendly format. Öko-Institut[1] as part of the European Topic Centre on Air and Climate Change[2] of the European Environment Agency[3] developed the CITL viewer, an analysis tool to explore to the information contained in the CITL. The CITL viewer enables users to assess the data on installations and emissions contained in the CITL by Member State, sector, size and year. This paper is mainly based on the CITL viewer and provides an overview of its functionality. The data was extracted from the CITL on 5 July 2007;[4] it has to be borne in mind that the CITL only contains specific information, not all of it is publicly available and some will only be published after five years. One example is the total national allocation: only the quantity of allowances which are allocated for free are published; specific information on new entrants reserves or auctioning is not available.

The EU Emissions Trading Scheme (ETS) was established by Directive 2003/87/EC[5]. It covers CO_2 emissions from large stationary sources including power and heat generators, oil refineries and installations for the production of ferrous metals, cement, lime, glass and ceramic materials, and pulp and paper. Together these sectors account for approximately 40% of the EU's total greenhouse gas emissions; other sectors (e.g. transport, agriculture, waste) or greenhouse gases (CH_4, N_2O and F-gases) are not covered by the current scheme. Under the ETS, operators receive emission allowances from their government which have to be surrendered after each year, according to the actual verified emissions of their installations during that year. Operators holding more allowances than required for compensating verified emissions may either sell unneeded allowances to operators in the EU who are in need of more allowances or keep them for future years within the trading period. The Linking Directive[6] allows operators to buy JI/CDM credits and bring them into the EU ETS to fulfil their obligations.

Under the EU ETS Directive, Member States prepare national allocation plans (NAP) for each trading period which have to be accepted by the Commission. Amongst other things, the allocation plans include the total quantity of allowances which will be available during a specific trading period as well as the rules for allocating these allowances

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1 www.oeko.de

2 http://air-climate.eionet.europa.eu/

3 http://www.eea.europa.eu/

4 The data of the Maltese installations was extracted on 20 November 2007 to include the verified emissions and allocation data which was not available on the 5 July. As this concerns only 2 of the 10 800 installations; in the following text the date referred to is the 5 July 2007, only.

5 OJ L 275, 25.10.2003, p.32.

6 OJ L 338, 13.11.2004, p. 18.

to operators. On 20 June 2005, the Commission accepted the last of the 25 NAPs for the first trading period (2005-2007). The acceptance process of the second NAPs for the 2008-2012 trading period started in 2006 and lasted until October 2007. Bulgaria and Romania, which joined the EU on 1 January 2007, also had to prepare NAPs for the year 2007 in addition to the second NAPs.

Table 1 provides an overview of some key figures of the Emissions Trading Scheme in 2005. Over 80 % of the installations covered are located in EU 15 Member States; only 20% are located in the new Member States.

The emissions trading sector accounts for 40% of the EU's total greenhouse gas (GHG) emissions. However, the coverage varies substantially between Member States: in France, Latvia, Lithuania, Luxembourg and Sweden, the emissions trading sector accounts for less than 30% of the total national emissions. In seven Member States, the scheme covers more than half of the national GHG emissions. On average, the level of coverage in the new Member States is substantially higher (49%) than in EU-15, in which the trading sector accounts for 39% of total GHG emissions.

Table 1 Key figures of the Emissions Trading Scheme in 2005

Member State	Number of installations covered	Verified emissions [Mt CO_2]	National GHG emissions [Mt CO_2]	Share of ETS in national GHG emissions [%]
Austria	199	33.4	93.3	35.8%
Belgium	322	55.4	143.8	38.5%
Cyprus	13	5.1	9.9	51.4%
Czech Republic	405	82.5	145.6	56.6%
Denmark	388	26.5	63.9	41.4%
Estonia	50	12.6	20.7	61.1%
Finland	606	33.1	69.3	47.8%
France	1 091	131.3	553.4	23.7%
Germany	1 866	474.7	1001.5	47.4%
Greece	152	71.3	139.2	51.2%
Hungary	239	26.0	80.5	32.3%
Ireland	117	22.4	69.9	32.1%
Italy	1 005	225.9	582.2	38.8%
Latvia	101	2.9	10.9	26.2%
Lithuania	101	6.6	22.6	29.3%
Luxembourg	15	2.6	12.7	20.4%
Malta	2	2.0	3.4	57.7%
Netherlands	212	80.4	212.1	37.9%
Poland	834	202.5	399.0	50.8%
Portugal	255	36.4	85.5	42.6%
Slovakia	176	25.4	48.7	52.2%
Slovenia	98	8.7	20.3	43.0%
Spain	1 021	183.6	440.6	41.7%
Sweden	736	19.4	67.0	28.9%
United Kingdom	797	242.5	657.4	36.9%
EU 15	**8 782**	**1 638.7**	**4 192.0**	**39.1%**
EU 10	**2 019**	**374.3**	**761.5**	**49.2%**
EU 25	**10 801**	**2 013.0**	**4 953.5**	**40.6%**

Source: Öko-Institut, CITL (5 July 2007), EEA 2007a

2 The first trading period

2.1 Comparison by sector

In the 25 Member States participating in the first two years of the ETS (Bulgaria and Romania only began participation in 2007), 10 800 installations fall under the scope of the Emissions Trading Scheme. In each of the years 2005 and 2006, over 2 000 Megatons (Mt) of CO_2 were emitted in the Emissions Trading Scheme annually. The allocation to installations in the trading sector exceeded actual emissions by 60 Mt, corresponding to 3 % of the total amount allocated. Table 2 provides an overview of all installations covered by the EU ETS to date.

Table 2 Allocation versus verified emissions for the average 2005/2006

EU-25 Type of installations		Average 2005/2006				
		Number of installations	Allocated allowances [1000 EUA]	Verified Emissions [kt CO_2]	Allocation versus emissions [1000 EUA]	[%]
1	Combustion installations	7 093	1 455 735	1 461 660	-5 925	0%
2	Mineral oil refineries	156	159 463	149 921	9 542	6%
3	Coke ovens	20	22 789	20 247	2 542	11%
4	Metal ore roasting or sintering installations	12	8 679	7 885	794	9%
5	Production of pig iron or steel	233	167 087	136 481	30 606	18%
6	Production of cement clinker or lime	518	188 224	178 387	9 838	5%
7	Manufacture of glass incl. glass fibre	406	22 291	19 834	2 457	11%
8	Manufacture of ceramic products	1 116	18 050	14 772	3 278	18%
9	Production of pulp, paper and board	809	37 035	30 092	6 943	19%
99	Other activity opted-in	437	427	293	134	31%
	All installations	**10 800**	**2 079 781**	**2 019 572**	**60 209**	**3%**

Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)

The installations covered can be classified in ten sectors (according to the annex of the EU ETS Directive, this numeration is used in the CITL). The biggest group of installations are combustion installations (sector 1) for the production of electricity and heat. Two thirds of all installations belong to this sector, causing 70 % of the total emissions of the trading sector. Allocation to all installations in sector 1 is slightly below verified emissions (5 Mt CO_2 or 0.4 %). For all other sectors the overall allocation exceeds the verified emissions by 11 % on average.

Mineral oil refineries and coke ovens (sectors 2 and 3) also belong to the energy activities covered under the Directive. Both sectors are characterised by a rather small number of installations which have high specific emissions. Together they account for 1.6 % of the installations covered and for 8.4 % of the CO_2 emissions. These installations are only relevant for some Member States: there are mineral oil refineries in 19 of the 25 Member States and coke ovens only in seven. Every second coke oven covered by the scheme is located in Poland, even though the largest share of coke oven emissions stems from the UK (13 of 20 Mt CO_2).

The twelve installations for roasting or sintering of metal ore (sector 4) are based in six Member States. Three quarters of the emissions from this sector are caused by two Aus-

trian installations. The fourth largest share of emissions (7 %) stems from sector 5: installations for the production of pig iron or steel including continuous casting, which are located in 20 Member States.

In all Member States except Malta there are installations for the production of cement clinker or lime (sector 6). This sector is responsible for the second largest share of emissions covered in the EU ETS (9 %).

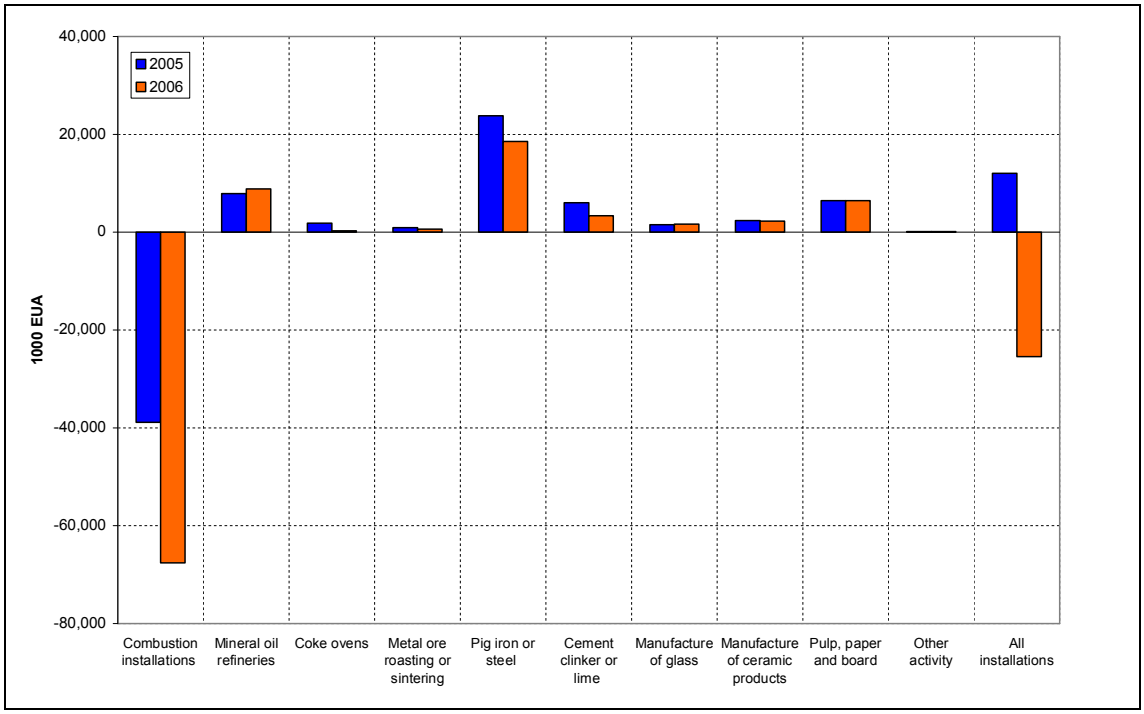
The manufacture of glass and glass fibre (sector 7), of ceramic products by firing (sector 8) and the production of pulp, paper and board (sector 9) account jointly for 3 % of CO_2 emissions in the trading sector. All in all, 22 % of all installations belong to these sectors.

Sector 99 was included to cover other installations opted in under Article 24 of the EU ETS Directive. For example, Sweden decided to include all installations with a thermal input below 20 MW that are nevertheless connected to a district heating network with a total rated thermal input above 20 MW. In practice, the activity of an installation which is listed under sector 99 in the CITL is often not clear. One of the reasons for this is that some Member States included installations erroneously in sector 99, even if no installations in this country were unilaterally included in the scheme. The number of installations belonging to this sector has decreased as more and more cases become clarified. In July 2007, installations in Belgium, Estonia, Finland, France, Latvia, the Netherlands and Sweden were included in sector 99.

There is a difference between the allocation in new Member States and the EU-15. Although many Member States in the EU 15 are currently above their Kyoto targets and therefore have to reduce their emissions further, the situation in the EU 10 is different. Mainly as a result of the transformation of the economic system which took place in the 1990s, emissions in all new EU Member States with reduction targets were below their respective Kyoto targets in 2005. Malta and Cyprus are non-Annex I countries under the Kyoto Protocol and have no quantified emission reduction targets. Every fifth installation covered in the scheme belongs to EU 10 countries.

Figure 1 and Figure 2 represent the difference between allocation and verified emissions by sector for the EU-15 and EU-10 for the years 2005 and 2006.

Figure 1 *Difference between allocation and verified emissions for the EU 15 in 2005 and 2006*



Note: A positive value indicates that the allocation to a sector was higher than the verified emissions for a year.

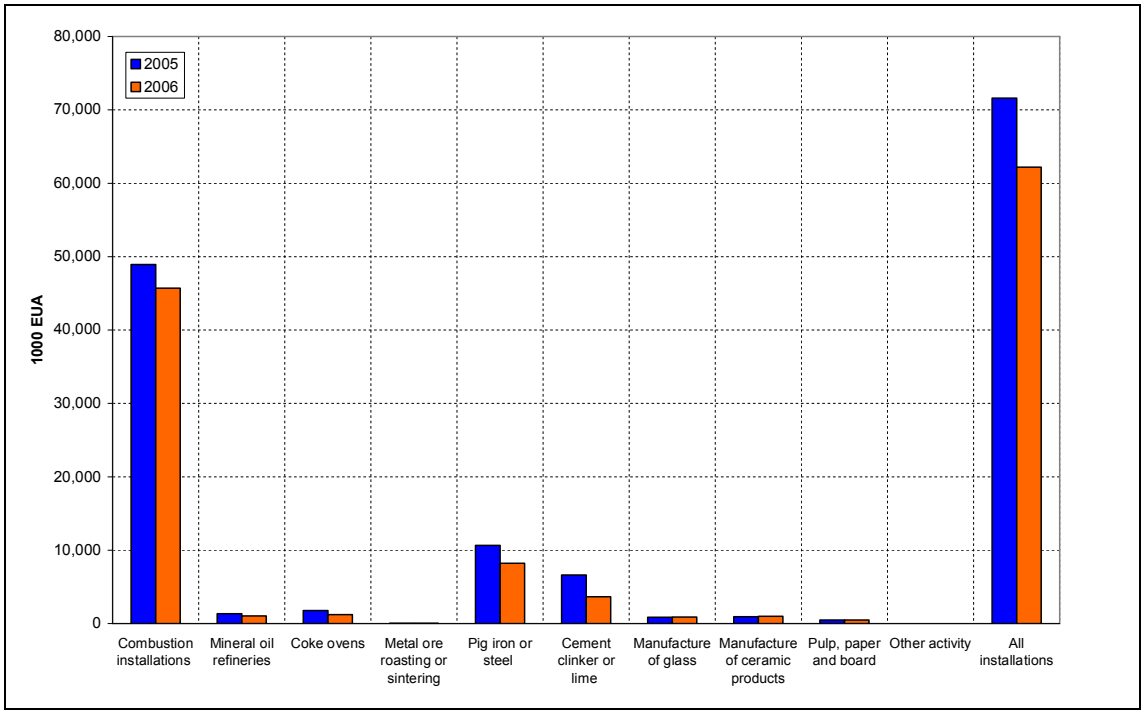
Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)

In the EU-15, the combustion installation sector was short in terms of allocation in both 2005 and 2006. In 2005, this is chiefly the case because eight combustion installations received between three and six million EUAs less than was necessary. These installations emitted almost 35 Mt CO_2 more than allocated for. This corresponds to approx. 90 % of the total under-allocation of the sector.

In 2006 thirteen installations were short by more than 56 million EUAs; this corresponds to approx. 83 % of the total under-allocation of the sector.

In contrast, the overall allocation was higher than the verified emissions in all other sectors. 5 % of the iron and steel installations, which make up more than 50 % of the total allocation in this sector, were each allocated more than 0.5 million EUAs than was actually required compared to the average 2005/2006. Three installations in total received more than 11 million EUAs than necessary.

Figure 2 *Difference between allocation and verified emissions for the EU 10 in 2005 and 2006*

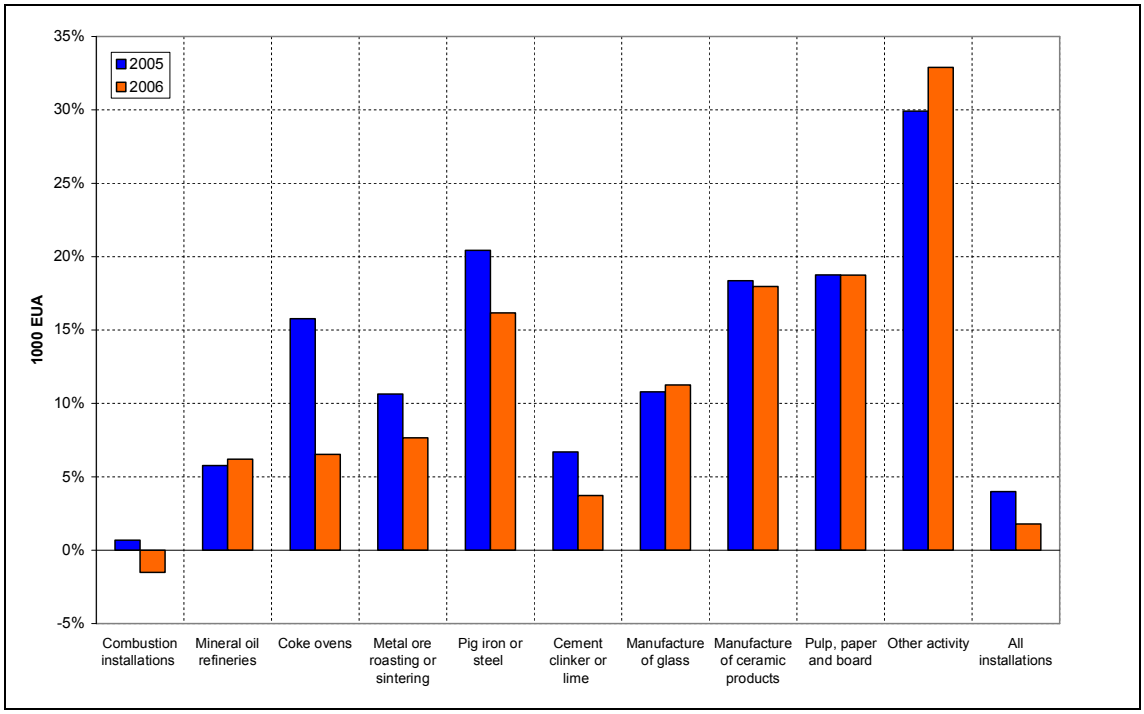


Source: *Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)*

In the EU 10, all sectors were long in terms of allocation in both 2005 and 2006. A threshold of 10 % for absolute small deviations between allocation and verified emissions relates to 70 % of the installations in total. This means that 70 % of the installations, which make up 49 % of the allocation in all sectors, received at least 10 % more EUAs in each case than necessary. Only 5 % of the installations were allocated on average 10 % EUAs too few in 2005/2006 (corresponding to 2 % of the allocation in all sectors). The same applies to the combustion sector, which accounts for a large share of the whole over-allocation in the EU 10, receiving on average 47.5 million EUAs in 2005/2006. Overall 24 installations were each allocated more than 0.5 million EUAs than were actually required compared to the average 2005/2006 emissions; only one installation received less than 0.5 million EUAs than necessary.

In comparison, only 49 % of the installations in the EU 15 were allocated at least 10 % more than necessary.

Figure 3 *Relative differences between allocation and verified emissions for the EU 25 in 2005 and 2006 by sector*



Source: *Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)*

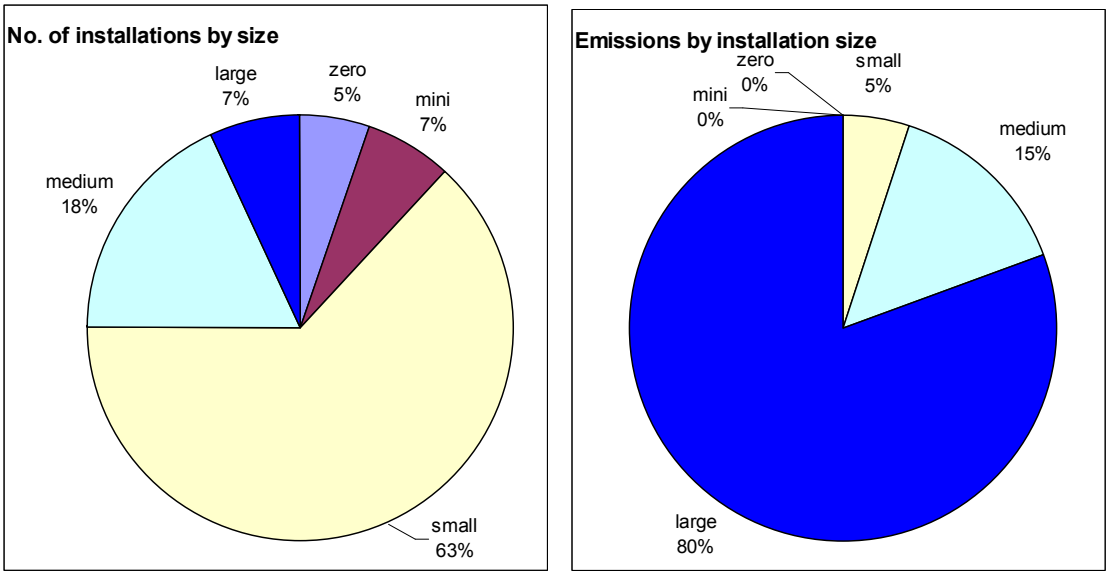
Figure 3 illustrates the relative differences between allocation and verified emissions for the EU 25 by sector. This analysis demonstrates that the combustion sector received approximately as many EUAs as necessary over the two years; all other sectors were subsidised by the Emissions Trading Scheme. The sectors pig iron and steel, manufacture of glass as well as pulp and paper profited the most, acquiring a difference of over 15 % between allocation and verified emissions.

It has to be pointed out that if a sector received more allocations than their emissions in total, it might not be true for individual installations in these sectors, whose emissions might have exceeded the allocation received or vice versa.

2.2 Comparison by size

75 % of all installations covered by the scheme emit less than 50 kt CO_2 per year; their share in overall emissions constitutes only 5 %. 1 282 installations emit less than 0.5 kt CO_2; these installations comprise a share of 0.01 % of the overall emissions. The opposite situation can be found in the group of installations emitting annually over 500 kt CO_2: even though only 758 installations fall into this category (7 %), their share of the total emissions is 80 %.

Figure 4 *Numbers of installations by size and emissions by installation size for the EU 25 (average 2005/2006)*



Notes:

Mini: *emitters below 0.5 kt CO_2 emissions*

Small: *emitters 0.5 to 50 kt CO_2 emissions*

Medium: *emitters 50 to 500 kt CO_2 emissions*

Large: *emitters over 500 kt CO_2 emissions*

Zero: *emitters with verified zero emissions*

Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)

The sector with the highest share of small installations (1 027 of 1 116 installations) is the manufacture of ceramic products by firing (sector 8). Of the remaining installations, 25 have de minimis emissions (under 0.5 kt), 32 are medium emitters (50 to 500 kt CO_2) and 32 installations have certified zero emissions. There are no large emitters either in this sector or in the sectors 'production of pulp, paper and board' and 'other activities opted-in'. Mineral oil refineries belong to the sector with the largest share of installations, having high emissions (54 %) which cause 92 % of the sectoral emissions.

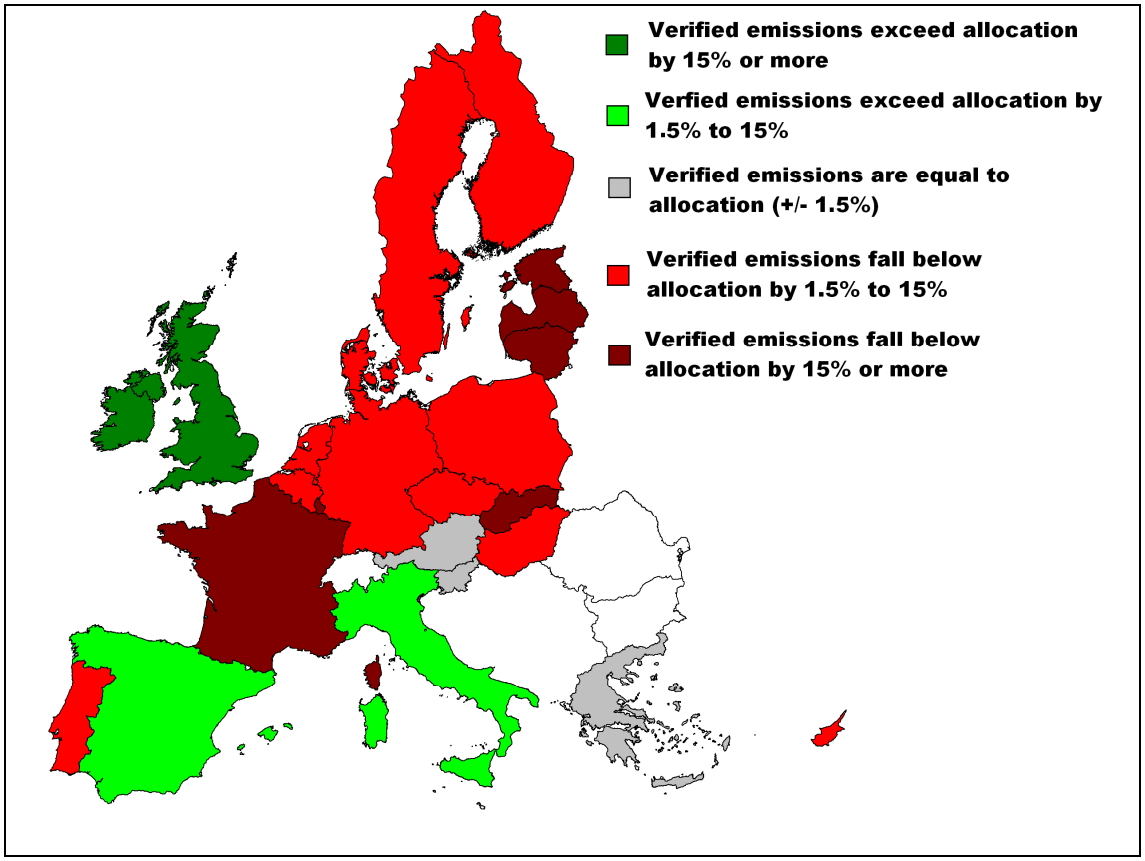
There can be several reasons as to why an installation can have certified zero emissions, e.g. installations acting as reserve capacity, installations closed down temporarily (e.g. for maintenance or after major damage has occurred in the installation) or permanently.

2.3 Comparison by Member States

In the following a comparison of the allocation and verified emissions for all sectors by Member State is outlined. Figure 5 and Figure 6 show that the total allocation in most countries is higher than verified emissions for the years 2005/2006. Exceptions are Spain, Italy and the United Kingdom; in these countries the emissions were higher than allocated for. Poland is the country with the most significant emissions in the EU 10

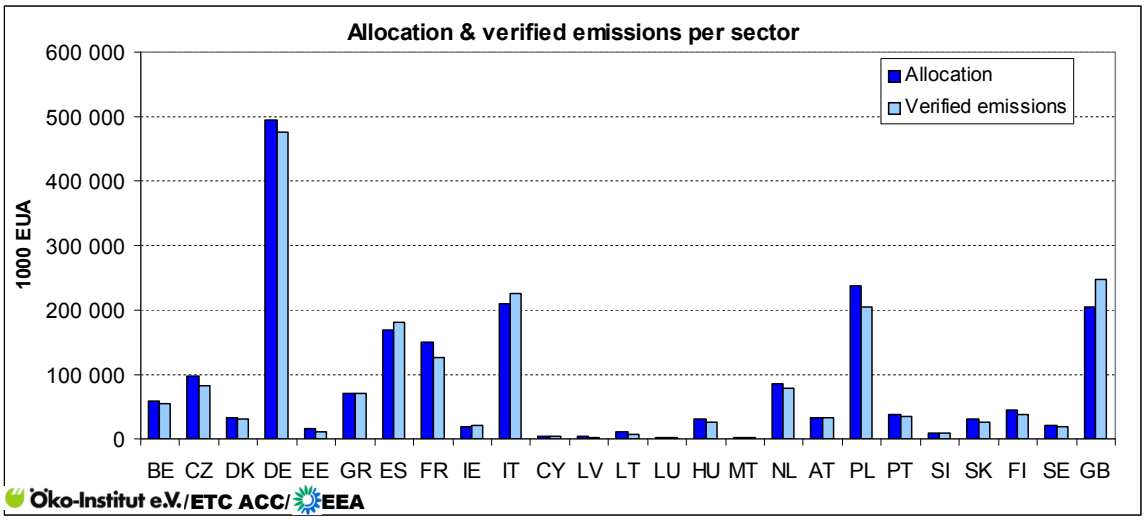
(approx. 202 Mt CO_2) followed by the Czech Republic. In the EU 15 Germany has the highest emissions followed by the United Kingdom, Italy, Spain and France. In all other countries emissions are, almost without exception, significantly below 100 Mt CO_2.

Figure 5 *Relation of verified emissions to allocation in relative terms (average 2005/2006)*



Source: *Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)*

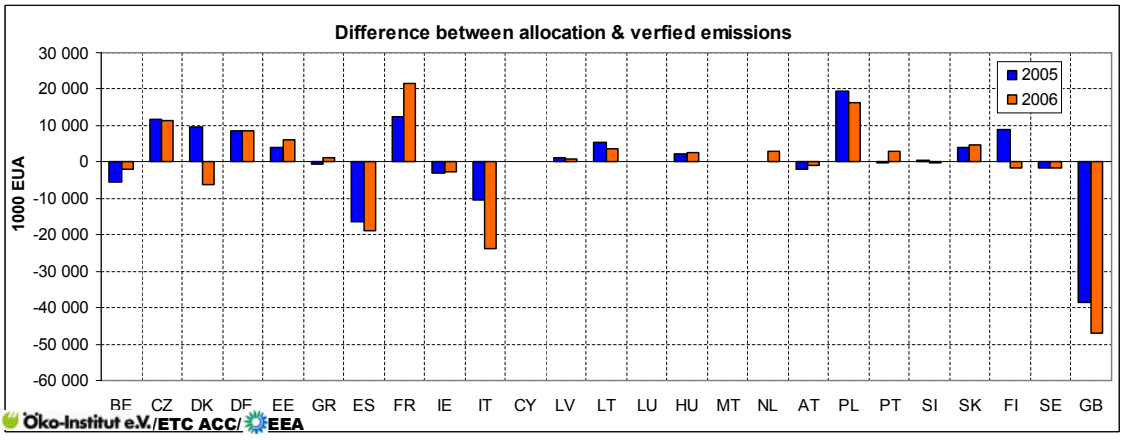
Figure 6 *Allocation and verified emissions for all sectors by Member State (average 2005/2006)*



Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)

In Figure 6 total allocation was compared to verified emissions. Figure 7 shows the difference between allocation and verified emissions for combustion installations in 2005 and 2006. In France and Poland combustion installations received 17 and 18 million EUAs more than was necessary respectively compared to average emissions in 2005/2006; the allocation to combustion installations in Poland was 2.5 times higher than in France, i.e. the over-allocated share in the French combustion sector is 23 % and in Poland 'only' 9 %.

Figure 7 *Difference between allocation and verified emissions for combustion installations by Member State*



Source: *Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)*

In six countries the combustion installation sector was short in both 2005 and 2006. It is striking that in Denmark as well as in Finland the allocation was in excess of the veri-

fied emissions in 2005, whereas in 2006 the case was vice versa. The main reason for this is the role of hydroelectric power plants in the Scandinavian countries: conventional power stations are only used to fill a gap between electricity production from hydro and energy demand. The rainy summer of 2005 was the reason for the increased usage of hydro power and operators of thermal power plants having excess allowances. However, 2006 was a hot year with a very dry summer and electricity generation from conventional power plants was required. For this reason, there was a shortage of allowances and operators had to purchase allowances on the market. On average the sector was long in Denmark and Finland over the two years.

2.4 Assessment of the 2005 to 2007 trading period

In many ways the first trading period from 1 January 2005 until 31 December 2007 can be seen as a trial phase, taking into account that the EU ETS is the first multinational emissions trading scheme of this magnitude. There was only limited information available on historic emissions for individual installations during the drafting and assessment of the first national allocation plans. Some Member States included special allocation rules in their NAPs, which led to substantial distribution effects. In addition, the set up of the scheme with national allocation plans led to a situation where national governments were under strong pressure from business association to draft NAPs favourable for business. The limited knowledge about the new market was also visible in the volatile price development for EU allowances (EUA); the price for one tonne of carbon dioxide started at around 7 €/EUA, rose to a maximum of approximately 30 €/EUA and dropped sharply after the publication of the first verified emissions in April 2006 to below 10 €/EUA. With the warm winter of 2006/2007 it became generally accepted that the EU carbon market for the 2005-2007 period would remain long and the price dropped to below 1 €/EUA in spring 2007 (Figure 9).

The CITL provides an indication of the underlying reasons for the over-allocation during the first period of the scheme. An analysis by sector and Member State shows that only 29 sectors were short of allocations in terms of the 2005/2006 average; in contrast, 139 sectors received more allowances than needed for the same period (Table 3). The analysis also shows that there are large differences between sectors and Member States. Verified emissions were higher than the allocation in only five Member States (Austria, Ireland, Italy, Spain and the UK). In contrast allocation exceeded verified emissions by more than 10 % in eleven countries, of which eight are new Member States. There is a clear difference between EU 15 and new Member States. EU 15 operators are, on average, 0.4% short whereas in the EU 10 operators are, on average, 15 % long. These country groups are themselves not homogeneous, e.g. Luxembourg allocated 18 % more than was necessary while emissions in Slovenia were only 1 % below allocation.

The EU totals show that the allocation rules in the first set of national allocation plans tended to favour industrial sectors; the most favoured are installations producing iron and steel (18 % long), manufacturing ceramics (18 % long) or producing pulp, paper

and board (19 % long). The combustion installation sector is the only short sector (-0.4 %) in the EU 25.

Despite these general trends, there are large differences between Member States and sectors, e.g. installations for the production of iron and steel were short by 9% in Slovenia and long by 54% in Poland. In total fifteen sectors in nine Member States received at least 3 Mt CO_2/yr more than they actually emitted (Table 4):

- the 'combustion installations' sector in eight countries (Poland, France, Czech Republic, Germany, Estonia, Lithuania, Slovakia and Finland);
- the 'production of iron and steel' sector in five countries (Poland, Belgium, the Netherlands, Spain and Sweden);
- the 'production of cement clinker or lime' sector in two countries (Germany and Poland).

The sectoral figures are not necessarily a good indication for individual installations, e.g. there are several power stations located in Germany which were short by over 1 Mt CO_2/yr despite the overall over-allocation in this sector in Germany (Table A- 1). In addition, the difference between allocation and verified emissions can also be an accounting issue to a large extent. There are several cases, especially in the iron and steel sector, in which installations transfer blast furnace gas to a combustion installation for the production of electricity and/or heat. The related CO_2 emissions occur at the combustion installation but the allocation was given to the iron and steel company. According to the CITL the respective combustion installation will be short while the iron and steel company appears long. In reality the allowances are normally transferred together with the blast furnace gas. An example is Belgium, for which the over-allocation of the iron and steel sector drops from 37 % to 5 % and the combustion installation sector is long by 3 % instead of being short by 15 % (Table 3) if this effect is taken into account.

All in all the 30 sectors by Member State with the highest over-allocation received 127.9 Mt CO_2/yr more than needed; in contrast, all 29 sectors which were short had to buy only 90.8 Mt CO_2/yr. The difference of 37.1 Mt CO_2/yr corresponds to 60% of the overall over-allocation of the scheme in these two years.

Another aspect of the allocation rules is demonstrated in Figure 8: the rules tended to err on the generous side. The graph shows the number of installations by difference between allocation and verified emissions. It can be seen that for the vast majority of installations the difference between allocation and verified emissions was less than 50 kt CO_2/yr. It can also be seen that there is a significant bias to the long side; the curve is asymmetrical, 2 407 installations had to acquire up to 100 kt CO_2/yr units while 6 536 installations had the possibility of selling up to the same quantity of allowances. The difference between allocation and verified emissions is quite small but the sheer quantity of installations being slightly long contributes significantly to the overall over-allocation of the EU ETS during the first phase. The insert in the figure shows the cumulated allocation above (long) / below (short) verified emissions as a function of the difference between allocation and verified emissions. It can be seen that the cumulative

over-allocation of installations being long rises sharply initially compared to the cumulative under-allocation.

Table 3 *Difference between allocation and verified emissions by Member State and sector in absolute and relative terms (average 2005/2006)*

	Combustion installations	Mineral oil refineries	Coke ovens	Metal ore roasting or sintering	Pig iron or steel	Cement clinker or lime	Manu-facture of glass	Manu-facture of ceramics	Pulp, paper & board	Other activity opted in	Total
Belgium	-3 806	974	0	0	5 646	1 020	18	70	125	9	4 055
Czech Republic	11 576	319	0	0	964	695	31	123	162	0	13 871
Denmark	1 798	93	0	0	-3	287	15	23	-1	0	2 213
Germany	8 592	342	525	0	2 324	3 511	734	630	1 947	0	18 604
Estonia	5 033	0	0	0	0	28	3	5	34	0	5 103
Greece	278	-538	0	-41	407	302	48	28	13	0	497
Spain	-17 655	-263	4	-12	3 277	495	369	755	443	0	-12 587
France	17 068	1 855	115	25	1 500	120	318	293	1 747	47	23 087
Ireland	-2 854	5	0	0	0	-184	8	4	8	0	-3 012
Italy	-17 056	1 630	0	0	-168	-1 593	28	95	-131	0	-17 194
Cyprus	247	0	0	0	0	84	0	43	0	0	373
Latvia	1 023	0	0	0	6	28	49	53	-1	7	1 167
Lithuania	4 399	571	0	0	0	331	91	19	38	0	5 449
Luxembourg	196	0	0	0	206	132	38	0	0	0	571
Hungary	2 526	52	22	21	972	394	16	231	37	0	4 271
Malta	148	0	0	0	0	0	0	0	0	0	148
Netherlands	1 515	1 848	0	0	4 012	199	3	-3	320	0	7 894
Austria	-1 473	-108	53	801	-12	42	3	39	306	0	-350
Poland	18 000	194	1 478	0	7 507	3 217	626	384	48	0	31 454
Portugal	1 208	252	0	0	80	213	33	318	50	0	2 154
Slovenia	133	0	0	0	-15	-38	3	-5	54	0	134
Slovakia	4 370	49	0	0	-4	397	50	105	115	0	5 083
Finland	3 603	324	0	0	616	294	10	3	885	48	5 781
Sweden	-1 744	502	0	0	3 244	54	-10	23	663	24	2 755
United Kingdom	-42 901	1 443	344	0	46	-188	-28	41	81	0	-41 162
EU-25	**-5 777**	**9 542**	**2 542**	**794**	**30 606**	**9 838**	**2 457**	**3 278**	**6 943**	**134**	**60 357**
EU-15	-53 232	8 357	1 042	773	21 175	4 702	1 586	2 320	6 455	127	-6 694
EU-10	47 455	1 185	1 500	21	9 431	5 135	871	958	489	7	67 051

	Combustion installations	Mineral oil refineries	Coke ovens	Metal ore roasting or sintering	Pig iron or steel	Cement clinker or lime	Manu-facture of glass	Manu-facture of ceramics	Pulp, paper & board	Other activity opted in	Total
Belgium	-15%	15%			37%	11%	1%	10%	14%	67%	7%
Czech Republic	14%	23%			17%	16%	4%	15%	38%		14%
Denmark	6%	18%				10%	17%	6%	-7%		7%
Germany	2%	1%	15%		7%	11%	16%	26%	27%		4%
Estonia	29%					43%	9%	9%	37%		29%
Greece	1%	-16%		-5%	51%	3%	45%	4%	7%		1%
Spain	-18%	-2%	16%	-6%	29%	2%	13%	13%	9%		-7%
France	23%	9%	34%	28%	5%	1%	8%	23%	33%	25%	15%
Ireland	-19%	1%				-5%	27%	14%	90%		-16%
Italy	-13%	6%			-1%	-6%	1%	13%	-3%		-8%
Cyprus	6%					5%		25%			7%
Latvia	33%				2%	8%	55%	58%	-8%	25%	29%
Lithuania	54%	25%				25%	60%	39%	45%		45%
Luxembourg	13%				32%	16%	15%				18%
Hungary	12%	4%	8%	6%	44%	14%	5%	27%	18%		14%
Malta	7%										7%
Netherlands	3%	14%			39%	24%	1%	-1%	15%		9%
Austria	-10%	-4%	4%	12%	-22%	1%	1%	8%	13%		-1%
Poland	9%	6%	37%		56%	23%	32%	27%	17%		13%
Portugal	5%	8%			26%	3%	5%	27%	14%		6%
Slovenia	2%				-9%	-4%	5%	-6%	11%		1%
Slovakia	30%	2%			0%	11%	27%	49%	73%		17%
Finland	13%	11%			9%	15%	6%	4%	19%	37%	13%
Sweden	-32%	13%		0%	45%	2%	-4%	40%	26%	32%	12%
United Kingdom	-27%	7%	3%		1%	-3%	-7%	24%	31%		-20%
EU-25	**0%**	**6%**	**11%**	**9%**	**18%**	**5%**	**11%**	**18%**	**19%**	**31%**	**3%**
EU-15	-5%	6%	6%	9%	16%	3%	8%	16%	18%	32%	0%
EU-10	13%	11%	35%	6%	30%	18%	24%	25%	28%	25%	15%

Notes: *A positive sign indicates that verified emissions (2005/2006 average) were lower than allowances (long sector). A negative sign indicates a short sector.*

In Belgium and Sweden, installations belonging to the iron and steel sector transferred blast furnace gas to the combustion installation sector. The values in brackets indicate how

long/short the sectors would be if this transfer of emissions from one sector to another is taken into account. The same applies to the Netherlands, but no figures were provided.

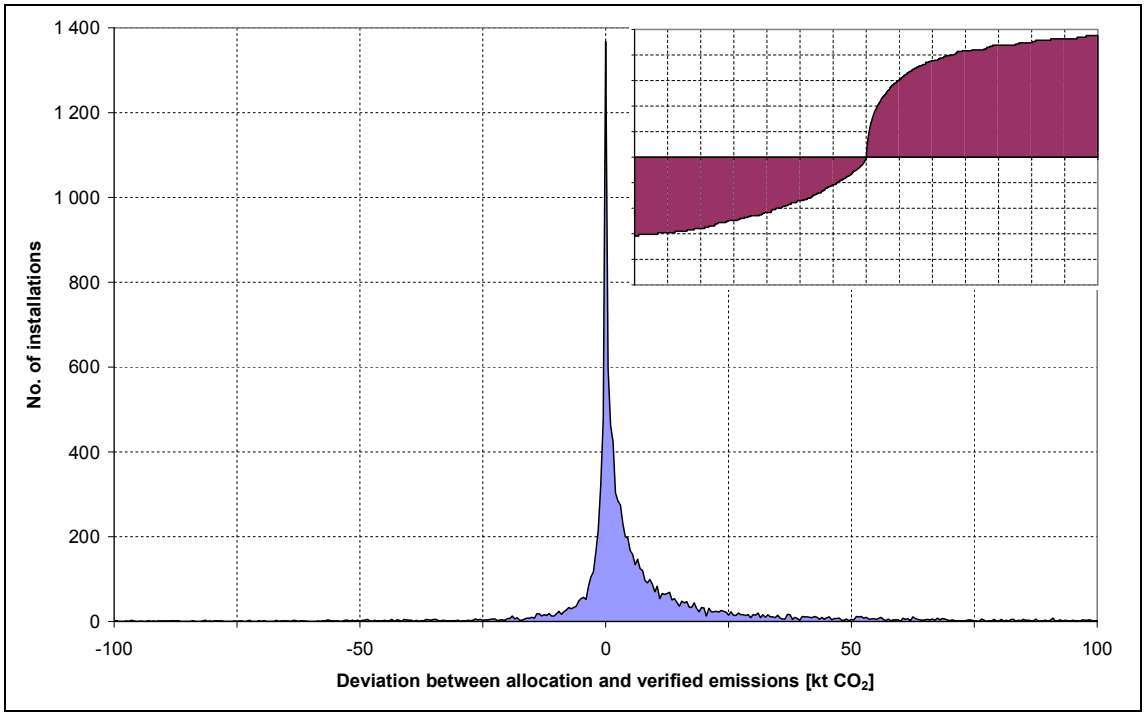
Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)

Table 4 Top 30 over-allocation by sector in absolute terms (average 2005/2006)

Rank	MS	Sector	Sector name	Allocation	Verified Emissions	Difference	
				[1000 EUA]	[kt CO_2]	[1000 EUA]	[%]
1	PL	1	Combustion installations	198,638	180,638	**18,000**	9%
2	FR	1	Combustion installations	73,001	55,933	**17,068**	23%
3	CZ	1	Combustion installations	83,325	71,749	**11,576**	14%
4	DE	1	Combustion installations	382,348	373,756	**8,592**	2%
5	PL	5	Production of pig iron or steel	13,349	5,841	**7,507**	56%
6	BE	5	Production of pig iron or steel	15,404	9,758	**5,646**	37%
7	EE	1	Combustion installations	17,215	12,182	**5,033**	29%
8	LT	1	Combustion installations	8,087	3,688	**4,399**	54%
9	SK	1	Combustion installations	14,466	10,096	**4,370**	30%
10	NL	5	Production of pig iron or steel	10,398	6,386	**4,012**	39%
11	FI	1	Combustion installations	27,621	24,018	**3,603**	13%
12	DE	6	Production of cement clinker or lime	31,956	28,445	**3,511**	11%
13	ES	5	Production of pig iron or steel	11,204	7,927	**3,277**	29%
14	SE	5	Production of pig iron or steel	7,240	3,996	**3,244**	45%
15	PL	6	Production of cement clinker or lime	14,216	10,999	**3,217**	23%
16	HU	1	Combustion installations	21,827	19,300	**2,526**	12%
17	DE	5	Production of pig iron or steel	33,646	31,322	**2,324**	7%
18	DE	9	Production of pulp, paper and board	7,118	5,171	**1,947**	27%
19	FR	2	Mineral oil refineries	20,233	18,378	**1,855**	9%
20	NL	2	Mineral oil refineries	13,645	11,797	**1,848**	14%
21	DK	1	Combustion installations	28,633	26,834	**1,798**	6%
22	FR	9	Production of pulp, paper and board	5,268	3,522	**1,747**	33%
23	IT	2	Mineral oil refineries	27,305	25,675	**1,630**	6%
24	NL	1	Combustion installations	58,608	57,093	**1,515**	3%
25	FR	5	Production of pig iron or steel	28,620	27,120	**1,500**	5%
26	PL	3	Coke ovens	3,984	2,505	**1,478**	37%
27	GB	2	Mineral oil refineries	19,624	18,181	**1,443**	7%
28	PT	1	Combustion installations	23,991	22,783	**1,208**	5%
29	LV	1	Combustion installations	3,129	2,106	**1,023**	33%
30	BE	6	Production of cement clinker or lime	9,192	8,172	**1,020**	11%

Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)

Figure 8 *Number of installations being long/short by difference between allocation and verified emissions (average 2006/06)*



Notes: *The insert shows the cumulative allocation above (long) / below (short) verified emissions (Y-axis) as a function of the difference between allocation and verified emissions (X-axis).*

Source: *Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)*

3 Second trading period

For the second trading period, the Commission has been much stricter towards Member States to ensure that the covered sectors reduce emissions or acquire emission allowances (Table 5). On average the Commission reduced the proposed caps of the 27 Member States by 10.5 %. This corresponds in fact to a reduction of 12.8 % on average of the total quantity of allowances for 23 Member States, and the acceptance of NAPs without cuts for four Member States (Denmark, France, Slovenia and the United Kingdom). The Baltic States had to reduce their proposed caps by the highest percentages (Estonia: -47.8 %, Latvia: -55.5 % and Lithuania: -47 %); in contrast, the Spanish cap was only reduced by 0.3%. In absolute terms the caps of Poland (76.1 Mt CO_2/yr), Germany (28.9 Mt CO_2/yr) and Bulgaria (25.3 Mt CO_2/yr) were the ones most significantly reduced. In total the allowed cap for the 27 Member States 49 Mt CO_2/yr lower than the average verified emissions for 2005/2006 and 244 Mt CO_2/yr lower than the proposed cap. Several Member States also either extended the scope of the trading scheme in their countries or will include installations which were temporarily opted out of the scheme in 2005 and 2006. Together with these installations, the difference be-

tween the annual cap for 2008-2012 and the average verified emissions for 2005/2006 increases to approximately 133 Mt CO_2/yr, which represents 6.3 % of the average verified emissions for 2005/2006.

The Czech Republic, Estonia, Hungary, Latvia, Slovakia and Poland decided to challenge the Commission Decisions on their second national allocation plans in court, arguing that the caps would impede their economic development. In total the proposed cap for these six countries is 121.3 Mt CO_2/yr higher than the allowed cap. Should the courts rule in favour of these Member States and give them the right to allocate the requested quantity to their operators, there is a danger that there would again be excess allowances during the second trading period of the EU ETS. An emissions trading scheme can only function properly when there is an overall shortage of emission allowances in the system, as can be observed from the first period.

The carbon market supports the assessment that operators on average will need to reduce emissions or buy emission allowances. The future price for 2008 allowances has remained at between 12 €/EUA and 25 €/EUA since the start of the assessment of the second national allocation plans in July 2006 despite the parallel free fall of the carbon price in the first trading period (Figure 9).

Table 5 Overview of the second national allocation plans and the Commission Decisions taken up to 22 October 2007

Member State	1st period cap	Verified emissions [average 2005/2006]	Proposed cap 2008-2012	Cap allowed 2008-2012	Add. emissions in 2008-2012[b]
	[MEUA/a]	[Mt CO_2]	[MEUA]	[MEUA]	[Mt CO_2]
Austria	33.0	32.9	32.8	30.7	0.3
Belgium	62.1	55.1	63.3	58.5	5.0
Bulgaria[a]	42.3	40.6	67.6	42.3	n.a.
Cyprus	5.7	5.2	7.12	5.48	n.a.
Czech Republic	97.6	83.0	101.9	86.8	n.a.
Denmark	33.5	30.3	24.5	24.5	0.0
Estonia	19.0	12.4	24.38	12.72	0.3
Finland	45.5	38.9	39.6	37.6	0.4
France	156.5	127.3	132.8	132.8	5.1
Germany	499.0	476.1	482	453.1	11.0
Greece	74.4	70.6	75.5	69.1	n.a.
Hungary	31.3	25.9	30.7	26.9	1.4
Ireland	22.3	22.1	22.6	22.3	n.a.
Italy	223.1	226.5	209	195.8	n.k.[c]
Latvia	4.6	2.9	7.7	3.43	n.a.
Lithuania	12.3	6.6	16.6	8.8	0.1
Luxembourg	3.4	2.7	3.95	2.5	n.a.
Malta	2.9	1.98[e]	2.96	2.1	n.a.
Netherlands	95.3	78.5	90.4	85.8	4.0
Poland	239.1	205.7	284.6	208.5	6.3
Portugal	38.9	34.8	35.9	34.8	0.8
Romania[a]	74.8	70.8	95.7	75.9	n.a.
Slovakia	30.5	25.4	41.3	30.9	1.7
Slovenia	8.8	8.8	8.3	8.3	n.a.
Spain	174.4	178.2	152.7	152.3	6.7[d]
Sweden	22.9	19.6	25.2	22.8	2.0
United Kingdom	245.3	246.8	246.2	246.2	39.5[f]
SUM - EU 27	**2298.5**	**2129.6**	**2325.3**	**2080.9**	**84.6**

[a] The emissions for 2005/2006 are taken from the Commission Press release on the adoption of the last second national allocation plan. summary tables of the NAP 2 submissions. These values are not independently verified.

[b] The figures indicated in this column comprise emissions in installations that come under the coverage of the scheme in 2008 to 2012 due to an extended scope applied by the Member State and do not include new installations entering the scheme in sectors already covered in the first trading period.

[c] Italy has to include further installations. The amount of additional emissions is not known at this stage.

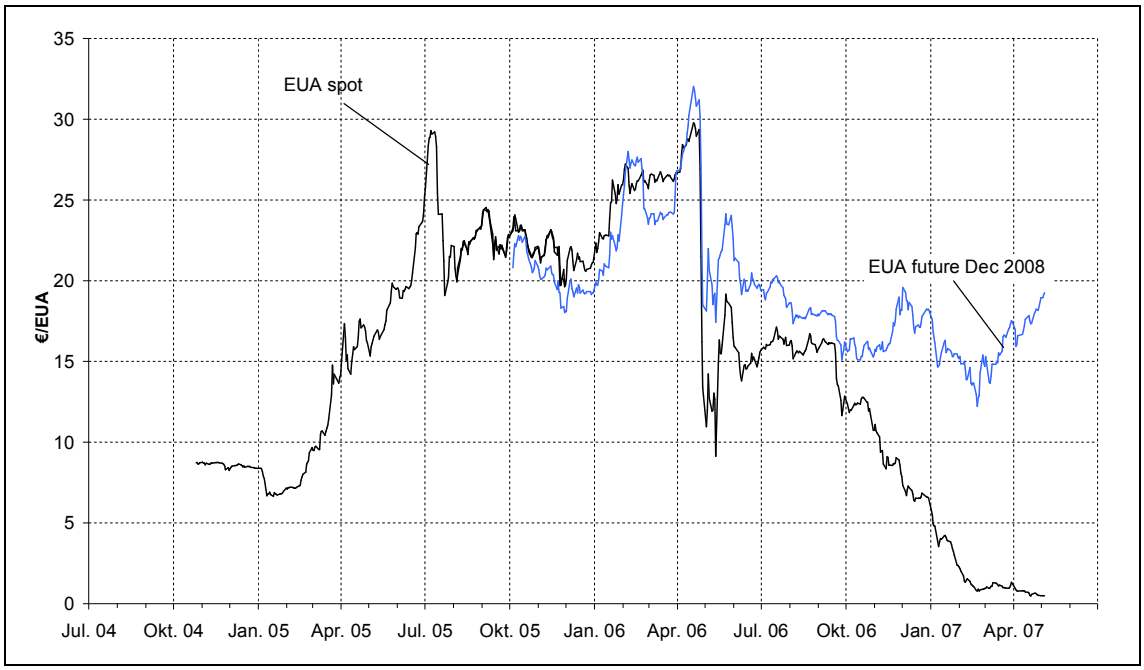
[d] The value represents the verified emissions of 2005. It was taken from the commisions summary information table.

[e] Additional installations and emissions of over 6 million tonnes are already included as of 2006.

[f] The figure includes installations which the UK opted to exclude temporarily in 2005/06 and which are estimated to amount to some 30 Mt.

Source: EC 2007, CITL (5 July 2007)

Figure 9 Carbon spot and future prices since 2004



Source: EEX, illustration by Öko-Institut

3.1 Use of CDM and JI

As part of the second national allocation plans, Member States had to include a limit on the maximum use of project-based credits (JI and CDM) by operators. In the first trading period of the ETS, the project-based mechanisms are not expected to be used much, if at all, mainly due to low allowance prices in 2006 and 2007 and the outstanding link of the EU registries system to the ITL[7]. The use of CDM and JI is expected to gain importance in the second trading period. Table 6 shows the limits accepted by the Commission on the use of JI and CDM by operators in Member States.

In total, up to 278 million CERs[8] or ERUs[9] may be used per year in the second trading period by ETS installations in 27 Member States. This corresponds to 13.4 % of the cap for the second trading period. If CDM and JI were used up to the allowed cap, CO_2 emissions by ETS installations could increase in the second trading period by 6.5 % or 145 Mt CO_2/yr above the verified emissions in 2005/2006 (including additional emissions from installations that are only in the second trading period covered under the ETS). Thus, the use of the flexible mechanisms in the second trading period may exceed the absolute emission reductions required by ETS installations, which constitutes about 133 Mt CO_2/yr (Figure 10). The limit is more than twice the difference between the

[7] Independent transaction log under the Kyoto Protocol, operated by the UNFCCC secretariat. There will be a link between the CITL and the ITL only during the Kyoto period.

[8] Certified emission reductions (applies to emission reductions under JI)

[9] Emission reduction units (applies to emission reductions under the CDM)

2008-2012 cap and current emissions for installations included in the approved NAPs. This is also almost three times higher than the intended use of Kyoto mechanisms by EU Member States. In effect, this means that operators under the EU ETS do not have to reduce their emissions, but are able to completely offset excess emissions through the acquisition of emission reduction units.

The use of CDM and JI in the ETS sector may be even larger than the use in the non-ETS sectors. In the non-ETS sector, governmental purchase programmes are expected to acquire 107.5 million CERs or ERUs per year. This corresponds to 3 % of the emissions in the non-ETS sector, whereas the cap on CDM and JI in the ETS sector corresponds to 13.4% of the emissions. Overall these figures might raise questions concerning the supplementarity of the use of flexible mechanisms: according to Articles 6 and 17 of the Kyoto Protocol the use of flexible mechanisms shall be supplemental to domestic actions. The planned government use of the mechanisms together with the maximum allowed use for operators corresponds to 7.1 % of the base year emissions for the EU 25. The average quantified emission reduction target under the Kyoto Protocol is 8% for EU countries, not much higher than the possible use of flexible mechanisms.

However, the limits for the use of JI and CDM credits represent an upper boundary and there are several reasons why the credits may not be totally used up. Firstly, the limits are largely defined per installation and in many cases not differentiated. Industrial installations, which received more generous allocations than power plants, might not make use of the option to acquire JI and CDM credits and sell allowances. Secondly, installations in those Member States that are close to achieving or are on track to overachieving their Kyoto targets do not face as strict allocations and, as is the case with industrial installations, may not purchase a significant number of JI and CDM credits to use up the limit awarded to them.

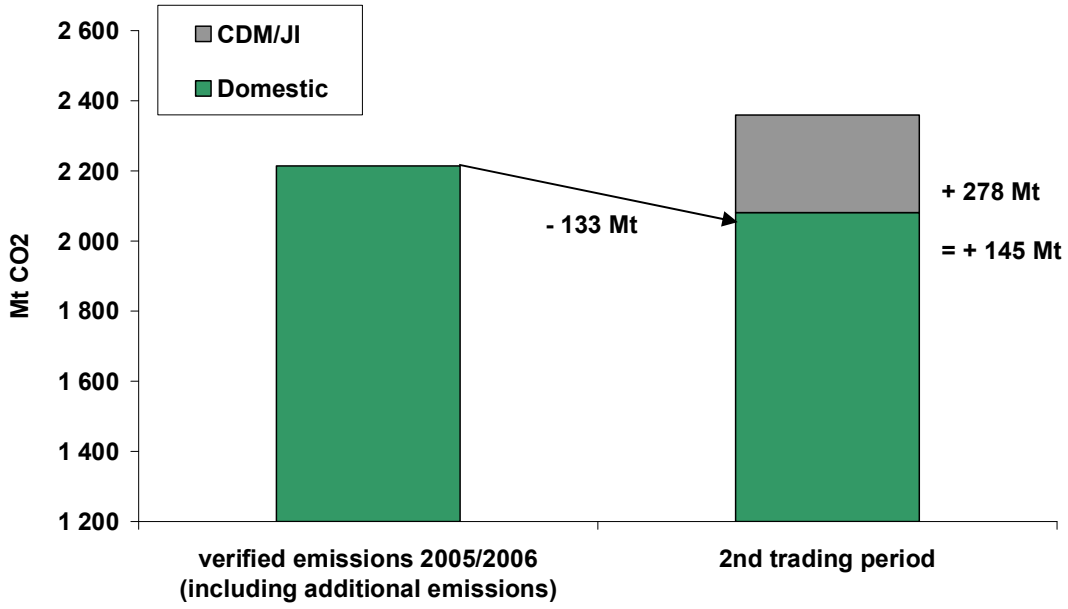
The extent to which CDM and JI will actually be used in the second trading period depends significantly on the supply of CERs and ERUs. Recent information on CDM and JI project development suggests that a significant shortage in the supply of CERs and ERUs is unlikely. However, an important factor will be whether and to what extent other emerging emission trading schemes will allow for the use of the CDM.

Table 6 *Cap on the use of JI and CDM by Member States with approved 2nd NAPs by the EU Commission*

	Difference between base-year and Kyoto or burden-sharing target	Projected government use of flexible mechanisms	2008 - 2012 EU ETS cap	CDM / JI limit for EU ETS operators	
	$MtCO_2/yr$	$MtCO_2/yr$	$MtCO_2/yr$	%	$MtCO_2/yr$
Austria	-10.3	9.0	30.7	10.0%	3.1
Belgium	-11.0	7.0	58.5	8.4%	4.9
Bulgaria	-10.6		42.3	12.6%	5.3
Cyprus	no target		5.5	10.0%	0.5
Czech Republic	-15.7		86.8	10.0%	8.7
Denmark	-14.6	4.2	24.5	17.0%	4.2
Estonia	-3.4		12.7	0.0%	0.0
Finland	0.0	2.4	37.6	10.0%	3.8
France	0.0		132.8	13.5%	17.9
Hungary	-7.4		26.9	10.0%	2.7
Germany	-258.8		453.1	20.0%	90.6
Greece	27.8		69.1	9.0%	6.2
Ireland	7.3	2.4	22.3	10.0%	2.2
Italy	-33.8	19.0	195.8	15.0%	29.4
Latvia	-2.1		3.4	10.0%	0.3
Lithuania	-3.8		8.8	20.0%	1.8
Luxembourg	-3.6	4.7	2.5	10.0%	0.3
Malta	no target		2.1	0.0%	0.0
Netherlands	-12.9	20.0	85.8	10.0%	8.6
Poland	-35.2		208.5	10.0%	20.9
Portugal	16.5	5.8	34.8	10.0%	3.5
Romania	-22.6		75.9	10.0%	7.6
Slovakia	-5.9		30.9	7.0%	2.2
Slovenia	-1.6		8.3	15.8%	1.3
Spain	43.4	31.8	152.3	20.0%	30.5
Sweden	2.9	1.2	22.8	10.0%	2.3
United Kingdom	-97.5		246.2	8.0%	19.7
EU 27	**-452.9**	**107.5**	**2 080.9**	**13.4%**	**278.2**

Source: *EC 2007, EEA 2007b*

Figure 10 *Comparison of verified emissions 2005/06 with caps in the second trading period*



Source: *Öko-Institut, EC 2007*

4 Effect of the EU ETS on CO_2 emissions from the sector

The EU ETS is one of the key measures introduced to help Member States achieve their Kyoto targets. Nevertheless, consistent and accurate estimates of the effect of the ETS in 2010 are not available for all countries, due to the limited information contained in the Community independent transaction log (CITL) and Member States reports. The existing projections on the effect of the EU ETS by 13 Member States (10 of which are EU 15 Member States) are older than the Commission Decisions on the second national allocation plans and therefore do not take into account the total quantity of emission allowances decided upon by the Commission. Thus, they do not necessarily reflect the full efforts expected of the trading sector in terms of reducing CO_2 emissions.

As an approximation, three different methods for estimating the effect of the EU ETS were used in this report, based on the Commission Decisions, Member States' submissions and the CITL:

1) **Reported effect and the reduction of the NAP2 cap**
   Effect of the EU ETS$_{(1)}$ = [Effect of the ETS projected by Member State] +[cap allowed by the Commission for 2008-2012] – [cap proposed by Member State]
   This approach gives good results for those Member States which estimated the effect of the EU ETS according to their draft NAP2. The reduction of the cap is taken into account because the Commission Decisions were only published after

the projections were prepared. Results are exaggerated for those Member States which intended to give their industry more allowances than needed.

2) **Difference between verified emissions and allowed cap**
Effect of the EU ETS$_{(2)}$ = [cap allowed by the Commission for 2008-2012] – [average verified emissions in 2005/2006]
If a Member State increased the coverage of the scheme for the second period the additional emissions are added to the verified emissions for the calculation. This estimate gives good results for those Member States in which the emissions from sectors included in the EU ETS would remain constant in the absence of the EU ETS. The results are underestimated for those Member States in which emissions from sectors included in the EU ETS would greatly increase without the EU ETS.
The methodology is also less appropriate for those Member States for which the Commission allowed a cap higher than the level of 2005/2006 verified emissions: in these cases the calculation results in an increase instead of a decrease of emissions.

3) **Combined approach using methodology 1 and 2**
Method 1 is used for those Member States which estimated the effect of the EU ETS; method 2 is used for the other Member States.

The results of these different methodologies are presented in Table 7. The assessment shows that the overall effect for the EU 15 is relatively independent from the methodology chosen. The EU ETS is estimated to provide a reduction of EU 15 total greenhouse gas emissions of approximately 146 to 175 Mt CO_2. However, for the new Member States the results differ greatly between the methods. For EU 12, estimates range from a reduction of emissions due to the ETS of 182 Mt CO_2 (method 1) to a net increase of emissions by 13 Mt CO_2 (method 2). The main reason for this spread is the extent to which intended over-allocation in the draft second national allocation plans by Member States is taken into account: high over-allocations lead to high cuts by the Commission, but this is not matched by real emissions reductions for those Member States which intended to allocate more allowances to their installations than needed even under a business-as-usual scenario. This is also reflected in the effect of the EU ETS for the EU 27: -343 Mt CO_2 for method 1, -133 Mt CO_2 for method 2 and -200 Mt CO_2 for method 3.

Method 2 can be used as a lower boundary for the effect of the EU ETS in the EU 15; this is valid under the assumption that average annual CO_2 emissions from industry between 2008 and 2012 would not be lower in the absence of the EU ETS than they were in 2005/2006. This assumption is supported by the historic trend of carbon dioxide emissions from energy industries and industry, which have increased or remained stable in recent years. The EU ETS is therefore estimated to contribute at least approximately 150 Mt CO_2 to the reduction of EU-15 greenhouse gas emissions, which is equivalent to 3.4 % of EU-15 base-year emissions.

The main difficulty in projecting the effect of the EU ETS is that Member States had to prepare their projections before their second national allocation plans and/or the Deci-

sions of the European Commission on the plans were published. With the completion of the second assessment of national allocation plans in 2007, Member States should be better able to estimate the effect of the EU ETS for future reports.

Table 7 Effect of the EU ETS

	Effect as reported by Member	verified emissions 2005/06	proposed cap	additional emissions	allowed cap	Effect of the EU ETS		
						Option 1	Option 2	Option 3
Austria	-5.5	32.9	32.8	0.3	30.7	-7.6	-2.5	-7.6
Belgium		55.1	63.3	5.0	58.5	-4.8	-1.6	-1.6
Bulgaria		40.6	67.6	0.0	42.3	-25.3	1.7	1.7
Cyprus		5.2	7.1	0.0	5.5	-1.6	0.3	0.3
Czech Republic	-2.5	83.0	101.9	0.0	86.8	-17.6	3.8	-17.6
Denmark	-5.2	30.3	24.5	0.0	24.5	-5.2	-5.8	-5.2
Estonia		12.4	24.4	0.3	12.7	-11.7	0.0	0.0
Finland	-8.7	38.9	39.6	0.4	37.6	-10.7	-1.7	-10.7
France	-7.7	127.3	132.8	5.1	132.8	-7.7	0.4	-7.7
Germany		476.1	482.0	11.0	453.1	-28.9	-34.0	-34.0
Greece		70.6	75.5	0.0	69.1	-6.4	-1.5	-1.5
Hungary		25.9	30.7	1.4	26.9	-3.8	-0.4	-0.4
Ireland	-3.0	22.1	22.6	0.0	22.3	-3.3	0.2	-3.3
Italy		226.5	209.0	0.0	195.8	-13.2	-30.7	-30.7
Latvia		2.9	7.7	0.0	3.4	-4.3	0.5	0.5
Lithuania		6.6	16.6	0.1	8.8	-7.8	2.2	2.2
Luxembourg	0.3	2.7	4.0	0.0	2.5	-1.1	-0.2	-1.1
Malta		2.0	3.0	0.0	2.1	-0.9	0.1	0.1
Netherlands	-7.3	78.5	90.4	4.0	85.8	-11.9	3.3	-11.9
Poland		205.7	284.6	6.3	208.5	-76.1	-3.5	-3.5
Portugal		34.8	35.9	0.8	34.8	-1.1	-0.8	-0.8
Romania		70.8	95.7	0.0	75.9	-19.8	5.1	5.1
Slovakia	-1.5	25.4	41.3	1.7	30.9	-11.9	3.8	-11.9
Slovenia	-1.3	8.8	8.3	0.0	8.3	-1.3	-0.5	-1.3
Spain	-26.1	178.2	152.7	6.7	152.3	-26.5	-32.6	-26.5
Sweden	-0.5	19.6	25.2	2.0	22.8	-2.9	1.2	-2.9
United Kingdom	-29.3	246.8	246.2	39.5	246.2	-29.3	-40.1	-29.3
TOTAL EU-15	**-93.0**	**1 640.4**	**1 636.5**	**74.8**	**1 568.8**	**-160.7**	**-146.4**	**-174.9**
TOTAL EU-12	**-5.3**	**489.3**	**688.9**	**9.8**	**512.1**	**-182.0**	**13.1**	**-24.8**
TOTAL EU-27	**-98.3**	**2 129.6**	**2 325.3**	**84.6**	**2 080.9**	**-342.7**	**-133.3**	**-199.7**

Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007), EEA 2007b

5 References

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6 Annex

Table A- 1 Differences between allocation and verified emissions > 1 million EUAs by installation in absolute terms (average 2005/2006)

Rank	Installation ID[a]	Name	Sector[b]	Difference allocation versus verified emissions	
				[1000 EUA]	[%]
1	PL 375	MITTAL STEEL POLAND SA (KOMBINAT HUTNICZY)	5	**5,722**	61%
2	BE 11	Sidmar nv	5	**4,291**	46%
3	NL 144	Corus Staal B.V., locatie Ijmuiden	5	**4,012**	39%
4	ES 212	Aceralia Corporación Siderúrgica, S.A.	5	**3,325**	38%
5	ES 202	Hidroeléctrica del Cantábrico, S.A.	1	**3,187**	100%
6	SE 495	1 Sverige (SSAB Tunnplåt AB, Metallurgi)	5	**2,788**	69%
7	FR 270	EDF Centrale Le Havre	1	**2,559**	48%
8	FR 514	LA SNET - Centrale Emile Huchet	1	**2,510**	61%
9	EE 2	Eesti Elektrijaam	1	**2,307**	23%
10	PL 5	Elektrownia Połaniec S.A. -Grupa Electrabel Polska (ELEKTROWNIA)	1	**2,256**	31%
11	LT 87	Lietuvos elektrine	1	**1,911**	74%
12	DE 1605	RWE Power Aktiengesellschaft	1	**1,873**	9%
13	ES 205	Hidroeléctrica del Cantábrico, S.A.	1	**1,828**	100%
14	ES 210	UNIÓN FENOSA GENERACIÓN, S.A.	1	**1,818**	100%
15	EE 1	Balti Elektrijaam	1	**1,780**	48%
16	DE 1415	ThyssenKrupp Steel AG (Dampfkesselanlage Duisburg Hamborn)	1	**1,595**	31%
17	ES 207	Iberdrola Generación, S.A.U.	1	**1,453**	100%
18	PL 16	Zespół Elektrowni Dolna Odra SA (ELEKTROWNIA DOLNA ODRA)	1	**1,381**	23%
19	IT 518	CENTRALE TERMOELETTRICA DI BRINDISI	1	**1,370**	43%
20	PL 374	MITTAL STEEL POLAND SA (KOMBINAT HUTNICZY)	5	**1,360**	43%
21	CZ 73	Mittal Steel Ostrava, a.s. (Mittal Steel Ostrava, a.s.)	1	**1,353**	21%
22	NL 172	Heijkant van den Gerard (Essent N.V.Amercentrale)	1	**1,328**	19%
23	DE 1456	Vattenfall Europe Generation AG & Co. KG	1	**1,268**	5%
24	ES 204	Hidroeléctrica del Cantábrico, S.A.	1	**1,217**	100%
25	FR 560	EDF Centrale de Cordemais	1	**1,184**	19%
26	BE 286	Carsid	1	**1,176**	72%
27	NL 99	Shell Nederland Raffinaderij BV	2	**1,163**	18%
28	IT 355	EniPower S.p.A. - Stabilimento di Ravenna	1	**1,122**	33%
29	DE 1411	ThyssenKrupp Steel AG (Heizkraftwerk ThyssenKrupp Stahl AG Duisburg Hamb.)	1	**1,100**	30%
30	GR 57	Tsimenta Titan	6	**1,092**	87%
31	IT 307	CENTRALE TERMOELETTRICA DI LA CASELLA	1	**1,087**	34%
32	GR 13	Die AE - Ais Ptolemaedas	1	**1,029**	22%

[a] BE: Belgium, CZ: Czech Republic, EE: Estonia,DE: Germany, ES: Spain, FR: France, GR: Greece, IT: Italy, LT: Lithuania, NL: Netherlands, PL: Poland, SE: Sweden

[b] Sector categories: 1 Combustion installations, 2 Mineral oil refineries, 5 Production of pig iron or steel, 6 Production of cement clinker or lime

Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)

Table A- 2 Differences between allocation and verified emissions < 1 million EUAs by installation in absolute terms (average 2005/2006)

Rank	Installation ID[a]	Name	Sector[b]	Difference allocation versus verified emissions	
				[1000 EUA]	[%]
1	GB 381	Garrett Nicola (Drax Power Station)	1	**-7,214**	-50%
2	ES 201	Hidroeléctrica del Cantábrico, S.A.	1	**-5,384**	-260%
3	IT 437	Piana Silvia (CENTRALE TERMOELETTRICA DI MONTALTO DI CASTRO)	1	**-5,339**	-396%
4	BE 74	Electrabel nv	1	**-4,059**	-913%
5	GB 202	Drew Richard (Cottam Power Station)	1	**-3,938**	-77%
6	GB 562	O'Meara James (Fiddlers Ferry Power Station)	1	**-3,929**	-87%
7	GB 564	O'Meara James (Ferrybridge "C" Power Station)	1	**-3,855**	-81%
8	ES 203	Hidroeléctrica del Cantábrico, S.A.	1	**-3,788**	-2031%
9	DE 1850	RWE Power Aktiengesellschaft	1	**-3,438**	no allocation
10	GB 145	Drew Richard (West Burton Power Station)	1	**-3,150**	-57%
11	GB 169	Henbest John (Eggborough Power Station)	1	**-2,888**	-64%
12	ES 208	UNIÓN FENOSA GENERACIÓN, S.A.	1	**-2,709**	-1495%
13	GB 153	Henderson Martin (Didcot A Power Station)	1	**-2,599**	-62%
14	NL 188	Wellink Bas (Nuon Centrale Velsen)	1	**-2,438**	-157%
15	GB 165	Hastings Tracy (Kingsnorth power station)	1	**-2,379**	-40%
16	GB 154	Rhodes Charlotte (Ratcliffe on Soar power station)	1	**-2,295**	-39%
17	SE 178	1 Sverige (Lulekraft AB)	1	**-2,276**	-8141%
18	GB 188	Henderson Martin (Aberthaw Power Station)	1	**-2,241**	-55%
19	GB 133	Henderson Martin (Tilbury Power Station)	1	**-2,120**	-73%
20	GB 750	Spittle Karen (Immingham CHP)	1	**-2,087**	no allocation
21	ES 173	Endesa Generación, S.A.	1	**-1,942**	-40%
22	GB 593	Wilson Lynn (Longannet Power Station)	1	**-1,911**	-26%
23	ES 270	Endesa Generación, S.A.	1	**-1,846**	-36%
24	ES 206	Iberdrola Generación, S.A.U.	1	**-1,790**	-337%
25	GB 740	Ridgway Christopher (Spalding Power Station)	1	**-1,748**	no allocation
26	GB 594	Wilson Lynn (Cockenzie Power Station)	1	**-1,616**	-74%
27	ES 647	Endesa Generación, S.A.	1	**-1,577**	-21%
28	DE 1205	E.ON Kraftwerke GmbH	1	**-1,564**	-18%
29	IT 511	Banfi Carlo (STABILIMENTO DI TARANTO)	1	**-1,541**	-18%
30	IT 521	Piana Silvia (CENTRALE TERMOELETTRICA DI BRINDISI SUD)	1	**-1,437**	-11%
31	NL 185	Wellink Bas (Nuon Centrale Ijmond)	1	**-1,437**	-290%
32	IT 197	Giammatteo Andrea (EniPower - Stabilimento di Mantova)	1	**-1,429**	-290%
33	IT 515	Alberti Agostino (ILVA S.P.A. - Stabilimento di Taranto)	5	**-1,423**	-16%
34	IT 543	Dubini Fabio (CENTRALE TERMOELETTRICA DI SAN FILIPPO DEL MELA)	1	**-1,368**	-67%
35	ES 648	UNIÓN FENOSA GENERACIÓN, S.A.	1	**-1,365**	-51%
36	IT 529	Piana Silvia (CENTRALE TERMOELETTRICA DI ROSSANO)	1	**-1,283**	-179%
37	DE 1855	BASF Power GmbH & Co.KG (GuD-Anlage A 800)	1	**-1,274**	no allocation
38	BE 75	Electrabel nv	1	**-1,259**	-98%
39	DE 1376	E.ON Kraftwerke GmbH	1	**-1,220**	-25%
40	DE 1380	Großkraftwerk Mannheim Aktiengesellschaft	1	**-1,188**	-18%
41	IT 438	Gosio Giovanni (Centrale Termoelettrica Torrevaldaliga)	1	**-1,178**	-79%
42	ES 731	Gas Natural, SDG S.A.	1	**-1,136**	no allocation
43	GB 132	Rhodes Charlotte (Ironbridge Power Station)	1	**-1,136**	-56%
44	IE 54	Heavey Geraldine (ESB Moneypoint Generating Station)	1	**-1,132**	-27%
45	GB 411	Harrison Colin (Teesside Power Station)	1	**-1,058**	-26%
46	DE 1606	RWE Power Aktiengesellschaft	1	**-1,046**	-6%
47	BE 72	Electrabel nv	1	**-1,044**	-83%
48	IT 538	Piana Silvia (CENTRALE TERMOELETTRICA DI TERMINI IMERESE)	1	**-1,043**	-87%

[a] BE: Belgium, DE: Germany, ES: Spain, GB: Great Britain, IT: Italy, NL: Netherlands, SE: Sweden

[b] Sector categories: 1 Combustion installations, 5 Production of pig iron or steel

Source: Öko-Institut/ETC-ACC/EEA, CITL (5 July 2007)