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CARBON DIOXIDE EMISSIONS FROM INSTALLATIONS SUBJECT TO EMISSIONS TRADING IN 2008

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1 AGGREGATED EVALUATION RESULTS OF THE VERIFIED EMISSIONS TABLES FOR 2008 (VET 2008)

In the past year, installations subject to emissions trading in Germany emitted a total of 473 million tonnes climate-damaging carbon dioxide (CO₂). For the first time since the beginning of emissions trading, emissions fell below the level of the previous year.

In 2007, emissions amounted to 487 million tonnes of carbon dioxide. The over three percent decrease is more than could be expected from the trend seen in the national greenhouse gas inventory for Germany, which includes other sectors as well as other climate-damaging gases.

A total of 1660 operators of installations subject to emissions trading must submit an annual report on their carbon dioxide emissions. Their independent verifiers submit the verified emissions (VET values). Until April 30th operators have to offset their emissions with allowances for 2008.

The volume of German emissions trading comprises 452 million allowances per annum, of which 389 million were allocated to operators free of charge. As the total emissions of the installations exceed allocations, most operators must either buy emission allowances on the market or submit allowances taken from the amount already allocated for 2009.

The situation varies, depending on operators and sectors. While energy suppliers usually have to buy additional allowances, other industries are able to act as potential net sellers. After the excessive allocation of emissions allowances free of charge (over-allocation) during the first trading period 2005-2007, the need for mitigation measures now becomes more urgent. Operators have the alternative option of buying allowances in other European countries or offset them with mitigation projects.

When comparing allowance allocations with the actual emissions of an installation or even an industry, it must be taken into account that a further 40 million allowances were sold and an unknown quantity of emission allowances (tens of millions) were transferred free of charge from the steel industry to energy-generating installations recycling blast furnace gas.

2 BASIS OF THE EVALUATION

2.1 Number of Allocations in 2008

On February 28th 2008, 1665 installations in Germany were subject to emissions trading, of which 1625 received emissions allowances free of charge (free allocation). Once the National Allocation Plan (NAP) had been approved by the European Commission (COM), the agreed quantity of allocations was issued and distributed to the accounts in the national registry in October 2008.

A procedure has been agreed upon, according to which data on changes in the number of allowances allocated (e.g. due to capacity extensions) and the number of installations participating in emissions trading (due to installations leaving the scheme, new entrants) are collected by the German Emissions Trading Authority and passed on to COM at regular intervals. As in the past years, the number of installations subject to emissions trading has changed over the trading period. According to the approved NAP changes, 1660 installations in Germany were subject to emissions trading in 2008, receiving 389.1 million emissions allowances free of charge (Table 1). This amounts to 0.3 million more emissions allowances than were first issued, due to changes in allocation decisions before the allocations to new entrants.

Table 1: Changes in the numbers of existing installations and of allocations during the current trading period (Updated 20/04/2009)

Reason for Allocation Changes	Number of Installations concerned	Changes in Allocations 2008 [EAs/a]	NAP Changes in Number of Installations
Allocation 28/02/2008		388,859,006	1665
Decrease	6	-169,605	
Increase	17	410,887	
Extension of Capacity	13	128,217	
New Entrants	7	85,860	+ 7
- those not receiving Allocationss	4	0	
Plant closures	5	-68,362	
Exempt from ETS	3	-22,037	
No longer subject to ETS	12	-99,625	- 12
Allocation 20/04/2009		389,124,341	1660

In 23 cases, the number of allocations was reviewed as a result of change notices or appeals against allocation decisions, while in 13 cases, adjustments were made due to capacity extensions.

By March 31st 2009, seven installations that began operating in 2008 entered the emissions trading scheme. Three of them have already received their allocations. All but one have entered their VET data on the appropriate date (see section 1.).

Installations that took part in emissions trading during the first trading period, but did not apply for allocations in the second trading period, are assumed to be subject to emissions trading until proven otherwise. These installations have been included in the NAP. In the course of 2008, twelve installations were identified that are no longer subject to emissions trading, either because they were decommissioned before 2008 or because their capacity fell below the relevant threshold values. This became known only after the allocation phase. There were only a few cases where it was decided ex post that the installations do not fall under the scope of the Emissions Trading Scheme (ETS). Where some of the allocations were erroneously issued, DEHSt has demanded their return. These will be deleted from the German registry, as the relevant installations will be struck off the NAP.

The number of approved changes is shown in the right column of Table I.

2.2 VET 2008

On March 31st 2009, 1660 installations were considered to be subject to emissions trading. They were hence under the obligation of making a VET entry into the German registry through their verifying bodies.

1656 operators complied, and only four entries into the Verified Emissions Table (VET) were missing on March 31st 2009. The four installations concerned had their accounts blocked as a result. Two of them fulfilled their entry obligations by April 30th 2009, while the other two can expect further sanctions. One of the installations concerned is due to be declared insolvent, while another produced no emissions at all.

The quality of the entered data is very high. The specifications made by operators are verified by independent accredited verifiers who then enter the data at the appropriate places into the DEHSt registry. The relevant electronic emissions report, documenting the monitoring and calculation of emissions data, is random-checked by the responsible Federal State authority

and then passed on to DEHSt. Only when the data entered have been approved can the installation be declared compliant. The operator must surrender the correct amount of emissions allowances to the registry. Often, operators surrender more emissions allowances than required in order to avoid sanctions at a later stage if the VET needs to be adjusted. Such surplus allowances can be offset in the following year. When emissions allowances for the previous year must be surrendered, operators have already been allocated their share of allowances for the current year, which provides sufficient “allowance liquidity” for operators.

Sorting installations according to activities as laid out in TEHG Annex1, 369 million tonnes of carbon dioxide are emitted by 1109 installations from energy activities I to V, while 104 million tonnes of carbon dioxide come from 551 industrial installations (activities VII to XVII). No installation is registered in Germany under activity XVIII, Flares.

Fehler! Verweisquelle konnte nicht gefunden werden. shows the relative proportions of activities type I to V installations and those of activities VI to XVIII. The largest proportion of installations with the highest emission rate is found in energy-related activities. Average emissions per installation amount to 333 kt per annum in the energy sector, which is significantly higher than in industrial installations (188 kt per installation and year). Both average values are similar in size, which suggests that the distribution of large and small emitters is similar in both sectors.

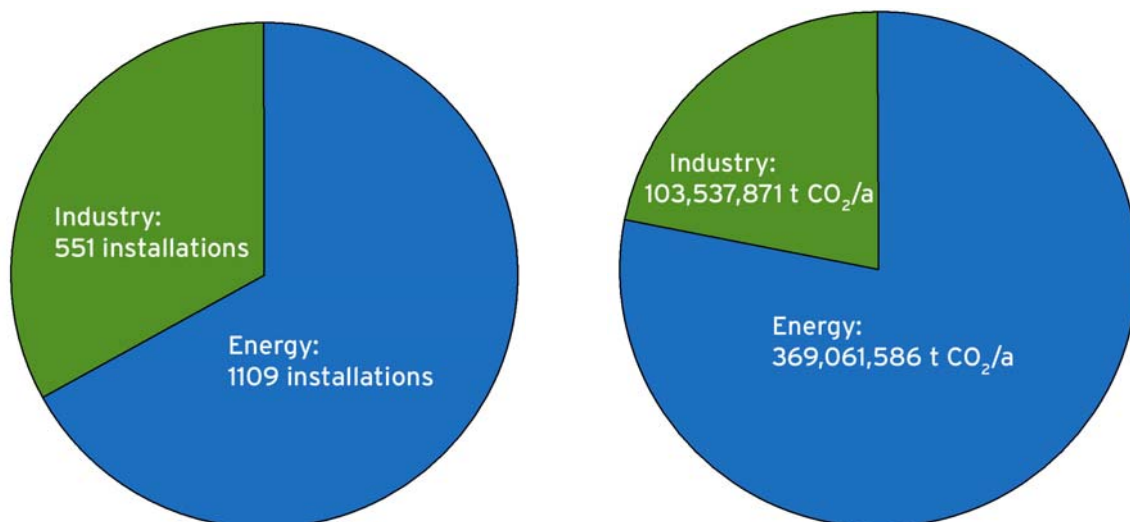


Figure 1: Relation between energy (activities I–VI) and industrial sectors (activities VII –XVIII). Number of installations and quantities of emissions in Germany for 2008.

2.3 VET 2007 and annual Emissions in 2007

Even later in the year, verified quantities of emissions had to be adjusted for individual installations. Table 2 shows the aggregated VET entries as well as the aggregated emissions for the years 2005 to 2007.

For VET reports, the relevant cut-off point for the first entry is March 31st of the relevant year. The reports are named accordingly VET 2005, VET 2006, VET 2007 or VET 2008. Data from the emissions report – whether adjusted or not – are known as (annual) emissions of the installation and referred to as EmB 2005, EmB 2006 or EmB 2007. The acronym EmB stands for Emissionsbericht (emissions report) where the verified emissions were recorded. EmB 2008 will be available for the first time in the autumn of 2009 when DEHSt will have evaluated the emissions report. Any new information and resulting adjustments may result in changes at a later date.

Table 2: VET entries by operators, annual emissions according to evaluated emissions reports and the relevant number of installations between 2005 and 2008.

Year	Number of Entries	VET [kt CO ₂ /a]	Number of Installations	Annual Emissions [kt CO ₂ /a]
2005	1815	473,681	1825	474,856
2006	1824	477,382	1780	478,044
2007	1882	487,050	1749	487,059
2008	1660	472,599		

The number of entries is the gross number of VET entries, irrespective of whether an installation is subject to emissions trading or not. Decommissioned installations or installations that left the scheme were under obligation to deliver VET and emissions reports throughout the following year. These entries and reports normally just showed the figure zero, as there were no emissions to report. This explains the increase in the number of entries. However, more installations have left the scheme due to decommissioning or diminished capacity than new entrants have joined the scheme. The gap between the two figures has grown continuously, explaining the enormous difference between the figures of 2007 (1882 against 1749).

The verified emissions had to be readjusted less over the years. Adjustments fell from 1.2 million additional emissions allowances for 2005 to only 9,000 tonnes of carbon dioxide in 2007. All aggregated adjustments are listed in the table, with individual adjustments exceeding the aggregated adjustments.

2.4 Classification of Installations

The current version of TEHG Annex 1 specifies 21 activities covering installations of the energy and emission-intensive industries subject to emissions trading. During the first trading period, another three supplemented the 15 activities initially listed in the annex, which are identified by the minuscule next to the Roman figure. The additional installations are listed under activities IXb Steel Processing, XIIa Mineral Fibres, XVI Propylene/Ethylene, XVII Soot and XVIII Flares. The exact definition of the activities is found in TEHG Annex I. The nomenclature for this classification has been defined in the 4th Federal Immissions Control Ordinance (4. BImSchV).

Table 3: Overview and Classification of Activities according to TEHG Annex 1

Activity according to TEHG Annex 1	Name of Activity	Group of Activity		Sector
I	Energy Conversion > 50 MW RTO	Large Combustion Plants	Energy	Energy
II	Energy Conversion 20-50 MW RTO	Combustion Plants 20-50 MW RTO		
III	Energy Conversion 20-50 MW RTO, other fuels			
IV	Prime Movers (engines)	Prime Movers		
V	Prime Movers (turbines)			
VI	Refineries	Refineries	Refineries	Industry
VII	Coke Ovens	Iron and Steel	Iron and Steel	
VIII	Iron Ore Sintering			
IX	Pig Iron and Steel			
IXa	Integrated Steel Plants			
IXb	Secondary Steel Plants			
X	Cement	Cement	Mineral- processing Industry	
XI	Lime	Mineral- processing Industry, excluding Cement		
XII	Glass			
XIIa	Mineral Fibres			
XIII	Ceramics			
XIV	Pulp	Pulp and Paper	Pulp and Paper	
XV	Paper			
XVI	Propylene/Ethylene	Bulk Organic Chemicals	Bulk Organic Chemicals	
XVII	Carbon black			
XVIII	Flares	Flares	Flares	

In order to keep track of the single activities the report summarises as follows: Energy installations of activities II and III are often technically comparable and are grouped together as combustion plants 20-50 MW. Thus, no distinction is made between the types of fuel used in the installations. Similarly, installations of activities IV and V are comparable as far as their emission situation is concerned. The group is dominated by natural gas compressor stations some of which also run engines and turbines in the same location.

Among the industrial activities, activities XI to XIII are grouped together as mineral-processing industry, excluding cement, while activities X to XIII form the group of mineral-processing industries. Compared to other activities, these are characterized by low emissions. Conversely, within the lime industry, a distinction is made between the industrial use of lime (energy, steel and building industries) and its use in the food industry where different economic forces apply. For similar reasons, (e. g. Section 3.5), the production of glass fibre for insulation purposes (glass wool) is taken out of activity XII and viewed alongside Mineral Fibre Production.

Activities XIV and XV are grouped together under Pulp and Paper, activities XVI and XVII under Bulk Organic Chemicals in order to give a clearer overview (see Figure 4)

For activity XVIII, Flares, there is no known installation in Germany currently in that category. The zero entries mean that this activity is not evaluated and is left out in many overviews. In this report, activities "...to XVII" and "...to XVIII" are therefore used as synonyms.

Grouping together activities I to V under the energy sector and activities VI to XVIII under the industrial sector is the most compact way of classifying the activities.

In other statistics - e.g., those by Arbeitsgemeinschaft Energiebilanzen (AGEB) - refineries and coke ovens are categorized as installations for distillation and dry distillation, which are part of the energy conversion sector. In this report, however, these activities are part of the industrial sector in line with TEHG Annex I.

The classification of activities according to TEHG Annex I differs from that of the EU Registry Regulation, where TEHG Annex I activities I to V are summed up under Combustion. At the European level at CITL, only the Registry Regulation classification is relevant.

3 COMPARISON OF VET ENTRIES WITH ANNUAL ALLOCATIONS

3.1 Comparisons with the National Emissions Trading Budget

Installations subject to emissions trading in Germany reported emissions of 472.6 million tonnes of carbon dioxide for 2008. Although this figure is about three percent less than the previous year (487 million tonnes), it is five percent above what was anticipated in the national budget (cap). The national cap for the second trading period 2008-2012 is 452 million emissions allowances per annum, of which 40 million are sold on the market by KfW bank over the year. From the national reserve of 23 million allowances, just over 200,000 have been issued for new entrants, extended capacity and adjustments of the allocation decision. After the approval of the third adjustment by COM, the national allocation has been set at 389.1 million allowances (Table 4, below).

Table 4: Number of Installations, Allocations and VET Entries in Germany in 2008, sorted by Activity, (updated 31/03/2009)

Main Activity	Name of Activity	Number of Installations	Allocations 2008 [1000 EAs/a]	VET 2008 [kt CO ₂ /a]	Ø VET 2008 per Installation [kt CO ₂ /a]
I	Energy Conversion > 50 MW RTO	525	243,125	360,162	686
II	Energy Conversion 20-50 MW RTO	516	9,280	7,123	14
III	Energy Conversion 20-50 MW RTO, other fuels	12	324	143	12
IV	Prime Movers (engines)	3	41	40	13
V	Prime Movers (turbines)	53	1.502	1.592	30
Energy subtotal		1109	254.272	369.060	333
VI	Refineries	27	24,198	23,086	855
VII	Coke Ovens	4	2,421	3,577	894
VIII	Iron Ore Sintering	1	3,988	1,718	1,718
IX	Pig Iron and Steel	26	10,605	7,887	303
IXa	Integrated Steel Plants	4	43,386	19,566	4,892
IXb	Secondary Steel Plants	8	502	1,068	134
X	Cement	39	20,499	20,433	524
XI	Lime	69	9,350	8,576	124
XII	Glass	85	4,086	3,911	46
XIIa	Mineral Fibres	8	362	335	42
XIII	Ceramics	137	1,987	1,445	11
XIV	Pulp	5	468	155	31
XV	Paper	125	6,545	6,013	48
XVI	Propylene/Ethylene	8	5,643	5,098	637
XVII	Carbon Black	5	803	663	133
XVIII	Flares	0	0	0	0
Industrial subtotal		551	134,843	103,531	188
Total		1660	389,124	472,599	285

* excl. transfer of allowances for transferred blast furnace gas

Table 4 shows the verified emissions from VET entries to allocations for 2008. 1656 of the 1660 installations had entered their VET data through their verifying bodies (see Section 2.2).

Here, an emission value of zero was set for the installations that did not enter their data. Thus, installations subject to emissions trading emitted 472,6 million tonnes of carbon dioxide over the first year of the trading period. Not included are carbon dioxide emissions from biogenic sources – i.e., physical carbon dioxide emissions of an installation may be higher, as long as they come from e.g., wood or biogas. The production of no emissions from fossil carbon resources was reported for 26 installations in total.

When comparing emissions with allocations, the discrepancy between the two is most striking for installations of the energy sector. However, the figure of 254 million allowances contains neither sold allowances nor allowances transferred free of charge in line with ZuG 2012 Article 11. According to ZuG 2012 Article 11, installations that produce blast furnace gas must transfer the corresponding number of allowances to installations that reuse them, releasing carbon as carbon dioxide. The transfer must be carried out free of charge by March 1st of the following year. The exact number of emissions allowances to be transferred free of charge can be determined by DEHSt only after the final evaluation of the emissions reports. This calculation is based on the preliminary evaluation of emissions reports and an estimate on the basis of allocated quantities. For the estimate, it is assumed that emissions equal the allocated allowances, an assumption also underlying the analysis of the allocation situation for additional installations described in TEHG Article 26. Some additional emissions allowances covering the reuse of blast furnace gas in additional installations, e.g., heat rolling mills, were issued to the blast furnace gas sources (which continue to be subject to emissions trading). These emissions allowances are then transferred from the recipient (source) installations to the additional (reusing) installations.

Before taking into account bought-in and transferred emissions allowances, there is a gap of 105 million allowances for installations of activities I to V, while there is a surplus of 31 million allowances for installations of activities VI to XVIII. The discrepancies between allocation and emissions will be explained in more detail in the next paragraph.

The number of allocations includes approximately 200,000 emissions allowances earmarked for new entrants and extended capacity (Table 1). This is only a small proportion of the annual national reserve of 23 million allowances. The reserve will over time match the anticipated emissions, as the annual issuance of emissions allowances to new entrants and installations with capacity extension will rise in the course of the trading period.

The energy-generating installations of Activities I (525 installations) and II (516) are the largest group of installations, whereas the total number of installations in Activities XIII (ceramics, 137 installations) and XV (paper, 125) amounts to just a quarter of that figure. When looking at activities with low participant figures, e.g., activity XIIa with just 8 installations, we must keep in mind that these are additional installations within a group of 85 in the glass and mineral fibre industries.

The relatively high allocations to installations of activities VIII to IXa include the allocations for blast furnace gas from smelting and conversion processes. In the calculations of section 3.3 and thereafter, the allocations for transferred blast furnace gases have been attributed to the re-using installations instead of the source installations, as their operators must have completed the free transfer of the relevant allowances by March 1st of the following year.

3.2 Correlation between Emissions and Allowances

In Figure 2, demand and surplus of emissions allowances have been listed according to volume for all activities. Most activities include installations with a demand („VET 2008 > AV 2008“) as well as others with a surplus, i.e. their verified emissions lie below the level covered by their free allocations. („VET 2008 < AV 2008“).

The axes in Figure 2 have been cut off at ±3 million to focus on the small quantities. The extremes, -23 million tonnes of carbon dioxide for installations with a surplus in activity XIa and +118 million tonnes of carbon dioxide for installations with a demand in activity I have not been reproduced in their entirety, due to limited space.

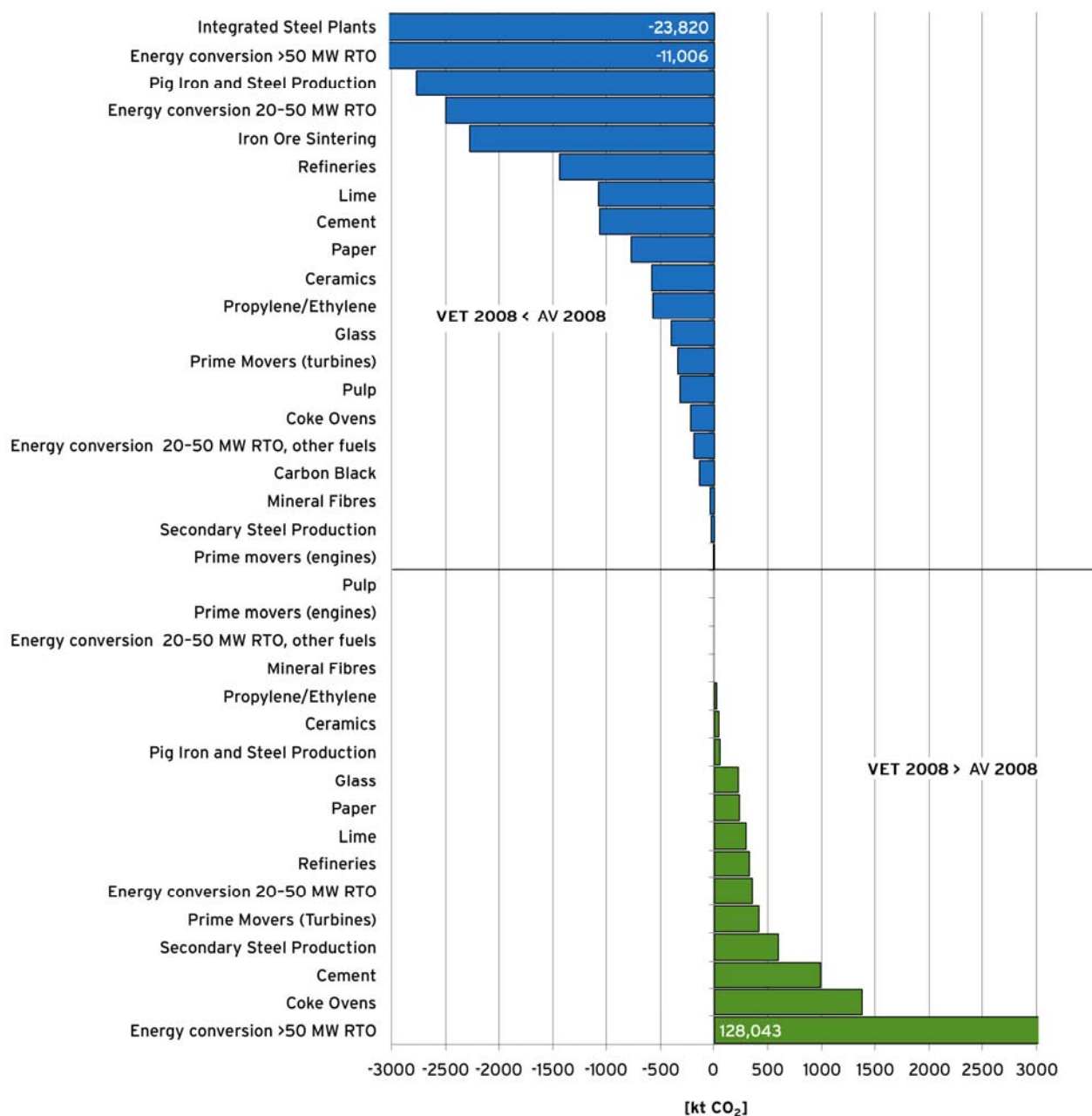


Figure 2: Overview of activities with installations falling below or exceeding the anticipated emissions, resulting in a surplus of or creating a demand for emissions allowances.

Several options are open to operators to obtain emissions allowances. The simplest way is to use allowances already issued by the registry, but earmarked for 2009. The allowances allocated for the trading period have been divided into five equal parts, each of which is issued on February 28th every year. Since allowances for the previous year must only be surrendered by April 30th, operators have access to two sets of annual allocations and can avoid buying further allowances on the market. This option ends at the end of the trading period at the latest

and includes the risk of having to buy emissions allowances at a relatively high price. It is not recommend drawing simple conclusions on the basis of the evaluations contained in this report and applying them for building expectations regarding the future market situations.

Operators can trade emissions allowances among each other. Figure 2 gives an indication of the volumes of available allowances in individual activities.

3.3 Allocation Situation for Installations in the Energy Industry

The allocation volumes in Table 5 have been adjusted by the allowances transferred to installations using blast furnace gas. Overall, these changes are all balanced against each other, the total of allocated allowances remaining at 389 million allowances.

Table 5: Number of Energy Installations, Volume of Allocations, VET Entries and aggregated Allocations for Installations subject to Emissions Trading in 2008, Activities I to V.

Main Activity	Name of Activity	VET 2008 vs Allocations 2008*	Number of Installations	Allocation Volume 2008* [1000 EAs/a]	VET 2008 [kt CO ₂ /a]	Deviation of VET 2008 from the 2008 Allocation* [kt CO ₂ /a]
I	Energy Conversion > 50 MW RTO	VET 2008 < AV 2008	330	62,902	51,839	-11,064
		VET 2008 > AV 2008	195	199,412	308,323	108,911
			525	262,314	360,162	97,848
II	Energy Conversion 20-50 MW RTO	Comparison not possible	3	18	0	0
		VET 2008 < AV 2008	384	7,420	4,921	-2,498
		VET 2008 > AV 2008	129	1,891	2,203	312
			516	9,328	7,124	-2,187
III	Energy Conversion 20-50 MW RTO, other fuels	VET 2008 < AV 2008	9	312	128	-185
		VET 2008 > AV 2008	3	12	15	4
			12	324	143	-181
IV	Prime Movers (engines)	VET 2008 < AV 2008	2	21	16	-5
		VET 2008 > AV 2008	1	21	24	4
			3	42	40	-2
V	Prime Movers (turbines)	VET 2008 < AV 2008	23	605	272	-333
		VET 2008 > AV 2008	30	897	1,321	423
			53	1,503	1,592	90
Total			1109	273,511	369,062	95,569

* including adjustment for transferred blast furnace gas

In large combustion installations (activity I), the majority, 330 out of 525 installations received free allocations covering more than their reported emissions in 2008. 11 million allowances (-17.6 percent) remain at the disposal of the installations. After the free allocation of the allowances and the transfer of allowances for reusing blast furnace gas, other installations end

up with an allowance deficit in the amount of 109 million tonnes of carbon dioxide. They need to obtain additional allowances for one third of their fossil carbon dioxide emissions.

In the smaller combustion plants of activities II and III, the total of all emissions lies below the total volume of allowances. Many of the installations are combined heat and power stations that have been allocated allowances for the production of both types of energy. Installations with a 100 percent efficiency standard or more have thus received a sufficient amount of allowances. The efficiency standard defines the effect of proportional cuts individually for each installation. If the efficiency of an installation is 100 percent or higher, no cuts will be made. Many installations in the sector are partially or entirely fuelled by biogenic material, resulting in very low or, in 19 cases, no fossil fuel emissions. Thus, 393 installations did not use up 35 percent of their allocated allowances, an average of 6,800 emissions allowances per installation. Conversely, 132 installations had to use 17 percent more than their 2008 allocation, which they either took from their 2009 allocation or bought on the market. This is an average of 200 emissions allowances per installation.

For engines and turbines (Activities IV and V), an allocation based on ambitious benchmarks and historic emissions did generally not cover the need. The companies could either enhance their efficiency or purchase more emissions allowances. Installations that received their allocations based on the standard capacity utilisation factor (ZuG 2012, Article 8) or on additional heat production fared better. About half of all installations received an adequate allocation free of charge. Overall, however, there was an additional demand for 88,000 emissions allowances, exceeding the total of allocations by 6 percent.

3.4 Allocation situation for Refineries and Installations in Iron and Steel Production

Refineries (Activity VI) have an overall surplus of emissions allowances. Having received a sufficient amount of free allowances, they reduced their use of crude oil, while increasing their efficiency higher-than-average. The surplus in this group of installations amounts to 1.1 million allowances or 4.6 percent of the allocated allowances (Table 6, Refineries, last column: 1,113 kt CO₂/a).

Table 6: Number of Energy Installations, Volume of Allocations, VET Entries and aggregated Allocations for Installations subject to Emissions Trading in 2008. Activities VI to IXb

Main Activity	Name of Activity	VET 2008 vs Allocation 2008*	Number of Installations	Number of Allocations 2008* [1000 EAs/a]	VET 2008 [kt CO2/a]	Deviation VET 2008 from Allocation 2008* [kt CO2/a]
VI	Refineries	VET 2008 < AV 2008	20	18,434	16,994	-1,439
		VET 2008 > AV 2008	7	5,765	6,092	326
			27	24,199	23,086	-1,113
VII	Coke Ovens	VET 2008 < AV 2008	4	3,932	3,578	-354
			4	3,932	3,578	-354
VIII	Iron Ore Sintering	VET 2008 < AV 2008	1	2,209	1,718	-491
			1	2,209	1,718	-491
IX	Pig Iron and Steel Production	VET 2008 < AV 2008	20	8,450	7,662	-788
		VET 2008 > AV 2008	6	173	225	52
			26	8,623	7,888	-736
IXa	Integrated Steel Plants	VET 2008 < AV 2008	4	25,829	19,566	-6.263
			4	25,829	19,566	-6.263
IXb	Secondary Steel Plants	VET 2008 < AV 2008	4	570	536	-34
		VET 2008 > AV 2008	4	504	533	28
			8	1,074	1,068	-6
Total			70	65,866	56,905	-8,962

* including adjustment for transferred blast furnace gas

The situation of installations in the iron and steel industry is closely linked to production process technology. The industry also plays a part in emission-relevant source streams, as combustible flue gas from furnaces, coke ovens and conversion processes (blast furnace gas) is transferred between installations. Overall, all installations subject to emissions trading in the iron and steel industries (activities VII to IXb) had a surplus of 7.8 million allowances after receiving a free allocation of 41.7 million allowances. Allocations for transferred blast furnace gas have already been assigned to the installations reusing them in the calculations of Table 5 to Table 11. Operators are under obligation to report the amounts transferred in their emission

reports. Surpluses are spread unevenly over the individual activities in the iron and steel industry.

Coke Ovens (VII) have a surplus of approx. 354,000 tonnes of carbon dioxide (Table 6, Coke Ovens VET 2008 < AV 2008, last column), which is nine percent of their overall allocation. The Iron Sintering (VIII) and Integrated Steel Plant (IXa) activities account for 22 and 24 percent surpluses of their allocations. In the Pig Iron and Steel Plant (IX) and Secondary Steel Plant (IXb) activities, some installations emitted more than was covered by their allocation, while others emitted less. Six of the 26 Pig Iron and Steel Production installations emitted an excess of 52,000 tonnes of carbon dioxide, which is 30 percent more than their allocation. The majority, i.e. 20 installations, emitted 788.000 tonnes of carbon dioxide less than they were entitled to, creating a 9 percent surplus in allocations. Among the steel processing installations subject to emissions trading, one half created a surplus of 6.0 percent, while the other half had a shortfall of 5.5 percent. The total balance shows a slight surplus of 6,000 emissions allowances.

3.5 Allocation Situation for Installations in mineral-processing and other Industries

The allocation of allowances to the cement industry (Table 7, Activity X) includes two installations that received their allocation not on the basis of historic emissions, but as hardship provision, i.e. they received additional allocations, taking into account the special economic circumstances of the operators (see below, section 3.6). For a further 24 installations their prospective or historic emissions were reduced to such an extent that a surplus of over a million emissions allowances was achieved. One third of the installations in the industry (13 out of 39) had a shortfall. In order to balance their emissions from the previous year, they need nearly one million of additional allowances. The cause for this increased demand lies in a reduced use of biogenic fuels in 2008, as the use of fossil fuels was the more efficient option. Overall, the industry gives a balanced picture. As this is a sector where few big players dominate the market, it is thought that whatever changes there will be in the sector, it will just be internal changes within the companies.

Table 7: Number of Industrial Installations, Number of Allocations, VET Entries and aggregated Allocations for Installations subject to Emissions Trading in 2008, sorted by Activities X to XVII

Main Activity	Name of Activity	VET 2008 vs Allocation 2008*	Number of Installations	Number of Allocations 2008* [1000 EAs/a]	VET 2008 [kt CO2/a]	Deviation VET 2008 from Allocation 2008* [kt CO2/a]
X	Cement	VET 2008 < AV 2008	26	13,762	12,699	-1,064
		VET 2008 > AV 2008	13	6,737	7,735	998
			39	20,500	20,434	-66
XI	Lime	VET 2008 < AV 2008	45	7,888	6,814	-1,074
		VET 2008 > AV 2008	24	1,463	1,763	300
			69	9,351	8,577	-774
XII	Glass	VET 2008 < AV 2008	41	1,928	1,529	-398
		VET 2008 > AV 2008	44	2,158	2,382	223
			85	4,086	3,911	-175
XIIa	Mineral Fibres	VET 2008 < AV 2008	6	274	239	-35
		VET 2008 > AV 2008	2	88	96	8
			8	362	335	-27
XIII	Ceramics	No comparison possible	1	4	0	0
		VET 2008 < AV 2008	112	1,668	1,084	-584
		VET 2008 > AV 2008	24	315	361	47
			137	1,987	1,445	-538
XIV	Pulp	VET 2008 < AV 2008	4	463	149	-314
		VET 2008 > AV 2008	1	6	6	1
			5	469	155	-314
XV	Paper	VET 2008 < AV 2008	73	4,326	3,555	-771
		VET 2008 > AV 2008	52	2,220	2,458	238
			125	6,546	6,014	-532

Main Activity	Name of Activity	VET 2008 vs Allocation 2008*	Number of Installations	Number of Allocations 2008* [1000 EAs/a]	VET 2008 [kt CO2/a]	Deviation VET 2008 from Allocation 2008* [kt CO2/a]
XVI	Propylene/ Ethylene	VET 2008 < AV 2008	7	5,292	4,721	-571
		VET 2008 > AV 2008	1	351	378	27
			8	5,643	5,099	-545
XVII	Carbon Black	VET 2008 < AV 2008	5	803	664	-140
				5	803	664
Total			481	49,747	46,633	-3,110

* including adjustment for transferred blast furnace gas

Two thirds of all installations in the lime industry (Table 7, Activity XI) have a surplus of almost 14 percent of emissions allowance free of charge. One third has a shortfall of 300,000 emissions allowances, 20 percent of the free allocation for these installations. As production and emission are closely related, the lower level of emissions compared to the baseline period is a direct reflection of the downturn in production in 2008. The Limekilns of Activity XI can be divided into two branches - those that produce lime for the building industry (see Table 8, Lime) and those that produce (hydrogenized) lime for food (see Table 8, Sugar).

Table 8: Lime Sector, divided into Construction and Sugar

Industry	VET 2008 vs Allocation 2008	Number of Installations	Number of Allocations 2008* [1000 EAs/a]	VET 2008 [kt CO ₂ /a]	Deviation VET 2008 from Allocation 2008* [kt CO ₂ /a]
Lime	VET 2008 < AV 2008	30	7,462	6,421	-1,041
	VET 2008 > AV 2008	16	1,761	2,043	310
Lime Subtotal		46	9,223	8,464	-731
Sugar	VET 2008 < AV 2008	14	80	57	-24
	VET 2008 > AV 2008	9	47	56	9
Sugar Subtotal		23	127	112	-15
Total		69	9,351	8,577	-746

* including adjustment for transferred blast furnace gas

The glass industry (Table 7, Activities XII and XIIa) comprises the main categories flat glass and hollow glass. Installations for the production of special glass or glass fibre have significantly lower emissions, while installations producing mineral fibre (rock wool) for insulation have been included in emissions trading only in the current 2008-2012 trading period, although their products are similar to glass wool. They now feature as Activity XIIa. The entire industry (Activities XII and XIIa) report a surplus of over 202,000 emissions allowances or 4.5 percent. There are large discrepancies within the group, as half of all installations has a demand for additional 231,000 emissions allowances in total, which amounts to 10 percent of their allocation, whereas the other half has a surplus of 434,000 allowances or 20 percent of their allocation to save up or to sell.

Table 9 shows the data of glass wool and technical glass fibre production, extracted from Activity XII data and compared with Activity XIIa data. Both groups achieve a similar surplus in allowances, 14 percent (XII) and 10 percent (XIIa)

Table 9: Glass and Mineral Fibre-Producing Industries within Activities Glass (XII) and Mineral Fibres (XIIa)

		VET 2008 vs Allocation 2008 incl Blast Furnace gas	Deviation VET 2008 from Allocation 2008*			
Industry	Main Activity		Number of Installation s	Number of Allocations 2008* [1000 EAs/a]	VET 2008 [kt CO ₂ /a]	[kt CO ₂ /a]
Production of Glass Fibre	XII	VET 2008 < AV 2008	6	116	73	-43
		VET 2008 > AV 2008	3	102	115	12
	XII Subtotal		9	219	188	-31
	XIIa	VET 2008 < AV 2008	6	274	239	-35
		VET 2008 > AV 2008	2	88	96	8
	XIIa Subtotal		8	362	335	-27
	Production of Glass Fibre Total			17	581	523

* including adjustment for transferred blast furnace gas

Small ceramics installations are no longer subject to emissions trading, due to changes to TEHG. Of the remaining 137 installations (Table 7, Activity XIII) a large majority, 112 installations, have a total surplus of 584,000 emissions allowances. That is one third of

their free allocation. A small number of installations have a shortfall of 47,000 emissions allowances or 15 percent of their allocation. This is caused by decreased production, caused by the downturn in the building industry. (see also Section 4.4).

The pulp industry (Table 7, Activity XIV) benefits from the allocation rules and its high use of biogenic residues. Their surplus amounts to 314,000 emissions allowances, which is 66 percent of free allocations. However, there is one small installation whose emissions are not covered by the free allocation for 2008.

In paper mills, the emission sources are usually steam generators of CHP installations. They also generally benefit from the allocation rules. 73 out of 125 installations (Table 7, Activity XV) end up with a surplus of 771,000 emissions allowances, while the rest has a shortfall of 238,000 allowances. This mirrors the divide in the development of emissions within the industry (Table 14).

The additional installations of the Bulk Organic Chemical Industry (Activities XVI Propylene/Ethylene and XVII Carbon Black) have only been subject to emissions trading since 2008. All in all, this group accumulated a surplus of 685,000 emissions allowances (Table 7, last column, total value Activities XVI and XVII) which is ten percent of the total allocation. So emissions trading does not represent an extra burden for this group.

As there are no installations in Germany for Activity XVIII Flares, it has not been included in this analysis.

3.6 Allocation Situation for Cases of Hardship

The 2012 Allocation Act contains two provisions on how to deal with economic hardship. Overall, five installations received allocations according to Article 6, Paragraph 6, while 40 installations regard to Article 12. The former generally received a slight over-allocation (Table 10). The operators were unable to achieve their production targets and thus did not reach the anticipated emissions level. Supposing there would have been a linear rise in emissions with increasing production, the five installations remained 15 percent below the anticipated production. Operators may have used their free allocations to improve their liquidity – at least there were press reports that this was an option taken up in many EU member states

Table 10: Allocation Situation for Installations with Allocations based on ZuG 2012, Articles 6 (6)/ 7 (5) and 12

Hardship	Sector	VET 2008 vs Allocation 2008*	Number of installations	Number of Allocations 2008* [1000 EAs/a]	VET 2008 [kt CO ₂ /a]	Deviation VET 2008 from Allocation 2008* [kt CO ₂ /a]
Article 12 ZuG 2012	Energy	Comparison not possible	1	6	0	0
		VET 2008 < AV 2008	16	669	267	-402
		VET 2008 > AV 2008	1	8	8	1
			18	683	276	-401
	Industry	VET 2008 < AV 2008	12	1,537	1,435	-102
		VET 2008 > AV 2008	10	489	539	50
				22	2,026	1,974
Articles 6 (6), 7 (5) ZuG 2012	Energy	VET 2008 < AV 2008	2	167	141	-26
				2	167	141
	Industry	VET 2008 < AV 2008	3	32	24	-8
				3	32	24
Total			45	2,907	2,414	-488

* including adjustment for transferred blast furnace gas

For installation operators receiving their allocations on the basis of ZuG 2012, Article 12, allocation rules similar to those for new entrants applied, and in particular the ambitious benchmark. Some energy installations received a significantly higher allocation than could be expected on the grounds of their verified emissions of the previous year. Eight energy-generating installations using prevalently biogenic fuel¹ achieved a surplus of well over 380,000 emissions allowances.

3.7 Allocation Situation for Small Installations

Installations with an emission of less than 25.000 tonnes of carbon dioxide over the base period received free emissions allowances on the basis of ZuG 2012, Article 6. 802 installations surrendered in total 7.6 million tonnes of carbon dioxide for 2008 (Table 11). Around 70 percent

¹ these data are not included in the table for confidentiality reasons

of these installations emitted 30 percent less carbon dioxide than what was covered by their allocated allowances. Some activities have surpluses of up to 45 percent.

The greatest surplus is found in installations of Activities II and III. The increased use of biogenic fuels is certainly a contributing factor. The surplus in industrial installations lies between 8 and 34 percent, which may partially be due to fuel-switching, as well as a downturn in production.

Table 11: Allocation Situation for Installations receiving an Allocation based on ZuG 2012, Article 6 (9)

Activity	VET 2008 vs Allocation 2008*	Number of Installations	Number of Allocations 2008 * [1000 EAs/a]	VET 2008 [kt CO ₂ /a]	Deviation VET 2008 from Allocation 2008* [kt CO ₂ /a]
Large Combustion Plants	VET 2008 < AV 2008	99	1,197	668	-529
	VET 2008 > AV 2008	31	298	574	277
		130	1,495	1,243	-252
Combustion Plants 20-50 MW RTO	VET 2008 < AV 2008	292	3,540	2,630	-910
	VET 2008 > AV 2008	95	933	1,092	159
		387	4,473	3,722	-750
Prime Movers (Engines and Turbines)	VET 2008 < AV 2008	21	262	144	-118
	VET 2008 > AV 2008	13	142	179	37
		34	404	323	-81
Refineries	VET 2008 < AV 2008	1	29	27	-2
		1	29	27	-2
Iron and Steel	VET 2008 < AV 2008	1	33	26	-7
	VET 2008 > AV 2008	4	50	73	22
		5	83	99	16

Activity	VET 2008 vs Allocation 2008*	Number of Installation s	Number of Allocations 2008 * [1000 EAs/a]	VET 2008 [kt CO ₂ /a]	Deviation VET 2008 from Allocation 2008* [kt CO ₂ /a]
Mineral-processing Industry	No comparison possible	1	4	0	0
	VET 2008 < AV 2008	127	1,355	899	-456
	VET 2008 > AV 2008	49	548	639	91
		177	1,907	1,538	-365
Pulp and Paper	VET 2008 < AV 2008	34	359	250	-109
	VET 2008 > AV 2008	34	367	435	68
		68	726	686	-41
Total		802	9,118	7,637	-1,476

* including adjustment for transferred blast furnace gas

Throughout all activities, however, there are 226 installations that emitted approx. 654.000 tonnes of carbon dioxide or 28 percent more than was covered by the allowances allocated to them. Some of these installations clearly did not receive enough allowances. Within the large combustion plant activity, more than 90 percent more carbon dioxide was emitted than was covered by the allocated allowances. This situation came about because during the base period, many fairly large installations worked at low capacity, emitting less than 25,000 tonnes of carbon dioxide. Running at higher capacity, they now exceed historic values. The higher capacity reflects higher productivity, which would normally produce value-added for an installation.

4 COMPARISON WITH THE PREVIOUS YEAR

4.1 Comparison with the Previous Year, sorted by Allocations

Emissions developed differently in each activity group listed in TEHG Annex I. Not all sectors show the effects of the economic recession in the last quarter of 2008 in their annual emissions. The data of the energy-generating installations for 2007 and 2008 are shown in Table 12, grouped according to activities. A similar overview of industrial activities will be given in Sections 4.3 and 4.4.

Within the individual activities, installations that decreased their emissions ($VET_{2008} < EmB_{2007}$) and those that increased them ($VET_{2008} > EmB_{2007}$) are listed separately. During the first trading period, some installations shared a licence, while others that figure now as one unit had been licensed separately. These changes in licensing have been accounted for in the data from the first trading period. The data therefore differ from the CITL entries. CITL does not show changes in the existing stock of installations. Some installations only entered the emissions trading scheme with the new trading period. As this is a comparison of VET entries, no historic data exist for comparison. Other installations have left the scheme and are no longer listed. The aggregated emissions² of 2007 486.5 million fall short of the aggregated VET entries for 2007 (487 million tonnes of carbon dioxide³) by 500,000 tonnes of carbon dioxide.

4.2 Comparison with the Previous Year - Energy-Generating Installations

Emissions from TEHG Activity I installations, especially large power stations, have significantly dropped in 2007. Emissions dropped in 280 installations with total VET entries of 239 million tonnes of carbon dioxide in 2007, which is a reduction by 32 million tonnes of carbon dioxide or 13 percent. In 235 installations, however, emissions rose by a total of 13.6 million tonnes of carbon dioxide or 10 percent. New entrants emitted 2.4 million tonnes of carbon dioxide. No data for comparison are available. Overall, including new entrants, emissions for this group of installations have dropped by 18 million tonnes of carbon dioxide.

² Activities I to V: 386,152 kt CO₂ (Table 12), Activities VI to IXb: 57.888 kt CO₂ (Table 13) and Activities X to XVIII: 43.438 kt CO₂ (Table 14)

³ see press release 021/2008 by the Federal Environment Agency:
<http://www.umweltbundesamt.de/uba-info-presse/2008/pdf/pd08-021.pdf>

Table 12: Comparison of 2008 VET Entries with Verified Data from the Emissions Reports by Energy-Generating Installations in 2007, sorted by Activities.

Main Activity	Name of Activity	VET 2008 vs EmB 2007				Deviation VET 2008 from Emissions 2007 [kt CO ₂ /a]
			Number of Installations	Emissions 2007 [kt CO ₂ /a]	VET 2008 [kt CO ₂ /a]	
I	Energy Conversion > 50 MW RTO	no comparison possible	10	0	2,381	0
		VET 2008 < EmB2007	280	238,850	206,733	-32,116
		VET 2008 > EmB2007	235	137,405	151,047	13,642
			525	376,255	360,162	-18,474
II	Energy Conversion 20-50 MW RTO	no comparison possible	5	25	5	0
		VET 2008 < EmB2007	243	3,802	3,327	-474
		VET 2008 > EmB2007	268	3,383	3,791	408
			516	7,209	7,124	-66
III	Energy Conversion 20-50 MW RTO, other fuels	VET 2008 < EmB2007	6	82	75	-7
		VET 2008 > EmB2007	6	62	69	7
			12	144	143	0
IV	Prime Movers (Engines)	VET 2008 < EmB2007	3	96	40	-56
			3	96	40	-56
V	Prime Movers (Turbines)	no comparison possible	2	0	40	0
		VET 2008 < EmB2007	21	763	670	-93
		VET 2008 > EmB2007	30	685	882	197
			53	1,448	1,592	104
Total			1109	385,152	369,062	-18,493

There are installations that started operating during 2007 and could not submit full VET data for their first year (new entrants 2007). Their 2007 emissions are therefore by definition below an annual average and are exceeded by their 2008 emissions. Conversely, other installations

that had below-average emissions in 2007 have increased their capacity in 2008. In order to simplify matters, it was assumed that the difference between 2007 and 2008 would balance out for installations in that group. The main product of these installations is electricity, and the reason for their drop in productivity is the return to normal operation of several nuclear power stations, which are outside the scope of emissions trading. Demand for electricity remaining equal, the shift of power stations out of the emissions trading scheme (with or without carbon dioxide emissions) must result in a drop in recorded emissions. The shift in energy generation away from black coal and lignite power stations to other types of power stations is reflected in the statistics of fuel use for 2008. According to data published by Arbeitsgemeinschaft Energiebilanzen e.V., the use of black coal and lignite decreased by seven and four percent respectively, while the use of nuclear energy went up by six percent.

TEHG Annex I divides smaller combustion installations with a rated thermal output between 20 and 50 MW into activities II and III, depending on the fuel used. Installations using prevalently conventional fuel are found in Activity II, while installations using other fuels – e.g. meat-and-bone meal – are assigned to Activity III. As both types of installations are comparable at a technical level, they are put into the same category here. Activity III does not comprise waste incinerators, which, as 17th-BImSchV-installations, are not part of the EU ETS. In 2008, 249 installations emitted approx. 481,000 tonnes of carbon dioxide less than in 2007, which is about 12 percent of the 2007 emissions. On the other hand, 274 installations emitted approx. 415,000 tonnes of carbon dioxide more, nearly 11 percent, roughly balancing out the emissions reductions. In this category, no trend towards or away from a reduction of emissions can be observed. Instead, a redistribution of emissions among the whole range of installations takes place, and a decrease in fossil fuel emissions could be caused by an increased use of biogenic fuels – e.g. wood residue or meat-and-bone meal – rather than by diminished output. It can be assumed that changes in the fuel mix without changes in production are responsible for changes in the emissions of individual installations compared to the previous year. As emissions reports do not collect production data, no conclusions can be drawn regarding the productivity of installations.

The group of Prime Movers (Activities IV and V) consists mainly of installations for the transport and storage of natural gas. Other installations in this activity group – district heating plants, emergency power generators, compressed air plants and refrigerators with a rated thermal output above 20 MW – are responsible for a smaller proportion of emissions. The emissions of natural gas compressors depend on the consumption of natural gas in Germany. However, economic considerations may also play a role in how operators use the available

storage capacities, such as current and anticipated gas price developments. Transport of gas depends on the length of the route, the weather, and the pressure at which it enters the grid, i.e. on physical conditions. All three engine installations had a drop in emissions, compared to the previous year. About half the turbines had increased emissions, while the rest had decreased emissions or could not be compared. To sum up, all installations in Activity IV and V emitted 48,000 tonnes of carbon dioxide more than in the previous year. This is just under three percent, which is below normal fluctuation levels in this activity.

4.3 Comparison with the Previous Year - Refineries, Iron and Steel

Refineries (Table 13, Activity VI) are classified as industrial activities, receiving an allocation on the basis of ZuG 2012, Article 6. In all locations, the notion installation covers several combustion plants involved in an industrial process that has been licensed as one entity. A single refinery is very complex and so unique that the only thing it shares with other refineries is the degree of complexity. Overall, emission increases and decreases in this group of installations balance each other out in comparison to the previous year. About two thirds of the installations achieved a total emissions reduction of 2.6 million tonnes of carbon dioxide, which is 16 percent of previous year levels. Conversely, one third of the installations ended up emitting 0.9 million tonnes of carbon dioxide more; which is 12.5 percent of the (low) level of the previous year. Another factor was a drop in petrol production for export to the US in 2008. Production shifted towards less emission-relevant distillates and less desulphurised products, leading to a decrease in absolute carbon dioxide emissions of 1.7 million tonnes. A concentration of existing installations, which is not reflected in the CITL registry, has been accounted for. It was thus possible to include historic emissions from installations that have now merged with others.

Table 13: Comparison of VET entries for 2008 with Verified Data from the Emissions Reports by Industrial Installations in 2007, sorted by Activities VI to IXb.

Main Activity	Name of Activity	VET 2008 vs EmB 2007	Number of installations	Emissions 2007 [kt CO ₂ /a]	VET 2008 [kt CO ₂ /a]	Deviation VET 2008 from Emissions 2007 [kt CO ₂ /a]
VI	Refineries	VET 2008 < EmB2007	19	17,646	14,998	-2,648
		VET 2008 > EmB2007	8	7,185	8,088	903
			27	24,831	23,086	-1,745
VII	Coke Ovens	no comparison possible	1	0	420	0
		VET 2008 < EmB2007	2	1,303	1,178	-125
		VET 2008 > EmB2007	1	1,976	1,980	4
			4	3,279	3,578	-121
VIII	Iron Ore Sintering	VET 2008 < EmB2007	1	1,852	1,718	-134
			1	1,852	1,718	-134
IX	Pig Iron and Steel Production	VET 2008 < EmB2007	16	7,780	7,361	-419
		VET 2008 > EmB2007	10	465	526	61
			26	8,246	7,888	-358
IXa	Integrated Steel Plants	VET 2008 < EmB2007	3	11,863	10,755	-1,108
		VET 2008 > EmB2007	1	7,817	8,811	994
			4	19,680	19,566	-114
IXb	Secondary Steel Plants	no comparison possible	8	0	1,068	0
				8	0	1,068
Total			70	57,888	56,905	-2,472

The installation in the iron and steel industries (Activities VII to IXb) are closely interlinked, making it difficult to comment on individual activities. Coke Ovens (Activity VII) include three existing installations and one new entrant with separate licences, while three further coke ovens are part of a larger unit and classified under integrated furnaces. Out of the three separately licensed coke ovens, two achieved reductions of approx. 125,000 tonnes of carbon

dioxide compared to the previous year. The third plant emitted approx. 4.000 more tonnes of carbon dioxide, which is a negligible 0.2 percent. The new entrant emissions cannot be compared to the previous year. These add approx. 420.000 tonnes of carbon dioxide to the total emissions of the group. Overall, emissions rose by over 0.5 million tonnes of carbon dioxide, not including the coke ovens within integrated furnaces.

Only one installation has been registered for Activity VIII, Iron Ore Sintering. It comprises several parts of various activities, as defined in TEHG Annex I. Compared to the previous year, it reports a decrease in emissions of seven percent, which is not representative of the activity.

Activity IX was restructured after an amendment to TEHG. The former Activity IX definition covered single furnaces and electric steel plants, while the new definition includes integrated furnaces, coke ovens and other subsidiary installations of the steel industry. Activity IXb includes additional steel-processing installations that are subject to emissions trading, in particular separately licensed heat steel mills that reuse blast furnace gas. In 16 out of 26 installations in pig iron and steel production, total emissions went down by 419.000 tonnes of carbon dioxide. This is five percent of the emissions of the previous year. The remaining installations in this group emit over 60,000 tonnes carbon dioxide, which is 13 percent of the (low) levels of the previous year. Overall, emissions in this group of installations fell by 358,000 tonnes of carbon dioxide, compared to the previous year. This could be an indication of a decrease in production, as the emission-production relation is fairly rigid. The overall emissions of four integrated furnaces remained more or less the same, compared to the previous year. Two installations report an increase in emissions by 1.3 million tonnes of carbon dioxide or 11 percent, while the two others decreased their emissions by 1.1 million tonnes of carbon dioxide (-14 percent). No reference data for 2007 are available for additional installations.

4.4 Comparison with the Previous Year - Mineral-Processing and other Industries

In the cement industry (Activity X), emissions in 28 out of 39 installations decreased by 1.7 million tonnes of carbon dioxide (-10 percent). The rest of the installations show a slight increase by approx. 133.000 tonnes of carbon dioxide (+3 percent). The emissions reductions are equivalent to a seven percent decrease in production⁴. At 20.4 million tonnes of carbon dioxide, emissions have fallen back to the levels of 2005 and 2006.

⁴ For Activity X, Cement, the produced volume must be included in the report, i.e. the industry production figures are known.

Table 14: Comparison of VET entries for 2008 with Verified Data from the Emissions Reports by Industrial Installations in 2007, sorted by Activities X to XVII.

Main Activity	Name of Activity	VET 2008 vs Emb 2007	Number of installations	Emissions 2007 [kt CO ₂ /a]	VET 2008 [kt CO ₂ /a]	Deviation VET 2008 from Emissions 2007 [kt CO ₂ /a]
X	Cement	VET 2008 < Emb2007	28	17,189	15,457	-1.732
		VET 2008 > Emb2007	11	4,843	4,977	133
			39	22,032	20,434	-1.598
XI	Lime	no comparison possible	12	0	52	0
		VET 2008 < Emb2007	34	4,520	3,683	-836
		VET 2008 > Emb2007	23	4,494	4,842	348
			69	9,014	8,577	-489
XII	Glass	no comparison possible	1	0	10	0
		VET 2008 < Emb2007	48	2,352	2,165	-187
		VET 2008 > Emb2007	36	1,633	1,736	103
			85	3,985	3,911	-84
XIIa	Mineral Fibres	no comparison possible	7	0	312	0
		VET 2008 > Emb2007	1	5	23	18
			8	5	335	18
XIII	Ceramics	no comparison possible	2	4	10	0
		VET 2008 < Emb2007	100	1,381	1,050	-331
		VET 2008 > Emb2007	35	345	385	40
			137	1,730	1,445	-290
XIV	Pulp	VET 2008 < Emb2007	5	507	155	-352
			5	507	155	-352

Main Activity	Name of Activity	VET 2008 vs EmB 2007	Number of installations	Emissions 2007 [kt CO ₂ /a]	VET 2008 [kt CO ₂ /a]	Deviation VET 2008 from Emissions 2007 [kt CO ₂ /a]
XV	Paper	VET 2008 < EmB2007	78	4,056	3,420	-636
		VET 2008 > EmB2007	47	1,948	2,593	645
			125	6,004	6,014	9
XVI	Propylene/Ethylene	no comparison possible	6	0	3,189	0
		VET 2008 > EmB2007	2	161	1,910	1,749
			8	161	5,099	1,749
XVII	Carbon Black	no comparison possible	5	0	664	0
			5	0	664	0
Total			481	43,438	46,633	-1,037

The limekilns of Activity XI, Lime, are divided into two different branches - one producing building material and aggregates, the other additives for the food industry (see next section). 34 installations are responsible for half the emissions of the previous year. They lowered their emissions by 0.8 million tonnes of carbon dioxide. 23 installations increased their emissions by just under 0.3 million tonnes of carbon dioxide. No data from the previous year are available for 12 installations. For the installations that could be compared, there is a decrease of approx. 489,000 tonnes of carbon dioxide, which is just five percent below the levels of the previous year.

The majority of installations in the glass industry (Activity XII) reports a decrease of eight percent or approx. 187,000 tonnes of carbon dioxide. The remaining installations had an increase of 103.000 tonnes of carbon dioxide. Overall, the installations of the glass industry decreased their emissions by two percent or 84,000 tonnes of carbon dioxide. The emissions of the Mineral Fibres installations (Activity XIIa) cannot be compared to the previous year, as they have been subject to emissions trading from 2008 only.

The recession in the construction sector had a negative impact on the production of bricks and tiles - the mainstay of a considerable part of ceramic installations (Activity XIII) subject to

emissions trading. 100 installations had a total drop of 331.000 tonnes in carbon dioxide emissions, which is 24 percent of the previous year levels. Only 35 installations increased their carbon dioxide emissions by a total of 40,000 tonnes or 12 percent, compared to the levels of the previous year. No comparison could be made for two installations.

The combustion plants of the pulp industry (Activity XIV) are mainly fuelled by biogenic waste from production plants. Their drop in carbon dioxide emissions by over 351.000 tonnes or 70 percent (compared to the previous year) could be attributed to several factors. One of them could be a change in the licensing procedure, as a consequence of which installations are no longer or only partially subject to emissions trading. As the emissions reports of the industry do not contain production data, no conclusions can be drawn on whether the decrease is due to increased efficiency or a slow-down in production.

In the paper industry (Activity XV), no change in the levels of total emissions has been found in the installations that could be compared. Most of the installations (78 out of 125), representing roughly two thirds of the emissions of the previous year, emitted approx. 636.000 tonnes of carbon dioxide less (-16 percent). The remaining 47 installations increased their fossil carbon dioxide emissions from 1.9 to 2.6 million tonnes of carbon dioxide (+37 percent). As in the case of installations of the pulp industry, no conclusions can be drawn as to the productivity of the industry, as the changes could be caused by switching between fossil and biogenic fuels.

All installations of Activities XVI and XVII have only been subject to emissions trading from 2008. So no previous data exist. No installations are registered in Germany for Activity XIII, Flares.

5 EVALUATION BY FEDERAL STATES

5.1 The Allocation Situation in Individual Federal States

Figure 3 shows the 2008 emissions and allocations by activity groups and by Federal States. In a Germany-wide comparison, the overall emissions of North Rhine-Westphalia are the highest at 219 million tonnes of carbon dioxide (see Table 17 in the appendix of this report). Only in the Federal States of Bavaria, Bremen, Hamburg, Rhineland-Palatinate and Thuringia were emission levels lower than what was covered by their allocations.

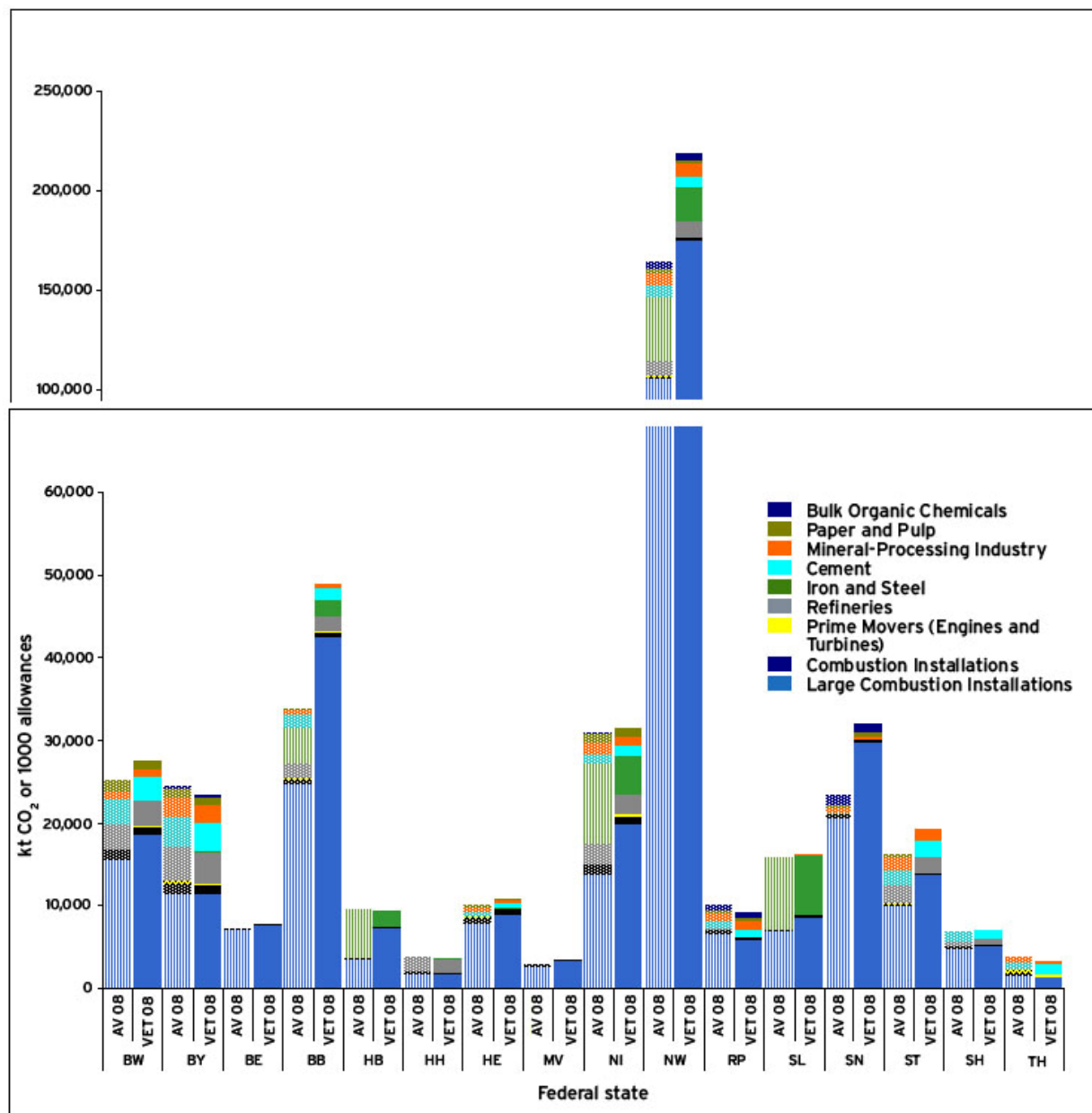


Figure 3: Federal States, Allocations and Emissions 2008

5.2 VET Entries for 2008 sorted by Federal States

The evaluation according to Federal States gives an overview of installations taking part in emissions trading, sorted by activities (Fig. 4). Discrepancies may occur between the analysis of individual activities and the analysis of the emission situation in individual states. The most striking examples are briefly highlighted.

5.2.1 Baden-Württemberg

Baden-Württemberg (BW) is one of the states with a large number of installations subject to emissions trading, currently 156 installations.

The largest part of emissions (two thirds) are caused by energy-generating installations, followed by refineries (two installations) with 3.1 million tonnes of carbon dioxide, cement production plants with 2.8 million tonnes of carbon dioxide and paper mills with 1.2 million tonnes of carbon dioxide emissions.

Emission figures for refineries have increased compared to 2007. One of the reasons lies in changes in licensing regulations. Installations that have been subject to emissions trading before, but licensed under other activities have been licensed under this activity group from the beginning of the second trading period.

Overall emissions were reduced by 2.2 million tonnes of carbon dioxide (7.5 percent) compared to 2007.

5.2.2 Bavaria

Bavaria (BY) is second only to North-Rhine-Westphalia regarding the number of installations subject to emissions trading, with a wide range of activities. Energy-generating installations are responsible for over half the emissions, followed by refineries with 3.8 million tonnes and the cement industry with 3.5 million tonnes of carbon dioxide emissions. The ceramics industry is relatively strong in Bavaria, compared to other states. These installations emit 0.5 million tonnes of carbon dioxide.

Total emissions of 23.3 million tonnes of carbon dioxide dropped marginally by 0.6 percent compared to 2007.

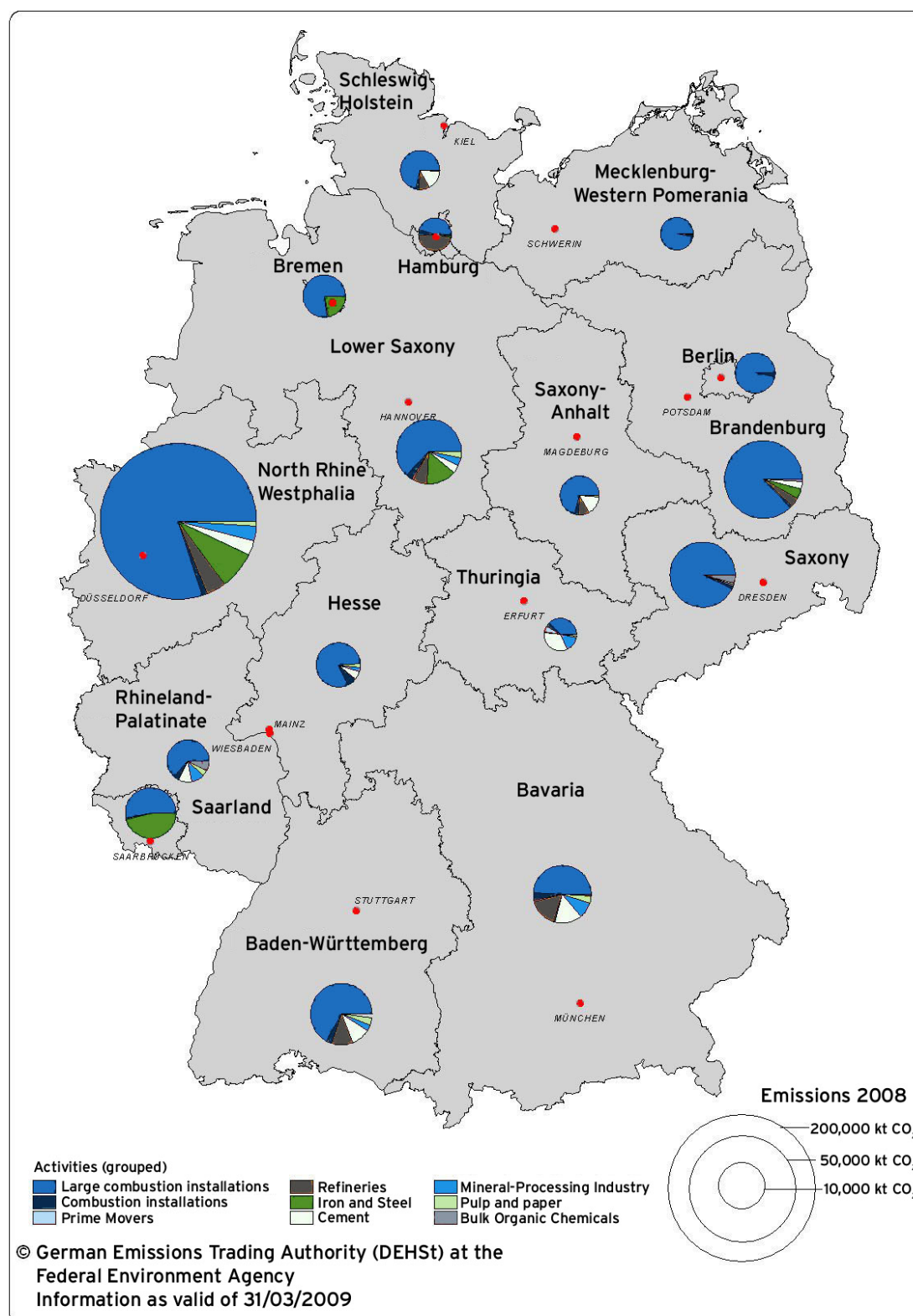


Figure 4: Carbon Dioxide Emissions of Installations in the Federal States in 2008, sorted by Activities.

5.2.3 Berlin

In Berlin (BE), only energy sector installations are subject to emissions trading. These are 34 installations, emitting 7.8 million tonnes of carbon dioxide in 2008. No changes compared to the previous year.

5.2.4 Brandenburg

After North-Rhine-Westphalia, Brandenburg (BB) is the state with the highest emissions for 2008. Only 65 installations are responsible for around 49 million tonnes of carbon dioxide emissions. The power stations Jänschwalde and Schwarze Pumpe have the largest share of nearly three quarters of all emissions.

Industrial activities are highly diverse, including refineries, installations of the iron, steel, mineral-processing, paper, and cellulose industries.

Overall emissions fell slightly from 2007 to 2008 (-1.3 percent).

5.2.5 Bremen

Bremen (HB) is the state with the smallest number of installations subject to emissions trading. There is a significant drop in emissions (-12.5 percent), compared to 2007.

Out of a total of 26 installations, 25 belong to the energy sector, with a five percent reduction in emissions, compared to the previous year.

Emissions reductions in Bremen are mainly due to the integrated steel plant which emitted 0.9 million tonnes of carbon dioxide less (-32 percent) than in 2007.

5.2.6 Hamburg

Out of 31 installations in Hamburg (HH), 26 were part of the energy sector and five industrial installations. Refineries and pig iron and steel-producing installations report an over five percent drop in emissions, compared to 2007.

5.2.7 Hesse

In Hesse (HE), 108 installations took part in emissions trading. Compared to the previous year, emissions fell by over eight percent in 2008, compared to the previous year. The reduction in emissions of large combustion installations (Activity I) was over nine percent.

Industrial installations also decreased their emissions by a considerable amount – Glass (13 percent) and Ceramics (21 percent).

5.2.8 Mecklenburg-Western Pomerania

Mecklenburg-Western Pomerania (MV) is another state with a low number of installations (33). They are mainly installations of the energy sector, with an increase of emissions by five percent, compared to the previous year. The six industrial installations (lime, glass, ceramics and paper) are small emitters on a Federal scale.

The rise in emissions in the lime industry is partly due to an installation that had not been subject to emissions trading before. Hence, no data on previous emissions were available. A drop in emissions in the ceramics industry is due to zero production (VET entry) in one installation which probably shifted its production to another installation.

So far, there have only been tentative and provisional explanations for the significant emission changes affecting Activities XI to XIII.

5.2.9 Lower Saxony

185 installations take part in emissions trading in Lower Saxony (NI). The proportion of installations in the energy sector is only slightly higher than that of the industrial sector. The industrial sector covers a wide range of activities from refineries to soot-producing installations.

Overall emissions from installations included in the ETS in Lower Saxony dropped by two percent to 31.5 million tonnes of carbon dioxide in 2008.

5.2.10 North Rhine-Westphalia

North Rhine-Westphalia (NW) is the state with the highest number of installations and the highest emissions.

Over a third of the installations subject to emissions trading belong to the energy sector.

This state has a concentration of installations and production plants in nearly all activities. Refineries report strong deviations between the emissions of 2007 and 2008 (-16 percent). These are partly the result of splitting two installations after the first (2005-2007) trading

period, while a rise in the emissions of coke ovens (+18 percent) could be due shifting production.

The installations of the other industrial activities follow Germany-wide trends in their activity. There is a striking trend away from generating electricity from coal, contributing to a drop in emissions. The overall emissions of North Rhine-Westphalia dropped by 2.6 percent, compared to the previous year.

5.2.11 Rhineland-Palatinate

The high proportion of emission increases in Rhineland-Palatinate (RP) is mainly the result of additional installations being registered under Activity XVI.

Just over half of all installations belong to the energy sector. Bucking the Federal trend, these installations emitted around nine percent more carbon dioxide than in 2007, using up 89 percent of their allocation.

The pig iron and steel production plant reported a large increase in emissions, due to enlarged capacity.

5.2.12 Saarland

Saarland (SL) has 32 installations with the largest proportion of drops in emissions (-16 percent). The decrease is greatest in large combustion installations (-26 percent). Coke ovens and pig iron and steel production also reported decreasing emissions. Taking into account the transfer of blast furnace gas, the overall allocation of allowances is sufficient.

5.2.13 Saxony

In Saxony (SN) nearly two thirds of all installations subject to emissions trading belong to the energy sector. Although these achieved a five percent reduction of their emissions, they still exceeded their allocation by 40 percent.

The increase in emissions compared to 2007 is mainly a result of the inclusion of Mineral Fibres and Propylene/Ethylene activities, which were not included in the emissions data up to 2007.

5.2.14 Saxony-Anhalt

Just under a quarter of installations (56) in Saxony-Anhalt (ST) belong to the energy sector. A rise in emissions was mainly reported by large combustion plants where emissions exceeded their 2008 allocation.

5.2.15 Schleswig-Holstein

In Schleswig-Holstein (SH), the main participants in emissions trading are installations of the energy sector (36 out of 45). They are responsible for an increase in emissions in 2008. Industrial installations include refineries (two installations), cement and glass (one installation each) as well as paper (five installations). Four of the paper industry installations are small installations. All except one reduced their emissions compared to 2007. Some installations have been merged at the end of the first trading period. Their aggregated emissions have risen, compared to 2007.

5.2.16 Thuringia

More than half of Thuringia's (TH) installations belong to the energy sector. However, the overall emissions of the industrial sector exceed those of the energy sector. All in all, a trend towards emissions reduction and a sufficient allocation of allowances can be observed in 2008.

It is striking that the pulp installation reports a large reduction of emissions (-46 percent), while enjoying a generous allocation (150 percent) of allowances. Similar observations were made in the ceramics industry. A reduction of emissions by 25 percent compared to the previous year resulted in an allowance surplus of 22 percent.

6 APPENDIX

Table 15: Overview of verified Emissions in 2007 by Federal States, sorted by Activities

Emissions 2007 [kt CO ₂ /a]		Federal State																
Name of Activity		BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Gesamt
I	Energy Conversion > 50 MW RTO	43,018	7,536	20,351	11,400	7,666	9,770	1,584	3,202	20,787	184,178	5,300	4,444	11,527	31,275	12,880	1,337	376,255
II	Energy Conversion 20- 50 MW RTO	394	223	915	944	139	634	181	74	944	1,389	338	172	245	228	248	143	7,209
III	Energy Conversion 20- 50 MW RTO, other fuels	0	0	0	22	0	0	45	0	0	58	0	15	0	0	0	4	144
IV	Prime Movers (Engines)	0	0	0	31	0	0	0	0	65	0	0	0	0	0	0	0	96
V	Prime Movers (Turbines)	208	0	58	211	1	96	0	0	273	274	75	0	0	19	64	169	1,448
VI	Refineries	1,666	0	2,845	3,789	0	0	1,861	0	2,386	9,417	32	698	0	0	2,137	0	24,831
VII	Coke Ovens	0	0	0	0	0	0	0	0	0	2,390	0	0	889	0	0	0	3,279
VIII	Iron Ore Sintering	1,852	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,852
IX	Pig Iron and Steel Production	193	0	143	109	0	53	98	0	212	820	19	0	6,440	109	0	49	8,246
IXa	Integrated Steel Plants	0	0	0	0	2,984	0	0	0	4,184	12,512	0	0	0	0	0	0	19,680
IXb	Secondary Steel Plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Emissions 2007 [kt CO ₂ /a]		Federal State																
Name of Activity		BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Gesamt
X	Cement	1,584	0	3,320	3,961	0	648	0	0	1,183	5,932	916	1,151	0	0	2,180	1,158	22.032
XI	Lime	342	0	393	751	0	247	0	4	518	4,839	609	0	0	0	1,135	177	9.014
XII	Glass	101	0	287	752	0	15	0	19	488	1,121	268	39	13	274	361	247	3.985
XIIa	Mineral Fibres	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
XIII	Ceramics	111	0	130	611	0	40	0	7	243	311	77	0	0	78	36	86	1.730
XIV	Pulp	0	0	37	354	0	0	0	0	1	0	0	0	0	0	78	37	507
XV	Paper	164	0	1,229	507	0	299	0	7	968	1,674	503	152	0	424	36	40	6.004
XVI	Propylene/ Ethylene	0	0	0	0	0	0	0	0	0	82	0	0	0	80	0	0	161
XVII	Carbon Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		49,632	7,759	29,707	23,447	10,791	11,802	3,769	3,315	32,252	224,997	8,137	6,671	19,113	32,487	19,153	3,447	486,478

Table 16: Overview of verified Emissions in 2008 by Federal States, sorted by Activities

Number of Allocations 2008* [1000 EAs/a]		Federal State																
	Name of Activity	BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Total
I	Energy Conversion > 50 MW RTO	24,693	7,033	15,415	11,358	3,525	7,679	1,639	2,639	13,616	105,654	6,462	4,736	6,764	20,514	9,863	1,536	243,125
II	Energy Conversion 20-50 MW RTO	411	303	1,262	1,168	162	755	245	234	1,158	1,655	444	171	204	533	324	251	9,281
III	Energy Conversion 20-50 MW RTO, other fuels	0	0	0	86	0	0	53	3	15	54	0	17	0	0	5	91	324
IV	Prime Movers (Engines)	0	0	0	21	0	0	0	0	21	0	0	0	0	0	0	0	42
V	Prime Movers (Turbines)	145	0	51	214	3	132	0	0	232	239	117	0	0	55	35	278	1,503
VI	Refineries	1,915	0	3,042	4,202	0	0	1,795	0	2,394	7,885	38	679	0	0	2,248	0	24,199
VII	Coke Ovens	0	0	0	0	0	0	0	0	0	2,056	0	0	366	0	0	0	2,422
VIII	Iron Ore Sintering	3,988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,988
IX	Pig Iron and Steel Production	221	0	148	94	0	56	97	0	255	1,256	85	0	8,235	114	0	43	10,605
IXa	Integrated Steel Plants	0	0	0	0	5,832	0	0	0	9,276	28,278	0	0	0	0	0	0	43,386
IXb	Secondary Steel Production	194	0	0	0	0	0	0	0	139	0	0	0	169	0	0	0	503

Number of Allocations 2008* [1000 EAs/a]		Federal State																
	Name of Activity	BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Total
X	Cement	1,469	0	2,947	3,605	0	674	0	0	1,109	5,995	839	1,165	0	0	1,809	887	20,500
XI	Lime	372	0	384	711	0	286	0	9	588	4,982	604	0	0	0	1,140	275	9,351
XII	Glass	82	0	253	741	0	16	0	12	529	1,143	301	38	13	317	383	259	4,086
XIIa	Mineral Fibres	0	0	59	88	0	0	0	0	12	77	0	0	0	28	61	38	362
XIII	Ceramics	87	0	122	766	0	48	0	12	302	359	95	0	0	78	35	83	1,987
XIV	Pulp	0	0	126	6	0	0	0	0	2	0	0	0	0	0	281	54	469
XV	Paper	217	0	1,326	1,003	0	294	0	7	1,084	1,668	375	82	0	412	41	36	6,546
XVI	Propylene/ Ethylene	0	0	0	354	0	0	0	0	0	3,102	849	0	0	1,338	0	0	5,643
XVII	Carbon Black	0	0	0	0	0	0	0	0	134	669	0	0	0	0	0	0	803
Total		33,795	7,336	25,134	24,417	9,523	9,940	3,829	2,917	30,865	165,073	10,209	6,887	15,751	23,390	16,226	3,832	389,124

* without redistribution of allowances for transferred furnace blas gas

Table 17: Overview of VET Entries 2008 per Federal State, sorted by Activities

VET 2008 [kt CO2/a]		Federal State																
	Name of Activity	BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Total
I	Energy Conversion > 50 MW RTO	42,439	7,535	18,524	11,411	7,263	8,854	1,608	3,376	19,756	175,444	5,769	5,013	8,491	29,703	13,704	1,271	360,162
II	Energy Conversion 20-50 MW RTO	375	231	882	931	140	642	179	64	953	1,343	366	174	239	225	238	142	7,124
III	Energy Conversion 20-50 MW RTO, other fuels	0	0	0	22	0	0	50	0	0	54	0	15	0	0	0	1	143
IV	Prime Movers (Engines)	0	0	0	16	0	0	0	0	24	0	0	0	0	0	0	0	40
V	Prime Movers (Turbines)	206	0	65	208	2	93	0	0	344	278	92	5	0	18	62	220	1,592
VI	Refineries	1,780	0	3,101	3,822	0	0	1,637	0	2,289	7,941	19	644	0	0	1,852	0	23,086
VII	Coke Ovens	0	0	0	0	0	0	0	0	0	2,808	0	0	770	0	0	0	3,578
VIII	Iron Ore Sintering	1,718	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,718
IX	Pig Iron and Steel Production	142	0	136	121	0	54	89	0	200	789	36	0	6,161	114	0	46	7,888
IXa	Integrated Steel Plants	0	0	0	0	2,033	0	0	0	4,176	13,358	0	0	0	0	0	0	19,566
IXb	Secondary Steel Production	169	0	0	0	0	0	0	0	306	120	0	0	473	0	0	0	1,068
X	Cement	1,430	0	2,833	3,460	0	613	0	0	1,130	5,915	900	1,126	0	0	1,875	1,152	20,434
XI	Lime	371	0	338	840	0	238	0	7	536	4,456	606	0	0	0	1,005	180	8,577
XII	Glass	94	0	284	764	0	13	0	15	499	1,076	251	34	13	270	361	237	3,911
XIIa	Mineral Fibres	0	0	41	96	0	0	0	0	11	70	0	0	0	27	56	35	335

VET 2008 [kt CO2/a]		Federal State																
	Name of Activity	BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Total
XIII	Ceramics	106	0	91	468	0	31	0	3	226	281	70	0	0	73	31	65	1,445
XIV	Pulp	0	0	35	6	0	0	0	0	1	0	0	0	0	0	77	36	155
XV	Paper	166	0	1,155	919	0	288	0	8	946	1,581	353	89	0	452	35	21	6,014
XVI	Propylene/Ethylene	0	0	0	216	0	0	0	0	0	3,045	743	0	0	1,095	0	0	5,099
XVII	Carbon Black	0	0	0	0	0	0	0	0	113	551	0	0	0	0	0	0	664
Total		48,997	7,766	27,484	23,303	9,438	10,827	3,563	3,472	31,509	219,110	9,204	7,101	16,147	31,976	19,296	3,406	472,599

7 LIST OF ABBREVIATIONS

AGEB	Arbeitsgemeinschaft Energiebilanzen
AV	Allocation Value
CHP	Combined Heat and Power
CITL	Community Independent Transaction Log at the EU Commission
CO ₂	carbon dioxide
EA	Emission allowance
EU ETS	European Emissions Trading Scheme
KfW	Kreditanstalt für Wiederaufbau (bank)
TEHG	(Treibhausgas-Emissionshandelsgesetz) Greenhouse Gas Emissions Trading Act
RTO	Rated thermal output
VET	Verified Emissions Table
ZuG	(Zuteilungsgesetz) Allocation Act