



# VET Report 2013

**Greenhouse gas emissions from stationary installations subject to emissions trading in Germany in 2013**



## Impressum

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## Summary

In the first year of the third trading period in the European Emissions Trading Scheme, the participating 1,929 installations in Germany emitted 481 million tonnes of carbon dioxide equivalents (CO<sub>2</sub>eq). In Germany, more than 400 installations became new participants in European emissions trading. Approximately 1,500 installations that already participated in the second trading period continue to take part in emissions trading. German energy and industrial installations are responsible for 25.4 percent of greenhouse emissions in the EU emissions trading sector.

Emissions from the energy sector have increased by two percent, mainly due to an increased use of hard coal for electricity generation. In the installations of energy-intensive industries that already took part in emissions trading in the second trading period – for example, refineries, iron and steel and cement producers – emissions have decreased by one percent to 99 million tonnes of carbon dioxide equivalents.

Starting in 2013, installations for non-ferrous metal processing, aluminium production, adipic and nitric acid production and ammonia production must also report their emissions and surrender an appropriate amount of allowances. The expansion of the scope in the third trading period introduced the reporting and surrendering obligation for the following greenhouse gases: nitrous oxide (N<sub>2</sub>O) from nitric and adipic acid production and for perfluorocarbons (PFCs) from primary aluminium production. Both gases are significantly more harmful to the climate than carbon dioxide (CO<sub>2</sub>). 22.5 million tonnes of carbon dioxide equivalents originate from these new installations in emissions trading.

The free allocation for 2013 was 169 million emission allowances. Another approximately 194 million – the German auction amount for 2013 – were auctioned at the Leipzig Energy Exchange in 2012 and 2013. The sum of the reported emissions exceeded the total number of allowances issued by 118 million emission allowances in 2013. In terms of emission allowances issued by Germany in the reporting year, German companies were therefore net buyers of emission allowances. Industrial activities had a surplus allocation of 12 million emission allowances in 2013. Taking account of the surplus from the second trading period (2008 to 2012) of about 103 million emission allowances, the surplus supply is approximately 115 million allowances. Assuming that the 2013 allocation for transferred waste gases from iron, steel and coke production and imported quantities of heat would be offset between the operators (about 18.5 million emission allowances would move from the industrial to the energy sector), the industrial sector had a shortfall of 6.5 million allowances in 2013. The energy sector emitted around 324 million tonnes of carbon dioxide (or around 305.5 million tonnes when adjusted by the abovementioned 18.5 million) more in 2013 than allocated as free emission allowances. Emission allowances as high as this difference had to be acquired on the market to meet the surrender obligation.

Due to the postponement of the 2013 reporting and surrender obligations for aviation in emissions trading to 31 March and 30 April 2015, respectively, aviation emissions cannot be considered in this year's VET report.

# Content

<b>Summary .....</b>	<b>3</b>
<b>Abbreviations .....</b>	<b>8</b>
<b>1 Introduction .....</b>	<b>9</b>
<b>2 Installations subject to emissions trading in the 3rd trading period.....</b>	<b>12</b>
2.1 Overview of new features of the scope .....	12
2.2 Installations subject to emissions trading .....	14
<b>3 Evaluation by Industrial sectors – Activities 1 to 29.....</b>	<b>15</b>
3.1 Energy installations.....	15
3.1.1 Large combustion installations of 50 MW or more.....	15
3.1.2 Combustion installations between 20 and 50 MW.....	20
3.1.3 Prime movers (natural gas compressors).....	23
3.2 Other combustion.....	25
3.3 Refineries .....	27
3.4 Iron and steel industry including coking plants.....	29
3.5 Non-ferrous metals industry.....	34
3.6 Mineral industry.....	36
3.6.1 Cement clinker production .....	36
3.6.2 Lime production (including sugar) .....	39
3.6.3 Production of glass and mineral fibres.....	43
3.6.4 Ceramics production .....	46
3.6.5 Gypsum production .....	49
3.7 Paper and pulp industry.....	49
3.8 Chemical industry.....	52
<b>4 Cross-industry analysis.....</b>	<b>57</b>
4.1 Evaluation of the allocation status in 2013.....	57
4.2 Assessment of emission reduction.....	61
4.3 Emission trends and economic growth .....	62
4.4 Comparison with other Member States.....	64
<b>5 Federal States .....</b>	<b>66</b>
<b>6 Sources and publications .....</b>	<b>72</b>

## List of Tables

Table 1:	VET entries and annual emissions of the audited reports and the respective number of installations .....	10
Table 2:	Activities as per Annex 1 TEHG compared to the activities of the 2nd trading period .....	13
Table 3:	Number and emissions of installations subject to emissions trading starting from 2012 compared to those subject to emissions trading only from 2013 .....	15
Table 4:	Overview of large combustion installations (Activity 2), number of installations, summary of emission and allocation amounts by comparability of emissions .....	15
Table 5:	Large combustion installations (Activity 2), number of installations, 2012 emissions and 2013 VET entries .....	16
Table 6:	Large combustion installations (Activity 2), number of installations, allocation amounts, 2013 VET entries and allowance coverage.....	20
Table 7:	Overview of combustion installations 20-50 MW (Activities 3 and 4), number of installations, summary of emissions and allocation amounts by comparability of emissions .	20
Table 8:	Combustion installations 20-50 MW (Activities 3 and 4), number of installations, 2012 emissions and 2013 VET entries.....	21
Table 9:	Combustion installations 20-50 MW (Activities 3 and 4), number of installations, allocation amounts, 2013 VET entries and allowance coverage .....	23
Table 10:	Overview of prime movers (Activities 5 and 6), number of installations, summary of emission and allocation amounts by comparability of emissions .....	23
Table 11:	Prime movers (Activities 5 and 6), number of installations, 2012 emissions and 2013 VET entries .....	24
Table 12:	Prime movers (Activities 5 and 6), number of installations, allocation amounts, 2013 VET entries and allowance coverage .....	25
Table 13:	Overview of other combustion installations (Activity 1), number of installations, summary of emission and allocation amounts by comparability of emissions .....	25
Table 14:	Other combustion installations (Activity 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage.....	26
Table 15:	Overview of refineries (Activity 7), number of installations, summary of emissions and allocation amounts by comparability of emissions .....	27
Table 16:	Refineries (Activity 7), number of installations, 2012 emissions and 2013 VET entries .....	28
Table 17:	Refineries (Activity 7), number of installations, allocation amounts, 2013 VET entries and allowance supply .....	29
Table 18:	Overview of iron and steel industry (Activities 8 to 11 and 1), number of installations, summary of emissions and allocation amounts by comparison of emissions .....	29
Table 19:	Iron and steel industry (Activities 8 to 11 and 1), number of installations, 2012 emissions and 2013 VET entries .....	30
Table 20:	Iron and steel industry (Activities 11 and 1), number of installations, 2013 VET entries subject to emissions trading from the beginning of the third trading period .....	31
Table 21:	Iron and steel industry (Activities 8 to 11 and 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage .....	32
Table 22:	Transfer of waste gases from iron, steel and coke production in 2013.....	33
Table 23:	Overview of non-ferrous metal industry (Activities 12, 13 and 1), number of installations, summary of emissions and allocation amounts by comparability of emissions .....	34
Table 24:	Non-ferrous metal industry (Activities 12, 13 and 1), number of installations, 2013 VET entries .....	34

Table 25:	Non-ferrous metals industry (Activities 12, 13 and 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage .....	36
Table 26:	Overview of the production of cement clinker (Activity 14), number of installations, summary of emissions and allocation amounts by comparability of emissions .....	36
Table 27:	Production of cement clinker (Activity 14), number of installations, 2012 emissions and 2013 VET entries .....	37
Table 28:	Production of cement clinker (Activity 14), number of installations, allocation amounts, 2013 VET entries and allowance coverage.....	38
Table 29:	Lime production overview (Activity 15), number of installations, summary of emission and allocation amounts, by comparability of emissions .....	39
Table 30:	Lime production (Activity 15), number of installations, 2012 emissions and 2013 VET entries .....	40
Table 31:	Lime production (Activity 15), number of installations, allocation amounts, VET entries and allowance coverage in 2013 .....	42
Table 32:	Overview of glass and mineral fibre production (Activities 16 and 18), number of installations, summary of emissions and allocation amounts by comparability of emissions .....	43
Table 33:	Glass and mineral fibre production (Activities 16 and 18), number of installations, 2012 emissions and 2013 VET entries .....	43
Table 34:	Glass and mineral fibre production (Activities 16 and 18), number of installations, allocation amounts, VET entries and allowance coverage in 2013 .....	46
Table 35:	Overview of ceramics production (Activity 17), number of installations, summary of emission and allocation amounts by comparability of emissions .....	47
Table 36:	Ceramics production (Activity 17), number of installations, 2012 emissions and 2013 VET entries .....	47
Table 37:	Ceramics production (Activity 17), number of installations, allocation amounts, 2013 VET entries and allowance coverage .....	48
Table 38:	Overview of the gypsum production (Activity 19), number of installations, summary of emissions and allocation amounts by comparability of emissions .....	49
Table 39:	Gypsum production (Activity 19), number of installations, allocation amounts, 2013 VET entries, and allowance coverage .....	49
Table 40:	Overview of the paper and pulp industry (Activities 20 and 21), number of installations, summary of emissions and allocation amounts by comparability of emissions .....	50
Table 41:	Paper and pulp industry (Activities 20 and 21), number of installations, emissions in 2012 and VET entries 2013 .....	50
Table 42:	Paper and pulp industry (Activities 20 and 21), number of installations, allocation amounts, 2013 VET entries and allowance coverage .....	52
Table 43:	Overview of the chemical industry (Activities 22 to 29 and 1), number of installations, summary of emissions and allocation amounts by comparability of emissions .....	52
Table 44:	Chemical industry (Activities 22, 27 and 1) already subject to emissions trading in the second trading period, number of installations, 2012 emissions and 2013 VET entries.....	53
Table 45:	Chemical industry (Activities 23 to 29 and 1), subject to emissions trading at the start of the third trading period, number of installations, 2013 VET Entries .....	54
Table 46:	Chemical industry (Activities 22 to 29 and 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage .....	56
Table 47:	Allocation status by activities in the second and third trading periods .....	59
Table 48:	Average prices for emission allowances (EUAs) in the second and third trading periods .....	60
Table 49:	Overview of verified emissions in 2012 per Federal State, by activities .....	66
Table 50:	Overview of 2013 VET entries in each Federal State, by activities.....	68
Table 51:	Overview of allocation amounts in each Federal State in 2013, by activities .....	70

## List of Figures

Figure 1:	Relationship between the energy sector (Activities 2 to 6) and industrial sector (Activities 1 and 7 to 29), number of installations subject to emissions trading and their emission volume in Germany in 2013 .....	9
Figure 2:	Large combustion installations (Activity 2), emissions in Germany, 2005 – 2013 .....	17
Figure 3:	Large combustion installations (Activity 2), emission figures in Germany, 2005 – 2013, according to fuel .....	18
Figure 4:	Large combustion installations of four major utilities, emission figures in Germany, 2005 – 2013 .....	19
Figure 5:	Combustion installations 20-50 MW (Activities 3 and 4), emission trends in Germany, 2005 – 2013 .....	22
Figure 6:	Prime movers (Activities 5 and 6), emission trends in Germany, 2005 – 2013 .....	24
Figure 7:	Other combustion installations (Activity 1), emission trends in Germany, 2005 – 2013.....	26
Figure 8:	Refineries (Activity 7), emission trends in Germany, 2005 – 2013 .....	28
Figure 9:	Iron and steel industry (Activities 8 to 11 and 1), emission figures in Germany, 2005 – 2013 .....	32
Figure 10:	Non-ferrous metal industry (Activities 12, 13 and 1). Emission figures in Germany, 2005 – 2013 .....	35
Figure 11:	Production of cement clinker (Activity 14), emission trends in Germany, 2005 – 2013 .....	38
Figure 12:	Lime production (Activity 15), emission trends in Germany, 2005 – 2013. Data from emissions reports .....	41
Figure 13:	Emission trends in the sugar industry, 2005 – 2013 .....	42
Figure 14:	Manufacture of glass and mineral fibres (Activities 16 and 18), emission trends in Germany, 2005 – 2013 .....	45
Figure 15:	Ceramics production (Activity 17), emission trends in Germany, 2005 – 2013 .....	48
Figure 16:	Paper and pulp industry (Activities 20 and 21), emission trends in Germany, 2005 – 2013 ...	51
Figure 17:	Chemical industry (Activities 22 to 29 and 1), emission trends in Germany, 2005 – 2013.....	55
Figure 18:	Price trends of emission allowances (EUAs) in the second and third trading periods .....	61
Figure 19:	Emission trends and German Cap 2005 – 2012, notional German cap from 2013 .....	62
Figure 20:	Emissions trends of stationary installations in the EU ETS and gross domestic product in Germany (2005 = 100) .....	63
Figure 21:	Emissions, free allocation and auction amounts comparing all countries participating in the EU ETS.....	65

## Abbreviations

AGEB	Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen)
BImSchV	Federal Immission Control Ordinance (Bundes-Immissionsschutzverordnung)
CER	Certified Emission Reductions
CITL	“Community Independent Transaction Log” at the EU Commission, since 8/2012: EUTL
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> eq	Carbon dioxide equivalents
DEV2020	Data Collection Ordinance (Datenerhebungsverordnung) of 2020
EB	Emission allowance (Emissionsberechtigung)
EHRL	Emissions Trading Directive (Emissionshandelsrichtlinie)
ERU	Emission Reduction Units (from JI projects)
EUA	EU (emission) allowances
EUTL	“European Transaction Log” at the EU Commission, has replaced CITL since 8/2012
DEHSt	German Emissions Trading Authority at the Federal Environment Agency
ICAO	International Civil Aviation Organisation
kt	Kilotonne or one thousand tonnes
m t	Megatonne or one million tonnes
RegVO	EU Registry Ordinance (Registerverordnung)
TEHG	German Greenhouse Gas Emission Allowance Trading Act (Treibhausgas-Emissionshandelsgesetz)
TP	Trading period
VE	Verified Emissions
VET	Verified Emissions Table
ZuG	Allocation Act (Zuteilungsgesetz) 2008-2012



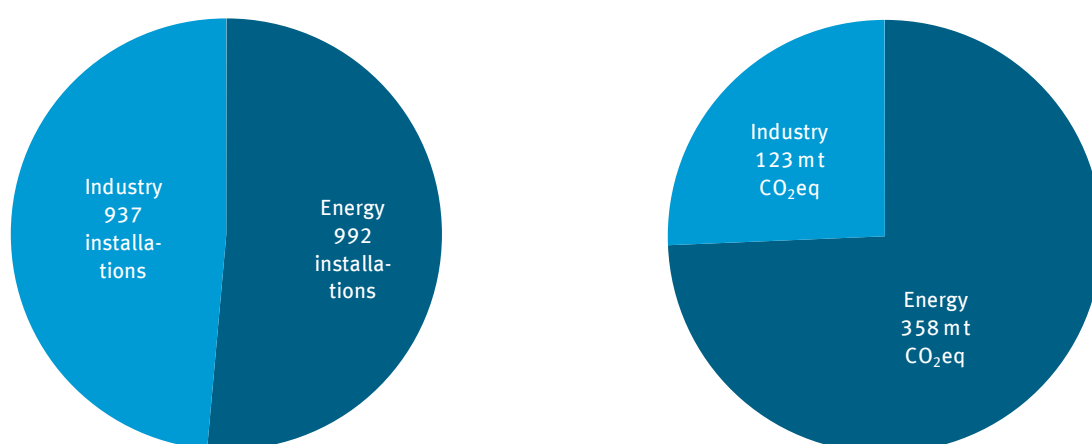
# 1 Introduction

The reporting year 2013 is the first year of the third trading period (2013-2020) of the European Emissions Trading Scheme (EU ETS) for stationary installations. The third trading period is characterised by the inclusion of other industrial activities (e.g. parts of the chemical industry and non-ferrous metal processing) in the EU ETS, as well as the EU-wide harmonisation of the allocation of emission allowances. While in the first and second trading period (2005-2007 and 2008-2012) emission allowances were allocated mostly for free, in the current, third trading period, the vast majority of allowances will be auctioned. For a gradual transition to full auctioning of allowances, installations continue to obtain a free allocation in the third trading period on the basis of so-called benchmarks, whose share should decrease annually. Allowances for greenhouse gas emissions caused by electricity generation must be entirely purchased on the market. Therefore, this report contains some changes compared to the previous report<sup>1</sup>, which will be discussed in the appropriate place.

## Number of installations, emissions in 2013

In 2013, the European Emissions Trading Scheme (EU ETS) recorded 1,929 stationary installations in Germany.

The Greenhouse Gas Emissions Trading Act (TEHG) – in its version valid for the third trading period differentiates all installations subject to emissions trading in Germany according to their activities as per Annex 1. Figure 1 shows the relationship between the installation group of activities 2 to 6 (energy sector) and the activities 1 and 7 to 29 (industrial sector). In 2013, 358 million tonnes of carbon dioxide from 992 installations were linked to activities 2 to 6 in the energy industry. 937 installations performing industrial activities 1 and 7 to 29 emitted 123 million tonnes of carbon dioxide equivalents. No installations have been reported in Germany for activities 30 to 32.



As of 02/05/2014

**Figure 1:** Relationship between the energy sector (Activities 2 to 6) and industrial sector (Activities 1 and 7 to 29), number of installations subject to emissions trading and their emission volume in Germany in 2013

## VET emissions, annual emissions, number of installations since 2005

The operators must send the electronic emissions report, that records the monitoring and calculation of emission volumes, to the German Emissions Trading Authority (DEHSt) at the Federal Environment Agency at the latest by 31.03 of the year following the reporting year. The data in the emissions report are verified by independent accredited verifiers. The verifiers must also enter the aggregated emission data by 31.03 directly into the so-called “Verified Emissions Table” (VET) in the European Emissions Trading Registry (EUTL). The operator then needs to surrender the same number of emission allowances equal to the emission volume of the previous year by 30.04. This method results in a very high quality of reported data.

<sup>1</sup> cf. DEHSt 2013a

Subsequently the emission reports will be checked by DEHSt. If it detects deficiencies or errors in the reported emissions, DEHSt may correct figures, factors or emission volumes. Table 1 shows the sums of VET entries and the annual emissions for 2005 to 2013. The first registry entry at the cut-off date of 31.03 in one of the years following the reporting year qualifies as a “VET” entry. Figures that result from the emissions report – with or without subsequent changes to the data on the cut-off date – are referred to as “annual emissions”. The figure “2013 annual emissions” is available for the first time in autumn 2014, after DEHSt has reviewed the emission reports, and may vary due to new knowledge and necessary corrections. The “Number of reports” is the unchecked number of VET entries, regardless of the currently existing emissions trading obligation of the installations, because closed or disqualified installations were obliged to provide VET entries for the year of closure or disqualification.

**Table 1: VET entries and annual emissions of the audited reports and the respective number of installations**

Year	Initial report by 31/03 of subsequent year		Audited reports, as of 28/02/2014	
	Number of reports	VET [kt CO <sub>2</sub> eq/a]	Number of installations	Annual emissions [kt CO <sub>2</sub> eq/a]
2005	1815	473,681	1838	474,992
2006	1824	477,382	1788	478,068
2007	1882	487,050	1758	487,166
2008	1660	472,599	1678	472,593
2009	1651	428,198	1664	428,295
2010	1628	453,883	1648	454,865
2011	1631	450,267	1656	450,351
2012	1629	452,586	1630	452,600
2013	1929	480,937		

As of 02/05/2014

Due to the extension of activities subject to emissions trading in the third trading period, the number of installations increased in Germany by more than 400 compared to 2012.

They emitted 23 million tonnes of carbon dioxide equivalents. At the same time 151 installations ceased to take part in emissions trading for a variety of reasons, for example due to mergers with other installations subject to emissions trading or due to a drop below the threshold. Approximately 1,500 installations take part in emissions trading without any change compared to the second trading period.

## Estimating emissions from selected installations and years

The 2013 emissions from installations that are new to emissions trading cannot be compared to the previous year's emissions. However, installations that are new to emissions trading because of the extension of the EU ETS scope and have applied for the free allocation, have at least submitted emission figures for 2005 to 2008 or 2009 and 2010 in their application. In order to be able to use these data, the 2011 and 2012, and, where appropriate, the 2009 and 2010 emissions have been estimated. The 2011 and 2012 emissions have been determined by a linear interpolation of the 2008 to 2013 emissions, or only from 2010 depending on available data.

## Simplifications

Individual activities listed in Annex 1 TEHG are considered together to achieve improved presentation in this report. Table 2 gives an explanation in the following chapter. The strongest abstraction is the bundling of activities 2 – 6 to the energy sector and activities 1 and 7 – 29 to the industrial sector. Within the industrial sector, individual activities are further bundled to improve the presentation, for example, paper production and pulp production to “Paper and pulp industry.”

## Carbon dioxide equivalents

The extension of the scope in the third trading period added the reporting and surrender obligation for the greenhouse gases nitrous oxide (N<sub>2</sub>O) from nitric and adipic acid production and perfluorocarbons (PFCs) from primary aluminium production. Both gases are more harmful to the climate than carbon dioxide: nitrous oxide 300 times and PFC more than 6,000 times. The emissions of these greenhouse gases are converted into carbon dioxide equivalents (CO<sub>2</sub>eq).

## Free allocation in 2013

In 2013, 169 million emission allowances were allocated free of charge to installations covered by this report. Free allocation as approved by the European Commission prior to 30/04/2014 is the basis for the assessment of the allocation situation, i.e. comparison of emissions and free allocations in 2013. It includes the National Allocation Table<sup>2</sup> NAT, which specifies the free basic allocation for 1,763 incumbents and the first corrections of this basic allocation for individual installations<sup>3</sup> as approved by the European Commission. This includes 23 installations for which no free allocation was issued. Two installations were found not to be subject to emissions trading. In 21 other cases, the 2012 production decreased to such an extent that the allocation was reduced to zero according to the regulation regarding partial cessation. In addition, 856,622 emission allowances were allocated to 38 new entrants, i.e. new installations or capacity extensions in incumbents that started operation after 01/07/2011. This means that 1,758 installations had received the free allocation of 169 million emission allowances for 2013 by 30/04/2014. Further adjustments of the basic allocation for individual installations that have not yet been approved by the European Commission are not included in this 2013 volume.

## Evaluation of the allocation status in 2013

Industrial activities obtained an excess allocation of 12 million emission allowances in 2013. Their allowance coverage, i.e. the ratio of free allocation to emissions, is about 110 percent. Taking account of the surplus from the second trading period (2008 to 2012)<sup>4</sup> of about 103 million allowances, an surplus allocation of 115 million emission allowances is obtained.

These emission allowances or, if already sold, their proceeds, can be used by the operators. Assuming that the 2013 allocation for transferred waste gases from iron, steel and coke production (15 million emission allowances) and imported quantities of heat (3.5 million emission allowances from the paper and chemical industries) will be offset between operators, the industrial sector had a shortfall of around 6.5 million emission allowances in 2013. The allowance coverage would be 95 percent.

A different picture emerges for energy activities: as full auctioning has applied for electricity generation starting from 2013, there was a shortfall of about 324 million emission allowances for energy installations in 2013, since the allowance coverage was only 9.5 percent of the emissions<sup>5</sup>. Thus, taking into account the balance of the second trading period, the cumulative shortfall increased to a total of 694 million emission allowances by the end of the first reporting year of the third trading period.

However, the extension of the nominal annual allocation shortfall between the second and third trading period has been substantially compensated for by the fall in emission allowance prices. While the annual shortfall increased by 337 percent, its market value grew by only 54 percent.

## Aviation

Basically, flights landing at or taking off from airports within the European Economic Area (EEA)<sup>6</sup> have been obliged to participate in emissions trading since 01/01/2012. A monitoring and reporting obligation regarding emissions has existed since 2010. This also applies to flights of aircraft operators based outside the EU.

<sup>2</sup> DEHSt 2013b

<sup>3</sup> In contrast to the evaluation report about the free allocation of the third trading period, which only includes the national allocation table. Cf. DEHSt 2014.

<sup>4</sup> The total surplus from the second trading period, which includes not only the free allocation but also the use of project credits and emission allowances auctioned by Germany, is about 260 million for German installations out of 1.7 billion emission allowances for the entire EU.

<sup>5</sup> Taking into account the 18.5 million emission allowances for the transferring of waste gases from iron, steel and coke production and heat imports of the paper and chemical industry, the allowance coverage is 14.7 percent.

<sup>6</sup> For 2012 and 2013: EU 27 (still without Croatia) and Norway, Iceland, Liechtenstein (no airport).

At the same time negotiations are going on within the International Civil Aviation Organisation (ICAO) about a global instrument to reduce emissions from aviation. To set a positive signal for the negotiations at ICAO level, the EU has already waived the sanctioning of violations of reporting and surrendering obligations for 2012 for flights subject to emissions trading which started or ended outside the EEA, Switzerland or Croatia (“Stop-the-clock”). The EU reserved the right to extend this suspension depending on the result of the ICAO General Assembly in autumn of 2013. There, it was basically decided to introduce a global market-based measure for the reduction of global emissions by aviation starting from 2020, and working groups have been established for the practical implementation of this measure. The next ICAO General Assembly shall finally decide about the global market-based emission reduction instrument in 2016. Therefore, initiated by the European Commission, the scope of the EU Emissions Trading Directive (EHRL) 2003/87/EC was reduced after the ICAO General Assembly – this time not only in the form of a one-year suspension, but as a policy change by Regulation (EU) No. 421/2014 of 16/04/2014.

Thus, emissions from flights starting or ending outside the EEA are not subject to emissions trading in 2013-2016. The regulation has also ruled that emissions by flights subject to emissions trading in 2013 need only be reported by 31/03/2015 and the relevant emission allowances must only be surrendered by 30/04/2015. Therefore carbon dioxide emissions from aviation subject to emissions trading in 2013 will not be addressed in this year’s VET report.

First, the stationary installations considered will be described in Chapter 2. Chapter 3 deals with the emissions from installations subject to emissions trading. Chapter 4 contains cross-sectoral analyses. Supplementary information is provided in overview tables in the annex.

## 2 Installations subject to emissions trading in the 3rd trading period

### 2.1 Overview of new features of the scope

The scope of the Greenhouse Gas Emissions Trading Act (TEHG) is laid down in its Annex 1 and it is crucial regarding the question whether an installation is subject to emissions trading and how the TEHG obligations apply to the operator. Furthermore, the scope determines the extent to which the installations are subject to emissions trading.

With the amendment of TEHG<sup>7</sup> of 21/07/2011, the regulations of Annex I of the EU Emissions Trading Directive<sup>8</sup> (EHRL) and the intended harmonisation in the allocation and application of the EU emissions trading scheme rules have also been implemented. This provided a significant expansion in the scope compared to the second trading period: further industrial activities such as large parts of the chemical industry, ferrous metal processing, non-ferrous metal processing and the manufacture of gypsum now fall within the scope.

In addition, some existing activity descriptions have been changed so that a larger group of installations is now subject to emissions trading. Due to the broad definition of “combustion”, not only energy installations (activities 2–6 as per Annex 1 TEHG), but all combustion units with a rated thermal input (RTI) of 20 megawatts (MW) or more are subject to emissions trading. These include, for example, process heaters in industries otherwise not subject to emissions trading, asphalt mixing plants and test stands for engines and prime movers. These new combustion installations are summarised<sup>9</sup> under activity 1 in Appendix 1 TEHG.

The activities (short description) of Annex 1 TEHG are listed in Table 2, and the activities were compared to the equivalent items of the second trading period. New or amended activities are indicated in italics.

7 <https://www.dehst.de/EN/understanding-emissions-trading/legislation/legislation-node.html>

8 Directive 2003/87/EC of the European Parliament and of the Council of 13/10/2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC as most recently amended by Directive 2009/29/EC  
[\[https://www.dehst.de/EN/understanding-emissions-trading/legislation/legislation-node.html\]](https://www.dehst.de/EN/understanding-emissions-trading/legislation/legislation-node.html)

9 Detailed information on the scope for the 3rd trading period has been published at [https://www.dehst.de/SharedDocs/downloads/DE/stationaere\\_anlagen/TEHG-Anwendungsbereich.pdf](https://www.dehst.de/SharedDocs/downloads/DE/stationaere_anlagen/TEHG-Anwendungsbereich.pdf).

Table 2: Activities as per Annex 1 TEHG compared to the activities of the 2nd trading period

TEHG No. (3rd TP)	Activity	Industrial sectors	Sector	TEHG No. (2nd TP)	Activity		
2	Energy conversion ≥ 50 MW RTI	Energy installations	Energy	I	Energy conversion ≥ 50 MW RTI		
3	Energy conversion 20–50 MW RTI			II	Energy conversion 20–50 MW RTI		
4	Energy conversion 20–50MW RTI, other fuels			III	Energieumwandlung 20–50 MW FWL, andere Brennstoffe		
5	Prime movers (engines)			IV	Prime movers (engines)		
6	Prime movers (turbines)			V	Prime movers (turbines)		
1	Combustion	Other combustion installations, iron and steel, non-ferrous metals, mineral processing industry, chemical industry	Industry	-	-		
7	Refineries	Refineries		VI	Refineries		
8	Coking plants	Iron and steel		VII	Coking plants		
9	Metal ore processing			-	-		
10	Pig iron and steel production			IX	Pig iron and steel production		
11	Ferrous metal processing			IXa	Integrated iron & steel works		
				IXb	Steel further processing		
12	Primary aluminium production	Non-ferrous metals		-	-		
13	Non-ferrous metal processing			-	-		
14	Cement clinker production	Mineral processing industry		X	Cement clinker		
15	Lime production			XI	Lime		
16	Glass production			XII	Glass		
17	Ceramics production			XIII	Ceramics		
18	Mineral fibre production			XIIa	Mineral fibres		
19	Gypsum production			-	-		
20	Pulp production	Paper and pulp		XIV	Pulp		
21	Paper production			XV	Paper		

TEHG No. (3rd TP)	Activity	Industrial sectors	Sector	TEHG No. (2nd TP)	Activity
22	Carbon black production	Chemical industry	Industry	XVII	Carbon black
23	Nitric acid production			-	-
24	Adipic acid production			-	-
25	Glyoxal and glyoxylic acid production			-	-
26	Ammonia production			-	-
27	Basic organic chemical production			XVI	Propylene/ethylene
28	Hydrogen and synthesis gas production			-	-
29	Soda production			-	-

Finally, so-called zero emission installations of the first and second trading periods, in which activities subject to emissions trading are carried out but which do not or cannot release any emissions themselves, in legal terms or in fact, are also included in emissions trading. These are installations in the paper and in the chemical industry.

It also follows from the extension to the scope that industrial energy installations, which were already subject to emissions trading in the first or second trading period, will not be registered as separate energy installations in certain cases. For example, if a production plant in the chemical industry which has been included in emissions trading starting from the third trading period is licenced together with the energy installation in terms of exposure control legislation, starting from the third trading period, both of them will be registered together under the relevant activity of the chemical industry.

With the amendment of TEHG, the regulation to form a so-called uniform installation has also been changed. In a uniform installation, several installations, licensed independently in terms of exposure control legislation, run by the same operator and operated on the same site as one technical unit, will be combined and considered together in terms of emissions trading. With the new rules, this procedure will allow for more activities than previously and will be compulsory for refineries. Also, this regulation means that energy installations so far treated separately will be registered together with industrial installations under their activities (e.g. energy installations in the paper industry).

## 2.2 Installations subject to emissions trading

As of 30/04/2014, a total of 1,929 installations were subject to emissions trading in 2013. In comparison, 1,622 installations were classified as subject to emissions trading in the previous year because of their permits.

The increase in the number of installations only has limited relevance since the changes described in Section 2.1 lead to an increase on the one hand while to a reduction in the number of installations on the other.

A total of 151 installations, which were still subject to emissions trading in 2012, did not fall within the scope of TEHG in 2013 or are no longer considered as independent installations due to installation mergers.



On the other hand, 458 installations were new in 2013. These are not only installations which first became subject to emissions trading because of the extended scope in the third trading period<sup>10</sup>, but also new entrants that only became operational in 2013. Table 3 shows the number and emissions of installations subject to emissions trading starting from 2012 compared to those subject to emissions trading only from 2013.

**Table 3:** Number and emissions of installations subject to emissions trading starting from 2012 compared to those subject to emissions trading only from 2013

ETS obligation	Number of installations in 2013	Number of installations no more subject to ETS in 2013	2012 emissions subject to ETS by installations subject to ETS in 2013 [kt CO <sub>2</sub> eq]	2012 emissions subject to ETS by installations no more subject to ETS in 2013 [kt CO <sub>2</sub> eq]	2013 VET of installations subject to ETS in 2013 [kt CO <sub>2</sub> eq]
Installations subject to ETS from 2012	1471	151	451,247	1,003	457,292
Installations subject to ETS from 2013	458		347	-	23,645
<b>Total</b>	<b>1929</b>		<b>451,593</b>	<b>1,003</b>	<b>480,937</b>

As of 02/05/2014

## 3 Evaluation by Industrial sectors – Activities 1 to 29

### 3.1 Energy installations

#### 3.1.1 Large combustion installations of 50 MW or more

In 2013, 490 large combustion installations, i.e. power plants, combined heat and power plants and boilers with a rated thermal input exceeding 50 MW, fell within the scope of Activity 2 as per Annex 1 TEHG. In contrast to the rules of the previous trading period, power plants in direct compound with industrial installations are combined with these industrial installations, thus some power plants from Activities I and II of the last trading period (TEHG2012) can now be found under industrial activities 7 to 29 and the stock in Activity 2 (TEHG2020) is correspondingly smaller. Such shifts between the activities have been included retrospectively in the subsequent analyses for all years.

Table 4 provides an overview of the installation group of large combustion installations discussed (Activity 2, TEHG2020). The 2013 emissions with 349.7 million tonnes of carbon dioxide have increased over the previous year – based on comparable installations - by 7.5 million tonnes, or two percent. Because of the changed allocation rules, the free allocation of 28.3 million allowances covers only eight percent of the emissions.

**Table 4:** Overview of large combustion installations (Activity 2), number of installations, summary of emission and allocation amounts by comparability of emissions

Energy conversion ≥ 50 MW RTI	Number of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance supply
Comparable	482	342,042	27,913	349,535	8.0%
Non-comparable	8	-	379	382	
<b>Total</b>	<b>490</b>	<b>342,042</b>	<b>28,292</b>	<b>349,917</b>	<b>8.1%</b>

As of 02/05/2014

<sup>10</sup> There are installations among them which were merged with installations subject to emissions trading already in the second trading period. For example, energy installations in the second trading period, where the rest of the installations are subject to emissions trading from 2013 due to the execution of an activity subject to emissions trading in the third trading period.

## Emissions

In 228 installations, the emissions have increased from 203.9 million to 234.4 million tonnes of carbon dioxide. In contrast, they dropped from 138.1 million to 115.1 million tonnes of carbon dioxide in 251 installations (Table 5). There are no 2012 verified emissions reports available for a few installations because they have only participated in emissions trading since the start of the third trading period or the installations had no carbon dioxide emissions subject to emissions trading in 2013 because they exclusively burnt biomass. Then it is obvious that there were no emissions in the previous year either.

**Table 5: Large combustion installations (Activity 2), number of installations, 2012 emissions and 2013 VET entries**

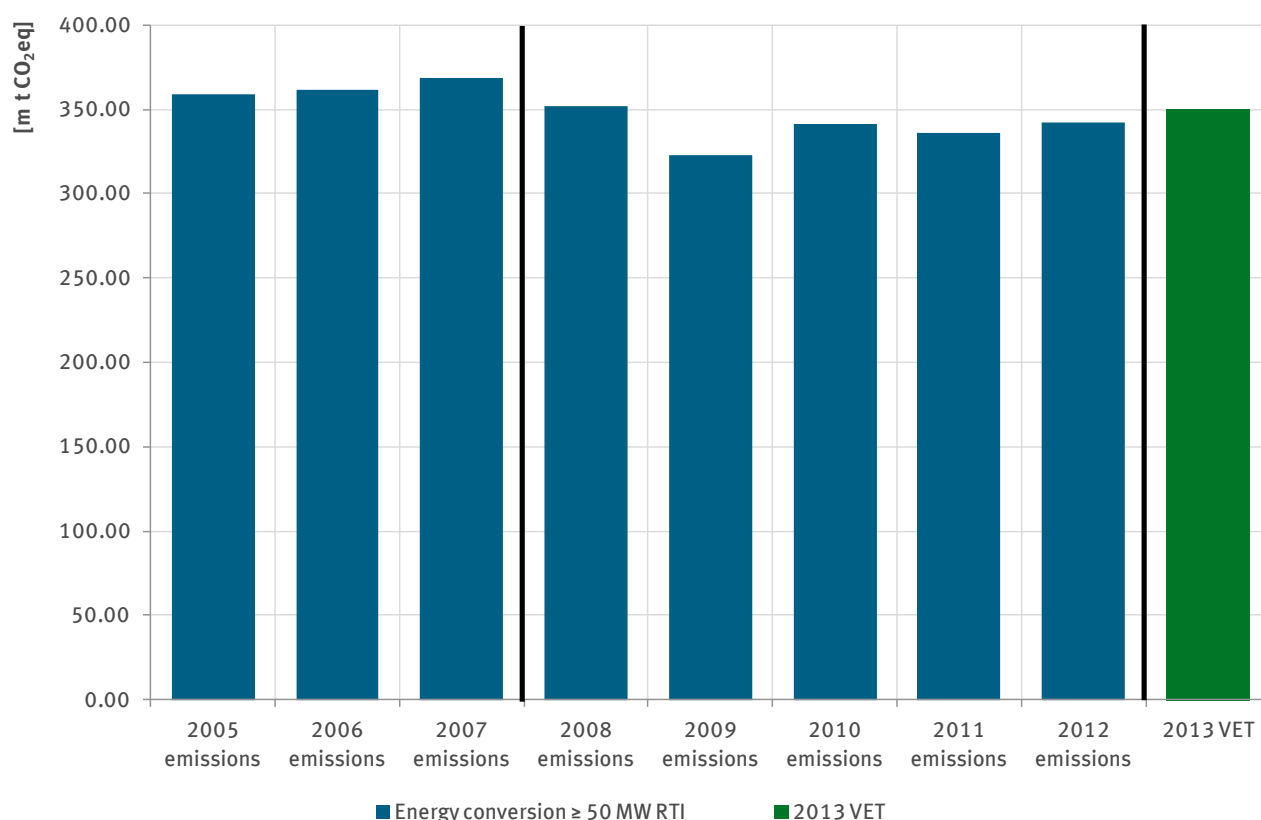
No.	Activity	2013 VET vs 2012 emissions	Number of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
2	Energy conversion ≥ 50 MW RTI	2013 VET > 2012 EM	228	203,930	234,408	30,478
		2013 VET < 2012 EM	251	138,113	115,128	-22,985
		No comparison possible	11	-	382	-
Total			490	342,042	349,917	7,493

As of 02/05/2014

The large combustion installations produce electrical and thermal energy (electricity and heat). The development of emissions is closely linked to electricity and heat demand and therefore is also influenced by economic performance and weather conditions – and also by electricity export.

Figure 2 shows the emissions for comparable installations since the start of emissions trading. In the first trading period, emissions from large combustion installations increased steadily. In the second trading period, emissions initially decreased in the first two years, especially under the influence of the financial and economic crisis, to then slowly rise again to the previous level. In course of this development, the emissions increased from 2012 to 2013 by two percent to 350 million tonnes of carbon dioxide – the initial level in 2008 for the same installation group.

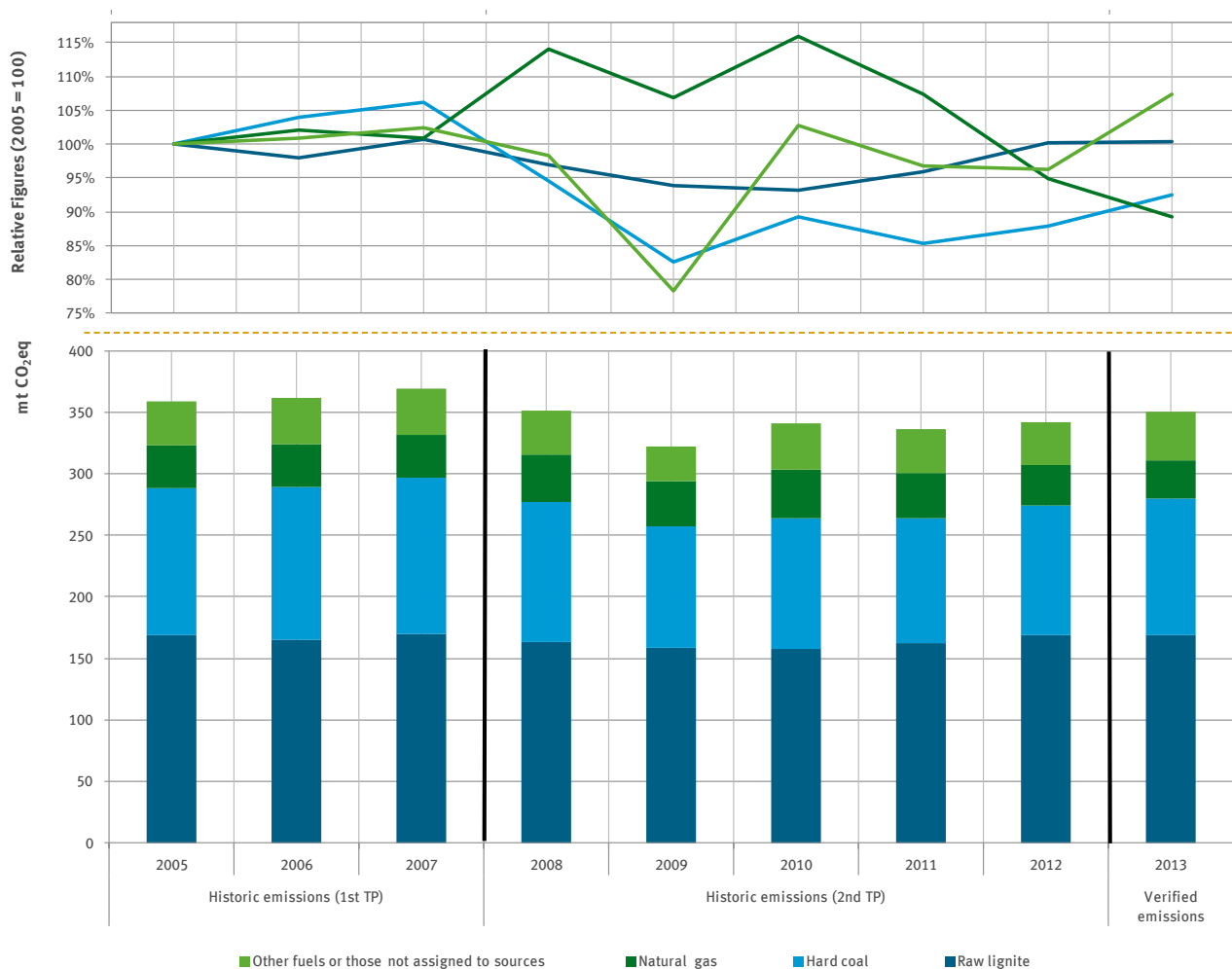




As of 02/05/2014

**Figure 2:** Large combustion installations (Activity 2), emissions in Germany, 2005 – 2013

A fuel, from which an installation gains more than 80 percent of its energy, is referred to as main fuel. The fuels lignite, hard coal and natural gas will be considered separately. All other emissions from other fuels, such as heating oil and waste gases from iron, steel and coke production are combined with those installations to which no main fuel could be assigned. Energy suppliers using lignite and hard coal fired power plants have the highest emissions. Based on 2005, i.e. the first year of emissions trading, emissions from installations using raw lignite as the main fuel have increased by somewhat less than one percent (Figure 3) – the emissions are constant at a high level. The emissions from hard coal fired power plants have made a leap in the past year of plus five percentage points compared to 2012, but were still about eight percent below the 2005 level in 2013. Emissions from natural gas fired power plants are still falling – but there is no advantage to the greenhouse gas balance, as these installations would be suitable to replace electricity and heat generated from more emission-intensive fuels. This does not happen however because natural gas fuel prices for power generation are very high and so the relevant power plants are underutilised. A prominent example is the Irsching power plant (E.ON), whose emissions have decreased by more than 50 percent over the previous year. The strong increase in emissions between 2012 and 2013 for other fuels and installations without assigning them to any source is a consequence of the increased use of hard coal. This was triggered by low coal prices as a result of lower world market demand, chiefly because of the shale oil boom in the United States.



As of 02/05/2014

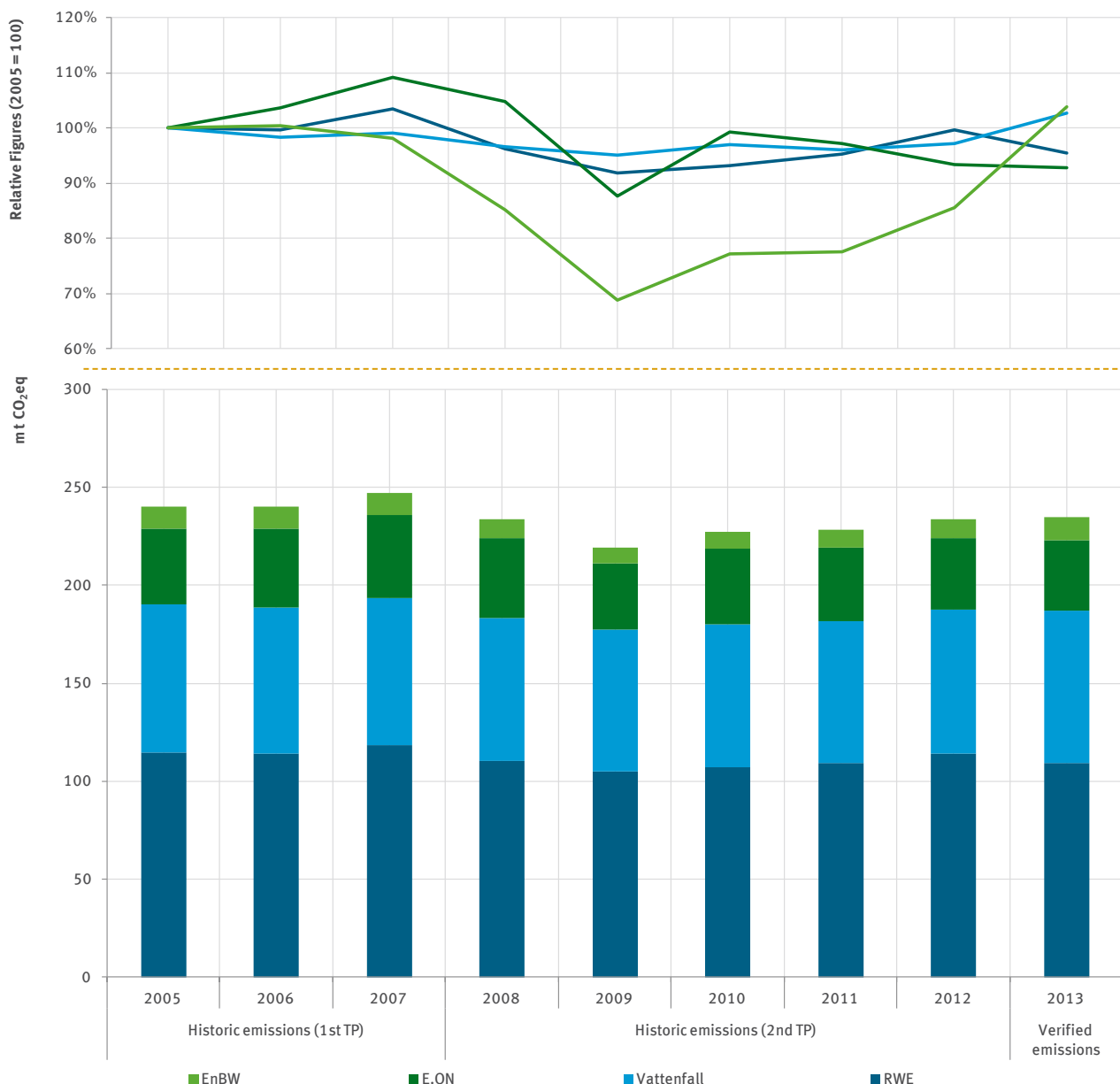
**Figure 3:** Large combustion installations (Activity 2), emission figures in Germany, 2005 – 2013, according to fuel

The four major utilities RWE, Vattenfall, E.ON and EnBW<sup>11</sup> are key players among the large combustion installations operators. Their power plants altogether cause 70 percent of emissions from the Activity 2 installations. Figure 4 shows the absolute emissions and relative figures from 2005. The emissions from the RWE and Vattenfall installations are still at a high level and have hardly abated during the economic slump caused by the financial and economic crisis in 2009. Compared to 2012, the emissions from RWE installations declined from 114 million to 109 million tonnes of carbon dioxide, i.e. by four percent. The Group explains this by an electricity generation shift from installations with low efficiency to modern installations with optimised efficiency<sup>12</sup>. These are, in particular, the Neurath and Niederaußem power plants, where electricity is produced from lignite with an efficiency of over 40 percent, whereas the output of the Weisweiler and Frimmersdorf power plants has been reduced accordingly.

11 In alphabetical order: E.ON AG (Düsseldorf) or more commonly, the subsidiary E.ON Power Plants GmbH (Hannover), EnBW Energy Baden-Württemberg AG (Karlsruhe), RWE Power AG (Essen/Cologne) and Vattenfall Europe AG (Berlin) or Vattenfall Europe Generation AG and Vattenfall Europe Heat AG.

12 cf. Schiffer 2014, p. 70.

In addition, the Ibbenbüren power plant had 1.8 million tonnes of carbon dioxide fewer emissions – 62 percent of the previous year's emissions – contrary to the general trend in electricity generation from hard coal. Among the Vattenfall installations, the additional emissions from the new Boxberg IV power plant unit are clearly visible (7 million tonnes of CO<sub>2</sub> in 2012 and 10.8 million in 2013), which is not compensated for by the reduced emissions from the Schwarze Pumpe power plant (12.5 million tonnes of CO<sub>2</sub> in 2012 and 11.3 million in 2013). Overall, emissions have increased significantly (by six percent) to 77.7 million tonnes in 2013. E.ON shows two opposite effects: the hard coal-fired power plants emit more, the natural gas-fired power plants less. In sum, the emissions have decreased slightly by 0.2 million tonnes or one percent. At EnBW, emissions have steadily risen since the low of 2009 due to market conditions, by another 2 million tonnes of carbon dioxide, i.e. 21 percent over the past year. The shutdown of the Neckarwestheim 1 and Phillipsburg 1 nuclear power plants in August 2011 has considerably changed EnBW's electricity mix. Until then, EnBW had the largest share of nuclear power among the major German utilities.



As of 02/05/2014

Figure 4: Large combustion installations of four major utilities, emission figures in Germany, 2005 – 2013

## Allocation status

In the third trading period, the free allocation for electricity generation was replaced by full auctioning. Thus operators of large combustion installations will only have 28.3 million annual emission allowances free of charge for heat production. That will only cover eight percent of their surrender liability for the emissions from the installations (Table 6). In the last trading period too, operators of large combustion installations had to purchase an average of 22 percent of additional emission allowances to offset the emissions of their installations, in addition to the free allocation.

In the third trading period, three factors determine the low allocation rate: first, electricity generation's share for which there is no free allocation is high among the large combustion plants. Second, raw lignite and hard coal, i.e. high-emission fuels, are used while the allocation for heat production assumes the use of natural gas. In addition, the free allocation for energy recovery from waste gases from iron, steel and coke production is given to producers of waste gases from iron, steel and coke production while a part of the allocation for heat production is not given to the producers but to heat consumers. The emissions from the use of waste gases from iron, steel and coke production were 26 million tonnes of carbon dioxide. This will be explained in Section 3.4.

**Table 6:** Large combustion installations (Activity 2), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installa- tions	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
2	Energy conversion ≥ 50 MW RTI	2013 VET > 2013 AA	407	348,347	25,432	-322,914	7.3%
		2013 VET < 2013 AA	78	1,571	2,860	1,289	182.1%
		2013 VET = 2013 AA	1	0	0	0	
		No comparison possible	4	-	0	-	
Total			490	349.917	28.292	-321.625	8.1%

As of 02/05/2014

### 3.1.2 Combustion installations between 20 and 50 MW

With 447 installations, the group of combustion installations between 20 and 50 MW, for example heating installations, district heating or industrial boilers, is almost the same in terms of numbers as the previous installation group of large combustion installations (Activity 2, 490 installations). Emissions increased here too by two percent over the previous year (Table 7). Compared to large combustion installations, Activity 3 and 4 installations emitted only 6.1 million tonnes of carbon dioxide, i.e. only 1.7 percent of what the group of large combustion installations emits into the atmosphere.

**Table 7:** Overview of combustion installations 20-50 MW (Activities 3 and 4), number of installations, summary of emissions and allocation amounts by comparability of emissions

Energy conversion 20-50 MW RTI	Number of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	431	5,914	4,510	5,971	75.5%
Not comparable	16	58	155	171	90.9%
<b>Total</b>	<b>447</b>	<b>5,972</b>	<b>4,665</b>	<b>6,142</b>	<b>76.0%</b>

As of 02/05/2014

The allowance coverage is 76 percent, and therefore 1.5 million emission allowances must be purchased. Since the operators of such installations still have a calculated credit of 9.5 million allowances from the last trading period (see Table 47), these emission allowances or, if already sold, their proceeds can be used.

## Emissions

Emissions have increased by 388,000 tonnes of carbon dioxide in 214 Activity 3 installations, and by 392,000 tonnes in 204 installations. Overall, emissions remain nearly the same at 5.95 million tonnes of carbon dioxide. In the group of Activity 4 installations that use other fuels, emissions more than tripled from 53,000 to 190,000 tonnes of carbon dioxide in 2013 due to new installations (Table 8).

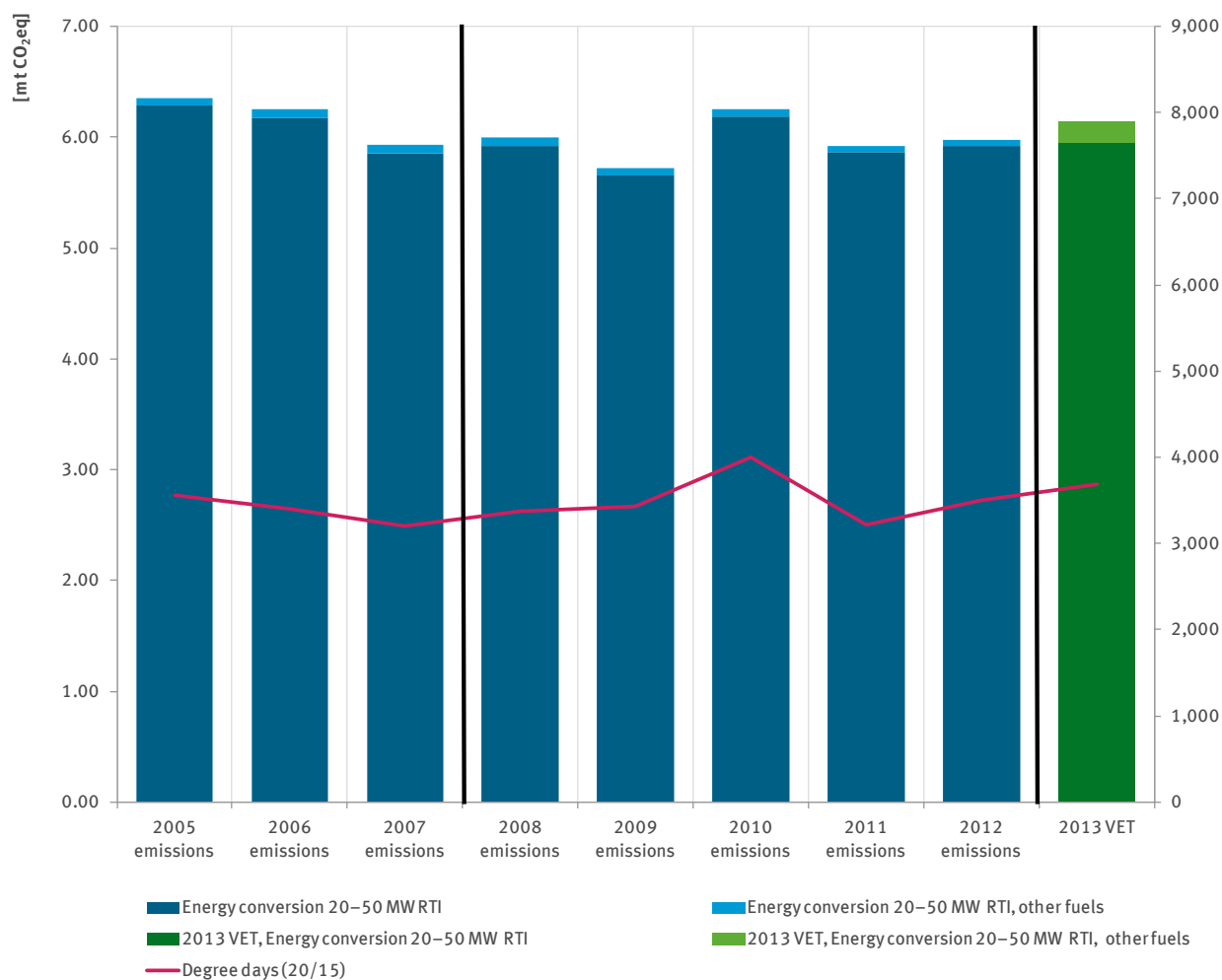
**Table 8: Combustion installations 20-50 MW (Activities 3 and 4), number of installations, 2012 emissions and 2013 VET entries**

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
3	Energy conversion 20–50 MW RTI	2013 VET > 2012 EM	214	2,979	3,367	388
		2013 VET < 2012 EM	204	2,847	2,455	-392
		2013 VET = 2012 EM	3	0	0	0
		No comparison possible	13	94	130	-
			434	5,919	5,952	-4
4	Energy conversion 20–50 MW RTI, other fuels	2013 VET > 2012 EM	5	38	142	103
		2013 VET < 2012 EM	2	14	8	-6
		2013 VET = 2012 EM	1	0	0	0
		No comparison possible	5	-	41	-
			13	53	190	97
Total			447	5,972	6,142	93

As of 02/05/2014

In these activities, there are many heat and power plants and district heating boilers, which makes emissions dependent on the heat production work load and thus on the weather. Figure 5 shows the time series of emission levels from the start of emissions trading for this installation group and the average degree days<sup>13</sup>.

<sup>13</sup> It is the average of the Hamburg-Fuhlsbüttel, Düsseldorf, Berlin-Tempelhof, Dresden-Klotzsche, Frankfurt/M-Airport and Munich/Airport weather stations. DWD, cf. IWU 2014.



As of 02/05/2014

**Figure 5:** Combustion installations 20-50 MW (Activities 3 and 4), emission trends in Germany, 2005 – 2013

### Allocation status

In these installations, the ratio of heat production (to some extent with a free allocation) to electricity generation (without any free allocation) is more favourable than in large combustion installations. Therefore, the free allocation covers three-quarters of the emissions, significantly more than in Activity 2 installations.

Activity 4 installations, in which biogenic fuels are used, even have an oversupply of nearly 15,000 emission allowances in excess of actual emissions.

**Table 9: Combustion installations 20-50 MW (Activities 3 and 4), number of installations, allocation amounts, 2013 VET entries and allowance coverage**

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
3	Energy conversion 20–50 MW RTI	2013 VET > 2012 AA	304	5,129	3,095	-2,034	60.3%
		2013 VET < 2012 AA	124	822	1,347	525	163.8%
		2013 VET = 2012 AA	4	0	0	0	
		No comparison possible	2	-	17	-	
			434	5,952	4,459	-1,509	74.9%
4	Energy conversion 20–50 MW RTI, other fuels	2013 VET > 2012 AA	4	164	25	-139	15.2%
		2013 VET < 2012 AA	8	26	181	155	697.9%
		2013 VET = 2012 AA	1	0	0	0	
			13	190	206	15	108.1%
<b>Total</b>			<b>447</b>	<b>6,142</b>	<b>4,665</b>	<b>-1,493</b>	<b>76.0%</b>

As of 02/05/2014

### 3.1.3 Prime movers (natural gas compressors)

There are 55 Activity 5 and 6 installations used to transport, store and process natural gas where the 2013 emissions were 14 percent higher than in the previous year. The free allocation covers three-quarters of the emissions here too. The operators have a calculated surplus of over one million emission allowances from the last trading period (see Table 47).

**Table 10: Overview of prime movers (Activities 5 and 6), number of installations, summary of emission and allocation amounts by comparability of emissions**

Prime movers	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance supply
Comparable	55	1,337	1,158	1,530	75.7%

As of 02/05/2014

## Emissions

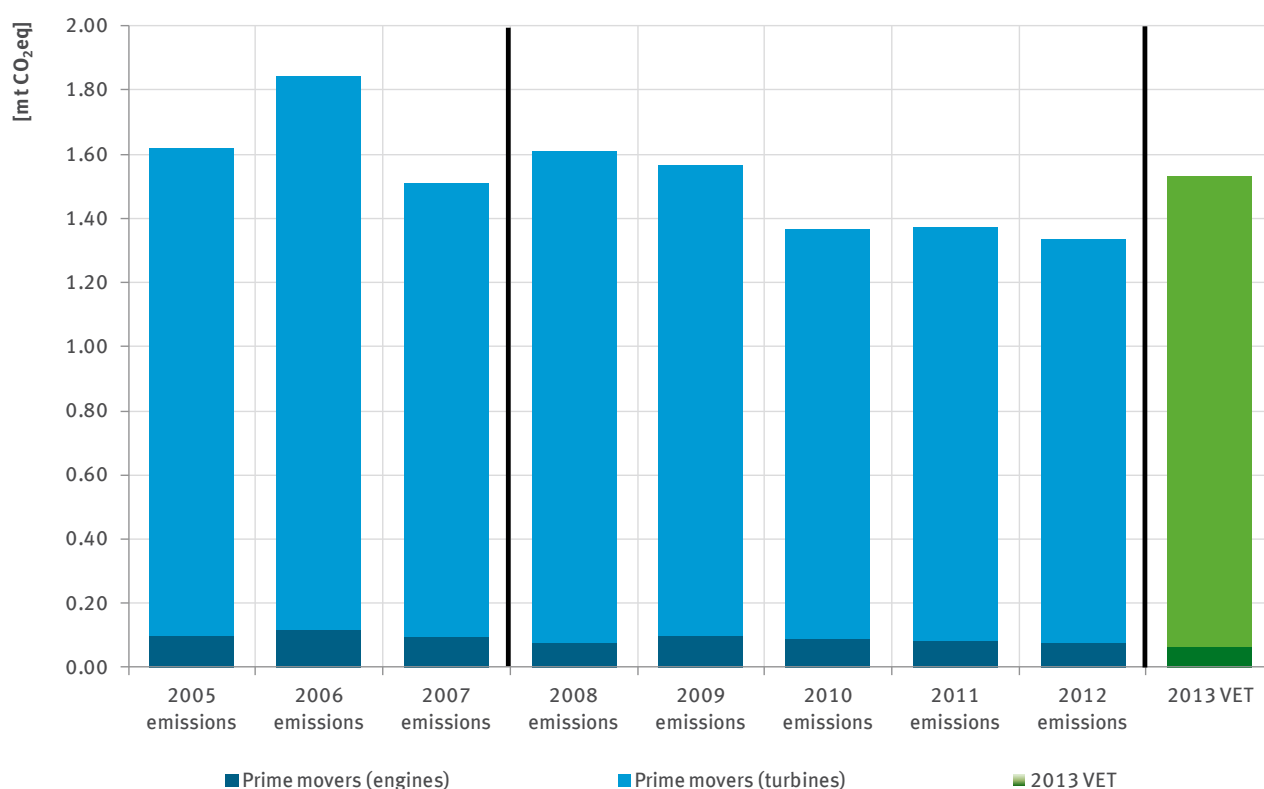
Among the prime mover engines and turbines, one-third of the installations exhibit an increase and two-thirds a reduction in the amounts of emissions (Table 11). Overall, emissions increased by 14 percent from 1.33 million tonnes to 1.53 million tonnes of carbon dioxide.

Table 11: Prime movers (Activities 5 and 6), number of installations, 2012 emissions and 2013 VET entries

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
5	Prime movers (engines)	2013 VET > 2012 EM	2	17	24	7
		2013 VET < 2012 EM	1	59	40	-19
			3	75	64	-12
6	Prime movers (turbines)	2013 VET > 2012 EM	30	796	1,127	331
		2013 VET < 2012 EM	22	466	339	-127
			52	1,262	1,466	204
Total			55	1,337	1,530	192

As of 02/05/2014

Figure 6 shows the emission figures from the beginning of emissions trading in 2005. After a large fluctuation in the early years, emissions have decreased since 2008 and were less than 1.4 million tonnes of carbon dioxide between 2010 and 2012. The operation of the installations depends on the conditions in the natural gas grid. Last year, natural gas consumption increased due to weather conditions – largely outside the emissions trading – so that transport and storage aggregates had to work harder and consequently caused higher emissions.



As of 02/05/2014

Figure 6: Prime movers (Activities 5 and 6), emission trends in Germany, 2005 – 2013



## Allocation status

Prime movers (turbines and engines) have mainly received a free allocation via the fuel benchmark for producing mechanical work. The free allocation for 20 installations is higher than the emissions, while operators must acquire additional emission allowances for 35 installations (Table 12).

**Table 12:** Prime movers (Activities 5 and 6), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installa- tions	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
5	Prime movers (engines)	2013 VET > 2013 AA	2	24	17	-7	71.9%
		2013 VET < 2013 AA	1	40	55	15	138.9%
			3	64	72	9	113.8%
6	Prime movers (turbines)	2013 VET > 2013 AA	33	1,262	813	-450	64.4%
		2013 VET < 2013 AA	19	204	273	69	133.7%
			52	1,466	1,085	-381	74.0%
Total			55	1,530	1,158	-372	75.7%

As of 02/05/2014

## 3.2 Other combustion

Around 80 installations with a rated minimum thermal input of 20 MW are recorded for the first time under Activity 1 in emissions trading due to the broader definition of “combustion” – as they do not fall within any other activity. This section only covers those 45 Activity 1 installations that are not assigned to other industries in this report. In addition to process heaters, asphalt mixing plants and test stands for turbines or engines for example are included in this installation group. Table 13 shows the data frame of this group. A total of 618,000 tonnes of carbon dioxide is emitted. The comparison with the previous year does not apply because there were no emissions subject to emissions trading. Installations in this group have an allowance coverage of 104 percent relative to their actual emissions and can keep or sell a part of their free allocation.

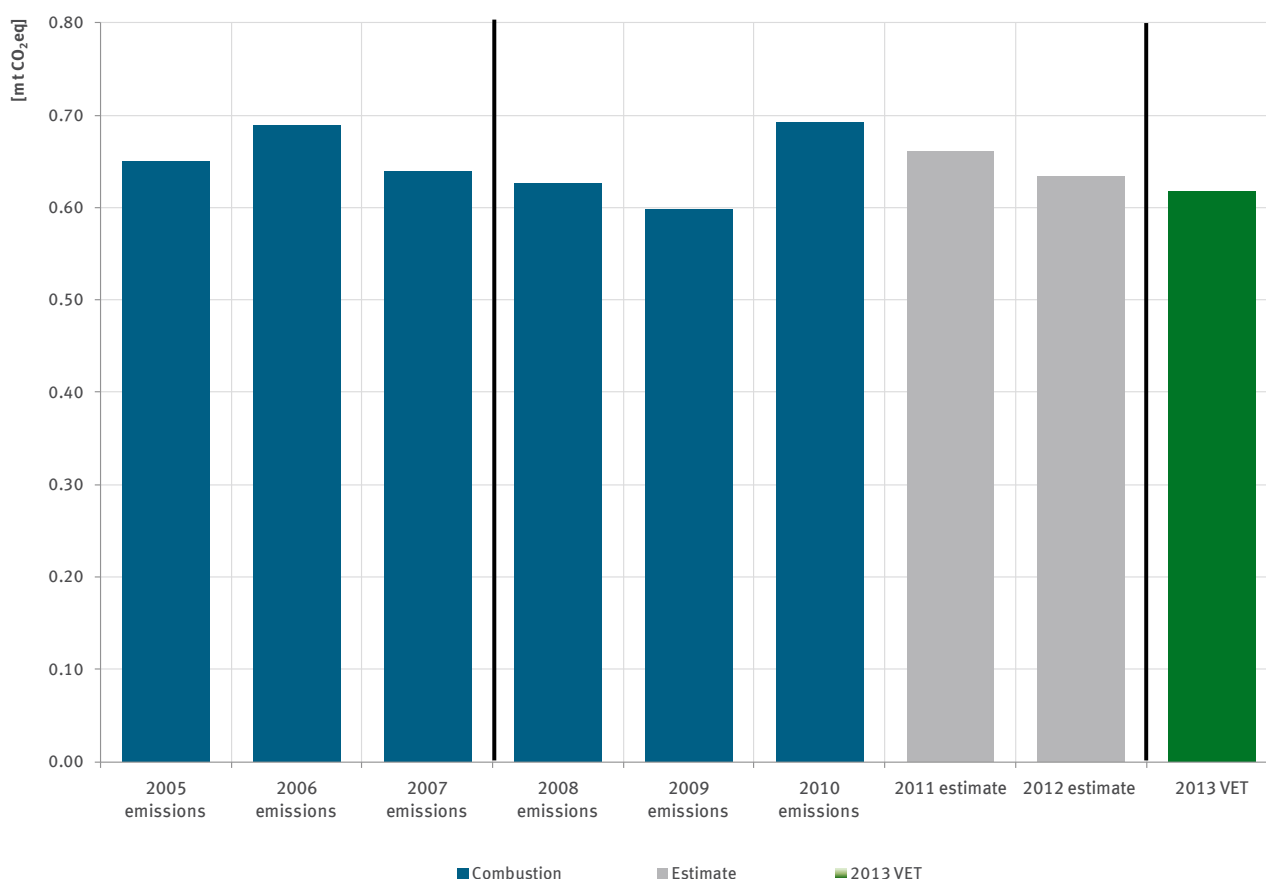
**Table 13:** Overview of other combustion installations (Activity 1), number of installations, summary of emission and allocation amounts by comparability of emissions

Other combustion plants	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance supply
Not comparable	45	-	645	618	104.4%

As of 02/05/2014

## Emissions

A direct comparison with the previous year is not possible because the operators have only submitted verified data for the baseline period 2005 to 2008, or 2009 and 2010. Figure 7 shows the historical data of the installations for the baseline period. The gap for 2011 and 2012 was linearly interpolated between 2010 and 2013 and is shown as an estimate. The installation group is very varied so that its interpretation should include a number of industries.



As of 02/05/2014

Figure 7: Other combustion installations (Activity 1), emission trends in Germany, 2005 – 2013

### Allocation status

Allowances must be purchased for the majority of the 45 installations; seven installations receive 220,000 allowances more than needed to offset their emissions. Two installations had no emissions, and four installations had no comparable data. Operators received their allocation on the basis of heat production. The allocation fell to the heat and fuel benchmark in approximately equal parts. Overall, the Activity 1 installations considered here can sell or retain approximately 27,000 emission allowances.

Table 14: Other combustion installations (Activity 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
1	Combustion	2013 VET > 2013 AA	32	443	250	-193	56.5%
		2013 VET < 2013 AA	7	175	395	220	225.6%
		2013 VET = 2013 AA	2	0	0	0	
		No comparison possible	4	-	-	-	
Total			45	618	645	27	104.4%

As of 02/05/2014

### 3.3 Refineries

In 2013, 24 installations belonged to refineries (Activity 7 in Annex 1 TEHG). Although the activity description for refineries was unchanged in the third trading period as per Annex 1 TEHG, changes nevertheless result in terms of installation size for some installations due to mergers of installation units previously authorised separately or because of the formation of a so-called unified system according to § 24 TEHG that is mandatory for refineries in the third trading period. Thus all refinery power plants, with the exception of the Leuna and Salzbergen power plants are considered as industrial installations together with the accompanying refinery. In order to obtain a consistent time series, this has also been applied for the previous years in this report. Hence there are differences in the industry's total emissions compared to data of previous reports<sup>14</sup>.

In 2013, emissions from refineries increased because of the addition of a new installation that was not previously subject to emissions trading by almost six percent compared to 2012, rising from 24.7 million to 26.1 million tonnes of carbon dioxide (see Table 15). The free allocation failed for the first time in 2013 to fully cover the emissions subject to surrender, but was around 5 million emission allowances, or about 19 percent below the amount required to meet the surrender liability.

**Table 15: Overview of refineries (Activity 7), number of installations, summary of emissions and allocation amounts by comparability of emissions**

Refineries	Number of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	23	24,673	19,617	24,504	80.1%
Not comparable	1	-	1,452	1,593	91.2%
<b>Total</b>	<b>24</b>	<b>24,673</b>	<b>21,069</b>	<b>26,097</b>	<b>80.7%</b>

As of 02/05/2014

Because of the mandatory creation of a unified installation, some installations are no longer considered as a separate installation starting from the third trading period. Thus the number of refineries has decreased in comparison to 2012, even if the capacity in these installations remained the same.

One ammonia-producing plant became subject to emissions trading in 2013 and is listed under refinery activity because it was licenced as a refinery according to § 4 TEHG. One installation (Wilhelmshaven refinery) has stopped its refinery operation and will only continue to operate as a terminal. It only reported very low emissions for 2012 and 2013 and received no allocation for 2013<sup>15</sup>. Another installation which made a partial cessation in 2012, that is, reduced its production by more than 50 percent over its initial activity, considerably increased its activity in 2013 again.

#### Emissions

Emissions increased across the industry over 2012 because a new entrant for ammonia production started operation. Carbon dioxide emissions from refineries which were already subject to emissions trading in the second trading period decreased by 168,000 tonnes of carbon dioxide, or 0.7 percent compared to the previous year. Table 16 compares the 2012 emissions with the 2013 VET entries. In this comparison, the installation pool of the third trading period was also applied to 2012, that is, for example, that accompanying power plants were also considered. There were seven installations where emissions increased by 785,000 tonnes (12.6 percent) and 16 installations where emissions decreased by 954,000 tonnes of carbon dioxide (5.2 percent). The reduction in emissions was due to a decline in production in most installations, while one installation switched from heating oil to natural gas. Emissions by an installation subject to emissions trading only as of 2013 are not considered in this evaluation.

<sup>14</sup> In previous reports, the emissions from the following installations were listed under "Energy installations": PCK Schwedt power plant, Godorf refinery power plant, Wesseling refinery power plant and Heide refinery power plant. cf. DEHSt 2013a.

<sup>15</sup> According to Article 23 of the EU-wide allocation rules, the free allocation for the year following the cessation of operations is proportionally reduced in the event of a (partial) cessation of operations. In this report, any partial cessations of operations were considered for 2012, but no partial cessation of operations for 2013. Therefore, discrepancies may occur between the data of free allocation and the data in the report "Free allocation of emission allowances to incumbents for the 2013-2020 trading period" (see DEHSt 2014), which is based on evaluations of the National Allocation Table (NAT) of November 2013.

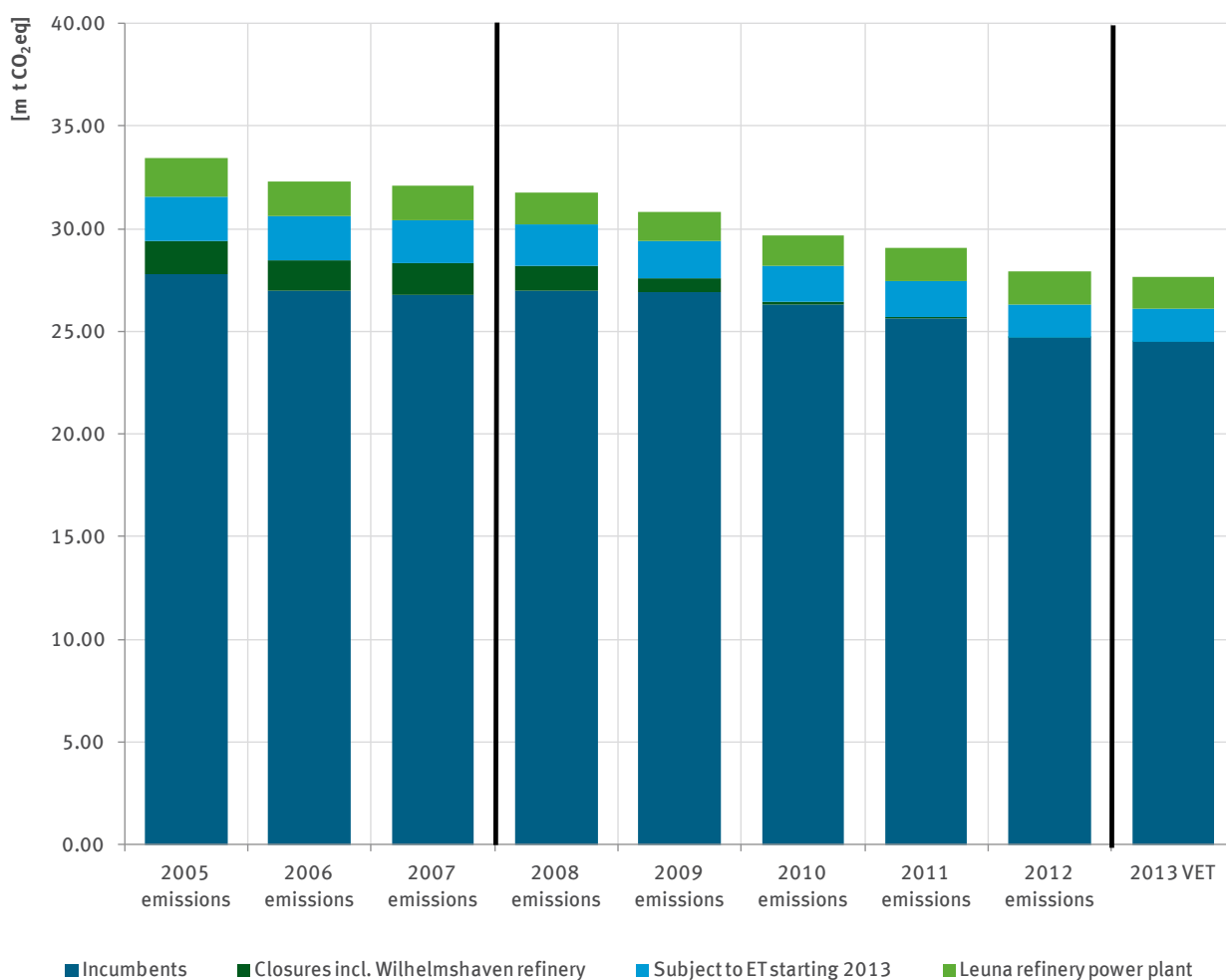
Table 16: Refineries (Activity 7), number of installations, 2012 emissions and 2013 VET entries

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
7	Refineries	2013 VET > 2012 EM	7	6,226	7,011	785
		2013 VET < 2012 EM	16	18,447	17,493	-954
Total			23	24,673	24,504	-168

As of 02/05/2014

Operators may often be assigned to one of the big corporations. The major operators are grouped here according to their names without any reference to their economic interrelations. The largest emitter is the Ruhr Oel GmbH with 4.8 million tonnes of carbon dioxide from two installations subject to emissions trading. It is followed by Shell Germany (3.96 million tonnes of CO<sub>2</sub>, three installations) and PCK Schwedt (3.6 million tonnes of CO<sub>2</sub>, one installation). The trend of continuously declining emissions observed from the beginning of emissions trading slowed down considerably in 2013 compared to the previous years. Figure 8 shows the 2005-2013 emissions from refineries including their power plants. Especially until 2010, capacity closures or partial cessations of operations led to lower emissions.

Emission data are available for the 2005 – 2010 period from the allocation process for the installation newly added in 2013. The 2011 and 2012 emissions were estimated by interpolation of the 2010 and 2013 figures.



As of 02/05/2014

Figure 8: Refineries (Activity 7), emission trends in Germany, 2005 – 2013

## Allocation status

Among the affected industrial sectors, refineries are particularly hard hit by the discontinuation of free allocation for electricity generation in the third trading period because of their accompanied power plants. In the majority of the installations – 20 out of 24 – free emission allowances allocated in 2013 covered only a part, on average 76.2 percent, of the emissions subject to surrender (Table 17). Included is the Wilhelmshaven refinery, which received no free allocation for 2013. Four installations still received slightly more free allocations than they needed for surrender, namely, 412,000 emission allowances.

**Table 17: Refineries (Activity 7), number of installations, allocation amounts, 2013 VET entries and allowance supply**

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EU-A/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
7	Refineries	2013 VET > 2013 AA	20	22,821	17,381	-5,440	76.2%
		2013 VET < 2013 AA	4	3,276	3,688	412	112.6%
Total			24	26,097	21,069	-5,028	80.7%

As of 02/05/2014

The year 2013 was the first time that the sector had a shortfall of about 5 million emission allowances. However, between 2008 and 2012, the refineries (including power plants) were allocated 14.7 million free emission allowances more than they needed to meet their surrender obligations. If not already sold, these allowances can be transferred to the third trading period and used for surrender. A part of the surplus allocation from the previous trading period is reduced as of the third trading period.

## 3.4 Iron and steel industry including coking plants

Activities 8 to 11 as well as an Activity 1 TEHG installation fall within the iron and steel industry, which means a total of 130 installations subject to emissions trading in Germany. Table 18 shows the emissions for 2012 and 2013 and the allocation amounts for 2013.

**Table 18: Overview of iron and steel industry (Activities 8 to 11 and 1), number of installations, summary of emissions and allocation amounts by comparison of emissions**

Iron and steel	Number of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	41	30,674	46,588	30,958	150.5%
Not comparable	89	616	4,809	4,783	100.5%
<b>Total</b>	<b>130</b>	<b>31,290</b>	<b>51,397</b>	<b>35,741</b>	<b>143.8%</b>

As of 02/05/2014

Emissions from the iron and steel industry in 2013 amounted to around 36 million tonnes of carbon dioxide. The 2013 free allocation was 144 percent of the 2013 emissions, i.e. about 16 million emission allowances more than necessary to meet the surrender liability. However, this figure must be considered in a differentiated way: installations in the iron and steel industry which produce waste gases from iron, steel and coke production receive an allocation for the generation of these waste gases, although the emissions are not released at the source of the waste gases from iron, steel and coke production when they are transferred to other installations (see Table 22). In 2013, waste gases from iron, steel and coke production were transferred to the energy sector, whose emissions correspond to 21.4 million tonnes of carbon dioxide (see page 46). Taking into account the assumption that the relevant free allocation of about 15 million allowances is passed on from the producer of waste gases from iron, steel and coke production to their users, the allowance coverage in the iron and steel industry falls to 102 percent.

## Emissions

The previous activities within the iron and steel industry were partially restructured with the beginning of the third trading period: TEHG no longer distinguishes between individually licenced blast furnaces and electric steelworks (Activity IX in the second trading period) and integrated iron and steel works (Activity IXa in the second trading period). The installations in the iron and steel industry are closely (inter)linked, therefore statements about individual activities should be considered with caution. As of the third trading period, pig iron and steel production is summed up under Activity 10. Integrated iron and steel works are also listed under Activity 10 in this report, even if coking plants (Activity 8) and sinter plants (Activity 9) are operated and partly ferrous metals are also further processed in these installations (Activity 11).

It is only the independent coking plants, sinter plants and processing installations that are listed under their own special activity, as in previous analyses.

Table 19 is a comparison between 2012 emissions and 2013 VET entries according to activities of installations that were already subject to emissions trading in the second trading period. In independent coking plants as well as metal ore processing and pig iron and steel producing installations (Activities 8, 9 and 10), total emissions increased by about 327,000 tonnes of carbon dioxide (or 1.1 percent) over the previous year. In ferrous metal processing installations (Activity 11), however, a slight reduction in emissions was recorded (corresponding to -2.9 percent). Overall, carbon dioxide emissions from the installations in the iron and steel industry grew by about 283,000 tonnes compared to the previous year. This represents an increase of around 0.9 percent. In those seven installations subject to emissions trading in the second trading period where no comparison of the 2013 emissions with the previous year was possible, the emissions were approximately 714,000 tonnes of carbon dioxide.

**Table 19: Iron and steel industry (Activities 8 to 11 and 1), number of installations, 2012 emissions and 2013 VET entries**

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
8	Coking plants	2013 VET > 2012 EM	2	2,424	2,526	102
		2013 VET < 2012 EM	2	1,211	1,201	-11
			4	3,636	3,727	91
9	Metal ore processing	No comparison possible	1	306	69	-
			1	306	69	0
10	Pig iron and steel production	VET 2013 > EM 2012	13	11,326	12,470	1,144
		VET 2013 < EM 2012	14	14,200	13,291	-909
		No comparison possible	5	279	577	-
			32	25,804	26,338	236
11	Ferrous metal processing	VET 2013 > EM 2012	3	264	288	24
		VET 2013 < EM 2012	7	1,250	1,182	-68
		No comparison possible	1	31	68	-
			11	1,545	1,538	-43
<b>Total</b>			<b>48</b>	<b>31,290</b>	<b>31,672</b>	<b>283</b>

As of 02/05/2014

Overall, only 48 of the 130 installations were subject to emissions trading in the second trading period. The number of installations has thus almost tripled from the second trading period to the third trading period due to the entry of 82 additional installations. This mainly includes installations for the further processing of ferrous metals (Activity 11)<sup>16</sup>, which were previously not subject to emissions trading and are also mainly the smaller emitters in this sector. One Activity 1 installation is also assigned to the iron and steel industry. The emissions from these installations together amounted to around 4 million tonnes of carbon dioxide in 2013 (see Table 20).

**Table 20: Iron and steel industry (Activities 11 and 1), number of installations, 2013 VET entries subject to emissions trading from the beginning of the third trading period**

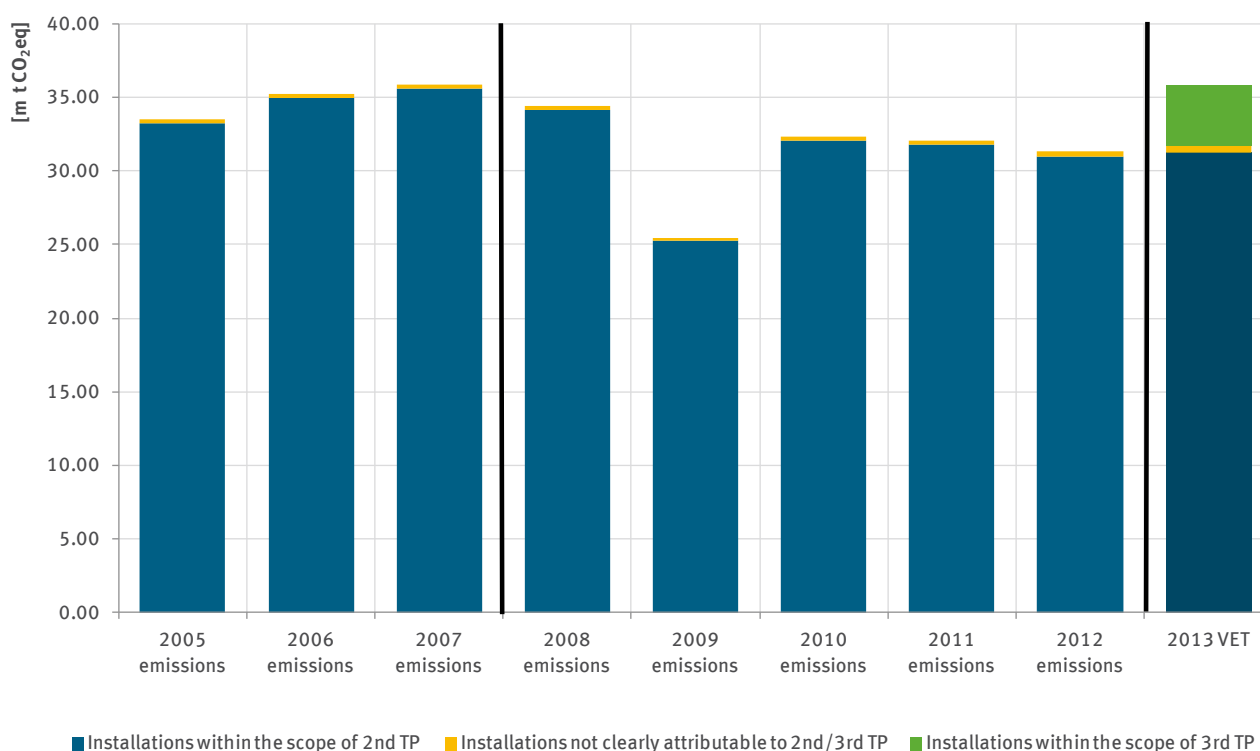
No.	Activity	2013 VET vs 2012 emissions	Number of installations	2013 VET [kt CO <sub>2</sub> eq/a]
11	Ferrous metal processing	No comparison possible	81	3,989
1	Combustion	No comparison possible	1	80
<b>Total</b>			<b>82</b>	<b>4,069</b>

As of 02/05/2014

Most installations in the iron and steel industry can be assigned to ThyssenKrupp and ArcelorMittal. The highest emissions (about 16 million tonnes of carbon dioxide) are caused by ThyssenKrupp, followed by ArcelorMittal, Salzgitter AG and Saarstahl (around 5 million tonnes of carbon dioxide each).

Figure 9 shows the change in emission levels from the beginning of emissions trading. Compared to the first trading period, a slight reduction in emissions can be seen in the second trading period. The emission status of installations in the iron and steel industry is typically closely linked to technical production processes. Therefore, the 2008 – 2012 change in carbon dioxide emissions also reflects economic development. Although emissions from installations subject to emissions trading in the second trading period increased over the previous year starting the third trading period (see Table 19), additional installations also became subject to emissions trading. Thus, 2013 emissions assigned to the iron and steel industry were significantly higher. Some of the installations and thus the emissions cannot be clearly assigned to the scope of the second or third trading period due to plant mergers. Emissions from installation units subject to emissions trading in the second trading period are also highlighted in previous years. The 2013 emissions from these installations cannot meaningfully be compared with previous years.

<sup>16</sup> In individual cases, non-ferrous metals are processed in these installations.



As of 02/05/2014

Figure 9: Iron and steel industry (Activities 8 to 11 and 1), emission figures in Germany, 2005 – 2013

### Allocation status

For the iron and steel industry as a whole, allocation is significantly higher than emissions: based on the VET entries, the surplus allocation is around 144 percent at the start of the third trading period, which means that all surrender obligations can be met with free emission allowances. However, the surplus is not evenly distributed to the different activities within the sector (see Table 21). While only around 48 percent of the emissions was allocated free of charge to coking plants (Activity 8) and approximately 89 percent to ferrous metal processing installations (Activity 11), i.e. less than they emitted in 2013, the allocation for pig iron and steel production (Activity 10) exceeded the emissions by 69 percent, and by 3 percent for the processing of metal ores.

Table 21: Iron and steel industry (Activities 8 to 11 and 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
8	Coking plants	2013 VET > 2013 AA	3	3,389	1,279	-2,110	37.7%
		2013 VET < 2013 AA	1	338	524	186	154.9%
			4	3,727	1,803	-1,924	48.4%
9	Metal ore processing	2013 VET < 2013 AA	1	69	71	2	103.3%
			1	69	71	2	103.3%
10	Pig iron and steel production	2013 VET > 2013 AA	12	1,082	306	-777	28.2%
		2013 VET < 2013 AA	20	25,256	44,288	19,033	175.4%
			32	26,338	44,594	18,256	169.3%



No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
11	Ferrous metal processing	2013 VET > 2013 AA	53	3,683	2,759	-924	74.9%
		2013 VET < 2013 AA	39	1,844	2,169	325	117.6%
			92	5,527	4,928	-599	89.2%
1	Combustion	2013 VET > 2013 AA	1	80	0	-80	0.0%
			1	80	0	-80	0.0%
Total			130	35,741	51,397	15,656	143.8%

As of 02/05/2014

Both a surplus allocation as well as large differences within the sector are primarily influenced by the allocation for waste gases from iron, steel and coke production (blast furnace, converter and coke oven gas). The producers of waste gases from iron, steel and coke production receive the allocation for these waste gases via the respective product benchmark for liquid pig iron and coke although, in the case of a transfer, the emissions from waste gases from iron, steel and coke production are not released by the installations themselves that generate these waste gases. About two-thirds of the allocation to Activity 8 and 10 installations must be assigned to waste gases from iron, steel and coke production<sup>17</sup>.

In recent VET reports, the transfer of waste gases from iron, steel and coke production was directly offset when the allocation took place. In the second trading period, when waste gases from iron, steel and coke production were transferred, the allowances were allocated to the generating installations but the operators were obliged to transfer the emission allowances to the importing installation according to § 11, Allocation Act 2012. In contrast, the operators are not legally obliged to pass on the emission allowances in the third trading period.

Therefore, offsetting does not take place in the VET report with regard to the allocation. Table 22 shows the emissions that correspond to the transfer of waste gases from iron, steel and coke production and are therefore not released by the producer.

**Table 22: Transfer of waste gases from iron, steel and coke production in 2013**

No.	Activity	Transfer to coking plants [kt CO <sub>2</sub> eq/a]	Transfer to pig iron and steel production [kt CO <sub>2</sub> eq/a]	Transfer to ferrous metal production and combustion [kt CO <sub>2</sub> eq/a]	Transfer to energy installations [kt CO <sub>2</sub> eq/a]	Transfer to refineries [kt CO <sub>2</sub> eq/a]	Transfer to non-ETS* [kt CO <sub>2</sub> eq/a]	Total [kt CO <sub>2</sub> eq/a]
8	Coking plants	-	966	241	129	199	55	1,591
10	Pig iron and steel production	2,700	25	1,182	21,320	0	127	25,353
<b>Total</b>		<b>2,700</b>	<b>991</b>	<b>1,423</b>	<b>21,449</b>	<b>199</b>	<b>182</b>	<b>26,944</b>

\* The actual amount transferred totals 185,000 tonnes of carbon dioxide equivalents, of which 3,000 tonnes are inherent carbon dioxide  
As of 02/05/2014

When transfer takes place to installations which are not subject to emissions trading, the installation that produces waste gases from iron, steel and coke production must surrender emission allowances for the inherent amount of carbon dioxide (this amount has already been subtracted from the transferred amount in Table 22). However, in the case of a transfer to installations subject to emissions trading, the installation that uses waste gases from iron, steel and coke production must surrender emission allowances for the entire transferred amount of carbon dioxide. A total of about 182,000 tonnes of carbon dioxide was transferred to non-ETS installations in 2013<sup>18</sup>.

<sup>17</sup> cf. DEHSt 2014, Chapter "Iron and steel industry".

<sup>18</sup> The non-deductible inherent carbon dioxide has already been taken into account here.

Within the industry, 2.7 million tonnes of carbon dioxide were transferred to Activity 8 installations while these transferred 966,000 tonnes to Activity 10 installations. In other sectors subject to emissions trading, waste gases from iron, steel and coke production corresponding to about 23 million tonnes of carbon dioxide were transferred, the bulk of which went to energy installations (about 21 million tonnes of carbon dioxide).

### 3.5 Non-ferrous metals industry

The non-ferrous metal industry within the European emissions trading scheme comprises a total of 37 installations and is the sector with the lowest emissions. It primarily includes installations that have only been subject to emissions trading since 2013. Two energy installations on non-ferrous metal production sites had also already been included in emissions trading; however, they have been recorded together with the installation unit that manufactures or processes non-ferrous metals as of 2013. These energy installations emitted about 23,000 tonnes of carbon dioxide in 2012 (see Table 23, column “2012 emissions”).

**Table 23: Overview of non-ferrous metal industry (Activities 12, 13 and 1), number of installations, summary of emissions and allocation amounts by comparability of emissions**

Non-ferrous metals	Number of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Not comparable	37	23	2,466	2,421	101.8%

As of 02/05/2014

Installations subject to emissions trading in the non-ferrous metal industry emitted an estimated 2.4 million tonnes of carbon dioxide equivalents in 2013. Data for 2012 are only available for the above energy installations.

#### Emissions

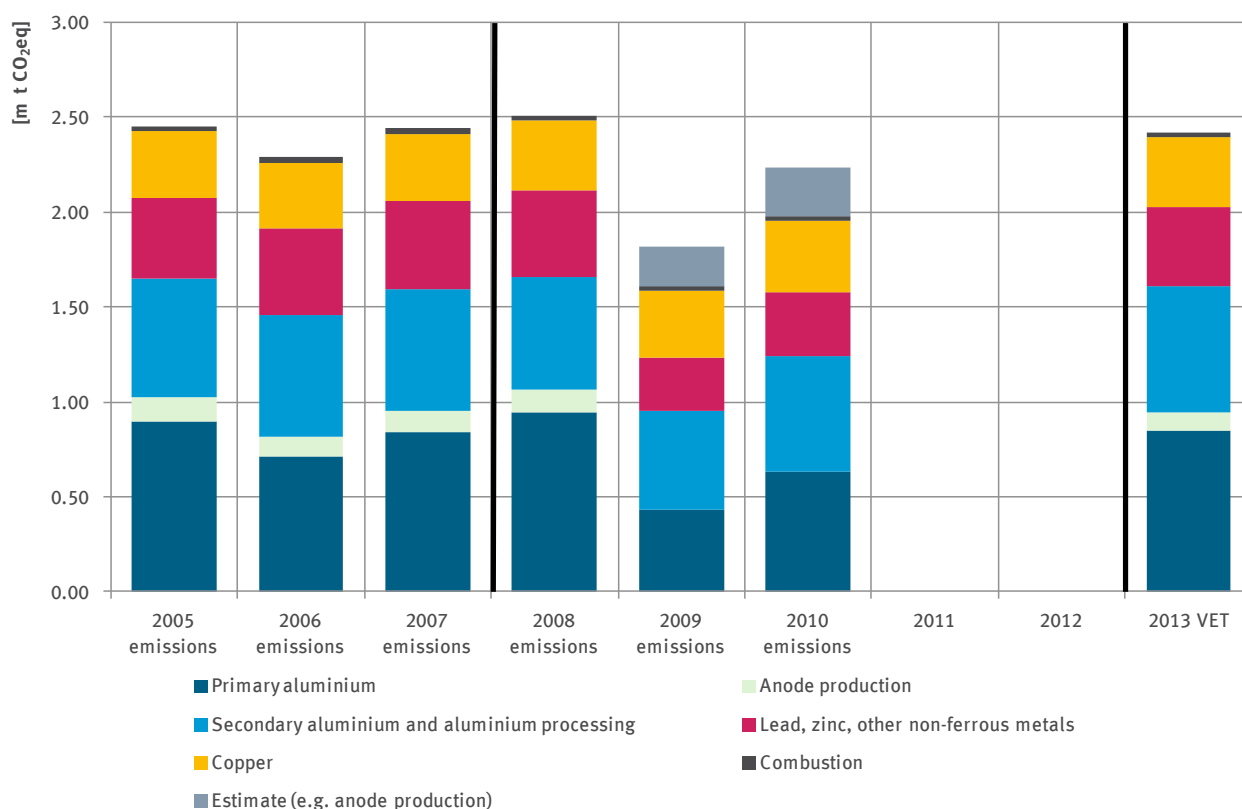
The non-ferrous metal industry includes Activities 12 and 13 according to Annex 1 TEHG and two Activity 1 installations.

**Table 24: Non-ferrous metal industry (Activities 12, 13 and 1), number of installations, 2013 VET entries**

No.	Activity	Number of installations	2013 VET [kt CO <sub>2</sub> eq/a]
12	Primary aluminium production*	7	948
13	Non-ferrous metal processing	28	1,448
1	Combustion	2	25
<b>Total</b>		<b>37</b>	<b>2,421</b>

\* Including PFC emissions of 110,000 tonnes of carbon dioxide equivalents  
As of 02/05/2014

This includes seven installations for primary aluminium production (Activity 12), which emit 948,000 tonnes of carbon dioxide equivalents. There are three installations among them which only produce anodes that are consumed in primary aluminium production. The remaining four Activity 12 installations are electrolysis installations for primary aluminium production. In addition to carbon dioxide, these four installations emit PFC (perfluorocarbons). These PFC emissions have also been subject to emissions trading since the start of the third trading period. The 2013 PFC emissions correspond to about 110,000 tonnes of carbon dioxide equivalent and thus have an average share of about 13 percent of the emissions from the electrolysis installations. The 28 installations for the production and processing of other non-ferrous metals such as copper, zinc or lead (Activity 13) emitted approximately 1.4 million tonnes of carbon dioxide in 2013 and thus account for more than half of the carbon dioxide emissions of the non-ferrous metal industry. Secondary aluminium production is also classified as Activity 13. The two installations assigned to Activity 1 are rolling mills to process non-ferrous metals.



As of 02/05/2014

**Figure 10: Non-ferrous metal industry (Activities 12, 13 and 1). Emission figures in Germany, 2005 – 2013**

Figure 10 shows the emissions of the non-ferrous metal industry according to the materials or products predominantly produced or processed. Since installations of the non-ferrous metal industry chiefly became subject to emissions trading with the start of the third trading period, emissions data cannot be analysed based on emissions reports. Instead, emissions data from the allocation process for the third trading period can be used for a general overview about the emission figures in the industry. Emissions of five installations were estimated for 2009 and 2010 (see Figure 10), which included among others the three anode production installations.

Combustion activity 1 has a share of only one percent of the emissions in the sector in 2013. Activity 12 was divided into electrolysis installations for primary aluminium production and anode production installations. Their share of emissions is about 35 and 4 percent, respectively. Activity 13 is divided into installations for secondary aluminium production and aluminium processing, installations for copper production and processing as well as installations that produce or process lead, zinc and other nonferrous metals. Their share of the industry's total emissions is about 27, 17 and 15 percent, respectively.

## Allocation status

Overall, in 2013 the non-ferrous metals industry has a surplus allocation of 45,000 emission allowances. However, allocation levels differ depending on activity.

Table 25: Non-ferrous metals industry (Activities 12, 13 and 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EU-A/a]	2013 VET deviation from 2013 allocation [kt CO <sub>2</sub> eq/a]	Allowance coverage
12	Production of primary aluminium	2013 VET > 2013 AA	6	905	746	159	82.5%
		2013 VET < 2013 AA	1	43	59	-16	136.6%
			7	948	805	143	84.9%
13	Processing of non-ferrous metals	2013 VET > 2013 AA	19	1,027	897	130	87.3%
		2013 VET < 2013 AA	9	420	735	-315	175.0%
			28	1,448	1,633	-185	112.8%
1	Combustion	2013 VET < 2013 AA	2	25	28	-3	112.1%
			2	25	28	-3	112.1%
Total			37	2,421	2,466	-45	101.8%

As of 02/05/2014

Activity 12 installations receive a free allocation according to the product benchmark (“aluminium” or “prebaked anodes”<sup>19</sup>). They had to acquire emission allowances for about 15 percent of their emissions in order to fulfill their surrender obligations in 2013. On average, Activity 13 installations are better equipped. In 2013, their allocation level was 113 percent, so that after fulfilling their surrender obligation, they still held about 185,000 emission allowances.

## 3.6 Mineral industry

### 3.6.1 Cement clinker production

The emissions from the 36 installations which produce cement clinker and one installation for the manufacture of products from baked oil shale (hereinafter, all of these installations are subsumed under the term “cement industry”) decreased by 844,000 tonnes of carbon dioxide or four percent compared to the previous year, to 19 million tonnes of carbon dioxide now (Table 26). The free allocation for 2013 covers these emissions to 98.5 percent. Unlike in the second trading period, the emission allowances allocated free of charge no longer exceed emissions.

Table 26: Overview of the production of cement clinker (Activity 14), number of installations, summary of emissions and allocation amounts by comparability of emissions

Cement clinker production	Number of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	37	19,856	18,724	19,012	98.5%

As of 02/05/2014

<sup>19</sup> see DEHSt 2014, Chapter “Non-ferrous metals industry”.

The entry threshold of 500 tonnes of cement clinker per day is far exceeded by all installations in the industry in Germany; therefore the data cover the entire industry in Germany. Compared to 2012 the number of installations for that activity has decreased by one installation to 37 installations. One installation reported zero emissions. The emissions of all 37 installations are comparable with the previous year.

## Emissions

In the cement industry, emissions have declined by a total of 844,000 tonnes of carbon dioxide, or 4.25 percent. In 26 installations they fell by 1.122 million tonnes of carbon dioxide; in the remaining eleven installations they have increased by 278,000 tonnes (Table 27).

**Table 27: Production of cement clinker (Activity 14), number of installations, 2012 emissions and 2013 VET entries**

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
14	Cement clinker production	VET 2013 > EM 2012	11	5,056	5,334	278
		VET 2013 < EM 2012	26	14,800	13,678	-1,122
Total			37	19.856	19.012	-844

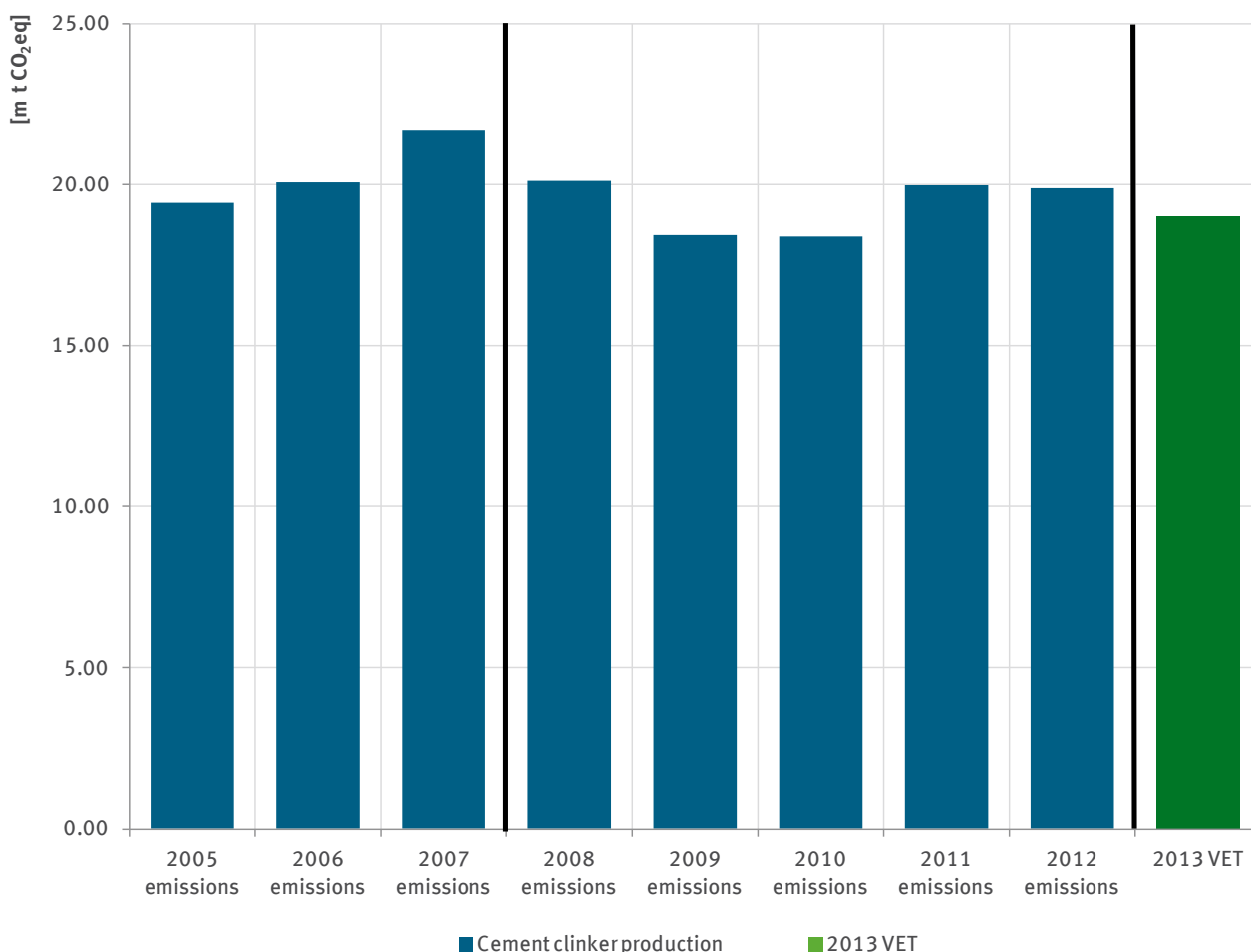
As of 02/05/2014

It should be noted that, due to the requirements of the EU Monitoring Regulation, the process-related emissions in the third trading period must now be analysed by the operators, whereas in the second trading period they were reported using a uniform emission factor of 0.525 tonnes of CO<sub>2</sub> per tonne of cement clinker – multiplied by the amount of clinker produced. At about 21,000 tonnes of carbon dioxide, the effect of this change is relatively small, as the (weighted) emission factor of the process emissions analysed is 0.526 tonnes of CO<sub>2</sub> / tonne of cement clinker.

A similar calculation of the 2013 emissions using the default values of the process emissions for the second trading period produces a decrease in emissions of approx. 4.4 percent. Concurrent with the reduction in emissions, production decreased by a similar magnitude.

Changes in emission intensity induced by this are in the range of measurement uncertainties of the activity rates for calculating emissions.

Figure 11 shows the trend of carbon dioxide emissions from the cement industry from 2005 to 2013. After emissions rose each year in the first trading period, they declined after the peak in 2007, especially in 2009 and 2010. They then rose again in 2011, almost to the same level of the first trading period 2005 to 2007, to finishing the second trading period in 2012 on a consistent level. The 2013 decrease is roughly equivalent to half of the 2009 decrease compared to 2008.



As of 02/05/2014

Figure 11: Production of cement clinker (Activity 14), emission trends in Germany, 2005 – 2013

### Allocation status

For 2013, the free allocation to the cement industry (Table 28) is 288,000 emission allowances or 1.5 percent below the amount required to meet the surrender obligation. In total, 22 installations have a shortfall of 1.225 million emission allowances, 14 installations have a surplus of 936,000 allowances. One installations has a VET entry of zero, but also received no allocation.

Table 28: Production of cement clinker (Activity 14), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installa- tions	2013 VET [kt CO <sub>2</sub> eq/a]	2013 alloca- tion amount [1000 EU- A/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
14	Production of cement clinker	2013 VET > 2013 AA	22	11,387	10,163	-1,225	89.2%
		2013 VET < 2013 AA	14	7,625	8,561	936	112.3%
		2013 VET = 2013 AA	1	0	0	0	
Total			37	19,012	18,724	-288	98.5%

As of 02/05/2014

The shortfall is thus significantly lower than would have been expected in the context of allocations according to the product benchmark (0.766 tonnes of CO<sub>2</sub> per tonne of cement clinker) and the application of the cross-sectoral correction factor of 7.56 percent. In 2013 eight installations had lower emissions in tonnes of CO<sub>2</sub> per tonne of cement clinker than the product benchmark of 0.766 tonnes CO<sub>2</sub> per tonne of cement clinker. For 2013, the emission intensity of all cement industry installations is 0.795 tonnes of CO<sub>2</sub> per tonne of cement clinker. This does not include the production of white cement and baked oil shale because they have other product benchmarks than grey cement clinker. But the production of cement kiln dust (CKD) was added to the production amount for cement clinker, since the allocation rules provide for this as well.

The small deficit is mainly explained by the fact that the 2013 production (24.5 million tonnes of cement clinker) is lower than in the years from 2005 to 2008 (25.4 million tonnes), which was used for calculating the allocation.

In principle the sector can also use the emission allowances which were additionally available in the second trading period where the allocation often far exceeded the emissions and allowances could be saved. This amounts to a total of about 5.8 million emission allowances. Analyses<sup>20</sup> indicate that the five largest manufacturers in the EU have already sold significant portions of these surpluses.

### 3.6.2 Lime production (including sugar)

Activity 15 (lime production) installations are divided into two different sectors of industry. On the one hand, 46 installations produce lime or dolime for the construction, paper, chemical as well as the iron and steel industry and environmental technology. They are dominated by the economy of the steel and construction industries. On the other hand, 20 installations produce lime for food production, for example in the sugar sector and are dominated by the quality and quantity of sugar beet crop. From the third trading period on, these installations, together with the energy installations of the sugar industry, belong to the lime production activity, while in the second trading period, energy installations and lime installations were considered separately. Due to the revised scope, partial activities relevant to emissions have been added to sugar manufacturing, especially beet pulp drying, caramelisation installations and emergency generators. For this reason, the 2013 emissions of the 20 sugar installations, are not considered commensurable with the emissions of previous years (see Table 29), although the installations were already subject to emissions trading prior to 2013. Their previous year's emissions are principally taken from the data in allocation applications for the third trading period of 2005-2010. The 2011 and 2012 values were extrapolated from 2005 to 2010 data. The use of the data from the allocation application ensures that the installation's scope is comparable to that of 2013.

Additionally assigned to Activity 15 is a combustion installation (Activity 1) newly admitted to emissions trading because of the expanded emissions trading scope in the third trading period, which is also not comparable with the previous year.

Table 29: Lime production overview (Activity 15), number of installations, summary of emission and allocation amounts, by comparability of emissions

Lime production	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	46	7,493	6,583	7,478	88.0%
Not comparable	21	1,860	1,295	1,870	69.3%
<b>Total</b>	<b>67</b>	<b>9,354</b>	<b>7,878</b>	<b>9,348</b>	<b>84.3%</b>

As of 02/05/2014

Because of two new entrants and three decommissionings, the total number of installations has been reduced from 67 to 66 (formerly 47 lime installations and 20 sugar installations). In addition, one Activity 1 combustion installation was added so that a total of 67 installations were analysed.

<sup>20</sup> see Climate Strategies 2014.



## Emissions

In Table 30, the Activity 15 lime kilns are divided into “Lime production”<sup>21</sup> (NACE Rev. 2: 23.52) and “Sugar production” (NACE Rev. 2: 10.81). Accordingly, in 2013 lime production for blast furnaces, power plants and the construction industry, nominal emissions were almost unchanged at around 7.5 million tonnes of carbon dioxide, the sugar industry lime kilns also emitted a nearly constant 1.86 million tonnes of carbon dioxide.

For two installations no data was available, or no direct comparison was possible. In both cases, there is (currently) no production, but DEHSt has not been made aware of a formal decommissioning. In the one “no comparison possible” case, the VET entry is lacking.

The new Activity 1 combustion installation entrant is also responsible for about 15,000 tonnes of carbon dioxide. For lime and sugar, the number of installations with increased and decreased emissions, and the respective increase or decrease in emissions is about evenly distributed.

**Table 30: Lime production (Activity 15), number of installations, 2012 emissions and 2013 VET entries<sup>22</sup>**

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
15	Lime production	2013 VET > 2012 EM	23	4,889	5,243	353
		2013 VET < 2012 EM	21	2,604	2,235	-369
		2013 VET = 2012 EM	1	0	0	0
		No comparison possible	1	-	-	-
			46	7,493	7,478	-16
	Sugar production	No comparison possible	20	1,860	1,856	-
			20	1,860	1,856	0
<b>Total</b>			<b>66</b>	<b>9,354</b>	<b>9,333</b>	<b>-16</b>

As of 02/05/2014

The figures in Table 30 are based on several changes between the second and third trading period, which make a direct comparison methodologically difficult. Firstly, for a direct comparison for sugar installations, about 0.2 to 0.3 million tonnes of carbon dioxide would have to be added to 2012 emissions for the above-mentioned additional activities (for example, beet pulp drying lines). Second, the 2013 emission data for total activity involve a change in the reporting methodology, in that from 2013 on, emissions must be reported on the basis of analyses of the materials used, while up to 2012, they were for the most part calculated on the basis of production volumes and uniform materials values. Especially for the process-related emissions from lime production, at the bottom line this appears to be a reduction of emissions, the level of which could not be exactly specified. As a rough estimate, a reduction of five to ten percent can be assumed, which results from the change in the reporting method and not from a real emissions trend. Maintaining uniform reporting methods, the real emissions would therefore be at a correspondingly higher level.

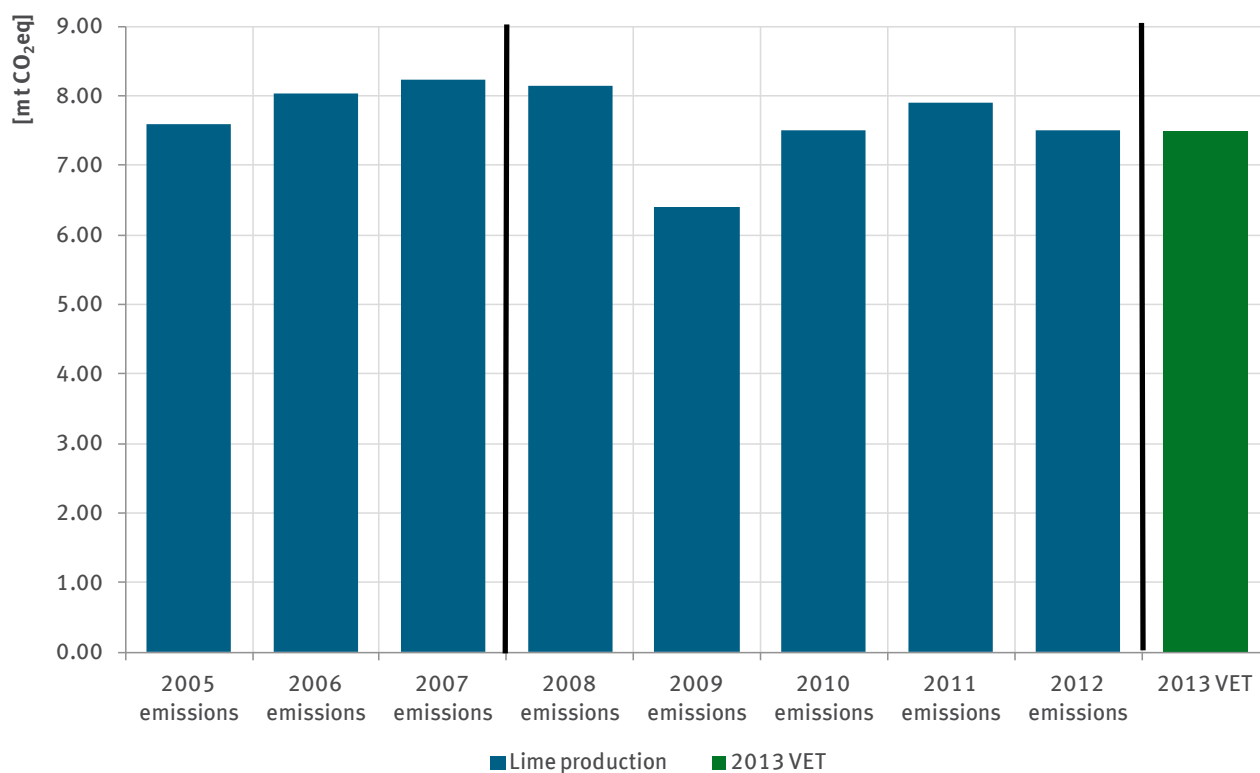
According to the German Federal Statistical Office, in 2013, the production index of lime increased by 0.7 percent, while that of sugar decreased by 15.3 percent. Therefore, in the sugar industry, the decrease in production and the extended scope of the EU ETS counteract each other.

The following figures show the emission trends since 2005, separated by lime (Figure 12) and sugar production (Figure 13). The sugar production emissions also include the combustion installations which were grouped separately during the second trading period.

<sup>21</sup> The nominal designation of the sector is “Production of lime and gypsum plaster.” Since the production of gypsum is a separate activity in the ETS, the emissions from the production of gypsum are described in a separate Section 3.5.5.

<sup>22</sup> Added to this is an Activity 1 combustion installation, with about 15,000 tonnes of carbon dioxide.





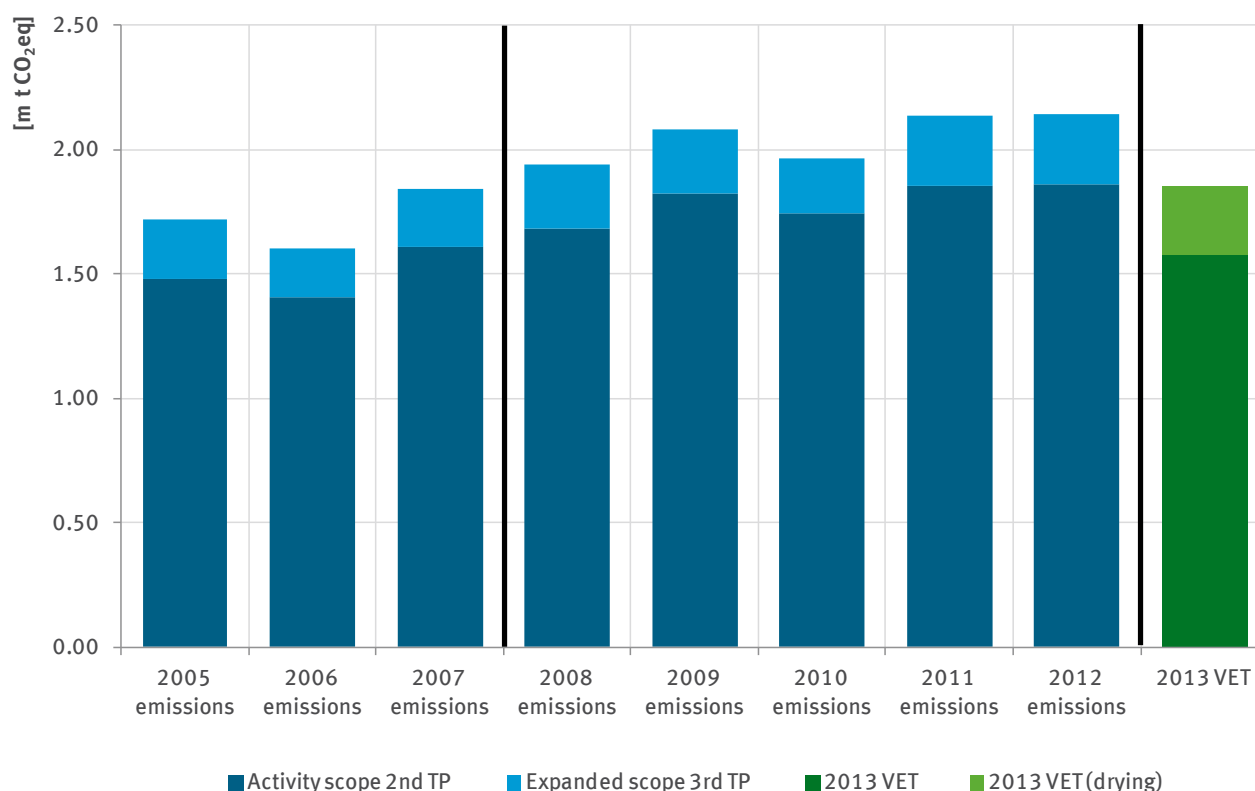
As of 02/05/2014

**Figure 12:** Lime production (Activity 15), emission trends in Germany, 2005 – 2013. Data from emissions reports

During the first trading period, the emissions from the production of lime steadily increased (see Figure 12) and initially remained constant during the transition to the second trading period. In 2009, which was heavily impacted by the financial and economic crisis, emissions from lime kilns, which are economically dependent on the steel and construction industry, have fallen dramatically.

In 2010 and 2011 they increased again due to the economic situation, but did not reach the level of 2008; in 2012 and 2013 they even decreased almost to the level of 2010, just below the 2005 level.

Output of sugar production installations is primarily dependent on the availability of sugar beet (Figure 13).



As of 02/05/2014

Figure 13: Emission trends in the sugar industry, 2005 – 2013

2005 to 2010 emissions are taken from the application data for the allocation in the third trading period; 2011 and 2012 emissions are from the emissions reports (lower portion of the columns) and the average share of the expanded activities scope in 2005 to 2010 (about 15 percent), multiplied by the emissions according to the 2011 or 2012 emissions reports (upper portion of the column).

## Allocation status

In lime production there is a total shortfall of 895,000 allowances, which corresponds to an allowance shortfall of approximately 12 percent of emissions in 2013. In sugar production it is 574,000 emission allowances, which corresponds to a shortfall of 31 percent of 2013 emissions. 13 of 46 lime production installations have a surplus allocation, but only one sugar producing installation does. Power generation in the sugar industry, for which no allocation free of charge is granted in the third trading period, also plays a role here. The Activity 1 combustion installation has a shortfall of 1,000 emission allowances and therefore only needs to purchase about ten percent of its 2013 emissions to meet surrender obligations.

Table 31: Lime production (Activity 15), number of installations, allocation amounts, VET entries and allowance coverage in 2013

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EU-A/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
15	Lime production	2013 VET > 2013 AA	31	6,472	5,325	-1,146	82.3%
		2013 VET < 2013 AA	13	1,006	1,257	251	125.0%
		2013 VET = 2013 AA	1	0	0	0	
		No comparison possible	1	-	0	-	
			46	7,478	6,583	-895	88.0%

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EU-A/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
	Sugar production	2013 VET > 2013 AA	19	1,832	1,256	-576	68.6%
		2013 VET < 2013 AA	1	24	26	2	110.5%
			20	1,856	1,282	-574	69.1%
1	Combustion	2013 VET > 2013 AA	1	15	13	-1	90.2%
			1	15	13	-1	90.2%
<b>Total</b>			<b>67</b>	<b>9,348</b>	<b>7,878</b>	<b>-1,470</b>	<b>84.3%</b>

As of 02/05/2014

In the second trading period, installations for the production of lime and sugar had allocation surpluses of 12 million allowances. Insofar as these have not already been sold, they can be used to cover emission allowance shortfalls in 2013.

### 3.6.3 Production of glass and mineral fibres

For the reporting year, 84 installations subject to emissions trading were assigned to Activity 16 “Glass production”, and seven installations to Activity 18 “Mineral fibre production” – three fewer than in 2012. Carbon dioxide emissions have increased by 139,000 tonnes, an increase of about three percent. The free allocation covers about 84 percent of emissions.

Table 32: Overview of glass and mineral fibre production (Activities 16 and 18), number of installations, summary of emissions and allocation amounts by comparability of emissions

Production of glass and mineral fibres	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	91	3,923	3,416	4,062	84.1%

As of 02/05/2014

## Emissions

Table 33 breaks down the two activities further. It includes the sub-category “manufacture of glass fibres” (NACE Rev. 2: 23.14) in both Activity 16 and 18.

Table 33: Glass and mineral fibre production (Activities 16 and 18), number of installations, 2012 emissions and 2013 VET entries

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
16	Manufacture of flat glass	2013 VET > 2012 EM	11	1,084	1,233	149
		2013 VET < 2012 EM	6	252	243	-10
			17	1,336	1,476	140
	Manufacture of hollow glass	2013 VET > 2012 EM	18	728	777	49
		2013 VET < 2012 EM	21	906	848	-58
			39	1,634	1,625	-9

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
	Manufacture of glass fibres	2013 VET > 2012 EM	6	109	117	8
		2013 VET < 2012 EM	3	98	91	-7
			9	207	207	0
	Manufacture and processing of other glass including technical glassware	2013 VET > 2012 EM	9	159	177	18
		2013 VET < 2012 EM	10	251	229	-22
			19	410	406	-4
			<b>84</b>	<b>3,587</b>	<b>3,714</b>	<b>127</b>
18	Manufacture of glass fibres	2013 VET > 2012 EM	1	9	9	1
			1	9	9	1
	Manufacture of other non-metallic Mineral products	2013 VET > 2012 EM	4	193	206	13
		2013 VET < 2012 EM	2	134	132	-2
			6	328	338	11
			7	336	348	11
<b>Total</b>			<b>91</b>	<b>3,923</b>	<b>4,062</b>	<b>139</b>

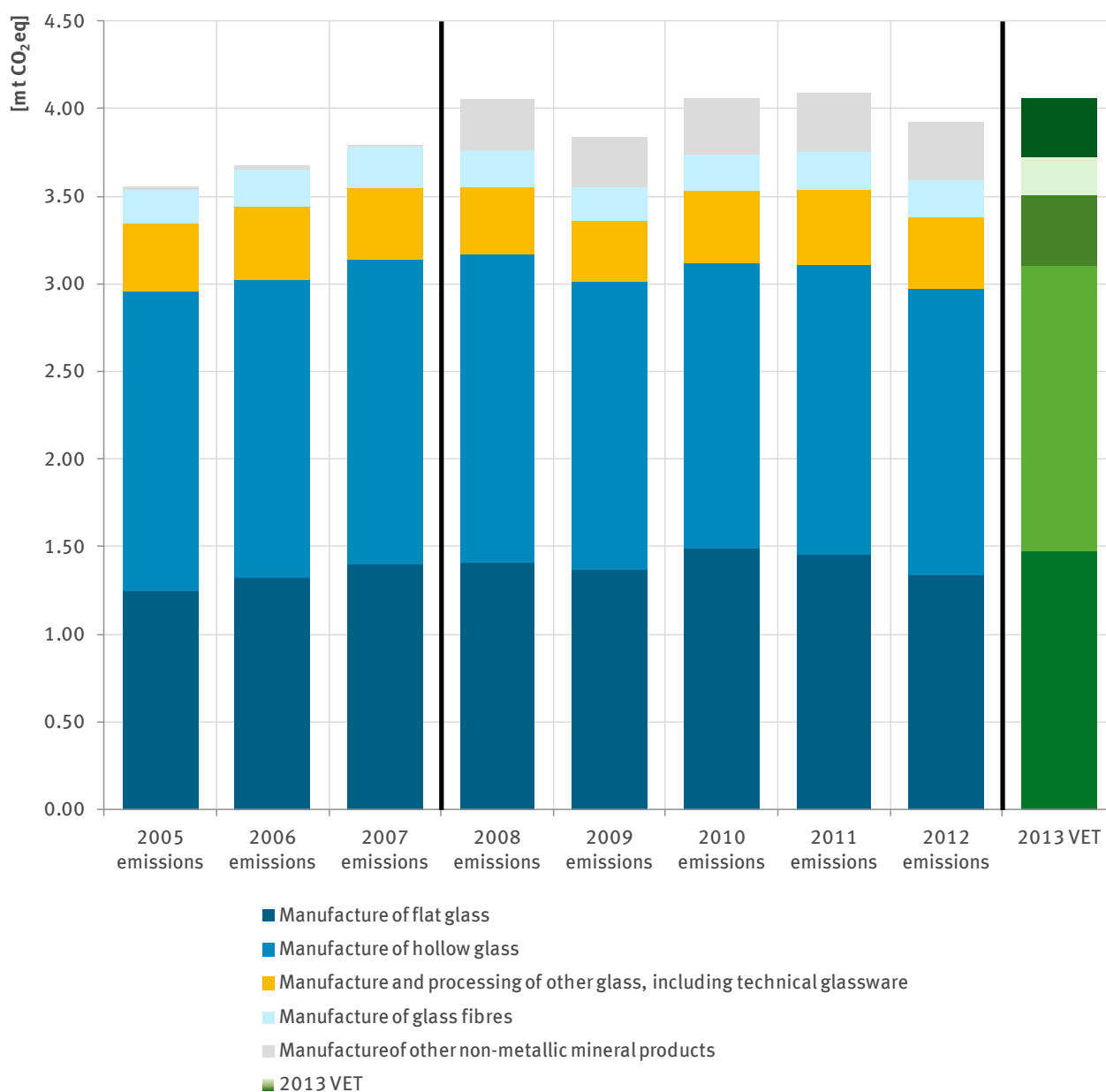
As of 02/05/2014

The above emissions increase is due almost exclusively to an increase in the manufacture of flat glass – for example, from suppliers to the automotive industry and the construction sector – by 140,000 tonnes, or 10.5 percent. At ten percent, this corresponds almost exactly to the increase in production according to the production index of the German Federal Statistical Office. In 2012, the emissions were reduced by 113,000 tonnes compared to 2011, they therefore again caught up with the 2011 level and slightly exceeded it. In contrast, emissions in hollow glass and all other subcategories remained almost constant after having decreased almost across the board in the previous year<sup>23</sup>. According to the production index, increases in production by almost three percent each (hollow glass and glass fibres) and nearly six percent (other glassware) were recorded.

After continuous increases in 2005 to 2008 (Figure 14), emissions from glass and mineral fibre production (Activities 16 and 18) decreased in 2009, the year of the financial and economic crisis. Since then, the emissions have increased again. They reached a peak in 2011, the highest since the beginning of emissions trading<sup>24</sup>, and have fallen to just below that in 2013.

<sup>23</sup> DEHSt 2013a, Table 31

<sup>24</sup> Taking into account mineral fibres, which have been part of the EU ETS since 2008, 2007 emissions would be as high as those in 2011.



As of 02/05/2014

**Figure 14:** Manufacture of glass and mineral fibres (Activities 16 and 18), emission trends in Germany, 2005 – 2013<sup>25</sup>

The emissions from the manufacture of flat glass significantly increased from 2005 to 2008. This trend continued in 2010, after an economic downturn in 2009. After a significant subsequent decline in 2012 they again rose almost to the level of 2010 in 2013.

The emissions from the manufacture of hollow glass rose until 2008, fell in 2009 by about eight percent, and have increased only slightly since then, which puts them at 97 percent of 2005 levels in 2013.

In the glass industry, an increase or decrease in production is not necessarily reflected in emission levels: The installation must be continuously supplied with heat to prevent solidification of the melt in the glass tank, even at low utilisation.

<sup>25</sup> The term “Manufacture of other non-metallic mineral products” refers to Activity 18, except for one installation of this activity, which has been assigned to the glass fibre sector and which is accounted for there.

## Allocation status

The entire sector (Activities 16 and 18) recorded a shortfall of 647,000 allowances, including a shortfall of 579,000 allowances for the manufacture of glass (see Table 34). The shortfall – influenced by the emissions increase in 2013 – is larger for flat glass than for hollow glass. In the 2008-2012 trading period there was an overall allocation surplus of around 3 million emission allowances.

**Table 34: Glass and mineral fibre production (Activities 16 and 18), number of installations, allocation amounts, VET entries and allowance coverage in 2013**

No.	Activity	2013 VET vs 2013 allocation	No. of installa- tions	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocati- on amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance supply
16	Manufacture of flat glass	VET 2013 › AA 2013	14	1,361	1,035	-326	76.0%
		VET 2013 ‹ AA 2013	3	115	137	23	119.8%
			17	1,476	1,173	-303	79.4%
	Manufacture of hollow glass	VET 2013 › AA 2013	31	1,337	1,107	-230	82.8%
		VET 2013 ‹ AA 2013	8	288	309	21	107.3%
			39	1,625	1,416	-209	87.1%
	Manufacture of glass fibres	VET 2013 › ZM 2013	7	159	93	-66	58.5%
		VET 2013 ‹ ZM 2013	2	48	60	11	123.6%
			9	207	153	-55	73.6%
	Manufacture processing of other glass, including technical glassware	VET 2013 › AA 2013	10	235	209	-26	88.8%
		VET 2013 ‹ AA 2013	9	171	185	15	108.5%
			19	406	394	-12	97.1%
Subtotal “Manufacture of glass”			84	3,714	3,135	-579	84.4%
18	Manufacture of glass fibres	VET 2013 › AA 2013	1	9	5	-4	54.2%
			1	9	5	-4	54.2%
	Manufacture of goods from non- metallic mineral products	VET 2013 › AA 2013	3	204	122	-82	59.8%
		VET 2013 ‹ AA 2013	3	134	154	19	114.3%
			6	338	276	-63	81.4%
	Subtotal “Manufacture of mineral fibres”			7	348	281	-67
Total			91	4,062	3,416	-647	84.1%

As of 02/05/2014

### 3.6.4 Ceramics production

Table 35 lists the emission and allocation amounts of the reporting year for the 155 installations subject to emissions trading in the ceramics industry (Activity 17); there are 50 installations which are not comparable with the previous year, as they are new entrants to emissions trading in the third trading period, according to the expanded scope of TEHG. Fifteen of the 120 installations previously subject to emissions trading are not included in 2013, mainly due to decommissioning.

Among the comparable installations, emissions in 2013 increased by 25,000 tonnes of carbon dioxide, or approximately two percent. In total, the allocations of the comparable and non-comparable installations for 2013 make up 93 percent of the emissions for the year.

**Table 35: Overview of ceramics production (Activity 17), number of installations, summary of emission and allocation amounts by comparability of emissions**

Ceramics production	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	105	1,329	1,284	1,354	94.8%
Not comparable	50	0	706	778	90.8%
<b>Total</b>	<b>155</b>	<b>1,329</b>	<b>1,990</b>	<b>2,132</b>	<b>93.4%</b>

As of 02/05/2014

## Emissions

Table 36 shows the data of the 105 comparable installations of Activity 17. There are 56 installations with an increase in emissions totalling around 113,000 tonnes of carbon dioxide. There are 47 installations featuring a total decrease of 88,000 tonnes. In sum, there is a slight increase of 25,000 tonnes.

**Table 36: Ceramics production (Activity 17), number of installations, 2012 emissions and 2013 VET entries**

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
17	Ceramics production	2013 VET > 2012 EM	56	637	750	113
		2013 VET < 2012 EM	47	692	604	-88
		2013 VET = 2012 EM	2	0	0	0
<b>Total</b>			<b>105</b>	<b>1,329</b>	<b>1,354</b>	<b>25</b>

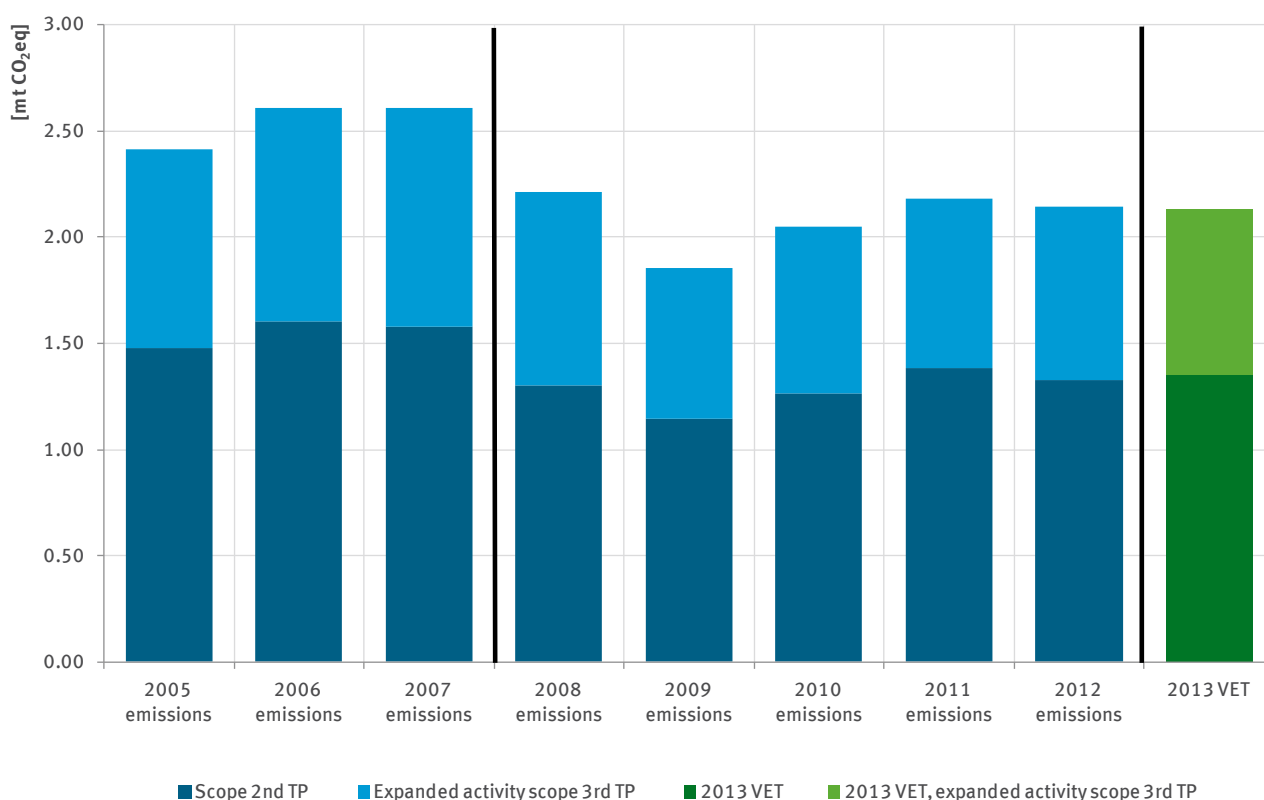
As of 02/05/2014

As shown above, the 50 not directly comparable installations emitted 778,000 tonnes of carbon dioxide.

Figure 15 shows both the 105 installations previously subject to emissions trading (dark column section) and the 50 installations included from the third trading period onwards (light column section)<sup>26</sup>. In the transition from the first trading period 2005 to 2007 to the second trading period 2008 to 2012, the obligation to participate in emissions trading for installations within this activity had changed once before; therefore not all installations from the first trading period are still in emissions trading. These are mainly small installations for the production of bricks and manufacturers of abrasives. Their emissions have not been adjusted here and can therefore reflect a “false decline” between 2007 and 2008. Added in the third trading period, however, are more production installations for, e.g. roof tiles and floor tiles with much larger production and emission levels.

The emissions of 105 installations previously subject to emissions trading increased slightly in 2013 and are higher than in 2008, but still below the level of 2011. In contrast, the 50 installations subject to emissions trading since 2013 generally show a declining emissions trend, which continued in 2013.

<sup>26</sup> All data for ceramics on this time series are based on the allocation applications for the third trading period, with the exception of 2011 and 2012. For these years, emissions from the emission reports were used for the installations already obligated in the second trading period; for the now newly added installations, an estimate of 60 percent of the emissions of the already obligated installations was used (60 percent as the interpolated value of the emission ratios in 2010 (62 percent) and 2013 (57 percent)).



As of 02/05/2014

Figure 15: Ceramics production (Activity 17), emission trends in Germany, 2005 – 2013

### Allocation status

Surplus and shortfall vary greatly: 89 installations have an average shortfall of 20 percent, whereas 63 installations have a surplus of the same order.

Table 37: Ceramics production (Activity 17), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EUA/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
17	Ceramics production	2013 VET > 2013 AA	89	1,435	1,146	-289	79.9%
		2013 VET < 2013 AA	63	697	844	147	121.2%
		2013 VET = 2013 AA	3	0	0	0	
Total			155	2,132	1,990	-142	93.4%

As of 02/05/2014

In the second trading period from 2008 – 2012, the previously obligated installations had a surplus of 2.3 million emission allowances.<sup>27</sup>

<sup>27</sup> Since 2.7 million allowances were reported as surplus in the previous VET report (see DEHSt 2013a), it is possible that the installations decommissioned in 2014 accounted for a portion of this surplus.



### 3.6.5 Gypsum production

Since the start of the third trading period, nine installations for gypsum production are subject to emissions trading as Activity 19. In sum, an average 94 percent of emissions in 2013 were allocated free of charge (Table 38). Since 2013 is the first year of operation in the ETS, historical comparisons are not yet possible in that year's report. Therefore, all nine installations are classified as "not comparable".

**Table 38:** Overview of the gypsum production (Activity 19), number of installations, summary of emissions and allocation amounts by comparability of emissions

Gypsum production	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Not comparable	9	-	252	268	94.0%

As of 02/05/2014

As Table 39 shows, two installations have a surplus allocation of an average of 4.3 percent of emissions in 2013; the remaining seven installations, however, have a shortfall of an average of 10.5 percent of emissions in 2013 and therefore need to acquire 20,000 emission allowances to meet their surrender obligations.

**Table 39:** Gypsum production (Activity 19), number of installations, allocation amounts, 2013 VET entries, and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocations amount [1000 EUA/a]	2013 allocation deviation from 2013VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
19	Gypsum production	2013 VET > 2013 AA	7	186	166	-20	89.5%
		2013 VET < 2013 AA	2	82	86	4	104.3%
Total			9	268	252	-16	94.0%

As of 02/05/2014

## 3.7 Paper and pulp industry

The sector includes the production of pulp and manufacturing of paper, cardboard or paperboard (Activities 20 and 21 pursuant to Annex 1 TEHG). Compared to the second trading period, no changes were made to the activity descriptions of TEHG. Nevertheless, there are two changes for the paper and pulp industry: 18 so-called zero emission installations will participate in emissions trading from the third trading period on (including a pulp mill). In addition, the amended TEHG includes the option to form uniform installations so that, from the third trading period on, energy installations are also taken into account in this sector. In two specific cases, which were previously reported as energy installations and have now been merged with installations in the paper industry which were not previously subject to emissions trading, the two installations are now reported as paper installations. Overall, the total number of installations, including a new installation, rose to 151 (previous year: 131), of which five installations are reported under pulp production and 146 are classified as papermaking. The two mergers mentioned above and one installation separation in which only the non-emitting part is classified as a paper installation (while the furnace is now covered by activities of 2 to 6) are not comparable with the previous year (Table 40).

**Table 40: Overview of the paper and pulp industry (Activities 20 and 21), number of installations, summary of emissions and allocation amounts by comparability of emissions**

Paper and pulp	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	130	5,438	6,135	5,456	112.4%
Not comparable	21	87	922	86	1069.2%
<b>Total</b>	<b>151</b>	<b>5,524</b>	<b>7,056</b>	<b>5,542</b>	<b>127.3%</b>

As of 02/05/2014

## Emissions

In pulp manufacturing, furnaces are mainly fuelled with fuel substances generated from biogenic residual waste. Therefore only small quantities of emissions based on fossil carbon are subject to a surrender obligation. The amount has increased from 106,000 tonnes of carbon dioxide in 2012 to a current 141,000 tonnes (see Table 41).

At 5.401 million tonnes of carbon dioxide in 2012, emissions within the paper production activity remained almost constant.<sup>28</sup> Emissions decreased by about 200,000 tonnes in half of the installations, with a corresponding increase in the other half. The “non-comparable” installations are the above-mentioned three installations with mergers or divisions. The 18 “zero emissions installations” are not listed here.

In total, production declined by 0.7 percent, remaining almost constant; copying and printing papers decreased by five percent, the (quantitatively less relevant) sanitary papers rose by four percent, as did packaging papers<sup>29</sup>.

**Table 41: Paper and pulp industry (Activities 20 and 21), number of installations, emissions in 2012 and VET entries 2013**

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviation from 2012 emissions [kt CO <sub>2</sub> eq/a]
20	Pulp production	2013 VET > 2012 EM	4	106	141	35
			4	106	141	35
21	Paper production	2013 VET > 2012 EM	63	2,759	2,951	193
		2013 VET < 2012 EM	63	2,573	2,363	-209
		No comparison possible	3	87	86	-
			129	5,418	5,401	-17
<b>Total</b>			<b>133</b>	<b>5,524</b>	<b>5,542</b>	<b>18</b>

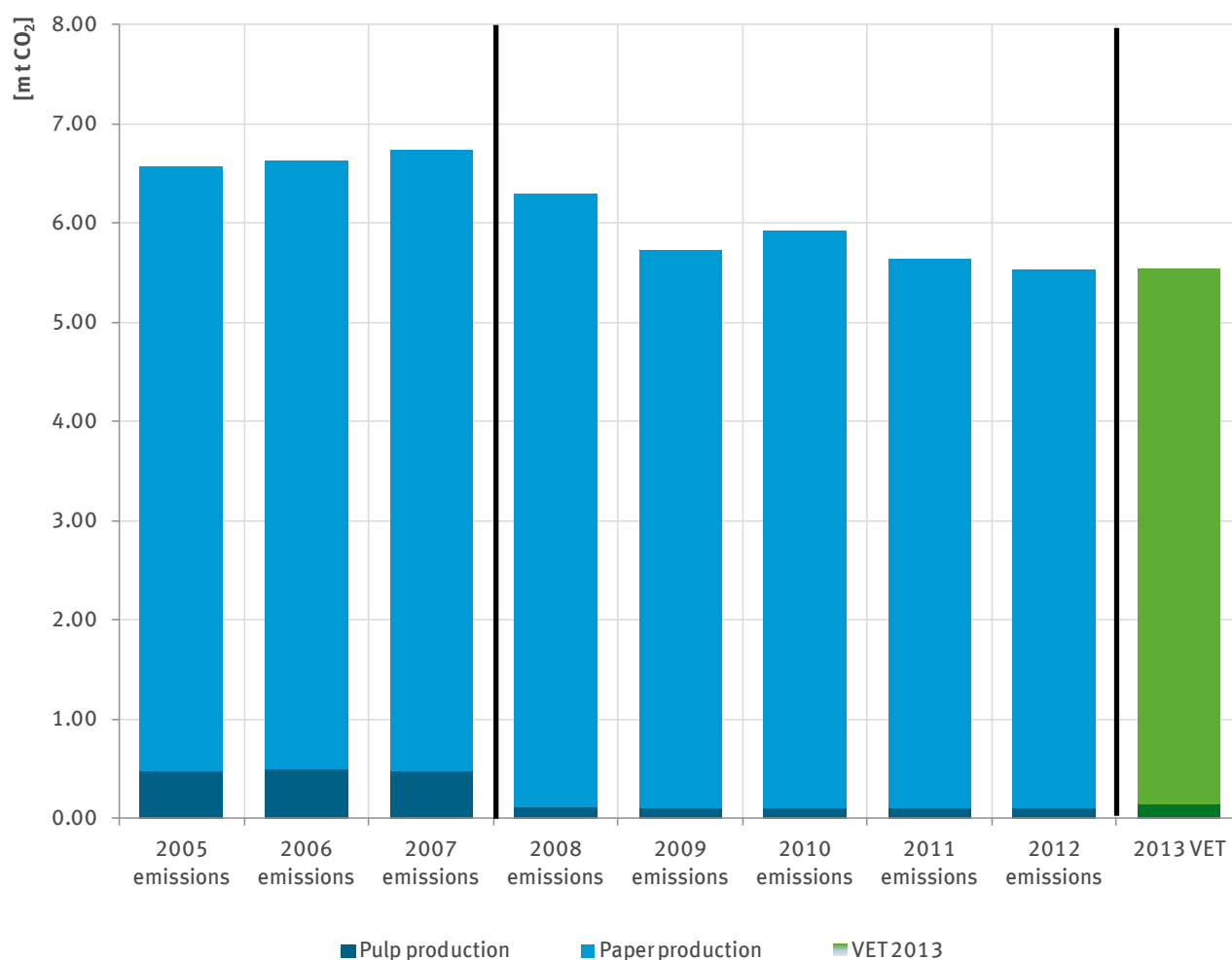
As of 02/05/2014

It is worth noting that installation operators are increasingly importing heat from installations outside of the EU ETS, where the rated thermal input is below the 20-megawatt threshold of the Emissions Trading Directive, or from waste incineration plants. Therefore, emissions are being removed from emissions trading. Moreover, the installations with a capacity of less than 20 MW which are not subject to emissions trading are often fired with lignite dust. If it replaces natural gas as fuel – which has been commonly used in installations subject to emissions trading – it would have the effect of a real increase in emissions, while emissions trading will show a reduction.

<sup>28</sup> Within two installations, plants previously treated as combustion installations will be classified as Activity 21 starting 2013, together with the paper machines. Their combustion installation emissions from 2012 and earlier years will also be accounted for under Activity 21. This ensures the comparability of the emissions of the activity. Compared with the emissions data in the 2012 VET report (see DEHSt 2013A) this results in an increase of almost 180,000 tonnes.

<sup>29</sup> See VDP 2014.

The 2012 and 2013 emissions remain below the level of 2009 and have thus reached the lowest level since the introduction of emissions trading (see Figure 9)<sup>30</sup>. Compared to 2008 (the first year of the second trading period) they have therefore decreased by 15 percent<sup>31</sup>. The use of electronic media has certainly contributed to a decline in sales of newspaper printing and copying paper, and efficiency improvements have had an impact as well.



As of 02/05/2014

Figure 16: Paper and pulp industry (Activities 20 and 21), emission trends in Germany, 2005 – 2013

## Allocation

The operators of the 146 installations in the paper activity obtained 1.543 million of the total of 6.955 million emission allowances received for 2013, or 29 percent more allowances than they would need for surrender according to 2013 VET figures (5.401 million emission allowances, see Table 42). However, this surplus is very unevenly distributed among the installations: while 69 installations show an oversupply of 3.323 million tonnes, an allocation more than four times the 2013 emissions, 73 installations feature a shortfall of a total of 1.779 million allowances – more than 40 percent of 2013 emissions. With a fair degree of certainty, this is due to the fact that power generation is no longer granted an allocation on the one hand, and the allocation for heat imports, which, according to the information below, is distributed very unevenly on the other.

The heat import allocation for 2013 is about 1.9 million allowances<sup>32</sup>. This would mean a decrease of the allowance coverage for the production of paper activity (Activity 21) to 94 percent – a slight shortfall.

30 The three installations classified as non-comparable above are not included.

31 Emissions for 2008: 6.16 million tonnes of carbon dioxide, see DEHSt 2009, Table 36.

32 See DEHSt 2014, Chapter “Paper and pulp industry” p. 50.

Table 42: Paper and pulp industry (Activities 20 and 21), number of installations, allocation amounts, 2013 VET entries and allowance coverage

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EU-A/a]	2013 allocation deviation from 2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
20	Pulp production	2013 VET > 2013 AA	3	138	83	-54	60.5%
		2013 VET < 2013 AA	2	3	18	14	539.8%
			5	141	101	-40	71.6%
21	Paper production	2013 VET > 2013 AA	73	4,356	2,577	-1,779	59.2%
		2013 VET < 2013 AA	69	1,045	4,367	3,323	418.1%
		2013 VET = 2013 AA	1	0	0	0	
		No comparison possible	3	-	11	-	
			146	5,401	6,955	1,543	128.8%
Total			151	5,542	7,056	1,503	127.3%

As of 02/05/2014

However, in sum, the installations of the pulp industry feature a considerable relative shortfall of almost 30 percent of emissions in 2013, which is not very significant for the operators in absolute terms because of the low level of emissions (due to the use of very low-emission fuels).

The second trading period resulted in an allocation surplus of 7.6 million allowances for the paper and pulp industry, which – unless already sold – can be used in the third trading period (see Section 4.1).

### 3.8 Chemical industry

The chemical industry comprises Activities 22 to 29 as per Annex 1 TEHG, which for the most part were added to emissions trading at the start of the third trading period. Also allocated to the sector are some installations which do not belong to any chemical activity subject to emissions trading, but which, because of their rated thermal input of at least 20 MW, fall under Activity 1 in Annex 1 TEHG – for example, installations for the production of titanium dioxide or other inorganic chemistry installations. Installations for the generation of electricity and heat for the chemical industry, however, are classified as energy installations.

In 2013 the emissions from the chemical industry amounted to 18.1 million tonnes. The free allocation in 2013 was therefore 2.3 million emission allowances higher than the amount necessary to fulfill the surrender obligation (12.9 percent).

Table 43: Overview of the chemical industry (Activities 22 to 29 and 1), number of installations, summary of emissions and allocation amounts by comparability of emissions

Chemical industry	No. of installations	2012 emissions [kt CO <sub>2</sub> eq]	2013 allocation amount [1000 EUA/a]	2013 VET [kt CO <sub>2</sub> eq/a]	Allowance coverage
Comparable	15	5,945	5,240	5,774	90.7%
Not comparable	176	324	15,194	12,333	123.2%
<b>Total</b>	<b>191</b>	<b>6,269</b>	<b>20,434</b>	<b>18,107</b>	<b>112.9%</b>

As of 02/05/2014

Of the 191 installations in the sector, 15 were already subject to emissions trading in the second trading period because of their activity (manufacture of carbon black and ethylene and propylene, the so-called steam crackers<sup>33</sup>) or because of their rated thermal input. There are other installations which were already partially subject to emissions trading as an energy installation in the second trading period, and which in the third trading period will be accounted for in the chemical industry together with the emissions from the chemical industry activity. Their emissions data for 2012 and 2013 are therefore not comparable. Three installations did not make a VET entry. However, these installations do not have emissions which are subject to emissions trading and are therefore included in this report with a “zero” VET entry.

## Emissions

Since the majority of installations in the chemical industry have been subject to emissions trading only since the third trading period, there are just 15 installations with comparable scope for which past verified emissions reports are available. However, these account for almost a third of the emissions of the industry.

In 2013, the emissions from the 15 installations whose scope is unchanged from the second trading period decreased by 171,000 tonnes of carbon dioxide, or 2.9 percent, compared to the previous year. The emissions of steam crackers in particular fell by 224,000 tonnes or 4.3 percent, while emissions from installations for the production of carbon black and combustion installations increased slightly, by 7.4 percent or 52,000 tonnes, compared to the previous year.

**Table 44:** Chemical industry (Activities 22, 27 and 1) already subject to emissions trading in the second trading period, number of installations, 2012 emissions and 2013 VET entries

No.	Activity	2013 VET vs 2012 emissions	No. of installations	2012 emissions [kt CO <sub>2</sub> eq/a]	2013 VET [kt CO <sub>2</sub> eq/a]	2013 VET deviations from 2012 emissions [kt CO <sub>2</sub> eq/a]
22	Production of carbon black	2013 VET > 2012 EM	3	557	591	34
		2013 VET < 2012 EM	2	58	38	-20
			5	615	629	14
27	Production of basic organic chemicals	2013 VET > 2012 EM	3	1,926	2,126	201
		2013 VET < 2012 EM	5	3,307	2,883	-424
			8	5,233	5,009	-224
1	Combustion	2013 VET > 2012 EM	2	97	136	39
			2	97	136	39
Total			15	5,945	5,774	-171

As of 02/05/2014

There are no verifiable emissions data from 2012 for comparison of the 176 systems which became fully or partially subject to emissions trading because of the expanded activity scope in the third trading period. Among the newly added activities, the production of ammonia (4.7 million tonnes) and the production of basic organic chemicals (3.1 million tonnes of carbon dioxide, excluding steam crackers) had the highest emissions, followed by the production of hydrogen and synthesis gas (1.8 million tonnes). The “other” category comprises Activity 1 installations (combustion) and Activity 25 installations (production of glyoxal and glyoxylic acid).

<sup>33</sup> In the third trading period, steam crackers are reported under the production of bulk organic chemicals activity.

**Table 45: Chemical industry (Activities 23 to 29 and 1), subject to emissions trading at the start of the third trading period, number of installations, 2013 VET Entries**

No.	Activity	Number of installations	2013 VET [kt CO <sub>2</sub> eq/a]
23, 24	Adipic and nitric acid*	10	800
26	Ammonia production	5	4,734
27	Production of basic organic chemicals*	114	3,136
28	Production of hydrogen and synthesis gas	13	1,820
29	Production of soda	6	580
1, 25	Miscellaneous	28	1,263
<b>Total</b>		<b>176</b>	<b>12,333</b>

\* Incl. nitrous oxide emissions totalling 813,000 tonnes of carbon dioxide equivalents.  
As of 02/05/2014

Among these installations are eleven installations which produce adipic or nitric acid and which are subject to emissions trading, not only with their carbon dioxide but also with their nitrous oxide emissions (nitrous oxide, N<sub>2</sub>O).<sup>34</sup>

Nitrous oxide emissions in 2013 corresponded to 813,000 tonnes of carbon dioxide equivalents and made up an average of 89 percent of the total emissions from these installations.

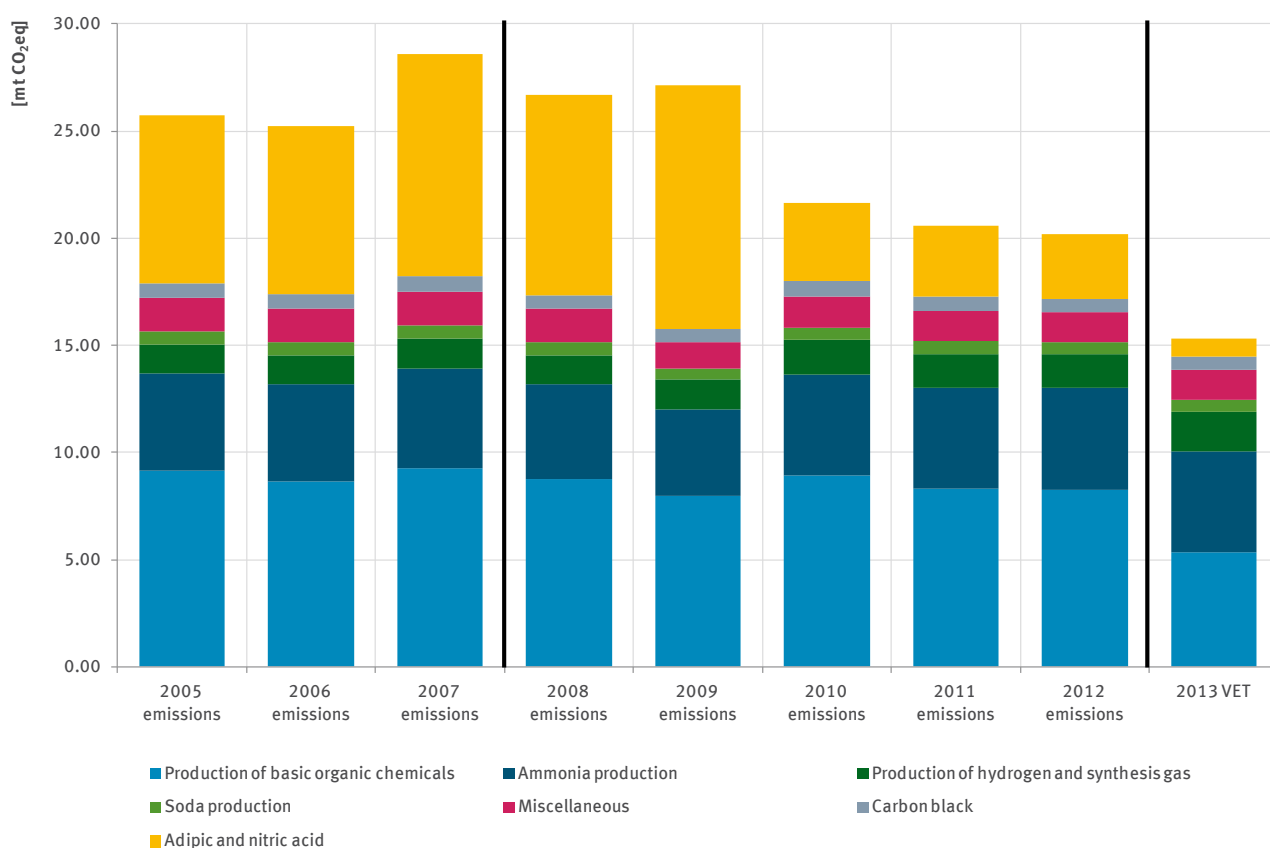
Similar to the paper industry the chemical industry also has – mainly in the production of basic organic chemicals – 35 zero-emission installations that are subject to emissions trading from the third trading period on, even though they produce no (direct) carbon dioxide or nitrous oxide emissions.

Most installations belong to one of the large chemical corporations: When the installation operators, regardless of other economic ties, are associated with the corporations by name, the BASF installations produce the highest emissions within the chemical industry (40 installations, 4.3 million tonnes of carbon dioxide), followed by the installations of the Agrofert group (3 installations, 2.5 million tonnes) and INEOS (21 installations, 2.4 million tonnes of carbon dioxide).

Since the majority of installations reported their verified emissions only from the start of the third trading period, the emission trends of the industry since 2005 can only be estimated. For installations that were not or only partially subject to emissions trading in the first and second trading period, but have received an allocation for the third trading period, information about their historic emissions is available. These usually cover the period from 2005 to 2010. Estimates are made for the emissions for those years for which no emission data is available from the allocation process, and for 2011 and 2012. The data on nitrous oxide emissions from adipic and nitric acid installations were taken from the National Inventory Report<sup>35</sup>.

<sup>34</sup> An installation produces adipic acid but is classified according to its main activity under “Production of basic organic chemicals”.

<sup>35</sup> See NIR 2014.



As of 02/05/2014

Figure 17: Chemical industry (Activities 22 to 29 and 1), emission trends in Germany, 2005 – 2013

The decrease of emissions from adipic and nitric acid production since 2010 is evident. Nitrous oxide emissions can be reduced relatively inexpensively by installing catalytic converters. As a result, commitments from industry, legal immission control requirements and the implementation of national Joint Implementation projects, achieved substantial emission reductions even before the start of compulsory emissions trading.

### Allocation status

Compared to other industries, the installations in the chemical industry are very well equipped with free emission allowances. In 2013, the operators of chemical installations received approximately 2.3 million emission allowances free of charge - 12.9 percent more than they needed for their surrender obligation. For 109 installations, the amount of emission allowances allocated free of charge exceeded emissions by a total of around 5.6 million allowances. In contrast, 67 plant operators received a total of approximately 3.3 million fewer free emission allowances than what they needed to fulfill their surrender obligation. In addition, there were 12 installations with a “zero” VET entry, which have received no free allocation. Three installations did not report a VET entry, although one had received a (minor) free allocation. These installations are listed in the table under “no comparison possible”.

**Table 46: Chemical industry (Activities 22 to 29 and 1), number of installations, allocation amounts, 2013 VET entries and allowance coverage**

No.	Activity	2013 VET vs 2013 allocation	No. of installations	2013 VET [kt CO <sub>2</sub> eq/a]	2013 allocation amount [1000 EU-A/a]	2013 VET deviation from 2013 allocation [kt CO <sub>2</sub> eq/a]	Allowance coverage
23, 24	Adipic and nitric acid	2013 VET > 2013 AA	3	555	266	290	
		2013 VET < 2013 AA	7	244	1,338	-1,094	
			10	800	1,604	-804	200.6%
22	Carbon black production	2013 VET > 2013 AA	3	591	514	77	
		2013 VET < 2013 AA	2	38	58	-20	
			5	629	572	57	90.9%
26	Ammonia production	2013 VET > 2013 AA	4	3,979	2,975	1,003	
		2013 VET < 2013 AA	1	755	952	-196	
			5	4,734	3,927	807	83.0%
27	Production of bulk organic chemicals	2013 VET > 2013 AA	35	5,624	4,471	1,153	
		2013 VET < 2013 AA	73	2,521	5,644	-3,123	
		2013 VET = 2013 AA	11	0	0	0	
		No comparison possible	3	-	2	-	
			122	8,145	10,118	-1,971	124.2%
28	Production of hydrogen and synthesis gas	2013 VET > 2013 AA	7	1,191	721	470	
		2013 VET < 2013 AA	6	629	912	-283	
			13	1,820	1,633	187	89.7%
29	Soda production	2013 VET < 2013 AA	5	580	1,124	-544	
		2013 VET = 2013 AA	1	0	0	0	
			6	580	1,124	-544	193.8%
1, 25	Miscellaneous	2013 VET > 2013 AA	15	918	591	327	
		2013 VET < 2013 AA	15	481	864	-383	
			30	1,399	1,456	-56	104.0%
<b>Total</b>			<b>191</b>	<b>18,107</b>	<b>20,434</b>	<b>-2,325</b>	<b>112.9%</b>

As of 02/05/2014

When examining the allocation situation of individual installations or individual activities in the chemical industry, it should be noted that most installation operators or their parent companies operate multiple installations which are often assigned to various activities. A shortfall in one installation can therefore optionally be compensated by a surplus in another installation.

The largest relative surplus of free emission allowances can be observed in the installations for the production of adipic and nitric acid. This is due to the fact that advanced emission control technologies have been installed in these installations, which results in specific emissions that are well below the specific product benchmarks for adipic acid and nitric acid.



Installations for the production of bulk organic chemicals also feature a significant surplus allocation compared to their emissions (124 percent, or almost 2 million emission allowances) and the installations for the production of soda (194 percent or 544,000 allowances). This can mostly be attributed to the allocation rules for cross-boundary heat flows: many installations of these activities import large amounts of heat and receive a free allocation for it, while the emissions are produced in the installations which generate the heat. In addition, many processes for the production of bulk organic chemicals are exothermic. A large part of the reaction heat can be used by using efficient heat recovery systems and without generating additional emissions.<sup>36</sup>

In contrast, the free allocation for the installations for the production of carbon black, ammonia and hydrogen or synthesis gas is not sufficient to fully cover the emissions of the installations in 2013: the operators of ammonia installations had to purchase a total 804,000 emission allowances on the market; hydrogen and syngas producers had to buy 256,000 emission allowances. In contrast, the need of carbon black installations to purchase was low in absolute terms (57,000 emission allowances).

After subtracting the allocation for heat imports for 2013 (1.6 million emission allowances)<sup>37</sup> the allowance coverage in the chemical industry would still be at 104 percent.

## 4 Cross-industry analysis

### 4.1 Evaluation of the allocation status in 2013

The verified emissions of all installations subject to emissions trading in Germany totaled 480.9 million tonnes of carbon dioxide equivalents in the first year of the third trading period – significantly more than the free allocation amount. In 2013 a total of approximately 169.4 million free emission allowances were allocated to the operators of 1,758 of the 1,929 installations in Germany<sup>38</sup>. On average, the free allocation covered 35.2 percent of the verified emissions of all installations. Table 47 shows the allocation and emissions situation according to activities. Initially, the comparison of the different activities reflects the significant differences between energy installations and industrial sectors in terms of the allocation rules in the third trading period.

The 937 installations in the industrial sector received a total allocation of 135.3 million emission allowances for the 2013 reporting year. This compares with total verified emissions of 123.3 million tonnes of carbon dioxide equivalents. On average, the industrial sectors therefore carried a surplus. The allocation corresponded to 109.7 percent of the surrender obligation of these installations. Taking into account the assumption that the 2013 allocation for transferred waste gases from iron, steel and coke production (15 million emission allowances) and imported heat (3.5 million emission allowances of the paper and chemical industries) are offset between installation operators, the industry sector has a shortfall of around 6.5 million emission allowances in 2013. The allowance coverage would then be 95 percent - a slight shortfall.

The situation for the 992 energy installations (main activities 2-6) is fundamentally different. Due to the elimination of the free allocation for power generation, the ratio of allocations and verified emissions was only 9.5 percent. In the third trading period energy installations will receive a free allocation only for the provision of heat. The energy installations received an overall allocation of 34.1 million allowances for verified emissions of 357.6 million tonnes of carbon dioxide for the 2013 reporting year.

36 see DEHSt 2014, Chapter “Chemical Industry”.

37 see DEHSt 2014, Chapter “Chemical Industry”, page 53.

38 See Chapter 1 for background data on the free allocation. In contrast to the evaluation report on the free allocation of the third trading period (see DEHSt 2014), which includes only the national allocation table, this report also takes into account initial amendments to this basic allocation, approved by the European Commission for individual installations.

However, the elimination of the free allocation for power generation also applies to industrial activities in which heat and power plants are usually in operation, such as in refineries and paper industry installations. In 2013, refineries received an allocation which corresponds to 80.7 percent of their verified emissions. In the paper industry, the elimination of the allocation for power generation will be more than offset mainly by the allocation rules for cross-boundary heat flows<sup>39</sup> to such an extent that it will even have a surplus of free emission allowances of 28.8 percent of their emissions (see Section 3.7, allocation situation in the paper and pulp industry). Producers of pig iron and steel also feature a large surplus relative to their emissions - the free allocation exceeds emissions by 69.3 percent. This situation is also characterized by the fact that the allocation claim no longer exists for the installations where the emissions actually occur (see Section 3.4, allocation situation in the iron and steel industry, including coking plants)<sup>40</sup>.

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39 It is likely that there is a compensation arrangement between the heat suppliers and the recipients of the free allocation to settle the surrender obligation for the emissions for delivered quantities of heat.

40 In the second trading period the free allocation for waste gases from iron, steel and coke production was also issued to the generating plant. However, pursuant to §11 Allocation Act 2012, when exporting waste gases from iron, steel and coke production, the installation operators were obliged to pass emission allowances on to the importing installation. A comparable provision is not included in the EU allocation rules for the third trading period. It can be assumed that there is a compensation arrangement between the recipients of the free allocation and users of the waste gases from iron, steel and coke production for those emissions subject to the surrender obligation.

Table 47: Allocation status by activities in the second and third trading periods

Sector TP 3	No.	Activity	No. of installations	Cumulative allocation surplus 2008-2012* [1000 EUA]	2013 Allocation amount [1000 EU-A/a]**	2013 VET [kt CO <sub>2</sub> eq]	Allocation surplus 2013 [1000 EUA/a]	Ratio of 2013 allocation amount to 2013 VET **
Energy	2	Energy conversion ≥ 50 MW RTI	490	-381,231	28,292	349,917	-321,625	8.1%
	3	Energy conversion 20-50 MW RTI	434	8,551	4,459	5,952	-1,509	74.9%
	4	Energy conversion 20-50 MW RTI, other fuels	13	990	206	190	15	108.1%
	5	Prime movers (engines)	3	-24	72	64	9	113.8%
	6	Prime movers (turbines)	52	1,068	1,085	1,466	-381	74.0%
Energy			992	-370,646	34,115	357,589	-323,490	9.5%
Industry	1	Combustion	78	101	2,133	2,126	7	100.3%
	7	Refineries	24	14,814	21,069	26,097	-5,028	80.7%
	8	Coking plants	4	2,544	1,803	3,727	-1,924	48.4%
	9	Processing of metal ores	1	696	71	69	2	103.3%
	10	Production of pig iron and steel	32	48,494	44,594	26,338	18,256	169.3%
	11	Processing of ferrous metals	92	638	4,928	5,527	-599	89.2%
	12	Production of primary aluminium	7		805	948	-143	84.9%
	13	Processing of non-ferrous metals	28	-14	1,633	1,448	185	112.8%
	14	Production of cement clinker	37	5,847	18,724	19,012	-288	98.5%
	15	Lime production	66	12,056	7,865	9,333	-1,468	84.3%
	16	Glass manufacture	84	2,906	3,135	3,714	-579	84.4%
	17	Ceramics production	155	2,285	1,990	2,132	-142	93.4%
	18	Production of mineral fibres	7	195	281	348	-67	80.7%
	19	Gypsum production	9		252	268	-16	94.0%
	20	Pulp production	5	352	101	141	-40	71.6%
	21	Paper production	146	7,249	6,955	5,401	1,543	128.8%
	22	Carbon black production	5	767	572	629	-57	90.9%
	23, 24	Production of adipic- and nitric acid	10		1,604	800	804	200.6%
	25	Production of glyoxal and glyoxylic acid	1		8	10	-2	80.8%
	26	Ammonia production	5	-29	3,927	4,734	-807	83.0%
	27	Production of bulk organic chemicals	122	3,858	10,118	8,145	1,971	124.2%
	28	Production of hydrogen and synthesis gas	13	75	1,633	1,820	-187	89.7%
	29	Soda production	6		1,124	580	544	193.8%
Industry			937	102,834	135,326	123,348	11,965	109.7%
Total			1,929	-267,812	169,441	480,937	-311,526	35.2%

\* Including redistribution of emission allowances for transferred waste gases from iron, steel and coke production in accordance with §11 Allocation Act of 2012

\*\* Excluding offsets for transferring waste gases from iron, steel and coke production and heat imports.

As of 02/05/2014

Source: DEHSt

Besides the allocation status of the activities subject to emissions trading in the 2013 reporting year, Table 47 also shows their imputed allocation surpluses from the second trading period<sup>41</sup>. For the industrial activities in the 2008 - 2012 period this resulted in a balance of free allocation and verified emissions of 102.8 million allowances<sup>42</sup>. After the first year of the third trading period, including the allocation surplus for 2013 (12 million allowances), this results in a total preliminary allocation surplus for industrial activities of 114.8 million allowances for 2008 – 2013.

Assuming that the 2013 allocation for waste gases from iron, steel and coke production (15 million emission allowances) and imported heat (3.5 million emission allowances from the paper and chemical industries) are settled between installation operators of the industrial and energy sectors, the industrial sector has a shortfall of around 6.5 million emission allowances in 2013. This reduces the total allocation surplus of industrial activities in the 2008-2018 period to 84.3 million allowances.

However, for energy installations this resulted in an imputed allocation shortfall of 370.6 million emission allowances for the entire second trading period. Apart from the ambition of the benchmarks at the time and the proportionate cuts to secure the budget, this is also due to the fact the free allocation for power generation was reduced in Germany in the second trading period in favour of auctioning emission allowances.<sup>43</sup> Since 2013 auctioning has been the exclusive standard in Europe for power generation.

At the end of the first reporting year of the third trading period, and taking into account the balance from the second trading period, this led to an increase in the cumulative shortfall in Activities 2-6 of 694.1 million emission allowances in total (323.5 million allowances in 2013). Assuming a settlement between the industrial and energy sectors on the free allocation for waste gases from iron, steel and coke production and heat imports, the 2013 shortfall amounts to around 305 million emission allowances.

For a monetary valuation of the allocation status, reference prices of the most liquid trading venue for emission allowances are used. The reference contract for the following analysis is the future for delivery in December of the current year (so-called “Front December Future”), traded on the London Energy and Raw Materials Exchange ICE. Table 48 contains the volume-weighted average prices of the reference contract for the completed second and the just started third trading period<sup>44</sup>. The relevant average price of an emission allowance was 13.62 euros in the second trading period. However, in the period from January 2013 to March 2014 this price was only 4.80 euros.

**Table 48: Average prices for emission allowances (EUAs) in the second and third trading periods**

Time period	Price
2nd trading period 01/2008-04/2013	13.62 [Euro/EUA]
3rd trading period 01/2013-03/2014	4.80 [Euro/EUA]

\* VWAP ICE EUA Front December  
Source: ICE, Thomson Reuters, DEHSt calculation

In the period from January 2008 to April 2013, the cumulative allocation surpluses of the industrial activities from the second trading period (102.8 million allowances) therefore had an average market value of around 1.4 billion euros. Using the current average price of the third trading period, the market value of the surpluses from the 2013 reporting year (12 million allowances) amounts to around 58 million euros. Assuming that industry has so far not sold excess emission allowances, this would result in an average market value of the cumulative allocation surpluses (114.8 million emission allowances) of approximately 551 million euros.

<sup>41</sup> The installation population of this evaluation is the same as for 2013.

<sup>42</sup> Including redistribution of emission allowances for transferred waste gases from iron, steel and coke production in accordance with §11 Allocation Act 2012.

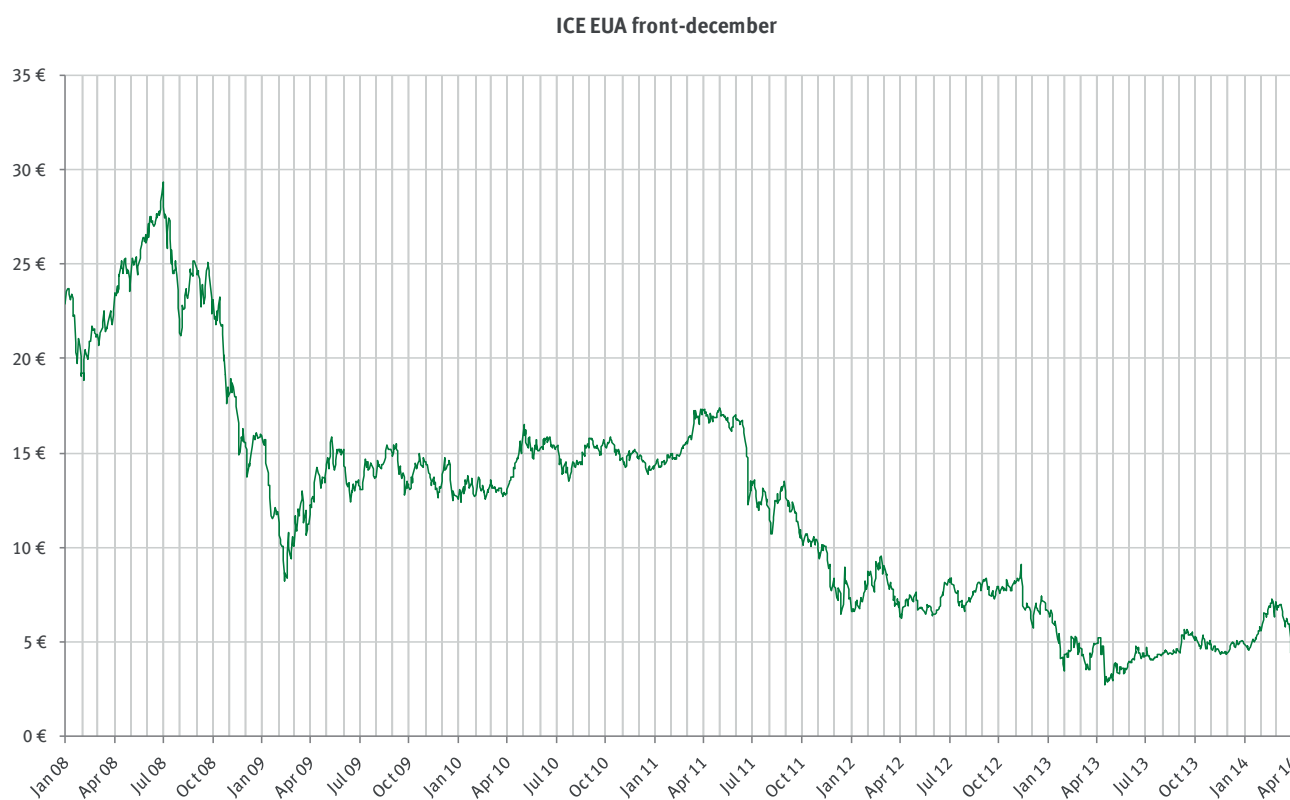
<sup>43</sup> In accordance with the requirements of §20 Allocation Act of 2012, the free allocation for power generation was reduced by 38 million allowances annually, in favour of the capital budget.

<sup>44</sup> The above prices are calculated as the average of the volume weighted daily average prices. The calculation only includes actually completed trades.

For energy installations, the average market value of their shortfall in the second trading period (370.6 million emission allowances) was just over 5 billion euros. On an annual average, this corresponds to around one billion euros (74.1 million allowances). The shortfall in the 2013 reporting year (323.5 million emission allowances) had an average market value of nearly 1.6 billion euros. The significant expansion of the nominal annual allocation shortfall between the second and third trading periods was therefore substantially offset by the fall in prices of emission allowances. While the annual shortfall increased by 337 percent, its market value grew by only 54 percent.

In assessing the market value of the accumulated surpluses and the shortfall, it is important to note that in addition to EUAs, installation operators were also able to surrender international project credits (CERs / ERUs). In the second trading period installation operators were allowed to surrender CERs / ERUs up to an amount equal to 22 percent of their allocation. Unused claims usually also remain available in the third trading period. Installation operators without prior claims can always use CER / ERU up to an amount equal to 4.5 percent of their emissions in the third trading period. The prices for CERs / ERUs are currently at 0.12 and 0.17 euros (as of 10/04/2014). In the second trading period, the market price for CERs / ERUs was generally also below the price of EUAs. In the energy sector, the actual fiscal burden of covering the shortfall is therefore likely to be lower than when exclusively confined to EUA prices.

Figure 18 shows the pricing trend for emission allowances in the period from January 2008 to March 2014.



Source: ICE, Thomson Reuters, graph DEHSt

Figure 18: Price trends of emission allowances (EUAs) in the second and third trading periods

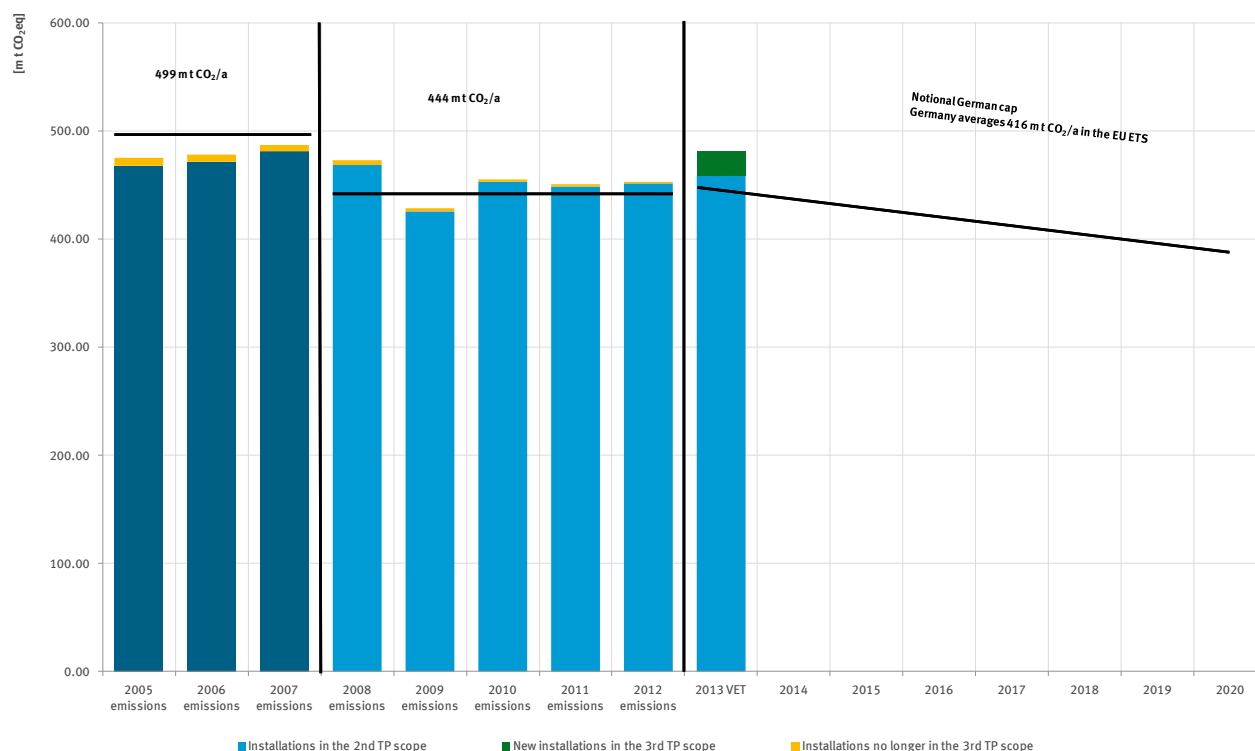
## 4.2 Assessment of emission reduction

In the Energy Concept of 2010, and most recently in the 2013 coalition agreement, the Federal Government committed to a goal of reducing national greenhouse gas emissions by 40 percent up to 2020, compared to 1990 levels. At the EU level, Germany is also committed to legally binding measures to achieve the EU climate change targets. Figure 19 shows the emissions from 2005 to 2012 as well as the VET entries 2013. The scope,

i.e. the emissions covered by emissions trading, has steadily increased over time up to the third trading period.

From 2005 to 2012, a national emission cap was set for Germany. In the first trading period (2005-2007) this was an average of 499 million tonnes and in the second trading period (2008-2012) stood at 444 million tonnes of carbon dioxide per year<sup>45</sup>. Starting in 2013, however, an EU-wide cap without differentiation in national caps will apply.

In order to assess emissions in Germany, Figure 19 shows a notional German share of the European cap<sup>46</sup>. Emissions from installations subject to emissions trading in the second trading period increased in 2012. At the same time, emissions from the installations newly subject to emissions trading increased the total emissions of stationary emissions trading. Total emissions in 2013 are above the notional German share of the European cap. The additional amount that German installations emit must be saved elsewhere.



Source: ICE, Thomson Reuters, graph DEHSt  
As of 02/05/2014

Figure 19: Emission trends and German Cap 2005 – 2012, notional German cap from 2013

In this context, it is necessary that operators of installations subject to emissions trading receive sufficient incentives to reduce their emissions in Germany. For this purpose, a rapid and sustained reform of the EU emissions trading scheme which takes effect prior to 2020 is required. Emissions trading can thus make its contribution to achieving the national reduction target of 40 percent by 2020.

### 4.3 Emission trends and economic growth

Explanations for emissions trends are often sought in economic developments that can be demonstrated by economic growth for an entire national economy or for individual sectors or industries by changes in gross value added.

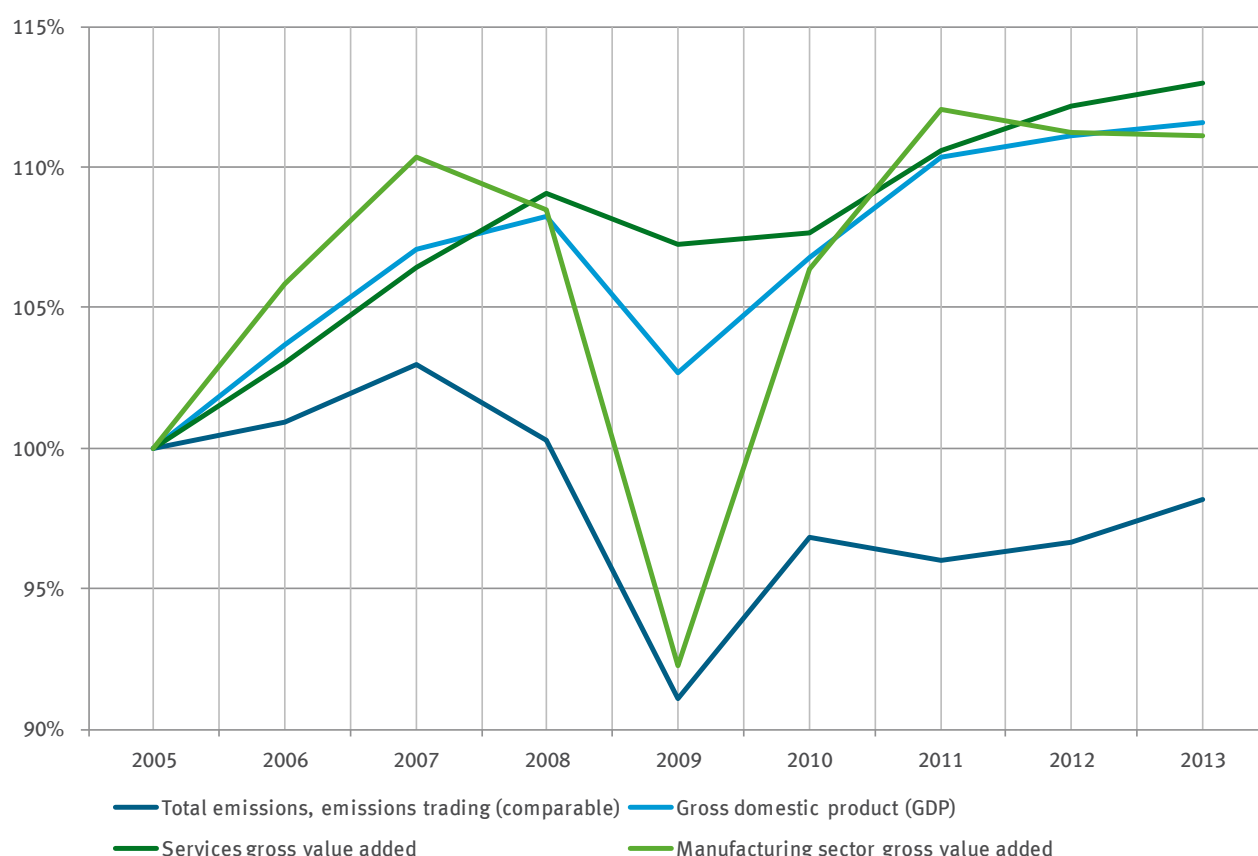
<sup>45</sup> The figure refers to the actual average emission allowances issued in 2008-2012. The maximum possible issue amounts to 452 million emission allowances.

<sup>46</sup> Update to the German emissions budget of the 2nd trading period using the linear correction factor in the amount of 1.74 percent, plus activities and gases newly added in the third trading period.

The measure of the prosperity of a country is its gross domestic product and the economic growth determined from it. The gross domestic product is calculated from the gross value added of the various economic sectors of the economy, taking into account corrections due to taxes and subsidies. Gross value added is determined – at least for market producers – on the basis of the production value or revenue minus intermediate consumption.<sup>47</sup>

Figure 20 shows the development of Germany's gross domestic product and gross value added in the manufacturing and service sectors. It also shows the emissions trends of German installations in European emissions trading since 2005, but without the emissions from installations that are new entrants in emissions trading since 2013 due to the expanded scope.

There is a recognizable link between the trend of gross domestic product (GDP) and the emission trend, for example, the decline in 2009 due to the financial and economic crisis. However, the trend runs counter, for example, between 2007/2008 and 2010/2011, which were years of economic growth paralleled by declining emissions.



As of 02/05/2014

**Figure 20:** Emissions trends of stationary installations in the EU ETS and gross domestic product in Germany (2005 = 100)<sup>48</sup>

This could be due to the fact that primarily installations in the manufacturing sector participate in European emissions trading. However, at 62 percent, the service sector represents the largest share of GDP. The manufacturing sector has a share of only 27 percent<sup>49</sup>, so that emissions trends should be compared only with the trend of gross value added in manufacturing.

There is also a connection between gross value added in the manufacturing sector and the development of emissions in emissions trading. Until 2010, both lines run synchronously. This is no longer the case from 2010 onward when emissions decline and the gross value added in manufacturing increases. From 2011 onward, it is the reverse: emissions increase, the gross value added in manufacturing decreases.

<sup>47</sup> Destatis 2002, page 39.

<sup>48</sup> Source: Gross domestic product from Destatis 2014, Table 3.2.2 Gross Value Added, adjusted.

<sup>49</sup> Source: Destatis 2014, Table 3.2.1 Gross value added at current prices; internal calculations

In order to determine the reason for this more accurately and whether there is still a connection between economic and emissions trend in some areas a sector-by-sector analysis would be required, if only to limit the trend of gross value added to the sectors that actually participate in emissions trading. However, a sector-by-sector analysis of the gross value added is not possible in a timely manner, as the gross value added for specific sectors is not published until two years after the year in question. Currently there are only data for 2011 or earlier. In addition, the economic activities of sectors recorded by the German Federal Statistical Office are not congruent with the activities referred to in TEHG. Further analysis and additional data would be necessary in order to draw more robust conclusions.

## 4.4 Comparison with other Member States

About 12,000 installations<sup>50</sup> in the 28 Member States of the European Union and the three associated countries Iceland, Liechtenstein and Norway participate in European emissions trading. At 1.89 billion tonnes of carbon dioxide equivalents, the total emissions subject to reporting exceed the amount issued or auctioned in 2013 by around four percent, but is still below the budget<sup>51</sup> of 2.08 billion allowances for 2013.

To obtain a rough comparison at the country level, in addition to the free allocation, the auctioned amount according to the allocation key pursuant to Article 10 (2) of the ETD (Emissions Trading Directive) was also considered in Figure 21. This comparison reflects the approximate respective demands for emission allowances. However, this representation does not allow for conclusions about the respective mitigation requirements in the Member States. To this end, a comparison of emissions with the respective notional shares in the total EU budget would be more suitable (as described for Germany in Section 4.2). In determining the auction shares, a redistribution component in favour of Eastern and Southern European countries has been taken into account such that, for example, the sum of free allocation and auction amount in Germany is below the notional budget share, while the reverse is true for e.g. Romania and Bulgaria.

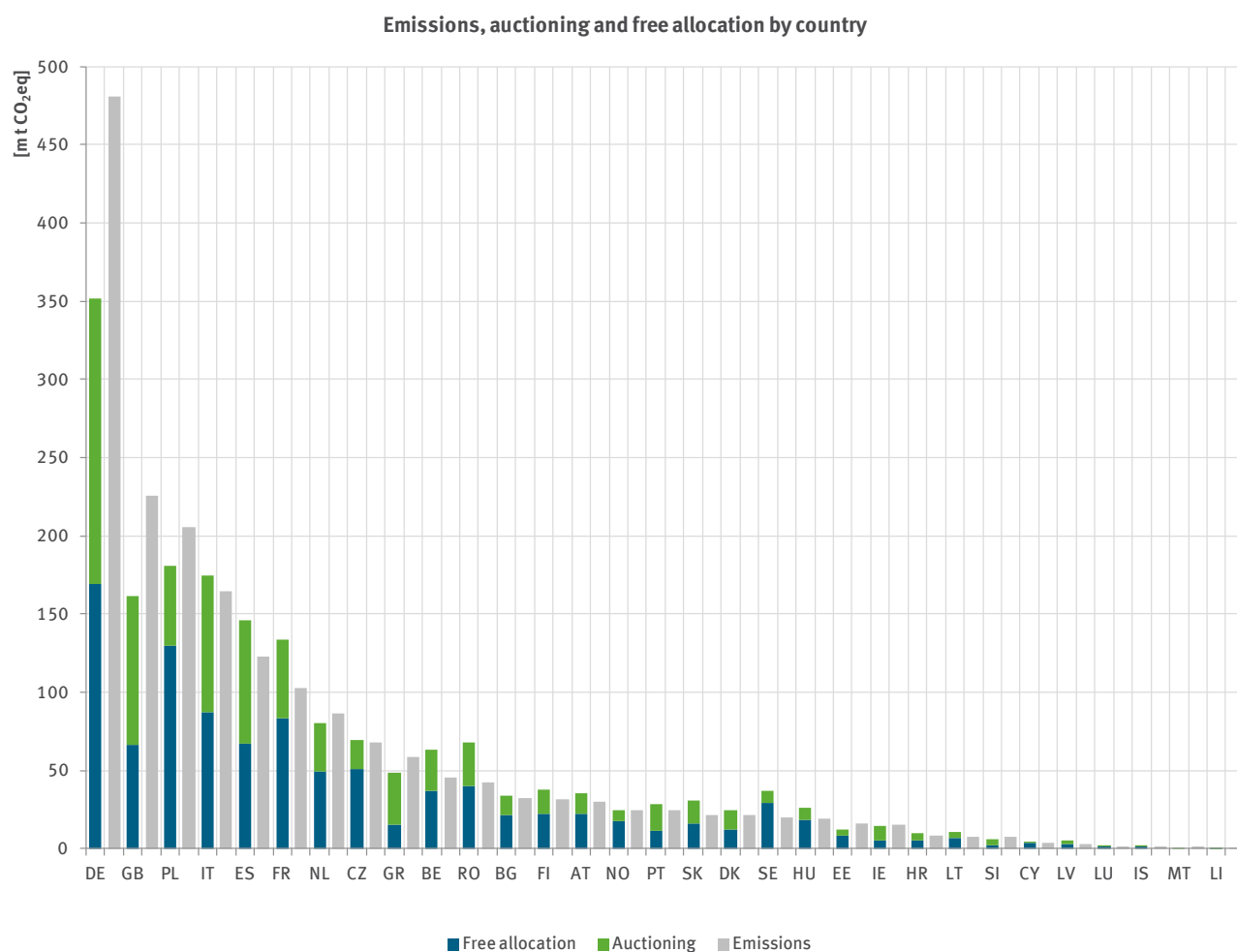
At 480.9 million tonnes of carbon dioxide equivalents, the German installations emit 25.4 percent of all emissions in European emissions trading, followed by the installations in the UK at 225.5 million (11.9 percent) and installations in Poland with 205.7 million tonnes of carbon dioxide equivalents (10.9 percent).

Figure 21 shows the emissions and the sum total of the free allocation to operators, and the auctioned amount for the 31 countries.

50 For simplicity's sake, the number of stationary installations is represented here with the number of 12,201 open accounts in the EUTL without "Aviation" As of 05/02/2014: [http://ec.europa.eu/clima/policies/ets/registry/docs/compliance\\_2013\\_en.xls](http://ec.europa.eu/clima/policies/ets/registry/docs/compliance_2013_en.xls)

51 The amount spent in 2013 is not the same as the cap for 2013, since allowances of the third trading period were already auctioned in the 2012 "early auctions" and NER300. In addition it is expected that unclaimed residual amounts of the reserve for new entrants as well as returns from the free allocation will be auctioned at the end of the trading period.





As of 02/05/2014

**Figure 21:** Emissions, free allocation and auction amounts comparing all countries participating in the EU ETS

## Table 49: Overview of verified emissions in 2012 per Federal State, by activities

[illegible]

2012 emissions [kt CO <sub>2</sub> eq]		Federal State																
	Designation of the activity, 3rd TP	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
20	Pulp production	0	0	0	4	0	0	0	0	3	0	0	0	0	0	64	35	106
21	Paper production	42	0	903	817	0	285	0	7	973	1,473	404	76	0	382	37	20	5,418
22	Carbon black produc- tion	0	0	0	0	0	0	0	0	106	510	0	0	0	0	0	0	615
23	Nitric acid production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Adipic acid production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Production of glyoxal and glyoxylic acid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Ammonia production	0	0	0	0	0	0	0	0	0	23	0	0	0	0	57	0	80
27	Production of bulk organic chemicals	0	0	0	417	0	0	0	0	47	2,918	881	0	0	1,195	0	0	5,458
28	Production of hydrogen and synthesis gas	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	19
29	Soda production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		47,947	7,283	25,775	23,101	9,746	9,338	3,619	3,680	30,641	206,836	8,478	6,886	15,453	31,848	18,005	2,957	451,593

As of 02/05/2014

Table 50: Overview of 2013 VET entries in each Federal State, by activities

2013 VET [kt CO <sub>2</sub> eq]	Designation of the activity, 3rd TP	Federal State																
		BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
1	Combustion	17	0	36	57	0	29	19	10	104	1,321	438	4	0	0	85	5	2,126
2	Energy conversion ≥ 50 MW RTI	40,478	7,319	19,858	10,150	7109	6,622	1,839	3,027	21,024	167,132	5,342	3,977	10,342	33,757	11,000	941	349,917
3	Energy conversion 20–50 MW RTI	249	191	665	994	123	449	224	48	787	1,096	259	138	232	195	159	142	5,952
4	Energy conversion 20–50 MW RTI, other fuels	0	0	10	8	0	0	0	0	43	71	30	0	0	0	0	28	190
5	Prime movers (engines)	0	0	0	24	0	0	0	0	40	0	0	0	0	0	0	0	64
6	Prime movers (turbines)	270	0	59	232	0	85	0	0	313	268	47	9	0	12	27	145	1,466
7	Refineries	3,599	0	2,892	3,640	0	0	1,191	0	1,231	8,293	24	2,615	0	0	2,612	0	26,097
8	Coking plants	0	0	0	0	0	0	0	0	0	2,864	0	0	862	0	0	0	3,727
9	Processing of metal ores	0	0	0	0	0	0	0	0	0	69	0	0	0	0	0	0	69
10	Production of pig iron and steel	1,316	0	138	145	2,406	41	89	0	4,407	13,207	6	0	4,476	64	0	41	26,338
11	Processing of ferrous metals	275	0	255	98	535	406	336	0	418	1,946	99	0	870	127	103	60	5,527
12	Production of primary aluminium	0	0	0	0	0	0	264	0	0	684	0	0	0	0	0	0	948
13	Processing of non-fer- rous metals	0	0	18	164	0	0	191	0	168	662	62	0	50	111	22	0	1,448
14	Production of cement clinker	1,272	0	3,299	3,579	0	313	0	0	1,146	5,065	811	1,104	0	0	1,436	988	19,012
15	Lime production	388	0	438	1,081	0	368	0	85	859	4,051	562	0	0	0	1,312	189	9,333
16	Glass production	122	0	129	757	0	12	0	19	355	945	289	30	13	236	561	247	3,714
17	Ceramics production	102	0	84	737	44	23	0	0	240	337	151	0	25	168	104	119	2,132
18	Production of mineral fibres	0	0	43	90	0	0	0	0	9	60	0	0	0	89	55	0	348
19	Gypsum production	94	0	22	81	0	0	0	0	21	31	0	0	0	20	0	0	268
20	Pulp production	0	0	0	17	0	0	0	0	3	0	0	0	0	0	75	45	141
21	Paper production	55	0	932	772	0	309	0	7	953	1,449	414	79	0	373	36	20	5,401

2013 VET [kt CO <sub>2</sub> eq]		Federal State																
	Designation of the activity, 3rd TP	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
22	Carbon black production	0	0	0	0	0	0	0	0	117	512	0	0	0	0	0	0	629
23	Nitric acid production	0	0	0	0	0	0	0	171	0	29	509	0	0	45	23	0	777
24	Adipic acid production	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	23
25	Production of glyoxal and glyoxylic acid	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	10
26	Ammonia production	0	0	0	0	0	0	0	0	0	627	1,585	0	0	0	2,521	0	4,734
27	Production of bulk organic chemicals	0	0	45	554	0	38	0	0	288	3,939	1,581	164	0	1,262	274	0	8,145
28	Production of hydrogen and synthesis gas	44	0	0	77	0	0	0	0	13	413	449	120	0	0	704	0	1,820
29	Soda production	0	0	0	0	0	0	0	0	0	147	84	0	0	0	349	0	580
Total		48,280	7,510	28,923	23,256	10,218	8,697	4,153	3,368	32,539	215,240	12,754	8,242	16,870	36,459	21,458	2,970	480,936

As of 02/05/2014

Table 51: Overview of allocation amounts in each Federal State in 2013, by activities

2013 allocation amount [kt CO <sub>2</sub> eq]		Federal State																
	Designation of the activity, 3rd TP	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
1	Combustion	83	0	36	31	0	106	20	7	116	1,134	429	5	0	0	162	3	2,133
2	Energy conversion ≥ 50 MW RTI	1,429	2,086	1,938	2,678	245	1,701	638	544	2,811	7,654	2,134	853	328	1,364	1,395	494	28,292
3	Energy conversion 20–50 MW RTI	152	134	531	638	76	362	169	80	639	805	243	72	207	152	89	110	4,459
4	Energy conversion 20–50 MW RTI, other fuels	0	0	78	63	0	0	0	0	25	24	0	0	0	0	0	15	206
5	Prime movers (engines)	0	0	0	17	0	0	0	0	55	0	0	0	0	0	0	0	72
6	Prime movers (turbines)	152	0	55	167	0	61	0	0	248	226	30	1	0	9	20	115	1,085
7	Refineries	2,043	0	2,240	2,686	0	0	1,429	0	1,055	7,116	18	2,122	0	0	2,359	0	21,069
8	Coking plants	0	0	0	0	0	0	0	0	0	1,505	0	0	298	0	0	0	1,803
9	Processing of metal ores	0	0	0	0	0	0	0	0	0	71	0	0	0	0	0	0	71
10	Production of pig iron and steel	3,038	0	144	153	3,958	49	75	0	6,134	24,614	9	0	6,286	89	0	46	44,594
11	Processing of ferrous metals	263	0	234	82	292	351	322	0	460	1,892	108	0	636	128	100	61	4,928
12	Production of primary aluminium	0	0	0	0	0	0	218	0	0	587	0	0	0	0	0	0	805
13	Processing of non-fer- rous metals	0	0	16	143	0	0	376	0	231	621	67	0	35	128	16	0	1,633
14	Production of cement clinker	1,378	0	2,943	3,376	0	253	0	0	1,055	5,244	729	1,025	0	0	1,785	934	18,724
15	Lime production	320	0	467	953	0	271	0	58	682	3,384	518	0	0	0	1,027	186	7,865
16	Glass production	100	0	136	682	0	10	0	7	307	725	199	35	9	224	487	214	3,135
17	Ceramics production	99	0	119	649	40	26	0	0	202	343	143	0	26	153	94	98	1,990
18	Production of mineral fibres	0	0	25	86	0	0	0	0	5	75	0	0	0	32	58	0	281
19	Gypsum production	81	0	24	78	0	0	0	0	20	29	0	0	0	20	0	0	252
20	Pulp production	0	0	9	16	0	0	0	0	8	0	0	0	0	0	45	22	101
21	Paper production	495	0	1,021	1,419	0	395	0	7	1,100	1,206	499	222	0	332	120	140	6,955

2013 allocation amount [kt CO <sub>2</sub> eq]		Federal State																
	Designation of the activity, 3rd TP	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
22	Carbon black production	0	0	0	0	0	0	0	0	95	477	0	0	0	0	0	0	572
23	Nitric acid production	0	0	0	0	0	0	0	288	0	172	247	0	0	28	35	0	770
24	Adipic acid production	0	0	0	0	0	0	0	0	0	230	603	0	0	0	0	0	833
25	Production of glyoxal and glyoxylic acid	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	8
26	Ammonia production	0	0	0	0	0	0	0	0	0	541	1,557	0	0	0	1,829	0	3,927
27	Production of bulk organic chemicals	0	0	19	570	0	69	0	0	527	4,783	2,546	124	0	1,044	436	0	10,118
28	Production of hydrogen and synthesis gas	24	0	0	109	0	0	0	0	6	430	640	69	0	0	356	0	1,633
29	Soda production	0	0	0	0	0	0	0	0	0	229	105	0	0	0	790	0	1,124
Total		9,658	2,220	10,032	14,596	4,611	3,654	3,246	991	15,782	64,119	10,833	4,528	7,825	3,704	11,204	2,438	169,441

## 6 Sources and publications

Climate Strategies 2014	K.Neuhoff; B. Vanderborght; A. Ancygier; A.T. Atasoy; M. Haussner; R. Ismer; B. Mack; JP. Ponssard; P. Quirion; A. van Rooij; N. Sabio; O. Sartor; M. Sato and A. Schopp (2014), “Carbon Control and Competitiveness Post 2020: The Cement Report”, Climate Strategies, Februar2014, <a href="http://www.climatestrategies.org/research/our-reports/category/61/384.html">http://www.climatestrategies.org/research/our-reports/category/61/384.html</a>
DEHSt 2009	German Emissions Trading Authority [ed.], “Kohlendioxidemissionen der emissionshandelspflichtigen Anlagen im Jahr 2008” (“Carbon dioxide emissions of installations subject to emissions trading in 2008”), Berlin, 15/05/2009 <a href="https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2008.pdf">https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2008.pdf</a>
DEHSt 2010	German Emissions Trading Authority [ed.], “Kohlendioxidemissionen der emissionshandelspflichtigen Anlagen im Jahr 2009 in Deutschland” (2009 carbon dioxide emissions from stationary installations in Germany subject to emissions trading), Berlin, 15/05/2010 <a href="https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2009.pdf">https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2009.pdf</a>
DEHSt 2011	German Emissions Trading Authority [ed.], “Kohlendioxidemissionen der emissionshandelspflichtigen stationären Anlagen im Jahr 2010 in Deutschland” (2010 carbon dioxide emissions from stationary installations in Germany subject to emissions trading), Berlin, 15/05/2011 <a href="https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2010.pdf">https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2010.pdf</a>
DEHSt 2012	German Emissions Trading Authority [ed.], “Kohlendioxidemissionen der emissionshandelspflichtigen stationären Anlagen und im Luftverkehr in Deutschland im Jahr 2011”(Carbon dioxide emissions from stationary sources subject to emissions trading and aviation in Germany in 2011), Berlin, 15/05/2012 <a href="https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2011.pdf">https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2011.pdf</a>
DEHSt 2013a	German Emissions Trading Authority [ed.], “Kohlendioxidemissionen der emissionshandelspflichtigen stationären Anlagen und im Luftverkehr in Deutschland im Jahr 2012”(Carbon dioxide emissions from stationary sources subject to emissions trading and aviation in Germany in 2012), Berlin, 15/05/2012 <a href="https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2012.pdf">https://www.dehst.de/SharedDocs/downloads/DE/publikationen/VET-Bericht-2012.pdf</a>
DEHSt 2013b	National allocation table (NAT), release date 25/11/2013 <a href="https://www.dehst.de/SharedDocs/downloads/DE/stationaere_anlagen/NAT_25-11-2013.pdf">https://www.dehst.de/SharedDocs/downloads/DE/stationaere_anlagen/NAT_25-11-2013.pdf</a> , as of 08/05/2014
DEHSt 2014	German Emissions Trading Authority [ed.], “Zuteilung 2013-2020 – Ergebnisse der kostenlosen Zuteilung von Emissionsberechtigungen an Bestandsanlagen für die 3. Handelsperiode 2013-2020” (Allocation 2013-2020 - Results of the free allocation of emission allowances to incumbents for the third trading period 2013-2020), Berlin, 22/04/2014 <a href="https://www.dehst.de/SharedDocs/downloads/EN/installation-operators/allocation_report_2013_2020.pdf">https://www.dehst.de/SharedDocs/downloads/EN/installation-operators/allocation_report_2013_2020.pdf</a>



Destatis 2002	German Federal Statistical Office [ed.], “Volkswirtschaftliche Gesamtrechnungen – Inlandsprodukt nach ESVG 1995 – Methoden und Grundlagen” (National Accounts - Domestic Product according to ESA 1995 - Methods and Principles), Fachserie 18 Reihe S.22 (Technical Journal), <a href="https://www.destatis.de/DE/Publikationen/Thematisch/VolkswirtschaftlicheGesamtrechnungen/Inlandsprodukt/InlandsproduktMethodenGrundlagen2189022059004.pdf">https://www.destatis.de/DE/Publikationen/Thematisch/VolkswirtschaftlicheGesamtrechnungen/Inlandsprodukt/InlandsproduktMethodenGrundlagen2189022059004.pdf</a> , as of 08/05/2014
Destatis 2014	German Federal Statistical Office [ed.], “Volkswirtschaftliche Gesamtrechnungen, Inlandsproduktberechnung, Detaillierte Jahresergebnisse 2013” (National Accounts, Domestic product calculation, Detailed annual results 2013), Fachserie 18 Reihe 1.4, (Technical Journal) Release date 05/03/2014, <a href="https://www.destatis.de/DE/Publikationen/Thematisch/VolkswirtschaftlicheGesamtrechnungen/Inlandsprodukt/InlandsproduktsberechnungVorlaeufigXLS_2180140.xlsx">https://www.destatis.de/DE/Publikationen/Thematisch/VolkswirtschaftlicheGesamtrechnungen/Inlandsprodukt/InlandsproduktsberechnungVorlaeufigXLS_2180140.xlsx</a> , as of 08/05/2014
EHRL	ETD Directive 2003/87/EC of the European Parliament and of the Council of 13.10.2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, in the most recent version, as amended by Directive 2009/29/EC <a href="https://www.dehst.de/EN/understanding-emissions-trading/legislation/legislation-node.html">https://www.dehst.de/EN/understanding-emissions-trading/legislation/legislation-node.html</a>
IWU 2014	Institute for Housing and Environment, “Gradtagszahlen_Deutschland.xls” (Heating degree days Germany): <a href="http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/Gradtagszahlen_Deutschland.xls">http://www.iwu.de/fileadmin/user_upload/dateien/energie/werkzeuge/Gradtagszahlen_Deutschland.xls</a> , as of January 2014
NIR 2014	National Inventory Report 2014, 15/01/2014, <a href="http://cdr.eionet.europa.eu/de/eu/ghgmm/envutt6ka">http://cdr.eionet.europa.eu/de/eu/ghgmm/envutt6ka</a> , as of 08/05/2014
Schiffer 2014	Schiffer, Hans-Wilhelm: “Deutscher Energiemarkt 2013” (German energy market in 2013), in ‘Energiewirtschaftliche Tagesfragen’ (Daily Energy Business Issues) (2014) Issue, 66-79
TEHG 2020	Greenhouse Gas Emissions Trading Act of 21 July 2011 (Federal Law Gazette I p 1475), as last amended by Article 2 (45) and Article 4 (28) of the Law of 7 August 2013 (Federal Law Gazette I p 3154). <a href="https://www.dehst.de/EN/understanding-emissions-trading/legislation/legislation-node.html">https://www.dehst.de/EN/understanding-emissions-trading/legislation/legislation-node.html</a>
VDP 2014	VDP Press Release <a href="http://www.vdp-online.de/de/presse/pressemitteilungen/pm-details/article/vdp-jahrespressekonferenz-papierproduktion-2013-stabil.html">http://www.vdp-online.de/de/presse/pressemitteilungen/pm-details/article/vdp-jahrespressekonferenz-papierproduktion-2013-stabil.html</a> , as of 08/05/2014
Ziesing 2014	Ziesing, Hans-Joachim: “Energieverbrauch in Deutschland im Jahr 2013” (Energy consumption in Germany in 2013), in Arbeitsgemeinschaft Energiebilanzen (Working Group on Energy Balance), Annual Report 2013, March 2014 <a href="http://www.ag-energiebilanzen.de/index.php?article_id=29&amp;fileName=ageb_jahresbericht2013_20140317.pdf">http://www.ag-energiebilanzen.de/index.php?article_id=29&amp;fileName=ageb_jahresbericht2013_20140317.pdf</a>

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