Greenhouse gas emissions in 2014

Stationary installations and aviation subject to emissions trading in Germany

Umwelt Bundesamt

DEHSt
Deutsche Emissionshandelsstelle

In memory of *Dr. Volker Kathöfer (1965-2015)*, who was instrumental in developing and devising this annual report as well as data analysis and reporting on EU emissions trading since 2004.

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Summary

The roughly 1,900 stationary installations subject to emissions trading in Germany emitted about 461 million tonnes of carbon dioxide equivalents in 2014. This represents a 4.1 percent decrease compared to 2013.

Energy supply emissions decreased by 5.5 percent to 338 million tonnes of carbon dioxide, while the emissions from the most important energy sources declined by various degrees: natural gas showed the highest decrease at 13 percent, followed by coal with eleven percent and lignite with four percent. The group of large combustion plants reached the lowest emission level in 2014 since the start of emissions trading with the exception of 2009 – the year of the economic crisis.

The energy-intensive industry emissions are 123 million tonnes of carbon dioxide equivalents, the same amount as in 2013. There are divergent developments in the individual sectors within the energy-intensive industry: refineries, chemical and paper industries reported reductions in emissions, while emissions from mineral processing, iron and steel industry, as well as the non-ferrous metal industry increased.

The free allocation for stationary installations in 2014 was 164 million emission allowances. A further 127 million emission allowances were auctioned at the Leipzig Energy Exchange in 2014. These are about 77 million emission allowances less than initially intended due to 'back-loading' in the EU emissions trading scheme. The sum of emissions reported in 2014 exceeded the total allowances issued by 170 million emission allowances. The 2014 industrial activities had an allocation surplus of 10 million emission allowances. Assuming that the 2014 allocation for transferred waste gases from the iron and steel industry and imported quantities of heat in the paper and chemical industries will be offset between the operators – approximately 18.5 million emission allowances altogether would change from the industrial to the energy sector – the industrial sector needs an additional 8 million emission allowances for 2014. The energy sector has a deficit of 307 million tonnes of carbon dioxide. Allowances on this scale had to be purchased on the market to meet the surrender obligation for the emissions in the previous year.

A total of 65 aircraft operators reported emissions of 8.8 million tonnes of carbon dioxide for 2014 because of the reduced scope of the 2013 – 2016 emissions trading specified by the EU for the aviation sector. This corresponds to approximately 17 percent of aviation emissions subject to emissions trading initially administered by Germany.

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Abbreviations

AGEB	Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen)
BImSchV	Federal Exposure Control Ordinance (Bundes-Immissionsschutzverordnung)
CER	Certified Emission Reductions
CO_2	Carbon dioxide
CO_{2eq}	Carbon dioxide equivalents
DEHSt	German Emissions Trading Authority at the Federal Environment Agency
EB	Emission Allowances
EHRL	Emissions Trading Directive (Emissionshandelsrichtlinie)
ERU	Emission Reduction Units
EU ETS	European Emissions Trading Scheme
EUA	EU Allowances
EUAA	EU Allowances Aviation
ICAO	International Civil Aviation Organisation
kt	Kilotonne or one thousand tonnes
Mt	Megatonne or one million tonnes
MW	Megawatt
N_2O	Dinitrogen monoxide
PFC	Perfluorocarbons
RegVO	EU Registry Ordinance (Registerverordnung)
RTI	rated thermal input
TEHG	German Greenhouse Gas Emission Allowance Trading Act (Treibhausgas-Emissionshandelsgesetz)
VE	Verified Emissions
VET	Verified Emissions Table
ZuG 2012	Allocation Act (Zuteilungsgesetz) 2008-2012

1 Introduction

Chapter 1 provides an overview of the main contents and results of the 2014 VET report. Divided into different sectors, chapter 2 addresses the emissions from stationary installations subject to emissions trading. Chapter 3 presents cross-sectoral evaluations regarding stationary installations. Chapter 4 describes emissions in the aviation sector subject to emissions trading managed by Germany. The appendix contains additional information organised in summary tables.

The data presented in the tables is rounded. Exact values are used in the calculation, so that sporadic deviations may occur in the representation of the totals (e.g. see Table 22, p. 41, last column).

Number of installations, emissions in 2014

In 2014, the European Emissions Trading Scheme (EU ETS) recorded 1,905 stationary installations in Germany.

The Greenhouse Gas Emissions Trading Act (TEHG) – in its version relevant to the third trading period from 2013 to 2020 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 2014, 338 million tonnes of carbon dioxide from 977 installations were linked to activities 2 to 6 in the energy industry. 928 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.

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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 2014

VET emissions, annual emissions, number of installations since 2005

The operators must send their electronic emissions report, in which the monitoring and calculation of emission volumes is recorded, 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. Independent accredited verifiers verify the data in the emissions report. The verifiers must also enter the aggregated emission data by 31.03 directly into the so-called „Verified Emissions Table“ (VET) in the European Union Registry. The operator then needs to surrender the same number of emission allowances equal to the emission volume of the previous year by 30.04. 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 2014. 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 up to the cut-off date – are referred to as annual emissions. The figure showing the 2014 annual emissions will be available for the first time in the autumn of 2015, 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 28/02/2015	
	Number of reports	VET [kt CO_2eq/a]	Number of installations	Annual emissions [kt CO_2eq/a]
2005	1815	473,681	1832	474,992
2006	1824	477,382	1782	478,068
2007	1882	487,050	1752	487,166
2008	1660	472,599	1672	472,593
2009	1651	428,198	1658	428,295
2010	1628	453,883	1642	454,865
2011	1631	450,267	1650	450,351
2012	1629	452,586	1624	452,600
2013	1929	480,937	1916	480,944
2014	1905	461,173		

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The significant increase in emissions between 2012 and 2013 can be traced back to the expansion of the scope at the start of the third trading period. For example, installations for non-ferrous metal processing and aluminium, adipic acid, nitric acid and ammonia production also participated in emissions trading from 2013. In addition, since 2013, the greenhouse gas nitrous oxide (N_2O) from adipic and nitric acid production and perfluorocarbons (PFCs) from primary aluminium production have been subject to emissions trading. Around 22.5 million tonnes of carbon dioxide equivalents were attributed to this extended scope in 2013. Emissions attributable to the extended scope, accounted for approximately 21.7 million tonnes of carbon dioxide equivalents in 2014.

Free allocation in 2014

In 2014, 164 million emission allowances were allocated free of charge to installations covered by this report. Free allocation as approved by the European Commission prior to 28/02/2015 is the basis for the assessment of the allocation situation, i.e. comparison of emissions and free allocations in 2014. It includes the National Allocation Table[1] NAT, which specifies the free basic allocation for 1,763 incumbent installations and the first corrections of this basic allocation for individual installations as approved by the European Commission until 28/02/2015. These are, amongst others, allocation changes resulting (partially) from partial cessations or capacity reductions. In addition, allocation amounts for new market entrants approved by the European Commission until 28/02/2015 are taken into account, i.e. for new entrants or a capacity extension in incumbent installations, which became operational from 01/07/2011.

1 see DEHSt 2013b

The allocation changes due to the adoption of the so-called Carbon Leakage List for 2014[2] are not included because the European Commission had not yet approved it by 28/02/2015. As of 28/02/2015, 1,717 of the installations regarded in the 2014 VET report received a free allocation in the amount of 164 million emission allowances for 2014.

Evaluation of the allocation status in 2014

Industrial activities obtained an allocation surplus of 10 million emission allowances in 2014. Their allocation coverage, i.e. the ratio of free allocation to emissions, is about 108 percent. Assuming that the 2014 allocation for transferred waste gases from iron, steel and coke production (an estimated 15 million emission allowances[3]) and imported quantities of heat (an estimated 3.5 million emission allowances in the paper and chemical industries[4]) is offset between operators and is therefore transferred in this extent from the industry to the energy sector, the industrial sector has a shortfall of around 8 million emission allowances in 2014. This corresponds to an adjusted allocation coverage of 93 percent.

A different picture emerges for energy activities: as full auctioning has applied EU-wide for power generation and free allocations have only been given to a proportion of heat deliveries starting from 2013, the allocation coverage of free emission allowances for power generation was only 9.2 percent of the emissions. Thus, in 2014 there was a need to purchase about 307 million emission allowances for power plants, which, in light of the 18.5 million emission allowances for the forwarding of waste gases from iron, steel and coke production and heat imports of the paper and chemical industries, is lower in certain situations (adjusted allocation coverage: 14.6 percent).

Aviation

Compared to the originally planned scope of the EU ETS for aviation, which included emissions from all flights starting or landing in the European Economic Area (EEA), only emissions from flights departing and landing in the EEA are subject to emissions trading between 2013 and 2016. Therefore, a total of 65 aircraft operators reported a total sum of 8.8 million tonnes of carbon dioxide for 2014. This corresponds to approximately 17 percent of the original full scope of the Emissions Trading Directive. Over 99 percent of the emissions are accounted for by commercial aircraft operators, which represent about two-thirds of the operators. Non-commercial operators make up about one-third of operators, but were responsible for less than one percent of total emissions. The allocation coverage in the aviation sector is on average 58 percent for 2014.

2 Evaluation by industrial sectors – Activities 1 to 29 as per Annex 1 TEHG

2.1 Energy installations

2.1.1 Large combustion plants from 50 MW

In 2014, 492 large combustion plants, i.e. power plants, combined heat and power plants and heat plants with a rated thermal input (RTI) exceeding 50 MW (Activity 2 as per Annex 1 TEHG) were subject to emissions trading. These included seven installations which first became subject to emissions trading in 2014 or are regarded as individual installations as a result of installation separations. In contrast, five large combustion plants closed their operation or will no longer be regarded individually due to installation merging. On balance, participation in emissions trading increased by two installations compared to 2013.

The emissions from these installations decreased by around 17 million tonnes of carbon dioxide compared to the previous year and amounted to 331 million tonnes in 2014 (see Table 2). Just as in the previous year, the free allocation of 25.7 million emission allowances covers only about eight percent of emissions.

2 Decision 2014/9/EU of the Commission of 18/12/2013
3 Information on the estimates, see DEHSt 2014a, Chapter "Iron and steel industry"
4 Information on the estimates of allocation, see DEHSt 2014a, Chapter „Paper and cellulose industry" and Chapter „Chemical industry"

Table 2: Overview of large combustion plants (Activity 2), number of installations, summary of emission and allocation amounts

Sector/Activity	Number of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Energy conversion ≥ 50 MW RTI	492	348,473	25,740	331,057	7.8%

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Emissions

Emissions have increased in just under a quarter of the installations compared to the previous year, while emissions from the majority of installations declined (see Table 3). In 2014 and 2013 respectively, five installations did not emit carbon dioxide.

Table 3: Large combustion plants (Activity 2), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
2	Energy conversion ≥ 50 MW RTI	2014 VET › 2013 EM	119	79,848	95,641	15,793
		2014 VET ‹ 2013 EM	368	268,625	235,416	-33,209
		2014 VET = 2013 EM	2	0	0	0
		Comparison not possible	3	-	-	-
Total			**492**	**348,473**	**331,057**	**-17,416**

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Figure 2 shows the emissions for comparable installations since the start of emissions trading. In the first trading period, emissions from large combustion plants increased steadily. At the beginning of the second trading period, emissions initially declined, especially under the influence of the financial and economic crisis, then rose again in the following years of the second trading period to between 333 and 338 million tonnes of carbon dioxide per year. In the first year of the third trading period emissions reached 348 million tonnes of carbon dioxide, returning to the high levels of 2008. This trend did not continue in 2014 – compared to the previous year, emissions from large combustion plants declined by five percent to 331 million tonnes of carbon dioxide. This reflects both the decline in power generation in 2014, especially from fossil fuels, as well as the significantly lower heat demand due to the exceptionally mild weather[5].

Since the implementation of emissions trading, large combustion plants reached - except for 2009 - the lowest level of emissions.

5 Ziesing 2015

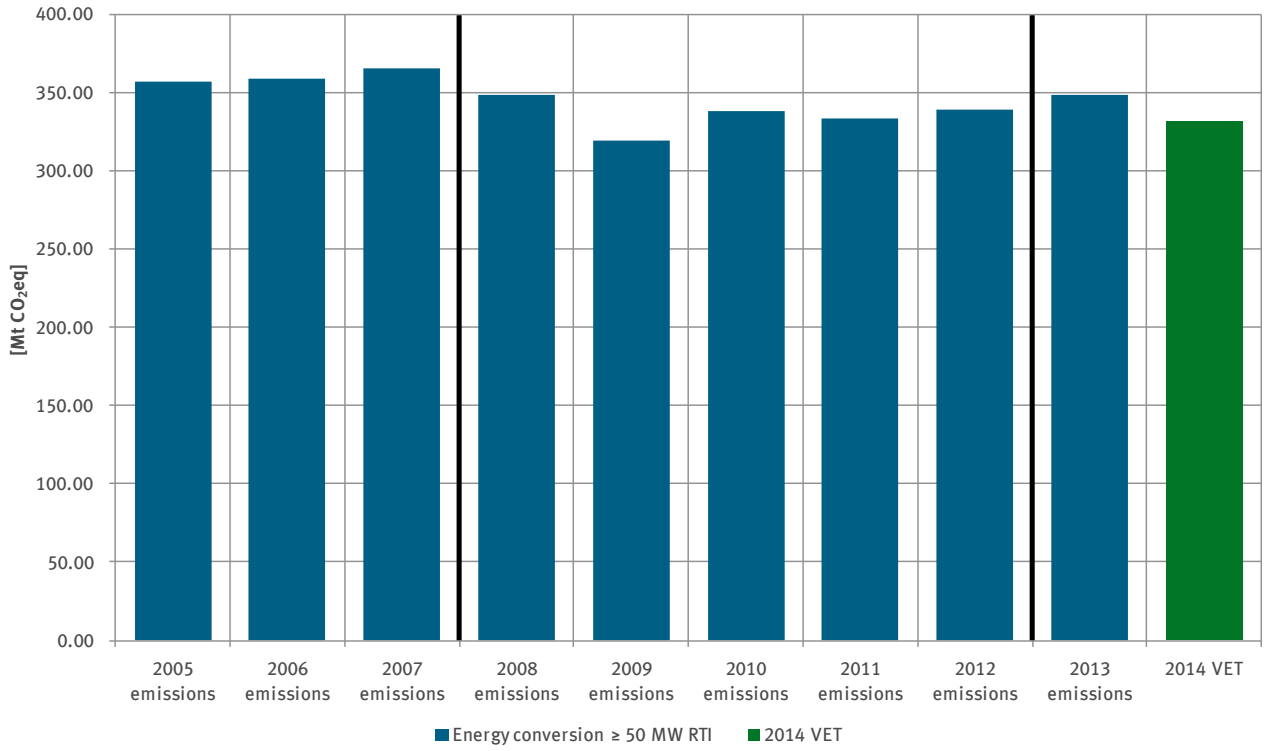

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Figure 2: Large combustion plants (Activity 2), emissions in Germany, 2005-2014

Figure 3 shows emissions from large combustion plants divided by fuels. For this purpose, large combustion plants were assigned to the fuels lignite, hard coal and natural gas, provided that more than 80 percent of the energy consumption of an installation can be assigned to one of these fuels. Installations that have no „main fuel“ assigned and installations that mainly use other fuels (e.g. heating oil and waste gases from iron, steel and coke production) are amalgamated.

Compared to the previous year, emissions from all three main fuels are declining. Installations using natural gas thus continue the trend of recent years. Compared to the previous year, emissions once again declined by around 13 percent. In addition to the weather-related impact, this is due to the fact that the use of coal is still more attractively priced than the use of natural gas in power generation. Emissions from coal are approximately eleven percent below the previous year, because amongst others, renewable energy sources increasingly displace power generation from coal. Compared to natural gas and coal, emissions from raw lignite declined disproportionately. The decrease of three percent is mainly due to power plant revisions[6].

Based on 2005, the first year of emissions trading, emissions from installations that use lignite as a main fuel only decreased by roughly three percent. Emissions from installations using coal or natural gas as main fuel decreased much more noticeably. Compared to 2005, the decline in the tenth year of emissions trading amounts to nearly 16 percent for coal and 23 percent for natural gas.

6 DEBRIV 2015

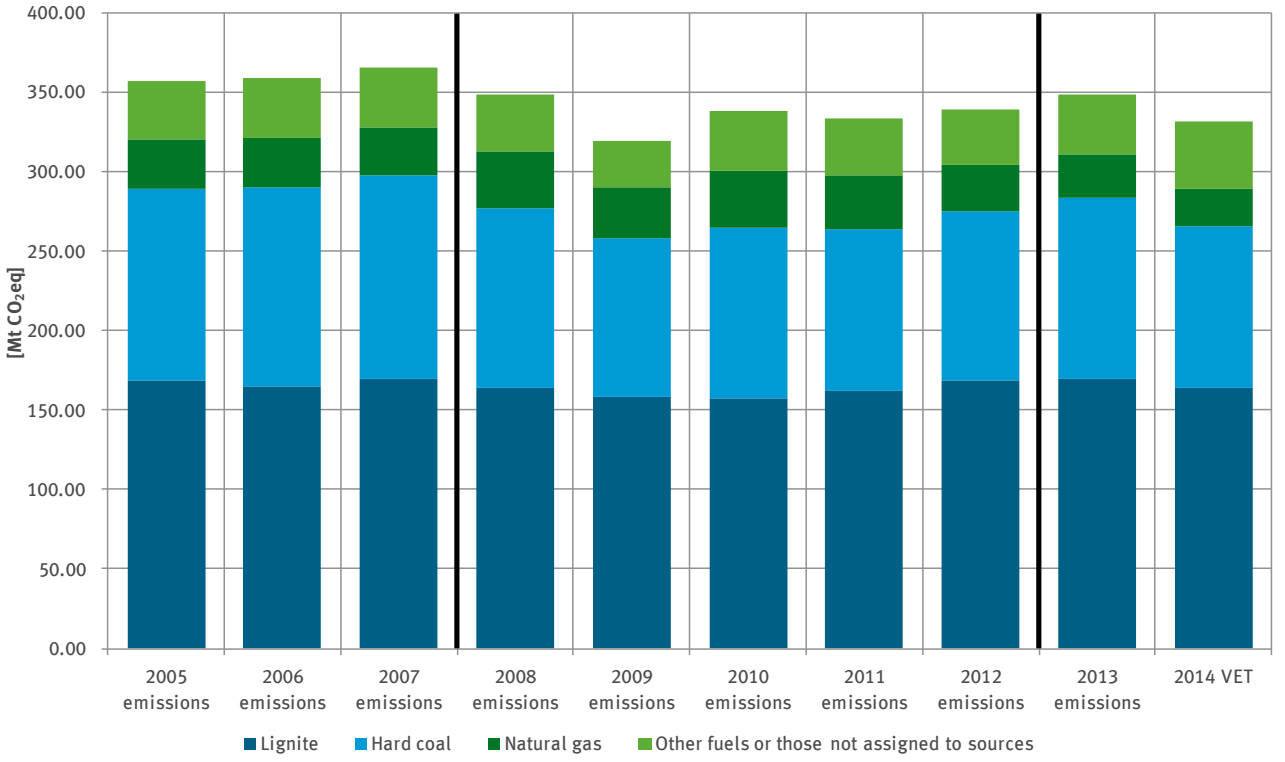

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Figure 3: Large combustion plants (Activity 2), emission figures in Germany, 2005-2014, according to fuel

RWE, Vattenfall, E.ON and EnBW[7] are the the four major energy suppliers amongst the operators of large combustion plants. Their share of the total emissions from large combustion plants has fallen by around five percent compared to 2013, however their power plants still cause 65 percent of emissions from Activity 2 installations. Absolute emissions since 2005 are presented in Figure 4.

The emissions of the companies RWE and Vattenfall are characterised by their large lignite power plants. Accordingly, their emission development is comparable to the emission development of lignite as a fuel: Compared to 2013, emissions from the RWE Group installations dropped from 105 million to 100 million tonnes of carbon dioxide, i.e. by nearly five percent. Emissions from Vattenfall installations decreased by more than two percent, i.e. from 77.5 to nearly 76 million tonnes of carbon dioxide. While in the previous year the emission trend of both companies was marked by the transfer of power generation to new and thus more efficient installations[8], lower emissions compared to the previous year are likely to have resulted from several revisions in the lignite power plants.

Compared to RWE and Vattenfall, emissions from E.ON installations have significantly decreased, they emitted about 20 percent less compared to the previous year. This decrease is also due to the lower power generation and the changes in the energy mix of power generation. Emissions from almost all E.ON installations are declining, regardless of the fuel used. Only the Buschhaus power plant emissions have risen significantly after several months of standstill in the previous year.

EnBW installations also emitted approximately 16 percent less compared to the previous year. For the first time since 2010, the increase of emissions from EnBW has not continued. This decline in emissions falls within the described trend of the group of large combustion plants.

7 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. The assignment of large combustion plants to the companies is based on the operator information available to DEHSt. Therefore, on occasion, the assignment does not take account of all large combustion plants of their respective companies or not all large combustion plants which are operated by the companies. Compared to the VET reports from previous years changes may arise in the observed installations (and thus the associated emissions) due to restructuring and sales.

8 DEHSt 2014b

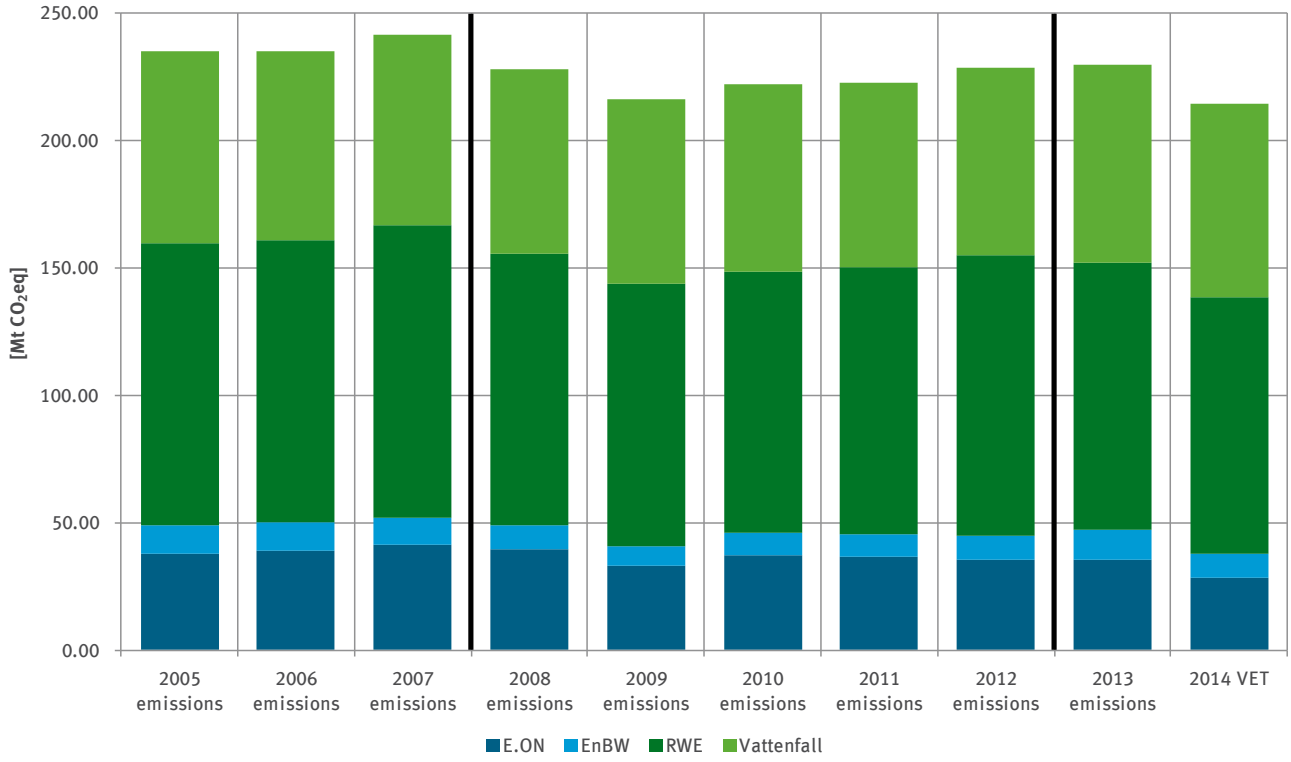

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Figure 4: Large combustion plants of four major utilities, emission figures in Germany, 2005-2014

Allocation status

In the third trading period, the free allocation for power generation was replaced by full auctioning. Thus operators of large combustion plants only received 25.7 million annual emission allowances free of charge for heat production in 2014. That will only cover eight percent of their surrender obligation for the emissions from the installations (Table 4).

In the third trading period, three factors determine the low allocation rate: first, the power generation's share for which there is no free allocation is very high among the large combustion plants. Second, 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 goes to producers of waste gases from iron, steel and coke production while a part of the allocation for heat production does not go to the producers but to heat consumers (see Chapters 2.4 and 3.1).

Table 4: Large combustion plants (Activity 2), number of installations, allocation amounts, VET entries and 2014 allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
2	Energy conversion ≥ 50 MW RTI	2014 VET › 2014 AA	383	329,348	22,717	-306,631	6.9%
		2014 VET ‹ 2014 AA	103	1,709	3,023	1,313	176.8%
		2014 VET = 2014 AA	5	0	0	0	
		Comparison not possible	1	-	-	-	
Total			**492**	**331,057**	**25,740**	**-305,318**	**7.8%**

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2.1.2 Combustion plants between 20 and 50 MW

plants and heat and power plants of district heating, smaller power plants and industrial boilers, decreased on balance by 18 installations compared to 2013. Nineteen installations no longer take part in emissions trading, or are no longer regarded separately due to installation merging; one installation newly became subject to emissions trading.

Although the number of installations is in a similar size range, installations of Activities 3 and 4 emit significantly less than large combustion plants. In 2014 they emitted 5.6 million tonnes of carbon dioxide, which is only 1.7 percent of the emissions of large combustion plants. Compared to the previous year, emissions have declined by about seven percent.

The free allocation coverage amounts to 75 percent and is distinctly higher than that of large combustion plants.

Table 5: Overview of combustion plants 20-50 MW (Activities 3 and 4), number of installations, summary of emissions and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Energy conversion 20-50 MW RTI	429	6,036	4,218	5,609	75.2%

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Emissions

Emissions have decreased in the majority of Activity 3 installations compared to the previous year, however emissions grew in about a quarter of the installations. Overall, this results in a decline of just over 400,000 tonnes of carbon dioxide corresponding to seven percent of the previous year's emissions. Emissions declined by about four percent in the much smaller group of Activity 4 installations, i.e. the installations that often use biomass or waste (Table 6).

Table 6: Combustion plants 20-50 MW (Activities 3 and 4), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
3	Energy conversion 20–50 MW RTI	2014 VET › 2013 EM	102	1,542	1,828	285
		2014 VET ‹ 2013 EM	311	4,318	3,621	-697
		2014 VET = 2013 EM	3	1	1	0
		Comparison not possible	2	-	-	-
			418	5,876	5,456	-412
4	Energy conversion 20–50 MW RTI, other fuels	2014 VET › 2013 EM	4	37	42	6
		2014 VET ‹ 2013 EM	7	123	110	-13
			11	160	153	-7
Total			**429**	**6,036**	**5,609**	**-419**

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Unlike large combustion plants, many combined heating and power plants and district heating plants belong to activity 3 and 4 installations, so that emissions depend on the weather-related heat demand. The 2014 weather, which was significantly milder than in the previous year, certainly had the biggest influence on the decrease in emissions. 2014 was Germany's warmest year ever recorded since 1881[9]. Figure 5 shows the time series of emission levels from the start of emissions trading for this installation group and the average degree days[10]. As for large combustion plants, the lowest emission level since the implementation of emissions trading was reached in 2014 – apart from 2009.

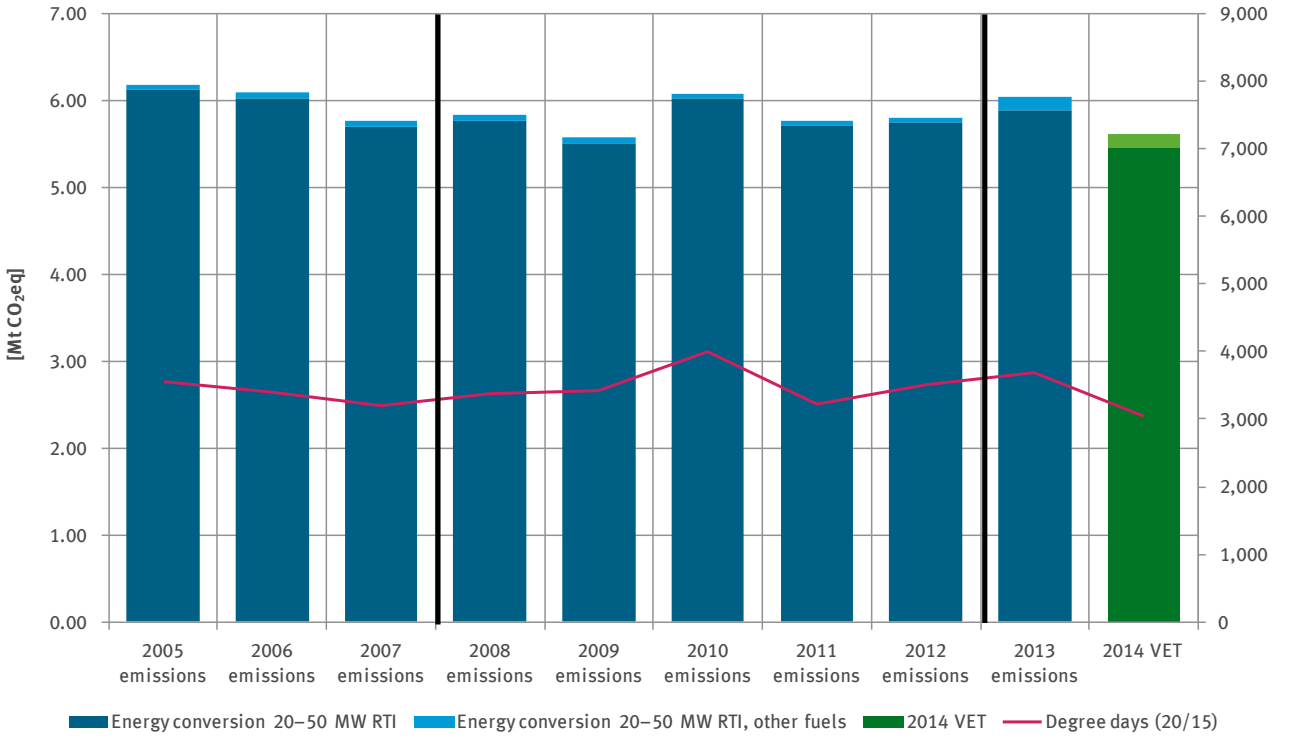

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Figure 5: Combustion plants 20-50 MW (Activities 3 and 4), emission trend in Germany, 2005-2014

Allocation status

The importance of heat production can also be seen by the allocation status of these installations. While large combustion plants only receive a free allocation for just under eight percent of their emissions, free allocation for energy installations with an RTI between 20 and 50 MW covers about three quarters of their emissions. Activity 4 installations, in which biomass and fuels with biogenic components are used even have an over-supply of nearly 46,000 emission allowances.

Allocation coverage has not significantly changed in this installation group either compared to the previous year.

9 Ziesing 2015

10 Average of weather stations: Hamburg-Fuhlsbüttel, Düsseldorf, Berlin-Tempelhof, Dresden-Klotzsche, Frankfurt/M-Airport, München/Airport. DWD, cf. IWU 2014

Table 7: Combustion plants 20-50 MW (Activities 3 and 4), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
3	Energy conversion 20–50 MW RTI	2014 VET > 2014 AA	287	4,749	2,743	-2,006	57.8%
		2014 VET < 2014 AA	127	701	1,276	576	182.2%
		2014 VET = 2014 AA	2	0	0	0	
		Comparison not possible	2	-	-	-	
			418	5,450	4,019	-1,430	73.7%
4	Energy conversion 20–50 MW RTI, other fuels	2014 VET > 2014 AA	3	123	24	-99	19.8%
		2014 VET < 2014 AA	8	30	174	145	589.1%
			11	153	199	46	130.3%
Total			**429**	**5,609**	**4,218**	**-1,384**	**75.2%**

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2.1.3 Prime movers (natural gas compressors)

There are 56 Activity 5 and 6 installations used to transport, store and process natural gas. The 2014 emissions have been reduced from last year's 1.5 million tonnes to around 1.3 million tonnes, although one additional installation is subject to emissions trading than in the previous year. Free allocation covers 87 percent of emissions (see Table 8).

Table 8: Overview of prime movers (Activities 5 and 6), number of installations, summary of emission and allocation amounts

Sector/activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Prime movers	56	1,530	1,104	1,267	87.2%

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Emissiones

Among the prime mover engines and turbines, one-third of the installations exhibit an increase and two-thirds a reduction in the amount of emissions (Table 9). Overall, emissions decreased by 263.000 tonnes of carbon dioxide.

Table 9: Prime movers (Activities 5 and 6), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
5	Prime movers (engines)	2014 VET › 2013 EM	1	40	43	3
		2014 VET ‹ 2013 EM	2	24	13	-11
			3	64	56	-7
6	Prime movers (turbines)	2014 VET › 2013 EM	17	198	264	65
		2014 VET ‹ 2013 EM	36	1,268	947	-322
			53	1,466	1,210	-256
Total			**56**	**1,530**	**1,267**	**-263**

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Figure 6 shows the emission figures from the beginning of emissions trading in 2005. Overall, emissions decreased by around 17 percent and reached by far the lowest level since the implementation of emissions trading. Operation of the installations depends on the conditions in the natural gas grid. Last year, it was not only power generation from natural gas that declined, but total natural gas consumption also dropped significantly, mainly due to the very mild weather, so that transport and storage facilities had to work less hard and consequently caused lower emissions.

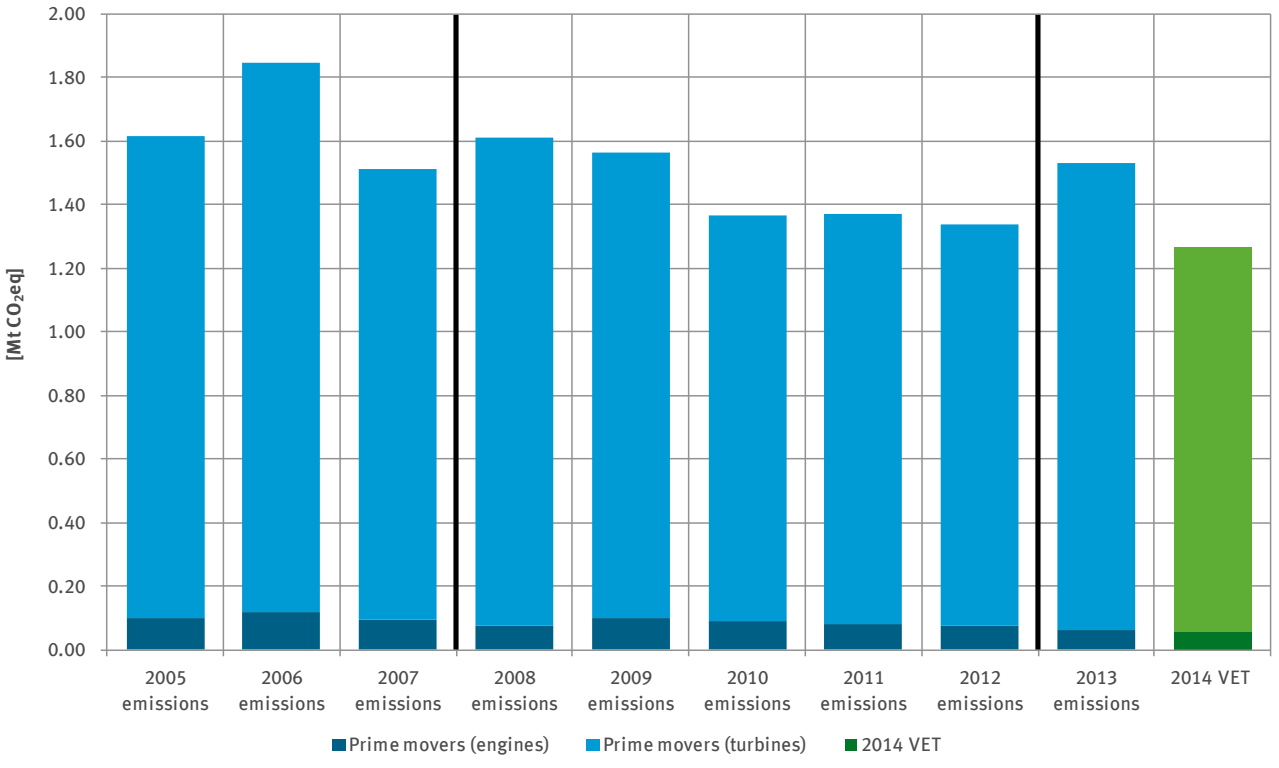

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Figure 6: Prime movers (Activities 5 and 6), emission trend in Germany, 2005-2014

Allocation status

Prime movers (engines and turbines) have mainly received a free allocation via the fuel benchmark for producing mechanical work[11]. On average, prime movers receive a free allocation covering 87 percent of their emissions (Table 10), thus, their allocation coverage has improved compared to the previous year. In 2013, installations received a free allocation for only around 76 percent of their emissions.

Table 10: Prime movers (Activities 5 and 6), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
5	Prime movers (engines)	2014 VET < 2014 AA	3	56	64	7	113.2%
			3	56	64	7	113.2%
6	Prime movers (turbines)	2014 VET > 2014 AA	26	886	572	-315	64.5%
		2014 VET < 2014 AA	27	324	469	145	144.7%
			53	1,210	1,040	-170	86.0%
Total			**56**	**1,267**	**1,104**	**-162**	**87.2%**

As of 04/05/2015

2.2 Other combustion

Slightly more than 70 installations with a minimum rated thermal input of 20 MW have been subject to emissions trading since 2013 due to the broader definition of "combustion" and have been recorded under Activity 1 for the first time. This section only covers those 43 Activity 1 installations that are not assigned to other industries in this report. In addition to process heaters, this installation group includes asphalt mixing plants and test rigs for turbines or engines for example. Compared to the previous year, two installations have left the emissions trading scheme.

Table 11 shows the data framework of this group where installations emitted a total of 635,000 tonnes of carbon dioxide and have a 98 percent allocation coverage relative to their actual emissions.

Table 11: Overview of other combustion plants (Activity 1), number of installations, summary of emission and allocation amounts

Sector/activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Other combustion plants	43	618	623	635	98.1%

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Emissions

The numbers of other combustion plants with higher or lower emissions compared to 2013 broadly even out (see Table 12). The balance for all installations in the group yields an overall emission increase of about three percent over the previous year.

11 cf. DEHSt 2014a, Chapter "Energy installations"

Table 12: Other combustion plants (Activity 1), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	VET 2014 deviation from 2013 emissions [kt CO_2eq]
1	Combustion	2014 VET › 2013 EM	17	416	455	38
		2014 VET ‹ 2013 EM	22	202	179	-23
		2014 VET = 2013 EM	2	0	0	0
		Comparison not possible	2	-	-	-
Total			**43**	**618**	**635**	**16**

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Figure 7 shows the emission trend since 2005. These installations have only participated in emissions trading since 2013, therefore the 2005 to 2010 figures are historic data reported by the operators in the allocation procedure. The installation group is very varied so that no general conclusions can be drawn from the emission data.

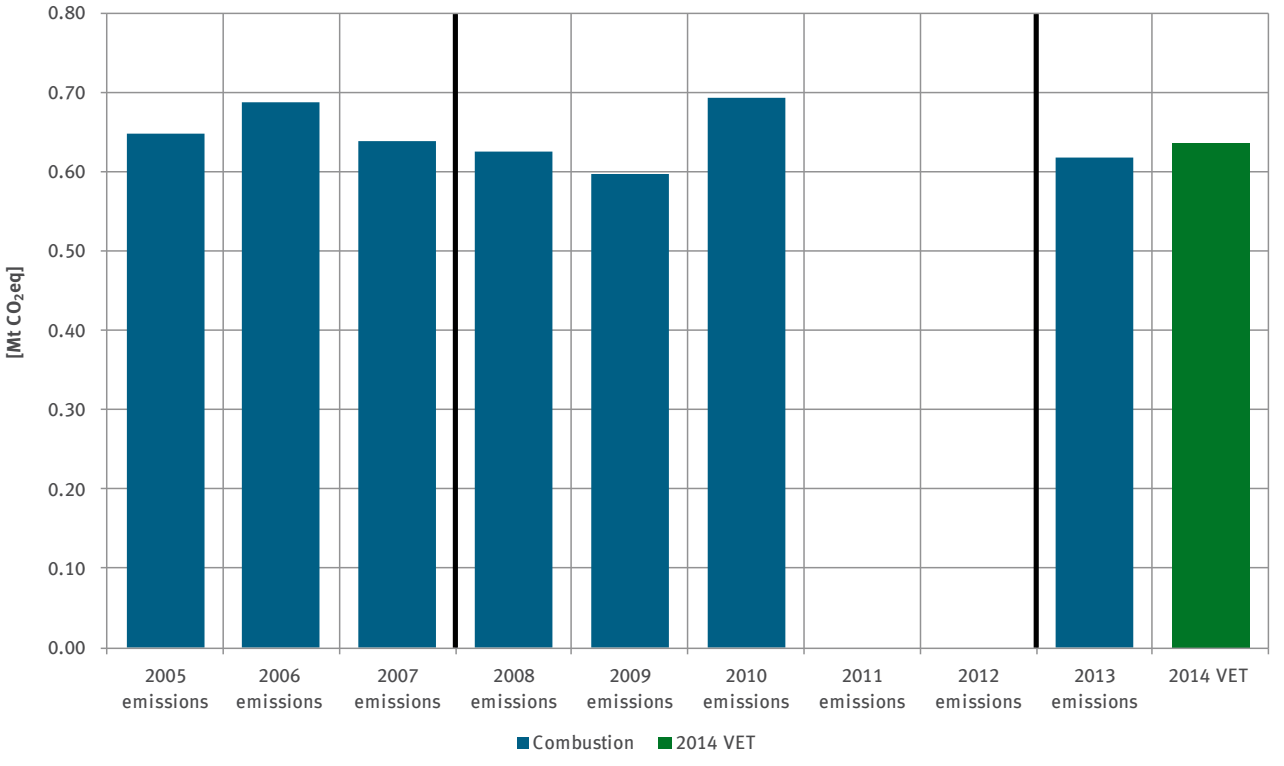

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Figure 7: Other combustion plants (Activity 1), emission trend in Germany, 2005-2014

Allocation status

This group as a whole achieved an almost complete offset using the free emission allowances equivalent to about 98 percent. However, the allocation status for the individual installations is very different. Allowances must be purchased for the majority of the 43 installations. The average allocation coverage for these installations is only around 53 percent. In contrast, eight installations received about 200,000 allowances more than needed to offset their emissions. This corresponds to an average allocation coverage of more than 200 percent.

Compared to the previous year, the overall allocation coverage has declined. In 2013, it was still at almost 105 percent for this group.

Table 13: Other combustion plants (Activity 1), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	VET 2014 [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
1	Combustion	2014 VET > 2014 AA	32	449	242	-207	53.9%
		2014 VET < 2014 AA	8	184	381	197	207.0%
		2014 VET = 2014 AA	1	0	0	0	
		Comparison not possible	2	-	-	-	
Total			**43**	**635**	**623**	**-10**	**98.1%**

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2.3 Refineries

In 2014, 24 installations belonged to refineries (Activity 7 in Annex 1 TEHG). One installation left this activity group due to a change in the permit situation in Annex 1 TEHG, so is no longer subject to emissions trading since its rated thermal input is below 20 MW. After a change of operator, another installation was separated legally from an installation subject to emissions trading and was able to report independently in 2014. This separation is not relevant in terms of considering and comparing the 2013 and 2014 total emissions and free allocation. The two installations have not been included in the detailed comparison of the emissions and allocation status at the installation level and have been labelled as „Comparison not possible“. The 24 installations also include an installation that ceased its refinery operation in 2013 and will only continue to operate as a terminal. This installation (Wilhelmshaven refinery) only reported very low emissions for the past years and has not received any allocation since 2013.

Total 2014 emissions decreased by 4.3 percent from 26.1 million to 25.0 million tonnes of carbon dioxide compared to 2013 (see Table 14).

The free allocation failed, as in 2013, to fully cover the emissions subject to surrender and was around 4 million emission allowances, or about 16 percent below the amount required to meet the surrender liability.

Table 14: Overview of refineries (Activity 7), number of installations, summary of emissions and allocation amounts

Sector/activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Refineries	24	26,095	20,980	24,984	84.0%

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Emissions

Table 15 shows a comparison of the 2013 emissions and the 2014 VET entries. Here, the scope in the third trading period was used for both years so that the refinery power plants covered by the single installation regulations were also included.

Carbon dioxide emissions from refineries decreased by a total of about 1 million tonnes, or 4.3 percent, compared to the previous year. Specifically, there are nine installations where emissions increased by 258,000 tonnes, or 3.2 percent, and 13 installations where emissions declined by 1.3 million tonnes, or 7.2 percent.

The reduction in emissions across the entire sector compared to 2013 was mainly due to the general decline in production.

Table 15: Refineries (Activity 7), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
7	Refineries	2014 VET › 2013 EM	9	8,011	8,269	258
		2014 VET ‹ 2013 EM	13	17,613	16,351	-1,261
		Comparison not possible	2	-	-	
Total			**24**	**26,095**	**24,984**	**-1,004**

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Operators may often be assigned to one of the sector's 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 4.6 million tonnes of carbon dioxide from two installations. It is followed by PCK Schwedt with more than 3.7 million tonnes from one installation and Shell with slightly less than 3.7 million tonnes of carbon dioxide from three installations.

Figure 8 shows the emissions from refineries as well as the Leuna and Salzbergen refinery power plants separately approved (Activity 2) for 2005-2014. 2005-2010 emission figures for the new installation added in 2013 are available from the allocation procedure, data for the 2011-2012 emissions were estimated using linear interpolation. All refinery power plants jointly approved with the refinery since 2013, or those refineries recorded as single installations in emissions trading since 2013, were also considered as industrial installations for 2005 – 2012, in order to obtain a consistent time series retrospective to 2005.[12]

The time series shows that the trend of steadily declining emissions has again strengthened in 2014.

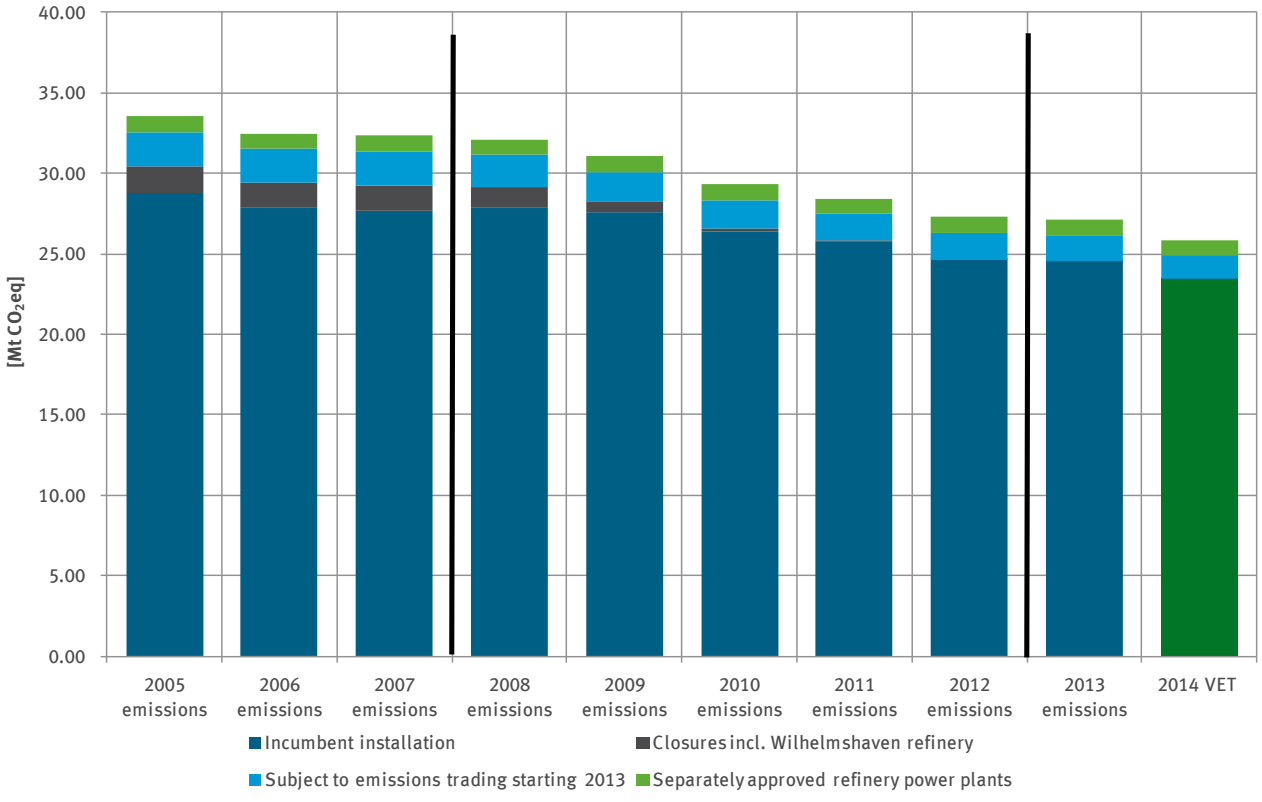

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Figure 8: Refineries (Activity 7), emission trend in Germany, 2005-2013

12 cf. DEHSt 2014b, Chapter 3.3 „Refineries"

Allocation status

Among the affected industrial sectors, refineries are particularly hard hit by the discontinuation of free allocation for power generation in the third trading period because of their associated power plants. In the majority of installations – 19 out of 22 – free emission allowances allocated in 2014 covered on average only 77.2 percent of the emissions subject to surrender (Table 16).

Three installations continued to receive a higher allocation than they needed for surrender. Two of these installations are refineries with separately approved power plants. In 2014, this surplus allocation amounted to 475,000 emission allowances or 12.2 percent.

Table 16: Refineries (Activity 7), number of installations, allocation amounts, VET entries and allocation coverage in 2014

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
7	Refineries	2014 VET > 2014 AA	19	20,730	16,010	-4,719	77.2%
		2014 VET < 2014 AA	3	3,891	4,366	475	112.2%
		Comparison not possible	2	-	-	-	
Total			**24**	**24,984**	**20,980**	**-4,244**	**84.0%**

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Thus, the sector had an additional required purchase in 2014, just as in 2013. This amounts to 4 million emission allowances and is slightly lower than in 2013, when it amounted to around 5 million emission allowances.

2.4 Iron and steel industry including coking plants

The iron and steel industry includes Activities 8 to 11, as well as an Activity 1 installation[13] as per TEHG, which means a total of 127 installations subject to emissions trading in Germany. The number of installations decreased in Activity 10 by one installation compared to 2013 as a result of a cessation. Operation was discontinued due to cessation in Activity 11 in two installations.

Table 17 shows the emissions for 2013 and 2014 and the allocation amounts for 2014.

Table 17: Overview of iron and steel industry (Activities 8 to 11 and 1), number of installations, summary of emissions and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Iron and steel	127	35,650	50,387	36,371	138.5%

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Thus in 2014, emissions increased by 0.7 million tonnes, or two per cent, compared to 2013 and now amount to 36.4 million tonnes. The allocation coverage – the 2014 allocation amount in relation to the 2014 emissions – measures 138.5 percent for the entire sector compared to 144 percent for the previous year. The decline resulted from the increase in emissions and the diminishing allocation due to the annual increase of the cross-sectoral correction factor in the EU ETS.

13 This is an independently approved grinding and drying installation for coal, which is part of the process of pig iron production.

The absolute total of this figure must be considered separately: the iron and steel industry installations, which produce waste gases from iron, steel and coke production (blast furnace, converter and coke oven gas), will also receive an allocation for the use of waste gases from iron, steel and coke production, even though emissions from a transfer to other installations are not released by the producers of waste gases from iron, steel and coke production. In 2014 waste gases from iron, steel and coke production amounted to 21.8 million tonnes of carbon dioxide and were transferred to the energy sector (see Table 19). Assuming that the necessary emission allowances for transferred waste gases from iron, steel and coke production (an estimated 15 million emission allowances) are passed from the waste gas generating installations to the power plants that use them, the above-mentioned allocation coverage in the iron and steel industry drops to 98 percent (adjusted allocation coverage; see p. 38-40).

Emissions

Table 18 differentiates the emissions trend in comparison to the previous year according to the individual Activities. It should be noted that installations in the iron and steel industry are strongly interlinked. Activity 10 „Pig iron and steel production“, in particular, may include coking plants (Activity 8) and sinter plants (for metal ore processing, Activity 9) when an approval facilitates this or when single installations have been created. A few Activity 10 installations also include processing steps for further processing crude steel, which would be assigned to Activity11 „Ferrous metal processing“ if they functioned as independent installations.

Taken together, the emissions from Activities 8 to 10 increased by roughly 717,000 tonnes of carbon dioxide (2.4 percent) compared to the previous year. The increase coincides with the 2014 production increase of oxygen steel by 2.4 percent[14]. The decrease of 2.9 percent in electric steel production is not significant, since the emissions of oxygen steel production, including the emissions from Activities 8 and 9 with a proportion of more than 95 percent, dominate the emissions from crude steel production in Germany, depending on technology.

Table 18: Iron and steel industry (Activities 8 to 11 and 1), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
8	Coking plants	2014 VET › 2013 EM	2	1,304	1,459	155
		2014 VET ‹ 2013 EM	2	2,423	2,377	-46
			4	3,727	3,836	109
9	Metal ore processing	2014 VET › 2013 EM	1	69	71	2
			1	69	71	2
10	Pig iron and steel production	2014 VET › 2013 EM	20	17,166	18,144	978
		2014 VET ‹ 2013 EM	11	9,205	8,832	-373
			31	26,371	26,977	606
11	Ferrous metal processing	2014 VET › 2013 EM	48	2,951	3,185	234
		2014 VET ‹ 2013 EM	42	2,453	2,233	-220
			90	5,403	5,418	14
1	Combustion	2014 VET ‹ 2013 EM	1	80	69	-10
			1	80	69	-10
Total			**127**	**35,650**	**36,371**	**721**

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14 see DBSV 2015

Figure 9 shows the historical emissions trend since the start of the EU ETS in 2005. The blue bars illustrate the incumbent installations in accordance with the scope of the second trading period[15]. The green bars additionally represent the estimated historical emissions from 2005 to 2012 from the installations, which, from 2013 onwards, were newly incorporated in the Emissions Trading Scheme (as installations of Activity 11). In this context, 81 new installations were added to the ten installations for ferrous metal processing, which had already become subject to emissions trading in the second trading period (see DEHSt 2014b).

The total emissions – analogous to the respective economic development – increased during the first trading period and declined during the second trading period. However, a distinct, clear trend for a reduction in emission intensity has not been seen so far.

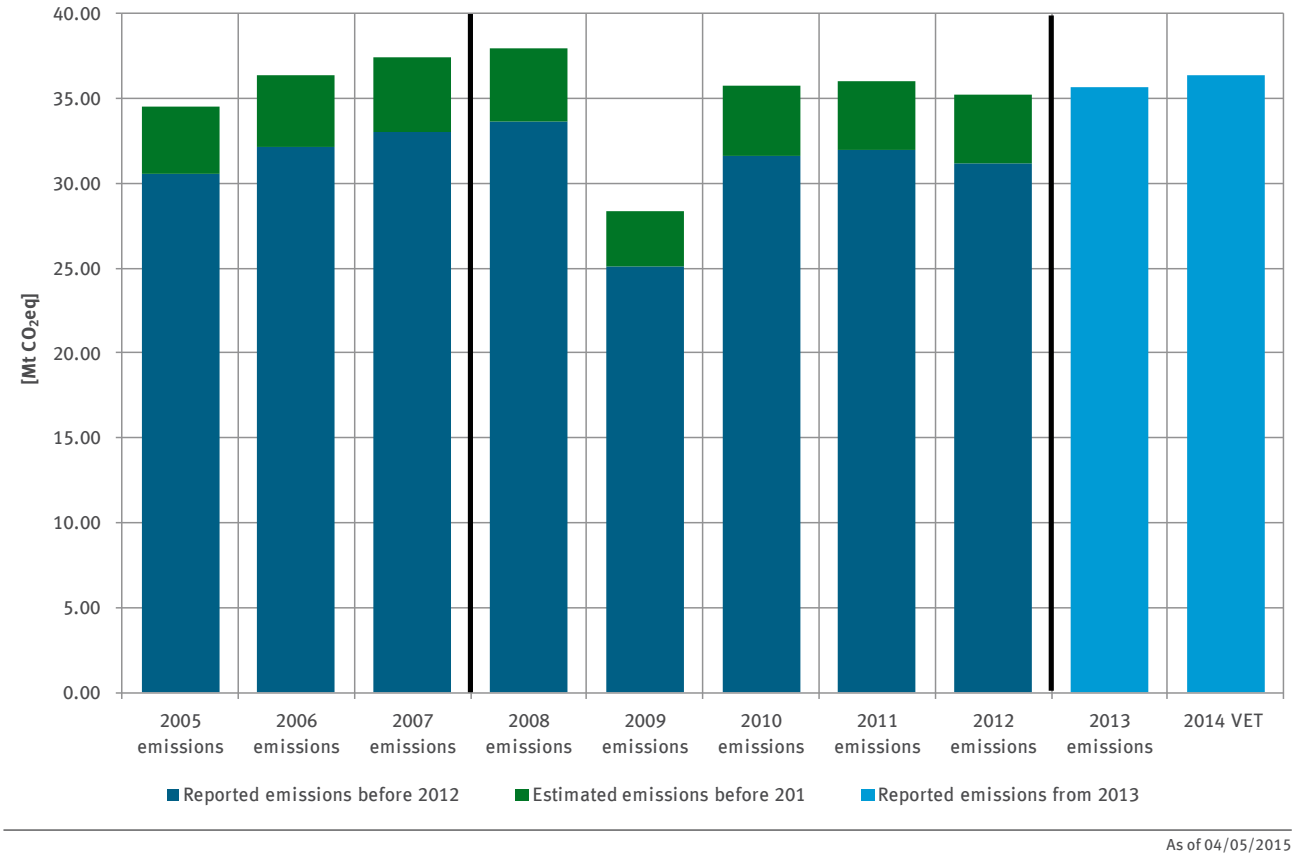

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Figure 9: Iron and steel industry (Activities 8 to 11 and 1), emissions trend in Germany, 2005-2014

Transfer of waste gases from iron, steel and coke production

Characteristic of the „iron and steel“ sector is the transfer of waste gases from iron, steel and coke production (blast furnace, converter and coke oven gas). In 2014 the transfer of waste gases from iron, steel and coke production resulted in emissions amounting to around 27 million tonnes of carbon dioxide (see Table 19).

15 It should be noted that for the period of 2005 to 2007, actual emissions of the first trading period scope are displayed, i.e. the extension of the scope for the second trading period was not retroactively added for the 2005 to 2007period.

Table 19: Transferred waste gases from iron, steel and coke production

No.	Activity	Transfer to coking plants [kt CO_2eq]	Transfer to pig iron and steel production [kt CO_2eq]	Transfer to ferrous metal production and combustion [kt CO_2eq]	Transfer to energy installations [kt CO_2eq]	Transfer to refineries [kt CO_2eq]	Transfer to non-ETS* [kt CO_2eq]	Total
8	Coking plants	-	959	268	184	160	58	1,630
10	Pig iron and steel production	2,888	27	1,117	21,586	0	85	25,703
Total		**2,888**	**987**	**1,385**	**21,770**	**160**	**144**	**27,333**

* actual amount transferred totals 186,000 tonnes of carbon dioxide equivalents, of which 42,000 tonnes are inherent carbon dioxide.
As of 04/05/2015

Around 2.9 million tonnes of carbon dioxide were transferred to Activity 8 installations within the iron and steel industry, while these Activity 8 installations transfer 959,000 tonnes of carbon dioxide to Activity 10 installations. In addition, Activities 8 and 10 together transferred approximately 1.4 million tonnes of carbon dioxide to ferrous metal processing installations (Activity 11). The majority of the remaining transfers went to power plants (around 21.8 million tonnes of carbon dioxide).

When a 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 (i.e. energetically no longer usable) amount of carbon dioxide. This amount has already been subtracted from the transferred amount in Table 19 and established as transfers of around 144,000 tonnes of carbon dioxide to non-ETS installations in 2014. 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.

Allocation status

Disregarding the transfer of waste gases from iron, steel and coke production, the allocation amounts for the iron and steel industry as a whole are significantly higher than the reported emissions: based on the VET entries, the 2014 allocation coverage by itself is around 138.5 percent. However, the allocation coverage for different Activities within the sector (see Table 20) varies widely. While the allocation coverage for all Activity 11 installations amounts to 88 percent, it comes to around 148 percent for Activities 8, 9 and 10 together. The allocation amount for this group of Activities exceeds the reported emissions by 48 percent.

Table 20: Iron and steel industry (Activities 8 to 11 and 1), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amounts [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
8, 9, 10	Pig iron and crude steel production*	2014 VET > 2014 AA	18	4,809	1,680	-3,129	34.9%
		2014 VET < 2014 AA	18	26,075	43,930	17,855	168.5%
			36	30,884	45,610	14,726	147.7%
11	Ferrous metal processing	2014 VET > 2014 AA	54	3,636	2,657	-979	73.1%
		2014 VET < 2014 AA	36	1,782	2,120	338	119.0%
			90	5,418	4,777	-641	88.2%
1	Combustion	2014 VET > 2014 AA	1	69	0	-69	0.0%
			1	69	0	-69	0.0%
Total			**127**	**36,371**	**50,387**	**14,016**	**138.5%**

*Coke ovens, metal ore processing, pig iron and steel production
As of 04/05/2015

The allocation coverage mentioned above is mainly shaped by the fact that the allocation for transferred waste gases from iron, steel and coke production (blast furnace, converter and coke oven gas) differs from the emission amounts under the reporting and surrendering obligation. The producers of waste gases from iron, steel and coke production receive the allocation for such gases through the respective EU-wide product benchmark for liquid pig iron and coke, even though in the case of a transfer, the emissions from waste gases are not released by the installation that generates these gases.[16]

In 2014, waste gases from iron, steel and coke production of 21.8 million tonnes of carbon dioxide were transferred to the energy sector (see Table 19). Assuming that the allocation for transferred waste gases (an estimated 15 million emission allowances) is transferred from the installations of the iron and steel industry which generate such gases to the power plants which use them[17], the aforementioned allocation coverage of the iron and steel industry would drop to only 98 percent (adjusted allocation coverage).

The transfer of waste gases from iron, steel and coke production plays a part in the allocation status even within the sector. The allocation coverage of 88 percent for the ferrous metal processing installations listed in Table 20 is also shaped by the fact that these installations import waste gases amounting to around 1.4 million tonnes of carbon dioxide from Activities 8 and 10. The allocation of the emission amounts for the reporting and surrendering obligation also differs partially in this case.

2.5 Non-ferrous metal industry

The non-ferrous metal industry in the EU ETS includes a total of 38 installations in the 2014 reporting year. Compared to 2013, the number of installations increased by one installation for the production and processing of non-ferrous metals, which took part in emissions trading in 2014 for the first time. The non-ferrous metal industry is the sector with the lowest emissions.

Table 21: Overview of non-ferrous metal industry (Activities 12 and 13), number of installations, summary of emissions and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Non-ferrous metals	38	2,421	2,545	2,481	102.6%

As of 04/05/2015

Non-ferrous metal industry installations subject to emissions trading emitted around 2.5 million tonnes of carbon dioxide equivalents in 2014. Compared to 2013, this represents an increase of 2.5 percent.

Emissions

The non-ferrous metal industry includes Activities 12 and 13 as per TEHG Annex 1. In the 2013 reporting year, two installations were still operated under Activity 1. However, because they are rolling mills that process non-ferrous metals, for 2014 they form part of the installations for non-ferrous metal processing as well (Activity 13).

16 see DEHSt 2014a, Chapter "Iron and steel industry"

17 In previous VET reports up to and including 2012, the transfer of waste gases from iron, steel and coke production was covered directly by the allocation. In the second trading period, the allocation was carried out at the generating installation, but installation operators were obliged by the 2012 § 11 Allocation Act to disclose emission allowances to the importing installation regarding the transfer of waste gases from iron, steel and coke production. In contrast, there are no similar obligations in the third trading period.

Table 22: Non-ferrous metal industry (Activities 12 and 13), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
12	Primary aluminium production*	2014 VET › 2013 EM	2	250	274	23
		2014 VET ‹ 2013 EM	5	698	680	-18
			7	948	954	6
13	Non-ferrous metal processing	2014 VET › 2013 EM	15	854	940	86
		2014 VET ‹ 2013 EM	16	619	587	-31
			31	1,473	1,527	54
Total			**38**	**2,421**	**2,481**	**60**

* Including PFC emissions of 82,500 tonnes of carbon dioxide equivalents.
As of 04/05/2015

Seven installations are included in primary aluminium production (Activity 12). They emitted 954,000 tonnes of carbon dioxide equivalents in 2014 which is slightly more than in the previous year. There are three installations among them that produce anodes used in primary aluminium production. These installations decreased their emissions by just 11 percent. The remaining four Activity 12 installations are electrolysis installations for primary aluminium production. In addition to carbon dioxide, these four installations emit PFC (perfluorocarbons). The 2014 PFC emissions correspond to about 82,500 tonnes of carbon dioxide and are thus 25 percent lower than in the previous year. The average share of emissions from the four electrolysis installations amounts to only 9.5 percent compared to 13 percent in 2013. Overall, however, emissions from the electrolysis installations subject to emissions trading increased by two percent compared to the previous year. The decrease in PFC emissions associated with the increase in total emissions is probably due to a more constant utilisation of the respective installations. The 31 installations for the production and processing of other non-ferrous metals such as copper, zinc or lead (Activity 13) emitted approximately 1.5 million tonnes of carbon dioxide in 2014 and thus account for roughly 62 percent of emissions subject to emissions trading in the non-ferrous metal industry. Secondary aluminium production is also classified as Activity 13.

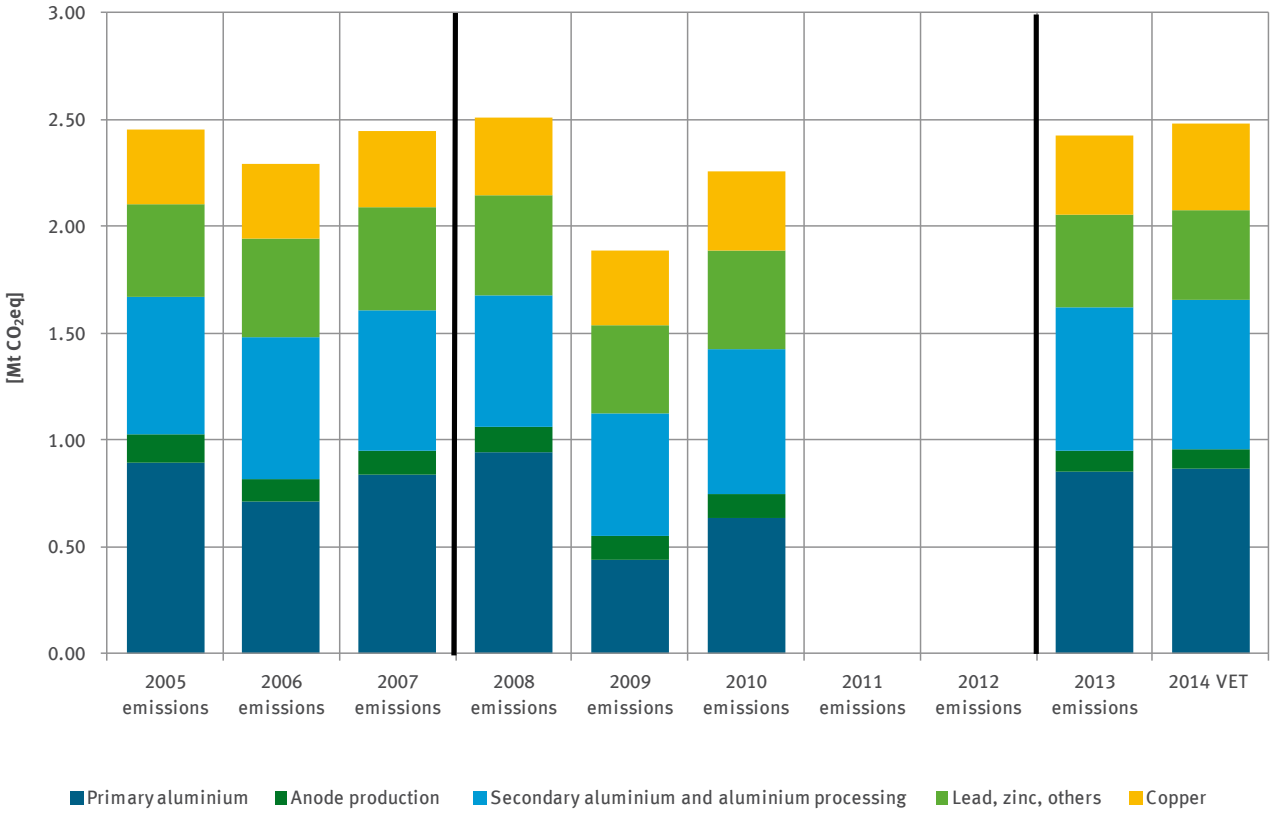

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Figure 10: Non-ferrous metal industry (Activities 12 and 13). Emission trend in Germany, 2005-2013

Figure 10 shows emissions from 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 emission reports before 2013. Instead, however, emissions data from the allocation process of the third trading period can be used for a general overview of the trend in emissions in the sector. 2009 and 2010 emissions were estimated (linear interpolation of the 2008-2013 data) for five installations. This applies for example to the three plants for anodes production. No data are available for 2011 and 2012.

Activity 12 was divided into electrolysis installations for primary aluminium production and anode production installations. Their proportion 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 non-ferrous metals. Their share of the industry's total emissions is about 28, 16 and 17 percent, respectively.

Allocation status

Overall, in 2014 the non-ferrous metals industry had a surplus allocation of 46,000 emission allowances. However, allocation coverage differs depending on activity even though differences are no longer as big as in the previous year.

Table 23: Non-ferrous metal industry (Activities 12 and 13), number of installations, allocation amount, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
12	Primary aluminium production	2014 VET > 2014 AA	5	679	573	-105	84.5%
		2014 VET < 2014 AA	2	275	378	103	137.4%
			7	954	951	-2	99.7%
13	Non-ferrous metal processing	2014 VET > 2014 AA	19	1,009	836	-173	82.9%
		2014 VET < 2014 AA	12	518	757	239	146.2%
			31	1,527	1,593	66	104.4%
Total			**38**	**2,481**	**2,545**	**64**	**102.6%**

As of 04/05/2015

Activity 12 installations receive a free allocation according to the product benchmark („aluminium“ or „pre-baked anodes“[18]). On average, the 2014 free allocation of these installations corresponded to their 2014 emissions. They had to acquire emission allowances for about 15 percent of their emissions in order to fulfil their surrender obligations in 2013[19]. The fact that, on average, these installations now no longer need to acquire emission allowances is due to the withdrawal of the allocation reduction as a result of a partial cessation of an installation. On average, Activity 13 installations are better equipped. However, their allocation coverage was only 104 percent in 2014 due to their increased emissions compared to the previous year.

2.6 Mineral processing industry

2.6.1 Cement clinker production

The 36 installations which produce cement clinker and one installation for the manufacture of products from baked oil shale are hereinafter referred to under the term „cement industry“. Compared to the previous year their emissions increased by 586,000 tonnes of carbon dioxide, or four percent, to 19.6 million tonnes of carbon dioxide. The free allocation for 2014 covers 93.9 percent of these emissions. The allocation coverage dropped by around five percent compared to the previous year.

Table 24: Overview of cement clinker production (Activity 14), number of installations, summary of emissions and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Cement clinker production	37	19,012	18,398	19,598	93.9%

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The entry threshold of 500 tonnes of cement clinker produced per day is far exceeded by all installations in the industry in Germany; therefore the data cover the entire sector in Germany. The number of cement clinker production plants has not changed compared to 2013.

18 see DEHSt 2014a, Chapter “Non-ferrous metal industry“

19 see DEHSt 2014b, Chapter “Non-ferrous metal industry“

Emissions

In the cement industry, emissions have increased by a total of 586,000 tonnes of carbon dioxide, or 3 percent. In 23 installations they increased by 906.000 tonnes of carbon dioxide; in 13 installations they decreased by 320,000 tonnes (Table 25).

Table 25: Production of cement clinker (Activity 14), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
14	Cement clinker production	2014 VET > 2013 EM	23	12,356	13,262	906
		2014 VET < 2013 EM	13	6,656	6,336	-320
		2014 VET = 2013 EM	1	0	0	0
Total			**37**	**19,012**	**19,598**	**586**

As of 04/05/2015

Figure 11 shows the carbon dioxide emissions trend from the cement industry from 2005 to 2014. After emissions rose each year in the first trading period, they clearly declined after the peak in 2007, especially in 2009 and 2010. They then rose again in the last two years of the 2nd trading period, 2011 and 2012, almost to the same level of 2008. After a slight decline in 2013, the 2014 emissions are only slightly below the 2012 emissions[20].

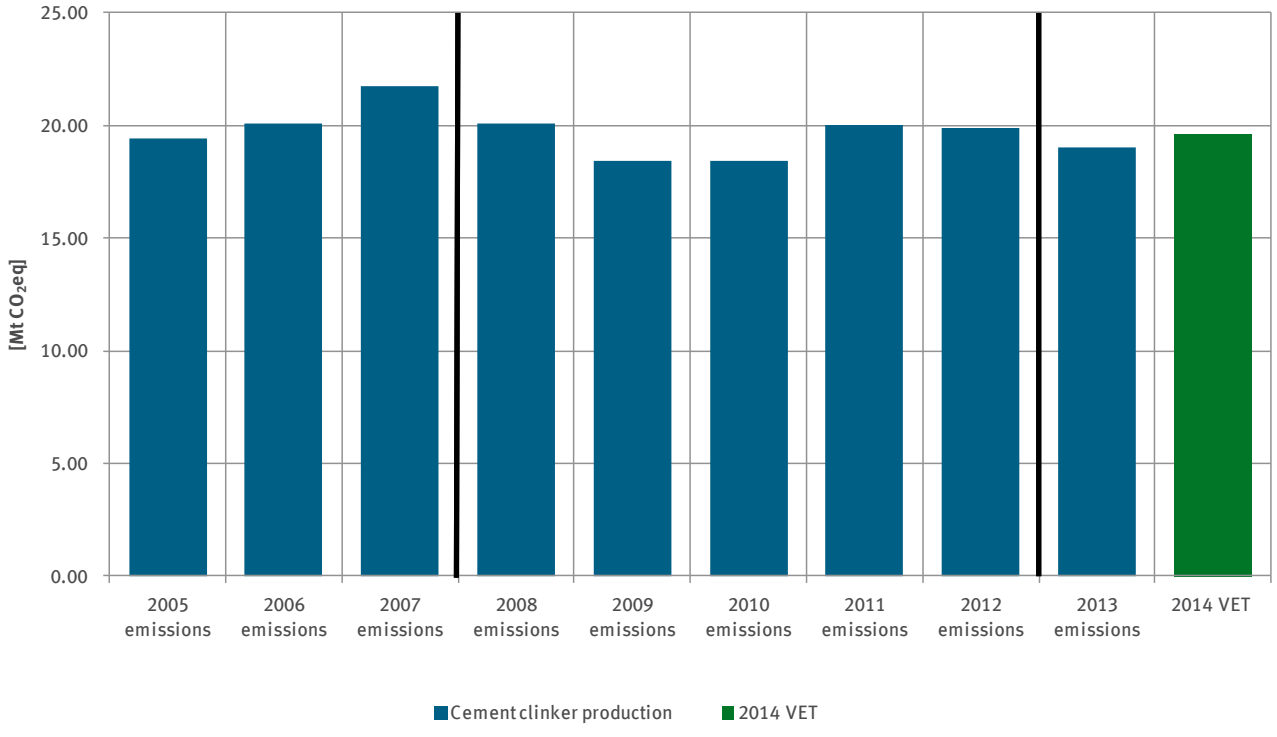

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Figure 11: Cement clinker production (Activity 14), emission trend in Germany, 2005-2014

20 It should be noted that a fixed emission factor of 0.525 tonnes CO_2/tonne of cement clinker has been applied to the process-related emissions in the time series of the second trading period. Since the beginning of the third trading period, operators must individually determine the emission factors. It has been found that the amended monitoring method for most installations (even for the most efficient ones) leads to higher process-related emissions. The reported emissions have thus been slightly higher since 2013 due to this methodological change than they would have been if the fixed emission factors had been updated.

Allocation status

For 2014, the free allocation to the cement industry (Table 26) was 1.2 million emission allowances, or 6.1 percent, below the amount required to meet the surrender obligation. In total, 26 installations had a deficit of 1.9 million emission allowances, 10 installations had a surplus of 714,000 allowances. One installation had a zero VET entry, but also received no allocation for 2014.

Table 26: Cement clinker production (Activity 14), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
14	Cement clinker production	2014 VET > 2014 AA	26	13,961	12,046	-1,914	86.3%
		2014 VET < 2014 AA	10	5,638	6,352	714	112.7%
		2014 VET < 2014 AA	1	0	0	0	0.0%
Total			**37**	**19,598**	**18,398**	**-1,200**	**93.9%**

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The amount to be purchased was thus higher than in the previous year but lower than expected in the context of the allocations according to the product benchmark (0.766 tonnes of CO_2 per tonne of grey cement clinker) and the application of the EU-wide cross-sectoral correction factor[21]. This can mainly be explained by the fact that the 2014 production was lower than in the years of the 2005 – 2008 period.

For 2014, the emission intensity of grey cement clinker installations[22] was 0.808 tonnes of CO_2 per tonne of cement clinker across all 35 installations and was thus somewhat worse than in 2013. Similar to 2013, eight installations came in lower than or achieved exactly the product benchmark.

2.6.2 Lime production (including sugar)

The 66 lime production installations are divided into two different sectors of industry: 45 installations produce lime or dolime for the construction, paper, chemical, the iron and steel industry and environmental technology. Their emissions are dominated by the economy of both the steel and construction industries. On the other hand, 20 installations produce lime for sugar production and are dominated by the quality and quantity of sugar beet crop. From the third trading period on, these installations, together with the sugar industry's energy installations, have fitted into the lime production activity, while in the second trading period, energy installations and lime installations were considered separately. In addition, due to the broader definition of "combustion", further partial activities, especially beet slice drying and caramelisation installations, have been added to sugar production. Lime production also includes a limestone drying plant, which was first included in emissions trading as an Activity 1 combustion plant in the third trading period.

The 2014 emissions of Activity 15 (lime production) amounted to a total of 9.4 million tonnes of carbon dioxide and thus remained largely constant – up by 0.4 percent – compared to the previous year. The free allocation on average covered 83.6 percent of emissions.

21 The cross-sectoral correction factor was 0.9427 for 2013 and 0.9263 for 2014, cf. DEHSt 2014a

22 White cement and baked oil shale (one installation each) have other product benchmarks than grey cement clinker (35 plants) and were therefore not included in the evaluation, the cement kiln dust (CKD) production volumes were added to the cement clinker production, as stipulated by the EU allocation rules.

Table 27: Lime production overview (Activity 15), number of installations, summary of emission and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Lime production	66	9,348	7,842	9,385	83.6%

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The total number of installations has been reduced from 67 to 66 due to a cessation of operation (lime production) compared to 2013.

Emissions

While the 2014 emissions of lime production for blast furnaces, power plants and the construction industry slightly decreased by 39,000 tonnes to about 7.4 million tonnes of carbon dioxide, the emissions from the sugar industry installations increased by about 78,000 tonnes, or 4.2 percent, and reached 1.9 million tonnes of carbon dioxide.

17 lime production installations reported higher emissions than in the previous year and 26 installations reported lower emissions. As in 2013, two installations reported zero emissions. For sugar manufacturers, emissions increased in 15 installations by a total of 104,000 tonnes of carbon dioxide and decreased in five more installations than in 2013. The low emissions from the limestone drying installation (combustion installation) remained almost constant.

Table 28: Lime production (Activity 15), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
15	Lime production	2014 VET › 2013 EM	17	2,183	2,432	249
		2014 VET ‹ 2013 EM	26	5,295	5,007	-288
		2014 VET = 2013 EM	1	0	0	0
		Comparison not possible	1	-	-	-
			45	7,478	7,439	-39
	Sugar production	2014 VET › 2013 EM	15	1,183	1,286	104
		2014 VET ‹ 2013 EM	5	673	647	-26
			20	1,856	1,933	78
1	Combustion	2014 VET ‹ 2013 EM	1	15	14	-1
			1	15	14	-1
Total			**66**	**9,348**	**9,385**	**38**

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The following figures show the emission trends since 2005, divided into lime (Figure 12) and sugar production (Figure 13).

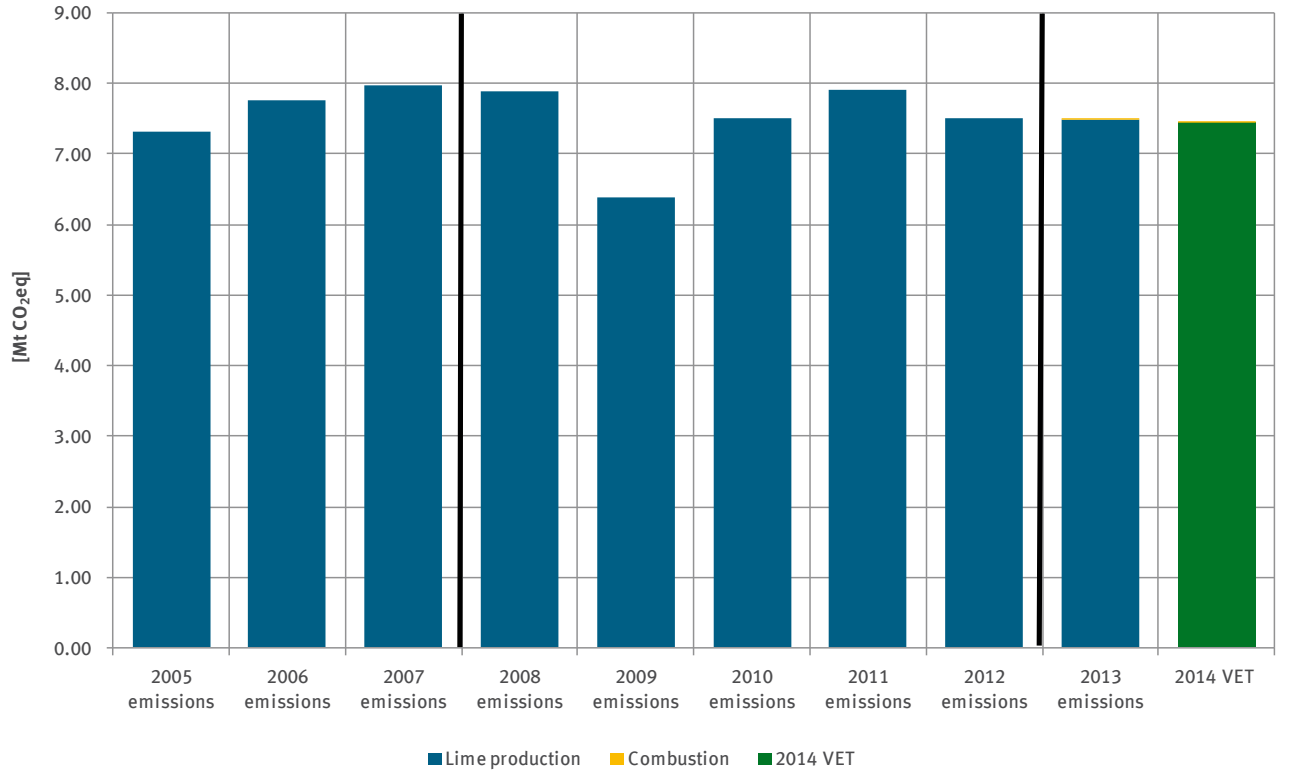

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Figure 12: Lime production (Activity 15), emission trend in Germany, 2005-2014

The emissions from lime production steadily increased during the first trading period (see Figure 12) and remained constant during the transition to the second trading period. In 2009, which was heavily affected by the financial and economic crisis, emissions from lime kilns, whose production is economically dependent on the steel and construction industry, fell dramatically. In 2010 and 2011 they increased again due to the recovering economic situation. After a reduction in emissions in 2012, emissions have largely been constant at about the 2010 level. However, post-2013 emissions cannot be directly compared with those from the second trading period on methodological grounds[23].

Figure 13 shows the emissions of the sugar industry from 2005. The emissions deriving from the extended scope of the third trading period, were retrospectively estimated for the first and second trading period (top part of the columns)[24]. The emissions data for 2005 to 2010 from the emission reports were compared with the application data for free allocation in the third trading period, which reflect the scope of the current third trading period. For 2011 and 2012, with no comparative data available, the average proportion of the extended scope in the years 2005 to 2010 (around 15 percent of the emissions) was multiplied by the respective years' emission data.

Sugar production and emissions primarily depend on the sugar beet harvest (Figure 13). The figure also includes the sugar industry's energy installations, which were separately considered in the second trading period. The emissions caused by sugar producers have continuously increased from 2005 until 2012 with the exception of a few years, where the emission portion attributable to the scope extension in the third trading period can only be estimated for the last years of the second trading period (see explanation above). Following a decline in emissions in 2013, emissions rose again in 2014, but were still below the second trading period's average.

23 Emissions before 2013 cannot be compared with the emissions from 2013 on because of the change in the emission determination method between 2012 and 2013 and the extended scope of emissions trading from 2013 (cf. DEHSt 2014b, Section "Lime production (including sugar)")

24 cf. DEHSt 2014a

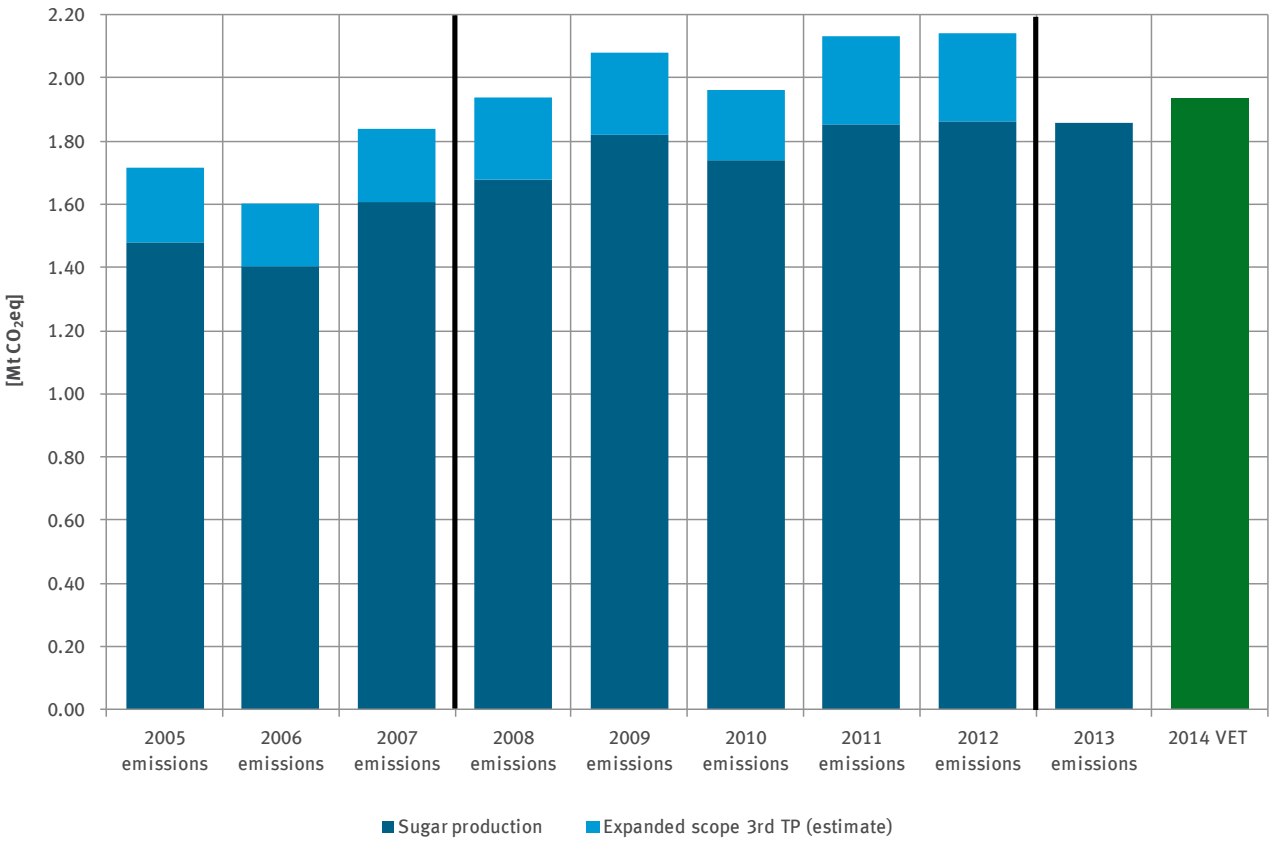

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Figure 13: Emission trend in the sugar industry, 2005-2014

Allocation status

Lime production had a total deficit of 870,000 allowances, which corresponds to an allowance shortfall of slightly less than 12 percent of the 2014 emissions. The sugar industry's deficit was 673,000 emission allowances meaning that the relative shortfall was significantly higher at around 35 percent of the 2014 emissions. About two-thirds of the lime producers, 29 installations, had to purchase approximately 1.2 million additional emission allowances in order to comply with their surrender obligations. 14 installations have a surplus.

By contrast, all sugar production installations had to purchase additional emission allowances with a total of 673,000. The sugar industry's power production also plays a role, for which no free allocation is granted in the third trading period. The free allocation for the Activity 1 combustion plant is only slightly below its reported 2014 emissions.

Table 29: Lime production (Activity 15), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
15	Lime production	2014 VET > 2014 AA	29	5,968	4,792	-1,176	80.3%
		2014 VET < 2014 AA	14	1,471	1,777	306	120.8%
		2014 VET = 2014 AA	1	0	0	0	
		Comparison not possible	1	-	-	-	
			45	7,439	6,569	-870	88.3%
	Sugar production	2014 VET > 2014 AA	20	1,933	1,260	-673	65.2%
			20	1,933	1,260	-673	65.2%
1	Combustion	2014 VET > 2014 AA	1	14	13	0	96.5%
			1	14	13	0	96.5%
Total			**66**	**9,385**	**7,842**	**-1,544**	**83.6%**

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2.6.3 Production of glass and mineral fibres

The production of glass and mineral fibres includes activities 16 (glass production) and 18 (mineral fibre production). In 2014, a total of 90 installations were recorded, one less than in the previous year, of which 83 installations produced glass and seven installations mineral fibres. The carbon dioxide emissions increased again by 97,000 tonnes, or 2.4 percent, in 2014. The free allocation covers about 84.5 percent of the emissions.

Table 30: Overview of glass and mineral fibre production (Activities 16 and 18), number of installations, summary of emissions and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Production of glass and mineral fibres	90	4,046	3,500	4,143	84.5%

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Emissions

The 2014 emissions from glass production installations (Activity 16) increased by 93,000 tonnes of carbon dioxide, or 2.5 percent, compared to 2013. About two-thirds of the installations reported higher emissions in 2014 than in the previous year, a total of about 138,000 more tonnes of carbon dioxide. The emissions decreased by 45,000 tonnes in the remaining one third of the installations. The emissions from mineral fibre production installations (Activity 18) remained fairly constant compared to the previous year (plus 0.9 percent).

Table 31 shows that the emissions increased particularly in the production, finishing and processing of flat glass installations, which is used in the car industry and construction industry. Here, emissions increased by approximately 70,000 tonnes of carbon dioxide, or 5.1 percent, compared to 2013. In contrast, the emissions from hollow glass production remained broadly constant in 2014 (plus 0.6 percent). Table 31 follows the Statistical Classification of Economic Activities (NACE) and is based on information provided by the operators.

Table 31: Glass and mineral fibre production (Activities 16 and 18), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
16	Manufacture of hollow glass	2014 VET > 2013 EM	21	805	840	35
		2014 VET < 2013 EM	17	793	768	-25
			38	1,598	1,608	9
	Manufacture of glass fibres and goods thereof	2014 VET > 2013 EM	4	107	115	8
		2014 VET < 2013 EM	6	103	99	-3
			10	210	215	5
	Manufacture, and processing of flat glass	2014 VET > 2013 EM	10	755	841	86
		2014 VET < 2013 EM	6	598	582	-16
			16	1,353	1,423	70
	Manufacture and processing of other glass including technical glassware	2014 VET > 2013 EM	11	422	443	22
		2014 VET < 2013 EM	8	116	103	-12
			19	537	547	9
			83	3,699	3,792	93
18	Manufacture of glass fibres and goods thereof	2014 VET > 2013 EM	1	43	46	2
		2014 VET < 2013 EM	1	9	9	0
			2	52	55	2
	Manufacture of other non-metallic mineral products n. e. c.	2014 VET > 2013 EM	3	188	194	6
		2014 VET < 2013 EM	2	108	102	-5
			5	295	296	1
			7	348	351	3
Total			**90**	**4,046**	**4,143**	**97**

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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 and have been – with the exception of 2012 – above 4 million tonnes of carbon dioxide per year. They reached a peak in 2014, the highest since the beginning of emissions trading[25].

25 This also applies if mineral fibres, first included in ETS in 2008, are disregarded.

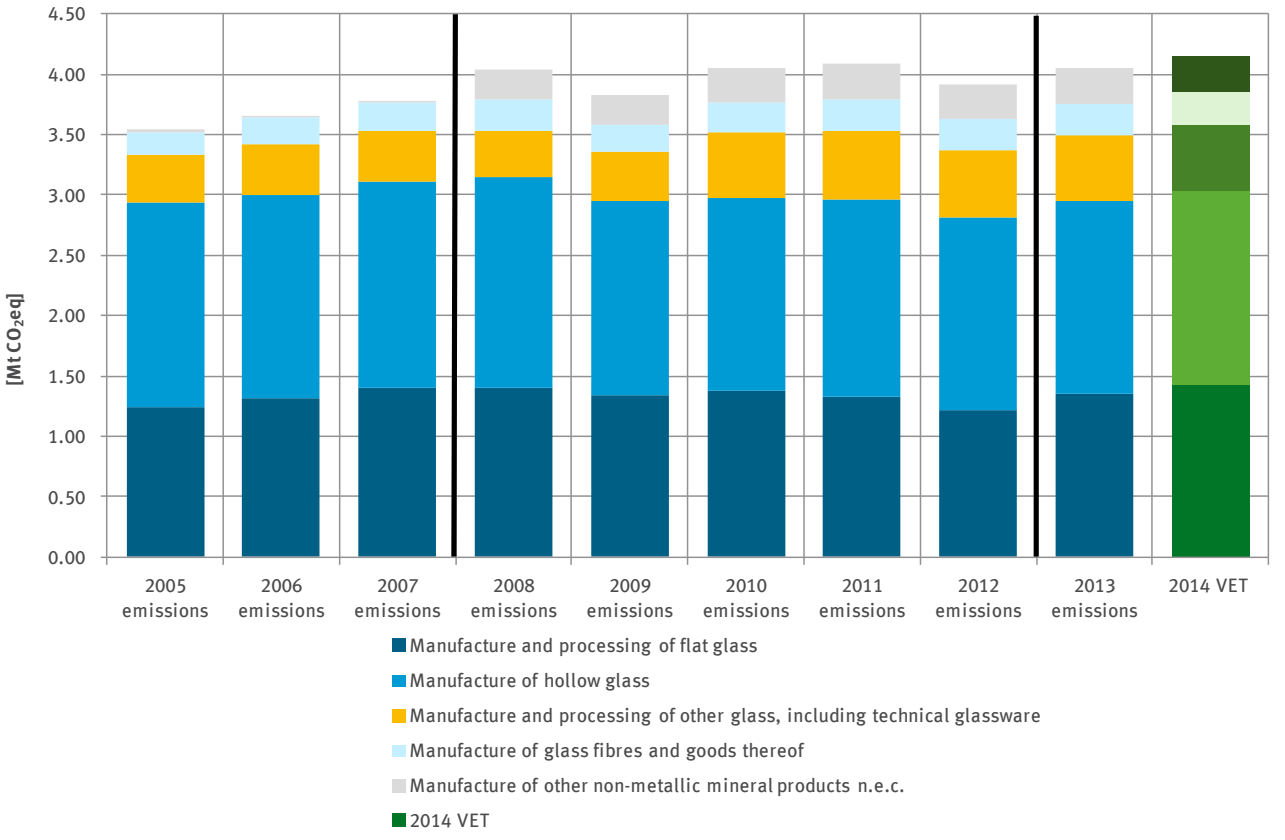

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Figure 14: Production of glass and mineral fibres (Activities 16 and 18), emission trend in Germany, 2005-2014

The emissions from flat glass production continuously increased from 2005 to 2008. After a drop in emissions in 2009, 2011 and 2012, emissions increased again in 2013 and in 2014, they reached a record level since the beginning of emissions trading. Emissions from the manufacture of hollow glass rose until 2008 then declined significantly in 2009 and 2010. Since then, emissions have only increased slightly so that they were at 95 percent of the 2005 figure in 2014.

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

Allocation status

Activities 16 and 18 together recorded a shortfall of 643,000 allowances compared to their emissions, including a shortfall of 588,000 allowances for the manufacture of glass (see Table 32). The deficit for flat glass and hollow glass was about the same.

Table 32: Glass and mineral fibres production (Activities 16 and 18), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
16	Production of hollow glass	2014 VET > 2014 AA	31	1,247	990	-258	79.3%
		2014 VET < 2014 AA	7	360	374	14	103.9%
			38	1,608	1,364	-244	84.8%
	Production of glass fibres and goods thereof	2014 VET > 2014 AA	7	162	92	-71	56.5%
		2014 VET < 2014 AA	3	53	60	8	115.1%
			10	215	152	-63	70.8%
	Production, finishing and processing of hollow glass	2014 VET > 2014 AA	13	1,300	1,064	-236	81.8%
		2014 VET < 2014 AA	3	123	135	12	109.8%
			15	1,423	1,199	-224	84.2%
	Production, finishing and processing of other glass including technical glassware	2014 VET > 2014 AA	12	390	326	-63	83.8%
		2014 VET < 2014 AA	6	157	164	6	103.9%
		2014 VET = 2014 AA	1	0	0	0	
			19	547	490	-57	89.6%
			83	3,792	3,205	-588	84.5%
18	Production of glass fibres and goods thereof	2014 VET > 2014 AA	2	55	29	-25	53.5%
			2	55	29	-25	53.5%
	Manufacture of other goods from non-metallic minerals e. n. c.	2014 VET > 2014 AA	3	214	172	-42	80.4%
		2014 VET < 2014 AA	2	82	94	12	115.0%
			5	296	266	-30	89.9%
			7	351	296	-55	84.3%
Total			**90**	**4,143**	**3,500**	**-643**	**84.5%**

As of 04/05/2015

2.6.4 Ceramics production

The emissions from Activity 17 „ceramics production“ amounted to a total of 2.1 million tonnes of carbon dioxide in 2014 and thus decreased by about three percent or 66,000 tonnes compared to the previous year. The free allocation covered on average 95.6 percent of the emissions.

Three installations were decomissioned so that a total of 152 installations are covered by emissions trading.

Table 33: Overview of ceramics production (Activity 17), number of installations, overview of the emission and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Ceramics production	152	2,127	1,971	2,061	95.6%

As of 04/05/2015

Emissions

Compared to the previous year more than half of the installations reported a decrease in emissions in 2014, by a total of 165,000 tonnes of carbon dioxide, or 12.3 percent. 69 installations reported a total of 99,000 tonnes or 12.4 percent more emissions than in 2013. In total, emissions went down by 3.1 percent or 66,000 tonnes.

Table 34: Ceramics production (Activity 17), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
17	Ceramics production	2014 VET › 2013 EM	69	788	886	99
		2014 VET ‹ 2013 EM	82	1,339	1,174	-165
		2014 VET = 2013 EM	1	0	0	0
Total			**152**	**2,127**	**2,061**	**-66**

As of 04/05/2015

Figure 15 presents the emissions trend since 2005 for the current scope of emissions trading in ceramics production. Since at the start of the third trading period 50 installations were newly included in emissions trading because of the extended scope and because these installations lack complete information regarding their past emissions, the data for Figure 15 were partly estimated[26]. In the transition from the first trading period (2005 to 2007) to the second trading period (2008 to 2012), the definition of being subject to emissions trading for installations within these activities 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 manufacture of abrasives. Their emissions are not real-term figures and can therefore reflect a „false decline“ between 2007 and 2008. However, more production installations e.g. for roof tiles and floor tiles with much larger production and emission levels were added in the third trading period.

26 All ceramics data for 2005-2010 stem from the applications for free allocation in the third trading period: some missing information for 2009 and 2010 was completed in the form of interpolated values. For the years 2011 and 2012, emissions from the emission reports were used for installations already included in the second trading period, while the values were also interpolated for the newly added installations.

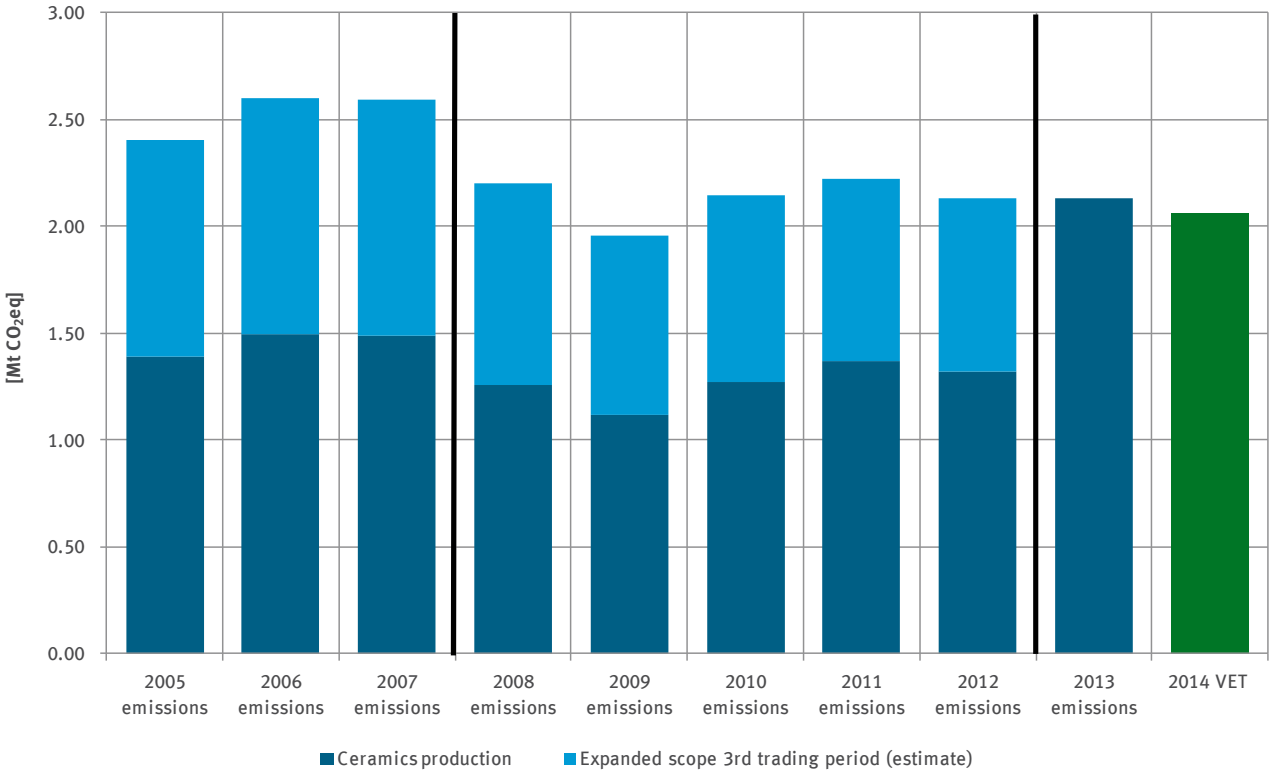

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Figure 15: Ceramics production (Activity 17), emissions trend from 2005 to 2014 in Germany

Allocation status

The supply of free allowances for the installations varies significantly: on average, 20 percent of emissions from 88 installations were not covered by the free allocation in 2014, whereas 63 installations received an over-supply of the same proportion.

Table 35: Ceramics production (Activity 17), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
17	Ceramics production	2014 VET › 2014 AA	88	1,297	1,042	-254	80.4%
		2014 VET ‹ 2014 AA	63	764	929	165	121.5%
		2014 VET = 2014 AA	1	0	0	0	
Total			**152**	**2,061**	**1,971**	**-90**	**95.6%**

As of 04/05/2015

2.6.5 Gypsum production

Nine Activity 19 installations for gypsum production have been subject to emissions trading since the start of the third trading period. In 2014 they emitted a total of 269,000 tonnes of carbon dioxide, which approximates to the same amount in the previous year (plus 0.4 percent). On average, the installations were allocated 84 percent[27] of their emissions free of charge in 2014.

27 This does not consider that the products of gypsum manufacturing have also been included in the EU Carbon Leakage List as of 2014.

Table 36: Overview of gypsum production (Activity 19), number of installations, overview of emission and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Gypsum production	9	268	226	269	83.9%

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Emissions

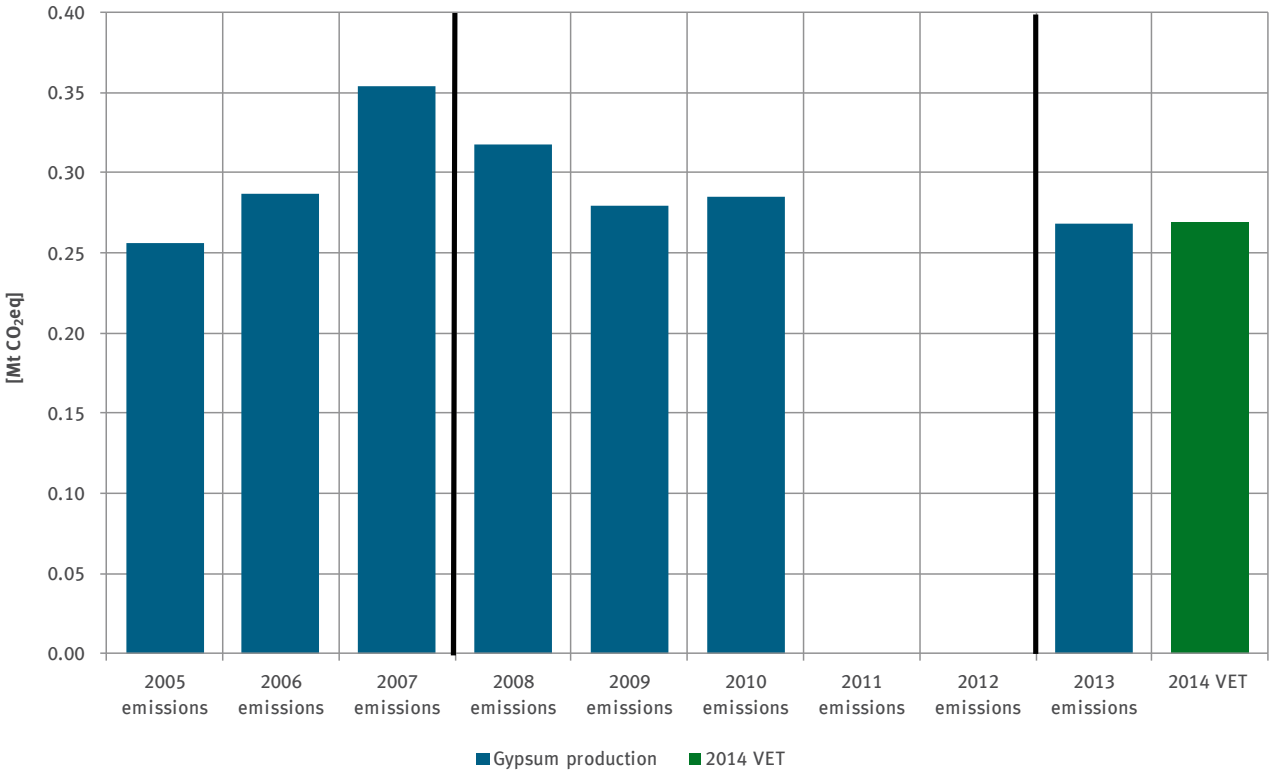
Overall, compared to the previous year, there were only minor changes in the emissions regarding gypsum manufacturers. In five installations, emissions increased in total by 3.8 percent, whereas they decreased in total by 2.9 percent in four other installations.

Table 37: Gypsum production (Activity 19), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
19	Gypsum production	2014 VET › 2013 EM	5	131	136	5
		2014 VET ‹ 2013 EM	4	138	134	-4
Total			**9**	**268**	**269**	**1**

As of 04/05/2015

Since gypsum production has only been subject to emissions trading from the start of the third trading period, there has been no complete data for the trend in emissions from 2005 (see Figure 16). Information between 2005 and 2010 has therefore been taken from the applications for free allocation. The emissions of three installations that had no available data for 2009 to 2010 were estimated by linear interpolation for this period. Figure 16 shows that after an increase, emissions have declined in 2005 to 2007, but are still slightly above the 2005 level.



As of 04/05/2015

Figure 16: Gypsum production (Activity 19), emissions trend from 2005 to 2014 in Germany

Allocation status

On average, the installations can cover 83.9 percent of their 2014 emissions with free emission allowances[28]. Therefore, the purchase requirement consists of just 43,000 emission allowances in order for installations to meet their surrender obligations. Only one installation has a surplus allocation, the 2014 emissions of all remaining eight installations exceed the free allocation.

Table 38: Gypsum production (Activity 19), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
19	Gypsum production	2014 VET > 2014 AA	8	251	204	-46	81.6%
		2014 VET < 2014 AA	1	19	21	3	113.8%
Total			**9**	**269**	**226**	**-43**	**83.9%**

As of 04/05/2015

2.7 Paper and pulp industry

The sector includes the production of pulp and paper, cardboard or paperboard manufacture (Activities 20 and 21 as per Annex 1 TEHG). Overall, the number of installations increased to 153 compared to 151 installations in 2013. Five installations are associated with pulp production and 148 with paper production. The pulp and paper industry emitted about 5.4 million tonnes of carbon dioxide equivalents in 2014. Compared to 2013 this represents a decrease of almost 2.4 percent.

28 This does not consider that the products of gypsum manufacturing have also been included in the EU Carbon Leakage List as of 2014.

Table 39: Overview of the paper and pulp industry (Activities 20 and 21), number of installations, overview of emission and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Paper and pulp	153	5,542	6,814	5,408	126.0%

As of 04/05/2015

Emissions

Production residues with very high biogenic content mainly fuel the pulp production combustion plants. The fossil emissions subject to emissions trading are therefore relatively low. The amount has decreased slightly to 135,000 tonnes of carbon dioxide from 141,000 tonnes in 2013 (see Table 40).

Compared to 2013, the paper production Activity emissions also decreased by 130,000 to 5.3 million tonnes. The emissions increased by about 165,000 tonnes in one third of the installations and decreased by 295,000 tonnes in about half of the installations. The emissions from one installation are not comparable to the previous year because it only became subject to emissions trading in 2014 through a capacity extension and therefore has no comparable VET figure for the previous year.

Similar to the chemical industry, the pulp and paper industry also has 18 so-called zero-emission installations that have been subject to emissions trading since the third trading period, even though they do not produce any carbon dioxide emissions.

2013 to 2014 emissions decreased by nearly 2.4 percent compared to the previous year, while the German paper industry production increased slightly by 0.6 percent as a whole[29].

Table 40: Paper and pulp industry (Activities 20 and 21), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
20	Pulp production	2014 VET › 2013 EM	1	3	4	0
		2014 VET ‹ 2013 EM	3	138	132	-6
		2014 VET = 2013 EM	1	0	0	0
			5	141	135	-6
21	Paper production	2014 VET › 2013 EM	54	2,049	2,213	165
		2014 VET ‹ 2013 EM	75	3,352	3,058	-295
		2014 VET = 2013 EM	18	0	0	0
		Comparison not possible	1	-	-	-
			148	5,401	5,273	-130
Total			**153**	**5,542**	**5,408**	**-136**

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In addition, the 2013-2014 emissions remained below the level of 2009 and therefore reached the lowest level since the implementation of emissions trading (see Figure 9). Compared to 2008 (the first year of the second trading period) they decreased by around 16 percent.

29 see VDP 2015, Press Release of 03/03/2015

In addition to the increased energy efficiency in production, the use of electronic media has certainly contributed to a decline in sales of paper for graphic purposes.

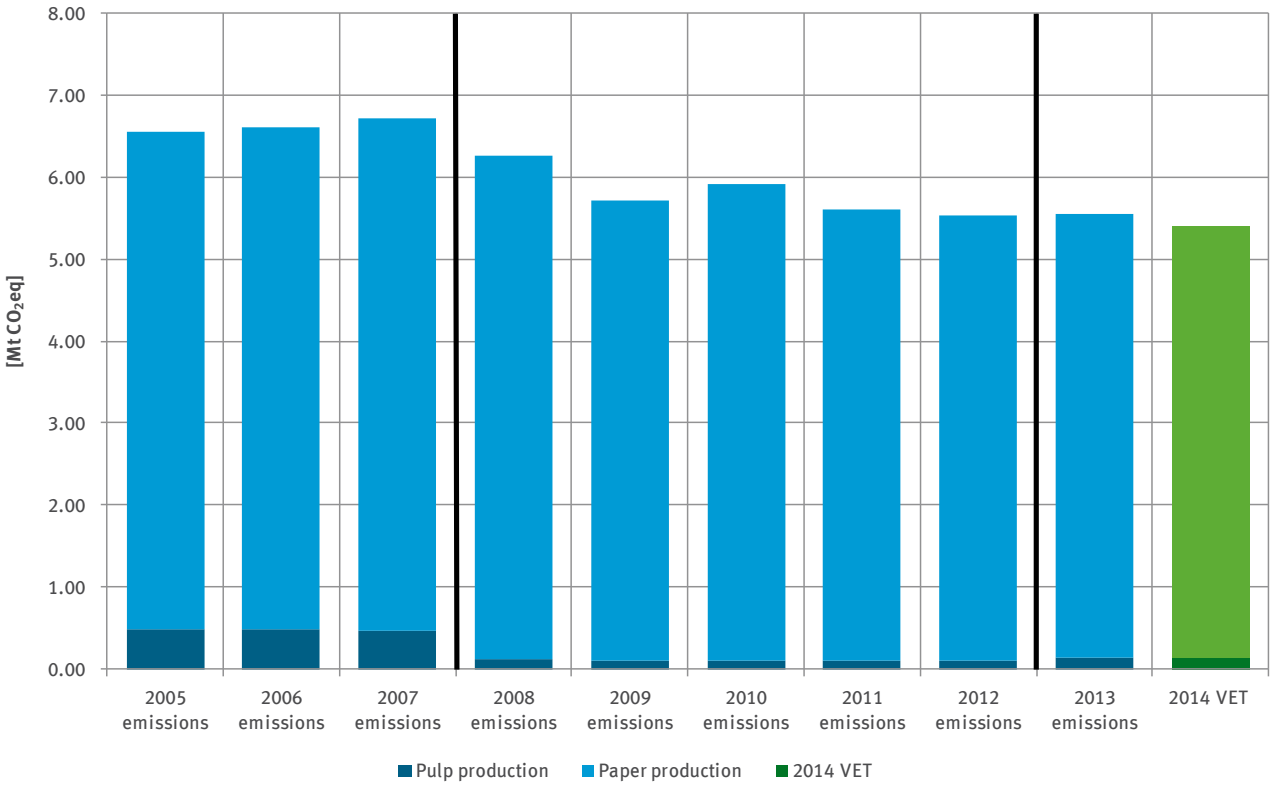

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Figure 17: Paper and pulp industry (Activities 20 and 21), emissions trend from 2005 to 2014 in Germany

Allocation

The operators of the 148 installations in the paper and pulp industry acquired 1.4 million of the total of 6.7 million emission allowances received for 2014, or 27 percent more allowances than they would need for surrender according to 2014 VET figures (5.3 million emission allowances, see Table 41). However, this surplus is very unevenly distributed among the installations: while for 74 installations the allocation exceeds the emissions by 3.1 million tonnes, i.e. the 2014 allocations are three times as high as the 2014 emissions, 69 installations are underfunded by a total of 1.7 million allowances.

With a fair degree of certainty, on the one hand this is due to the fact that power generation is no longer granted an allocation and on the other, the allocation for heat imports is distributed very unevenly.

The allocation share, which can be traced back to heat imports from other installations subject to emissions trading, can be estimated at about 1.9 million emission allowances. The allocation coverage for paper production (Activity 21) would decline to 90.5 percent (adjusted allocation coverage) without this share, which corresponds to a slight allocation shortfall.

Table 41: Paper and pulp industry (Activities 20 and 21), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
20	Pulp production	2014 VET > 2014 AA	2	116	66	-51	56.5%
		2014 VET < 2014 AA	3	19	33	14	176.4%
			5	135	99	-36	73.3%
21	Paper production	2014 VET > 2014 AA	69	3,975	2,306	-1,669	58.0%
		2014 VET < 2014 AA	74	1,298	4,409	3,111	339.7%
		2014 VET = 2014 AA	5	0	0	0	
			148	5,273	6,715	1,442	127.4%
Total			**153**	**5,408**	**6,814**	**1,406**	**126.0%**

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However, in total, the pulp industry installations had a significant shortfall of about 27 percent of the 2014 emissions.

2.8 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 a minimum of 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, provided they are independently approved in terms of pollution control.

Compared to the previous year (191 installations) the number of existing installations almost remained constant at 189 installations. The changes can be explained by starting operation and some cessations in 2014.

The chemical industry's emissions amounted to about 17.9 million tonnes of carbon dioxide in 2014. The 2014 free allocation therefore exceeded the required amount to fulfil the surrender obligation by around 2 million emission allowances (11.5 percent).

Table 42: Overview of the chemical industry (Activities 22 to 29 and 1), number of installations, summary of emissions and allocation amounts

Sector/Activity	No. of installations	2013 emissions [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	Allocation coverage
Chemical industry	189	18,078	19,962	17,904	111.5%

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Emissions

Emissions from the 189 installations declined by 160,000 tonnes of carbon dioxide, or 1 percent, compared to the previous year.

In detail, in almost all fields of activity, there were both rising and falling emissions, which in total lead to a slight decline compared to the previous year.

The biggest changes compared to the previous year came from Activity 26 (production of ammonia) with a decrease of 457,000 tonnes of carbon dioxide, or 9.7 percent, and Activity 27 (production of bulk organic chemicals) with an increase of 303,000 tonnes of carbon dioxide, or 3.8 percent. Activities 27 (8.3 million tonnes of carbon dioxide) and 26 (4.3 million tonnes of carbon dioxide) had the highest emissions within the chemical industry, followed by Activity 28 (production of hydrogen and synthesis gas) with 1.8 million tonnes of carbon dioxide. The „Miscellaneous" category comprises Activity 1 installations (combustion) and Activity 25 installations (production of glyoxal and glyoxylic acid).

Table 43: Chemical industry (Activities 22 to 29 and 1), number of installations, 2013 emissions and 2014 VET entries

No.	Activity	2014 VET vs 2013 emissions	No. of installations	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 emissions [kt CO_2eq]
22	Carbon black production	2014 VET › 2013 EM	5	629	674	45
			5	629	674	45
23, 24	Adipic and nitric acid	2014 VET › 2013 EM	6	237	269	32
		2014 VET ‹ 2013 EM	3	682	605	-76
		2014 VET = 2013 EM	2	0	0	0
			11	918	874	-45
26	Ammonia production	2014 VET › 2013 EM	2	2,036	2,190	154
		2014 VET ‹ 2013 EM	3	2,698	2,086	-612
			5	4,734	4,276	-457
27	Production of basic organic chemicals	2014 VET › 2013 EM	49	5,256	5,784	528
		2014 VET ‹ 2013 EM	40	2,743	2,517	-226
		2014 VET = 2013 EM	30	0	0	0
			119	7,998	8,301	303
28	Production of hydrogen and synthesis gas	2014 VET › 2013 EM	5	407	423	15
		2014 VET ‹ 2013 EM	9	1,413	1,359	-53
			14	1,820	1,782	-38
29	Soda production	2014 VET › 2013 EM	3	386	437	50
		2014 VET ‹ 2013 EM	2	194	180	-13
		2014 VET = 2013 EM	1	0	0	0
			6	580	617	37
1, 25	Miscellaneous	2014 VET › 2013 EM	15	532	692	160
		2014 VET ‹ 2013 EM	13	866	687	-179
		2014 VET = 2013 EM	1	0	0	0
			29	1,398	1,379	-19
Total			**189**	**18,078**	**17,904**	**-174**

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Among them are eleven installations producing adipic or nitric acid which are subject to emissions trading due to their carbon dioxide and nitrous oxide (dinitrogen monoxide, N_2O) emissions. In 2014, nitrous oxide emissions corresponded to 741,000 tonnes of carbon dioxide equivalents, making up an average of 85 percent of the total emissions for these installations.

Similar to the paper industry, there are 35 zero-emission installations in the chemical industry – mainly in the production of bulk organic chemicals, which have been subject to emissions trading from the third trading period, although they do not cause any (direct) carbon dioxide or nitrous oxide emissions.

Some installations can be attributed to large chemical corporations. By associating the operators with the corporations by name, regardless of other economic ties, BASF installations produce the highest emissions within the chemical industry (39 installations, 4.1 million tonnes of carbon dioxide), followed by the Agrofert group (3 installations, 2.4 million tonnes of carbon dioxide) and INEOS (21 installations, 2.4 million tonnes of carbon dioxide).

Since the majority of installations only reported their verified emissions from the start of the third trading period, the industry's emission trends since 2005 can only be estimated (see Figure 18). 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 from the allocation process[30], usually covering the 2005-2010 period. Emissions in the years with no emission data available from the allocation process and for 2011 and 2012 were estimated.

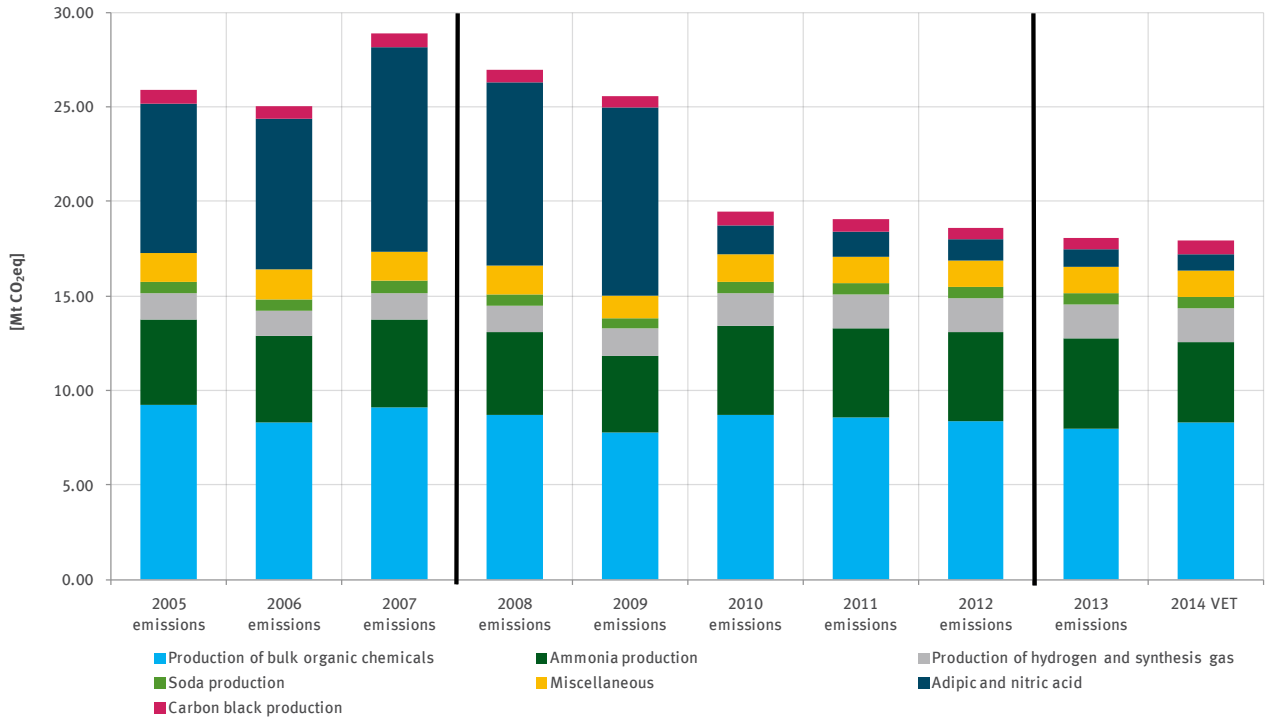

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Figure 18: Chemical industry (Activities 22 to 29 and 1), emission trend in Germany, 2005-2014

The decrease in emissions from adipic and nitric acid production since 2010 is evident. Implementing reduction technologies reduced nitrous oxide emissions relatively inexpensively, while commitments from industry, legal pollution control requirements and, chiefly, the implementation of Joint Implementation projects in Germany achieved substantial emission reductions even before the start of compulsory emissions trading.

30 These emissions are in part unchecked. Moreover, nitrous oxide emissions from adipic and nitric acid installations reported within the framework of the allocation process differ, for example, from the emissions in the National Inventory Report (cf. DEHSt 2014b).

Allocation status

The installations in the chemical industry are very well equipped with free emission allowances compared with other industries (see Chapter 3). This also applies to real-term allowance supplies.

In 2014, the operators of chemical installations received approximately 2.0 million free emission allowances – 11.5 percent more than they needed for their surrender obligation. For 106 installations, the amount of emission allowances allocated free of charge exceeded emissions by a total of around 5.3 million allowances. In contrast, 69 installations received a total of approximately 3.3 million fewer free emission allowances than they needed to fulfill their surrender obligation. In addition, there were 14 installations with a zero VET entry, which have received no free allocation.

Table 44: Chemical industry (Activities 22 to 29 and 1), number of installations, allocation amounts, 2014 VET entries and allocation coverage

No.	Activity	2014 VET vs 2014 allocation	No. of installations	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
22	Carbon black production	2014 VET › 2014 AA	4	672	547	-125	81.4%
		2014 VET ‹ 2014 AA	1	3	12	9	443.3%
			5	674	558	-116	82.8%
23, 24	Adipic and nitric acid	2014 VET › 2014 AA	3	491	261	-230	53.2%
		2014 VET ‹ 2014 AA	8	383	1,565	1,182	408.1%
			11	874	1,826	952	208.9%
26	Ammonia production	2014 VET › 2014 AA	2	2,368	1,796	-572	75.8%
		2014 VET ‹ 2014 AA	3	1,909	2,062	153	108.0%
			5	4,276	3,857	-419	90.2%
27	Production of bulk organic chemicals	2014 VET › 2014 AA	34	6,077	4,506	-1,571	74.1%
		2014 VET ‹ 2014 AA	72	2,224	5,099	2,875	229.3%
		2014 VET = 2014 AA	13	0	0	0	#DIV/0!
			119	8,301	9,605	1,304	115.7%
28	Production of hydrogen and synthesis gas	2014 VET › 2014 AA	8	1,154	708	-447	61.3%
		2014 VET ‹ 2014 AA	6	628	896	268	142.7%
			14	1,782	1,604	-178	90.0%
29	Soda production	2014 VET › 2014 AA	1	96	84	-11	88.0%
		2014 VET ‹ 2014 AA	4	522	1,021	499	195.6%
		VET 2014 = ZM 2014	1	0	0	0	#DIV/0!
			6	617	1,105	487	179.0%
1, 25	Miscellaneous	2014 VET › 2014 AA	17	1,019	707	-312	69.4%
		2014 VET ‹ 2014 AA	12	360	700	340	194.3%
			29	1,379	1,407	28	102.0%
Total			**189**	**17,904**	**19,962**	**2,058**	**111.5%**

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The largest relative surplus of free emission allowances can be seen in the installations producing adipic and nitric acid. This is due to the fact that advanced emission control technologies have been installed, which resulted in specific emissions per unit well below the specific product benchmarks for adipic and nitric acid.

Installations producing bulk organic chemicals (116 percent, or almost 1.3 million emission allowances) and installations for soda production (179 percent or 487,000 allowances) also feature a significant surplus allocation compared to their emissions. This can, in particular, be attributed to the allocation rules for cross-boundary heat flows: many of these installations import heat from other installations subject to emissions trading 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.[31]

In contrast, the free allocation for the installations producing carbon black, ammonia and hydrogen or synthesis gas was not sufficient to fully cover the emissions from the installations in 2014. The operators of ammonia installations had to purchase a total of 419,000 emission allowances on the market; hydrogen and synthesis gas producers 178,000 emission allowances. In contrast, the shortfall of carbon black installations was low (116,000 emission allowances) in absolute terms.

After subtracting the allocation for heat imports from other installations subject to emissions trading (approx. 1.6 million emission allowances) the adjusted allocation coverage in the chemical industry would still be 102.3 percent.[32]

3 Cross-sector analysis

3.1 Evaluation of the 2014 allocation status

The verified emissions of all installations subject to emissions trading in Germany totalled 461.2 million tonnes of carbon dioxide equivalents in the second year of the third trading period, which was significantly more than the free allocation amount. In 2014 a total of approximately 164.3 million free emission allowances were allocated to the operators of 1,717 out of the 1,905 German installations. On average, the free allocation covered 35.6 percent of the verified emissions of all installations in Germany (35.2 percent in 2013). The average allocation coverage was thus slightly higher than in the previous year because the total emissions declined by 3.8 percent, i.e. more than the allocation amounts. Here, the reduction was 2.6 percent vis-à-vis 2013.[33] Table 45 shows the allocation and emissions status according to activities (1 to 29).

Comparing the different activities clearly reflects the large differences between energy and industrial installations in terms of the third-trading-period allocation rules. The 928 installations in the industrial sector received a total allocation of 133.3 million emission allowances for the 2014 reporting year. This compares with total verified emissions of 123.2 million tonnes of carbon dioxide equivalents. On average therefore, the industrial sectors carried a surplus. The allocation corresponded to 108.1 percent of the surrender obligation for these installations (109.6 percent in 2013). The average allocation coverage was slightly below the previous year's level since the allocation amounts declined by 1.3 percent with almost unchanged emissions.

The adjusted allocation coverage which takes account of the transferred waste gases from iron, steel and coke production and heat imports is 93.3 percent (95 percent in 2013), i.e. below the 100 percent mark, representing a deficit rather than a surplus for the industrial sector (see Section below with Tables 46 and 47).

31 cf. DEHSt 2014a: Results of the free allocation of emission allowances to existing installations for the 3rd trading period 2013-2020, Chapter „Chemical Industry"

32 cf. Chapter 3, Table 46: 2014 allocation coverage by sectors

33 The change in the average allocation coverage depends on the ratio of the average emission to the average allocation. That the average allocation coverage of all installations increased compared to the previous year, although the corresponding value for both industry and energy sector decreased, is due to the very high proportion of industrial installations in the total allocation amount and the energy installations in the overall emissions. Thus the relatively weak decrease in allocations to industrial facilities has been overcompensated by a large emission drop in the energy sector (for this, see the two following paragraphs).

The situation for the 977 energy installations (Activities 2-6) is fundamentally different. Due to the discontinuation of the free allocation for power generation in the third trading period, the ratio of free allocation to verified emissions on average was only 9.2 percent, thus about the same as in the previous year (9.4 percent in 2013). Overall, the energy installations received an allocation of 31.1 million emission allowances for heat production in 2014, while the verified emissions accounted for 337.9 million tonnes of carbon dioxide equivalents. The allocation for the 977 installations under consideration reduced by 7.6 percent, which is somewhat greater than the decrease of 5.1 percent in the previous year.

The adjusted allocation coverage shows a rather more favourable ratio for the energy sector at 14.6 percent (14.7 percent in 2013) (see Section below with Tables 46 and 47).

Table 45: Allocation status by activities in 2014 (allocation coverage)

Sector	No.	Activity	No. of installations	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]	2014 allocation surplus [1000 EUA]	2014 allocation coverage*	*2013 allocation coverage**
Energy	2	Energy conversion ≥ 50 MW RTI	492	25,740	331,057	-305,318	7.8%	*8.0%*
	3	Energy conversion 20–50 MW RTI	418	4,019	5,456	-1,430	73.7%	*73.7%*
	4	Energy conversion 20–50 MW RTI, other fuels	11	199	153	46	130.3%	*128.5%*
	5	Prime movers (engines)	3	64	56	7	113.2%	*112.5%*
	6	Prime movers (turbines)	53	1,040	1,210	-170	86.0%	*73.9%*
Energy			977	31,062	337,932	-306,864	9.2%	*9.4%*
Industry	1	Combustion	73	2,035	2,085	-49	97.6%	*99.8%*
	7	Refineries	24	20,980	24,984	-4,244	84.0%	*80.6%*
	8	Coking plants	4	1,770	3,836	-2,067	46.1%	*48.4%*
	9	Processing of metal ores	1	70	71	-1	98.3%	*103.3%*
	10	Production of pig iron and steel	31	43,770	26,977	16,794	162.3%	*168.9%*
	11	Processing of ferrous metals	90	4,777	5,418	-641	88.2%	*90.8%*
	12	Production of primary aluminium	7	951	954	-2	99.7%	*84.9%*
	13	Processing of non-ferrous metals	31	1,593	1,527	66	104.4%	*110.1%*
	14	Production of cement clinker	37	18,398	19,598	-1,200	93.9%	*98.5%*
	15	Lime production	65	7,829	9,372	-1,543	83.5%	*84.3%*
	16	Glass production	83	3,205	3,792	-588	84.5%	*84.4%*
	17	Ceramics production	152	1,971	2,061	-90	95.6%	*93.5%*
	18	Production of mineral fibres	7	296	351	-55	84.3%	*84.7%*
	19	Gypsum production	9	226	269	-43	83.9%	*94.0%*
	20	Pulp production	5	99	135	-36	73.3%	*71.6%*
	21	Paper production	148	6,715	5,273	1,442	127.4%	*127.5%*
	22	Carbon black production	5	558	674	-116	82.8%	*90.9%*
	23, 24	Adipic and nitric acid	11	1,826	874	952	208.9%	*202.3%*
	25	Production of glyoxal and glyoxylic acid	1	8	12	-3	70.9%	*80.8%*
	26	Ammonia production	5	3,857	4,276	-419	90.2%	*83.0%*
	27	Production of bulk organic chemicals	119	9,605	8,301	1,304	115.7%	*122.1%*
	28	Production of hydrogen and synthesis gas	14	1,604	1,782	-178	90.0%	*89.7%*
	29	Soda production	6	1,105	617	487	179.0%	*193.8%*
Industry			928	133,249	123,241	9,770	108.1%	*109.6%*
Total result			**1905**	**164,310**	**461,173**	**-297,094**	**35.6%**	*35.2%*

* Disregarding potential settling in forwarding waste gases from iron, steel and coke production and heat imports
Source: DEHSt
As of 04/05/2015

However, in addition to the energy sector, the discontinuation of the free allocation for power generation also applies to industrial activities in which heating and power plants are usually in operation such as in refineries and the paper industry installations. In 2014, refineries received an allocation that corresponded to 84.0 percent of their verified emissions (80.6 percent in 2013). In the paper industry, the elimination of the allocation for power generation will be more than offset by the allocation rules for cross-boundary heat flows to such an extent that it will even create a surplus of free emission allowances (see Section 2.7, Allocation status in the paper and pulp industry). For installations in the paper industry, the ratio of allocation to verified emissions was 127.4 percent (127.5 percent in 2013).

Pig iron and steel production also features a large surplus relative to their emissions – the ratio of free allocation to emissions was 162.3 percent (168.9 percent in 2013). This situation, however, must be regarded in a differentiated way similar to the cross-boundary heat flows in the paper and chemical industries since the allocation claim does not necessarily emerge at the installations where the emissions actually occur. Installations in the iron and steel industry receive an allocation for the production of waste gases from iron, steel and coke production, although the emissions are released in the importing installation where the waste gases have been transferred to (see Section 2.4, Allocation status in the iron and steel industry, including coking plants).

Allocation status taking into account waste gases from iron, steel and coke production and heat imports

The allocation that can be traced back to waste gases forwarded from iron, steel and coke production, and heat imports from other installations subject to emissions trading, had a significant impact on the allocation coverage for the sectors concerned. An estimated 15 million emission allowances can be assigned to waste gases forwarded from iron, steel and coke production to energy installations, approximately 3.5 million emission allowances to energy installations importing heat. Assuming that those quantities were settled among industrial and energy sector operators, the industrial sector exhibited a shortfall of about 8.2 million emission allowances in 2014. Thus the allocation coverage would be 93.3 for the industrial sector, instead of the above 108.1 percent, which rather corresponds to a shortfall than a surplus.

Conversely, under the assumptions made for the energy sector, the adjusted allocation coverage, i.e. the ratio of adjusted allocation to verified emissions, increased from 9.2 to 14.6 percent in 2014. Table 46 summarises the 2014 adjusted allocation status based on forwarded waste gases from iron, steel and coke production and imported heat at the sectors level.

Table 46: Adjusted allocation coverage (taking into account waste gases from iron, steel and coke production and heat imports)

Sector	Branch	No. of installations	2014 allocation amount	2014 VET	2014 allocation coverage	2014 real-term allocation [M EUA]	2014 adjusted allocation coverage
Energy	Energy installations	977	31.1	337.9	9.2%	49.4	14.6%
		977	31.1	337.9	9.2%	49.4	14.6%
Industry	Other combustion plants	43	0.6	0.6	98.1%	-	-
	Refineries	24	21.0	25.0	84.0%	-	-
	Iron and steel	127	50.4	36.4	138.5%	35.6	98.0%
	Non-ferrous metals	38	2.5	2.5	102.6%	-	-
	Mineral processing industry	354	31.9	35.5	90.1%	-	-
	Paper and pulp	153	6.8	5.4	126.0%	4.9	90.5%
	Chemical industry	189	20.0	17.9	111.5%	18.3	102.3%
		928	133.2	123.2	108.1%	115.0	93.3%
Total result		**1905**	**164.3**	**461.2**	**35.6%**	**-**	**-**

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Allocation status in the overall 2008-2014 period

In addition to the 2014 allocation surpluses (shortfalls), the relevant figures for the installations considered in this report from the previous years are included in the following in order to obtain an extended review of the current allocation status. This seems appropriate because emission allowances allocated since 2008 could be converted into emission allowances for the current trading period and therefore can continue to be used for surrender obligations in emissions trading. For industrial activities, an overall cumulative allocation surplus resulted from the balance of free allocation and verified emissions in the second trading period (2008 to 2012) totalling 101.4 million allowances.[34] The cumulative allocation surplus amounted to another 21.8 million allowances in the first two years of the third trading period (2013 to 2020). This resulted in a total allocation surplus of 123.3 million emission allowances for industrial activities in the 2008-2014 period.

Under the assumption that the allocations for forwarded waste gases from iron, steel and coke production and imported heat (36.9 million allowances in 2013 to 2014) will be settled between the operators of the industrial and energy sectors, the industrial sector exhibits an accumulated deficit of 15.1 million emission allowances for the first two years of the third trading period, but this is offset by the surpluses accrued in the second trading period. The total allocation surplus for industrial activities in the 2008-2014 period would be 86.3 million emission allowances according to this delineation. Table 47 summarises the aggregated results differentiated by industrial and energy sectors.

Table 47: Pooled allocation status in the second and third trading periods

Sector	No. of installations	Cumulative allocation surplus				
		2008-2012* [M EUA]	2013-2014** [M EUA]	Real-term 2013-2014*** [M EUA]	2008-2014 [M EUA]	Real-term 2008-2014 [M EUA]
Energy	977	-367.2	-629.3	-592.4	-996.5	-959.6
Industry	928	101.4	21.8	-15.1	123.3	86.3
Total	**1,905**	**-265.8**	**-607.5**	**-607.5**	**-873.2**	**-873.2**

* Including redistribution of emission allowances for forwarded waste gases from iron, steel and coke production pursuant to § 11 Allocation Act (Zuteilungsgesetz)
** Disregarding potential compensations in forwarding waste gases from iron, steel and coke production and heat imports
*** Considering potential compensations in forwarding waste gases from iron, steel and coke production and heat imports
As of 04/05/2015

Unlike in the industrial sector, this resulted in an allocation shortfall of 367.2 million emission allowances for the energy installations in the second trading period. Apart from the ambitious level of the benchmarks at the time and the proportional cuts to secure the budget, this is also due to the fact that the free allocation for power generation was reduced in Germany in the second trading period in favour of auctioning emission allowances.[35] Auctioning has been the exclusive standard for power generation in Europe since 2013. The cumulative allocation shortfall in the energy sector including 2014 increased to a total of 996.5 million emission allowances (629.3 million allowances of it in the third trading period) when the balance from the second trading period is taken into account.

Assuming the free allocation for waste gases from iron, steel and coke production and heat imports is settled between the industrial and energy sectors, the shortfall decreases for the entire 2008 – 2014 period by 36.9 million allowances to 959.6 million.

34 Including redistribution of emission allowances for forwarded waste gases from iron, steel and coke production pursuant to § 11 Allocation Act (Zuteilungsgesetz) 2012

35 The free allocation for power generation was reduced by 38 million allowances each year in favour of the sales budget according to the specifications of § 20 Allocation Act 2012.

Monetary valuation of the allocation status

Reference prices of the most liquid trading venue for emission allowances are used for a monetary valuation of the allocation status. 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 started third trading period.[36] 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 April 2015 this price was only 5.51 euros.

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

Time period	2nd trading period 01/2008-04/2013 [Euro/EUA]	3rd trading period 01/2013 bis 04/2015 [Euro/EUA]
Price*	13.62	5.51

* VWAP ICE EUA Front December
Source: ICE, Thomson Reuters, DEHSt calculation
As of 04/05/2015

In the period from January 2008 to April 2013, the cumulative allocation surpluses of the industrial activities from the second trading period (101.4 million allowances) therefore had an average market value of around 1.38 billion euros. Using the current average price of the third trading period, the market value of the surpluses from 2013 and 2014 (21.8 million allowances) amounts to around 120 million euros. Assuming that the allocations for transferred waste gases from iron, steel and coke production and imported heat quantities were settled between the installation operators of the industrial sector and the energy sector in the third trading period, the average market value of the resulting allocation shortfall from the period 2013 to 2014 would amount to around 80 million euros (15.1 million allowances).

For energy installations, the average market value of their aggregated allocation shortfall in the second trading period (367.2 million emission allowances) was just over 5 billion euros. On an annual average, this corresponds to around one billion euros (73.4 million allowances). So far, the average shortfall in the third trading period (314.6 million emission allowances) had an average market value of nearly 1.73 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 328 percent, its market value grew by only 73 percent. The price trend for emission allowances for the period between January 2008 and April 2015 is shown in Figure 19.

36 The prices mentioned can be calculated as the average of the volume-weighted daily average prices. Only actually completed trade agreements („trades") were included in the calculation.

Source: ICE, Thomson Reuters, graph by DEHSt
As of 04/05/2015

Figure 19: Price trend of emission allowances (EUA) in the second and third trading periods

In assessing the accumulated surpluses and the shortfall, it is important to note that in addition to emission allowances (EUA), installation operators were also able to surrender international project credits (CER/ERU) in the second trading period. German operators were allowed to surrender CER/ERU up to an amount equal to 22 percent of their allocation. Unused claims usually also remained available in the third trading period[37]. 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 CER are currently at 0.53 euros (as of 13/04/2015). Since 20/03/2015 ERU have no longer been offered for trading at the London ICE; just before the due date of the futures contract from the previous March, the price was at a few euro cents.

In the energy sector, the actual monetary burden for covering the allocation shortfall is therefore likely to be lower than when considering the allocation amounts and benchmarks exclusively. Accordingly, through the use of project credits, the monetary burden or monetary use of emissions trading should further improve in the industrial sectors.

3.2 Assessment of emission reduction

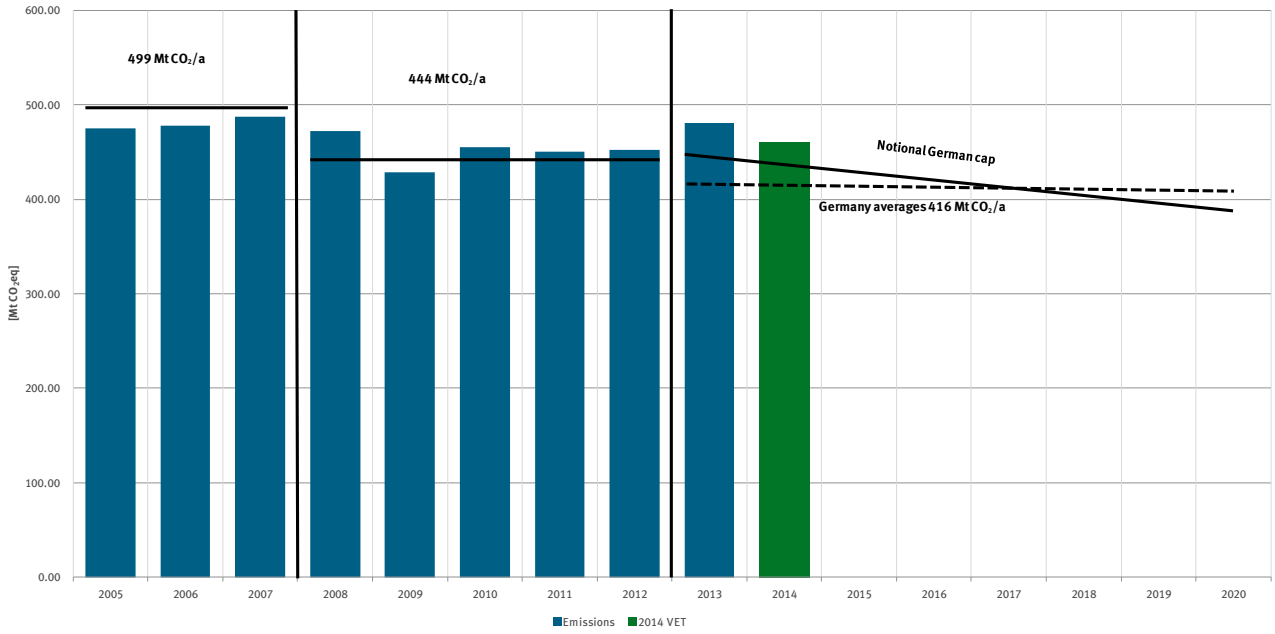
Through the European Emissions Trading Scheme and the Effort-Sharing-Decision for the sectors not covered by emissions trading, Germany is committed to legally binding measures to achieve the European climate protection targets. While the emission caps were set at the national level in the first two trading periods (2005 to 2007, 2008 to 2012), an EU-wide cap has applied since 2013, derived from an EU-wide baseline in accordance with Article 9 of the Emissions Trading Directive and is annually reduced by the so-called linear reduction factor, currently 1.74 percent. Figure 20 shows the emissions from 2005 to 2013 subject to emissions trading and the sum of the 2014 VET entries for stationary installations, i.e. not including aviation. The scope, i.e. the emissions subject to emissions trading, increased specifically during the transition from the second to the third trading period. In the first trading period (2005 to 2007), the national emission cap stood at an average of 499 million, while in the second trading period (2008 to 2012), at an average of 444 million tonnes of carbon dioxide per year.[38]

37 CER/ERU can no longer be used directly for the surrender, instead they must be exchanged at the DEHSt into EUA.

38 The figure refers to the actual average emission allowances issued in 2008-2012. The maximum possible amount issued for the second trading period amounts to 452 million emission allowances.

Only a notional German[39] share in the EU-wide cap can be determined for the third trading period (2013 to 2020) because there are no national emission caps anymore. This is also illustrated in Figure 20 in order to assess the emissions trend of German installations. The solid line in this case represents Germany's notional share in the cap for the respective year and the broken line shows the average German share in the third trading period cap. The emissions and caps in the figure form the effective scope of the relevant trading period.

The emissions of installations subject to emissions trading in Germany have been, with the exception of the crisis year 2009, above the national caps since the beginning of the second trading period, and above the notional German cap since 2013. However, in the second trading period, German installation operators were able to meet their surrender obligation through the surrender of project credits from the flexible mechanisms CDM and JI (Clean Development Mechanism and Joint Implementation) as part of its permissible utilisation quota[40], so that, overall, German operators were not compelled to buy emission allowances from other Member States in the second trading period. Operators facing limitations can use project credits even after 2013, provided that they have not exhausted their quotas.[41]



As of 04/05/2015

Figure 20: Emission trend and German Cap 2005-2012, notional German cap from 2013[42]

In the 2010 energy concept, the German federal government has decided to reduce Germany's emissions compared to 1990 by 40 percent by 2020. Since current predictions show that Germany cannot reach this goal with the current climate policy instruments, the German federal government decided to adopt a „Climate Action Programme 2020" on 03/12/2014 to achieve this goal. The programme also highlights the importance of an early reform and the strengthening of emissions trading. Without an efficient price signal, operators of installations subject to emissions trading do not have enough incentives for additional investments in emission reduction measures.

39 The calculation of the (notional) German Cap share here is analogous with the Cap determination at EU level in accordance with Article 9 of the Emissions Trading Directive, i.e. by updating the German emissions budget of the second trading period through the application of the linear reduction factor as of 2010 plus the newly added activities and gases in the third trading period.

40 see DEHSt 2012, Section „Use of project credits"

41 The current total claim for the use of project credits from 2008 to 2020 down to installations is visible on the Union Registry website: http://ec.europa.eu/environment/ets/ice.do

42 The figure shows the notional Cap trend that is not identical with the factual, annually available supply. Deviations result, for example, from unencumbered allocation and reserve quantities or from changes in the auction calendar (e.g. backloading).

3.3 Comparison with other Member States

About 11,500 installations and 530 aircraft operators in the 28 Member States of the European Union and the three associated countries Iceland, Liechtenstein and Norway participate in European emissions trading[43]. At 1.8 billion tonnes of carbon dioxide equivalents[44], the total emissions subject to emissions trading from stationary installations exceed the amount issued or auctioned in 2014 by around 24 percent, but is still below the budget of 2.05 billion allowances for 2014. The aviation emissions subject to emissions trading amounted to 56.3 million tonnes of carbon dioxide emissions, 10.3 percent (5.8 million) of which are covered by auctioned emission allowances (EUAA-share for 2014).

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 Emissions Trading Directive was also considered in Figure 21. A significant change compared to the previous year happened in the auctioning sector through the introduction of the so-called backloading in March 2014 which aims to withhold a portion of the emission allowances (900 million) from the auctions between 2014 and 2016 and to only auction them at the end of the third trading period. The aim of this measure is to reduce the surplus of emission allowances on the market and to stabilise allowances prices. In 2014, as a result of backloading, around 400 million emission allowances less were auctioned than originally intended in Europe[45]. Figure 21 also takes into account the 2014 retained amounts per Member State through backloading.

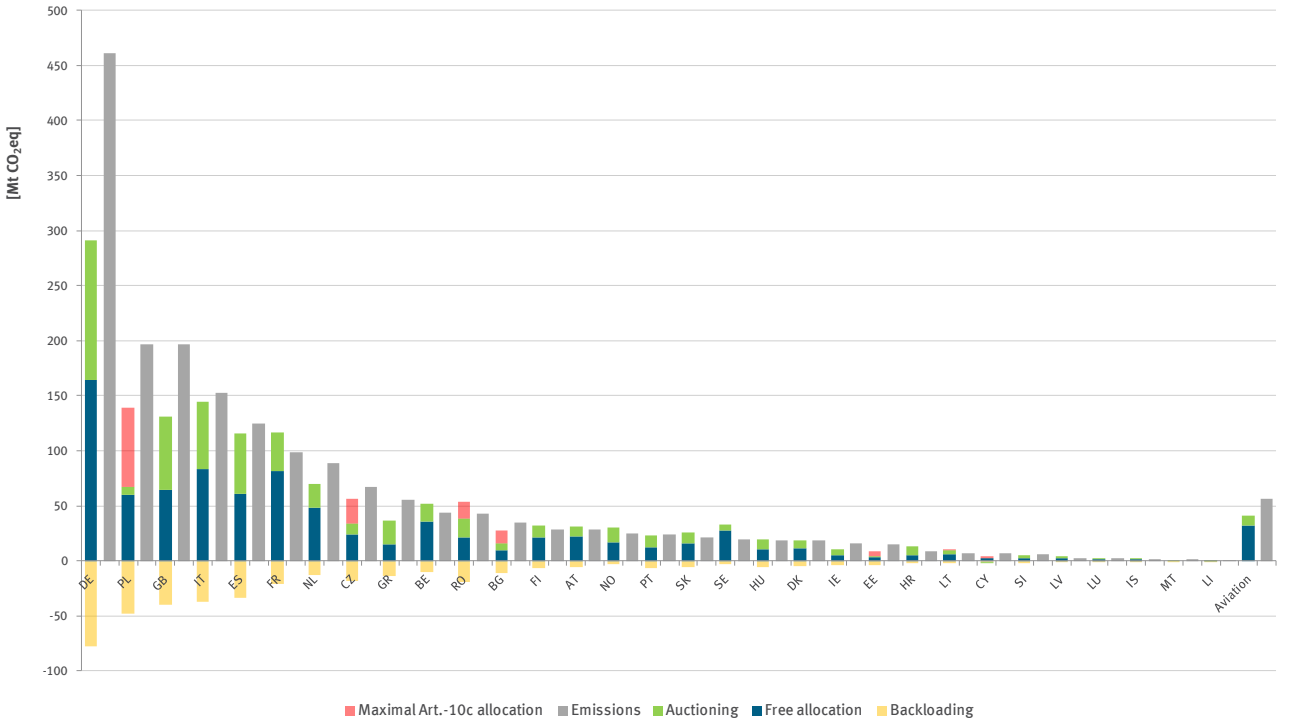
The overriding comparison between countries gives an idea about the approximate respective demand for emission allowances. However, this representation does not allow for conclusions about the respective mitigation requirements in the Member States. To this end, a comparison of emissions with the respective notional shares in the total EU budget would be more suitable (as described for Germany in Section 3.2). 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 Romania and Bulgaria.

At 461.2 million tonnes of carbon dioxide equivalents, the German installations emit 25 percent of all emissions in European emissions trading, followed by the installations in Poland at 196.9 million and installations in Great Britain with 196.3 million tonnes of carbon dioxide equivalents (11 percent each).

43 The number of operators is simplified and equated with the number of open accounts in the Union Registry (see COM 2015b)

44 Sources: COM 2015a and COM 2015b, as well as own calculations

45 In 2015 and 2016, 300 million and 200 million, respectively, are retained from sales within the framework of backloading. The auction amounts detained between 2014 and 2016 are planned to be returned in 2019 and 2020.



As of 04/05/2015

Figure 21: Emissions, free allocation and auction amounts[46] for 2014 comparing all countries participating in the EU ETS and for aviation[47]

4 Emissions in aviation

4.1 Development of EU emissions trading in aviation

In principle, since 01/01/2012 flights that land and take off at airports within the European Economic Area (EEA)[48] have been obligated to participate in emissions trading. Monitoring and reporting obligations regarding their emissions have existed since 2010. This also applies to flights of aircraft operators that have their headquarters outside of the EU.

At the same time, negotiations are held within the framework of the International Civil Aviation Organisation (ICAO) regarding a global instrument for the reduction of aviation emissions. To set a positive example for the negotiations at an ICAO level, the EU renounced the sanctioning of violations in 2012 for the reporting and surrender obligations for flights subject to emissions trading that started or ended outside of 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 the autumn of 2013. In principle, the assembly decided to introduce a global market-based measure to reduce global aviation emissions starting with 2020 and to establish working groups for the specific development of this global instrument. The next ICAO General Assembly in 2016 aims to settle on a global, market-based emissions reduction instrument.

Therefore, after the ICAO General Assembly the scope of the Emissions Trading Directive (EHRL) 2003/87/EC was reduced on the initiative of the European Commission – this time not only in the form of a one-year suspension, but as a change in the directive[49]. Thus, emissions from flights that begin or end outside of the EEA[50] are not subject to emissions trading between 2013 and 2016.

46 The 2014 auction amount of EUAA was about 9.3 million EUA. Details about the auctioning of emission allowances can be found on the European Commission website on auctioning: http://ec.europa.eu/clima/policies/ets/cap/auctioning/faq_en.htm.

47 In addition, it illustrates the maximum possible free allocation under Article 10c EHRL (see http://ec.europa.eu/clima/policies/ets/cap/auctioning/docs/process_overview_10c_2014_en.pdf), which was deducted from the auction amount of the respective countries, but is not included in the free allocation.

48 For 2012 and 2013: EU 27 (without Croatia at that point) and Norway, Iceland, Liechtenstein (no airport)

49 Regulation (EU) No. 421/2014 of 16/04/2014.

50 For 2014: EU 28 (including Croatia) and Norway, Iceland, Liechtenstein (no airport)

Unlike in 2012, flights from the EEA to Switzerland or return are not subject to emissions trading either. Moreover, non-commercial aircraft operators are exempt from emissions trading, if their annual emissions based on the original full scope are less than 1,000 tonnes of carbon dioxide. The Regulation amending the Directive also specifies that the 2013 emissions of flights subject to emissions trading must be reported by 31/03/2015 and that the corresponding emission allowances should be surrendered by 30/04/2015. This is why the previous report on VET emissions contained no mention of the emissions from the aviation sector. The 2014 emissions are once again subject to regular deadlines so that this year's report on VET emissions once more includes aviation emissions.

4.2 Methodology of emission calculations in aviation

The emissions of aircraft operators administered by Germany must be distinguished from the emissions of stationary installations. Emissions from stationary installations must be explicitly attributed to Germany according to the territorial principle, while aviation emissions follow a different pattern.

To simplify the administration, each aircraft operator is assigned to an administrative Member State. What matters is whether a permit by a European country is available. If this is not the case, the allocation will go to the country that has the largest estimated proportion of emissions in relation to the flights of the aircraft operator[51].

Aviation emissions will only be assigned to the emissions of a country in the emissions report of the national greenhouse gas inventory if a flight takes off in the country in question. Since in the emissions trading scheme, aircraft operators are distributed among individual Member States, all flights subject to emissions trading of a specific operator are assigned to a Member State for administration. Therefore, Germany also administers flights that do not start in Germany, and therefore emissions, which do not emerge in Germany. Other Member States of the EU ETS also administer, among others, flights departing from Germany, and therefore aviation emissions territorially attributable to Germany in the greenhouse gas inventory.

In addition, inventory relevant emissions by flights not subject to emissions trading are missing in this case. As per Annex 1 No. 33 TEHG, all aircraft flights with a maximum take-off mass of less than 5,700 kg are not subject to emissions trading. Military, police, customs, non-EU governments flights, flights for research purposes, sightseeing and practice flights are also excluded from the scope of emissions trading. In addition, flights of commercial aircraft operators that perform fewer than 243 flights in a third of a year or emit less than 10,000 tonnes of carbon dioxide annually are also exempt. An aircraft operator is commercial if it provides paid transportation services to the public. From 2013 to 2020, non-commercial small emitters are also excluded from emissions trading, if their annual emissions are less than 1,000 tonnes of carbon dioxide.

Therefore, a complete determination of the German aviation emissions in accordance with the allocation scheme of the national greenhouse gas emission inventory cannot be made on the basis of emission reports.

4.3 Overview

According to the list of administrative Member States, Germany is responsible for 498 aircraft operators for the 2014 reporting year. This assignment is purely administrative, because not all of these operators perform activities subject to emissions trading every year. Furthermore, cases of cessations and insolvency proceedings are also partly included in this list. In addition, the number of aircraft operators with activities subject to emissions trading decreases significantly by excluding small emitters with less than 1,000 tonnes of carbon dioxide per year. In accordance with the present emission estimates from Eurocontrol, 66 (in 2013) and 65 (in 2014) aircraft operators assigned to Germany are subject to emissions trading.

51 Directive 2008/87/EC Article 18a (1) b)

Table 49: Overview of aviation, number of aircraft operators, summary of emission and allocation amounts

Year	No. of operators	Allocation amount [1000 EUA]	VET [kt CO_2eq]	Allocation coverage
2013	62	5,141	8,686	59.2%
2014	65	5,130	8,848	58.0%

As of 04/05/2015

60 operators reported the emissions of their flights subject to emissions trading in 2013, 65 in 2014 i.e. all operators subject to emissions trading. The 2013 and 2014 emissions of flights subject to emissions trading amounted to about 8.7 or 8.8 million tonnes of carbon dioxide[52]. The allocation coverage for aircraft operators administered by Germany and receiving free emission allowances amounts to about 59 percent for 2013 and 58 percent for 2014, which means that aircraft operators had to acquire a total of about 3.5 and 3.7 million emission allowances.

4.4 Emissions

Table 50 illustrates commercial and non-commercial aircraft operators with the associated reported 2014 VET emissions; two-thirds of operators are commercial and one-third is non-commercial. This ratio was the other way around in 2012 because the flights of non-commercial aircraft operators with emissions below 1,000 tonnes of carbon dioxide per year were subject to emissions trading.

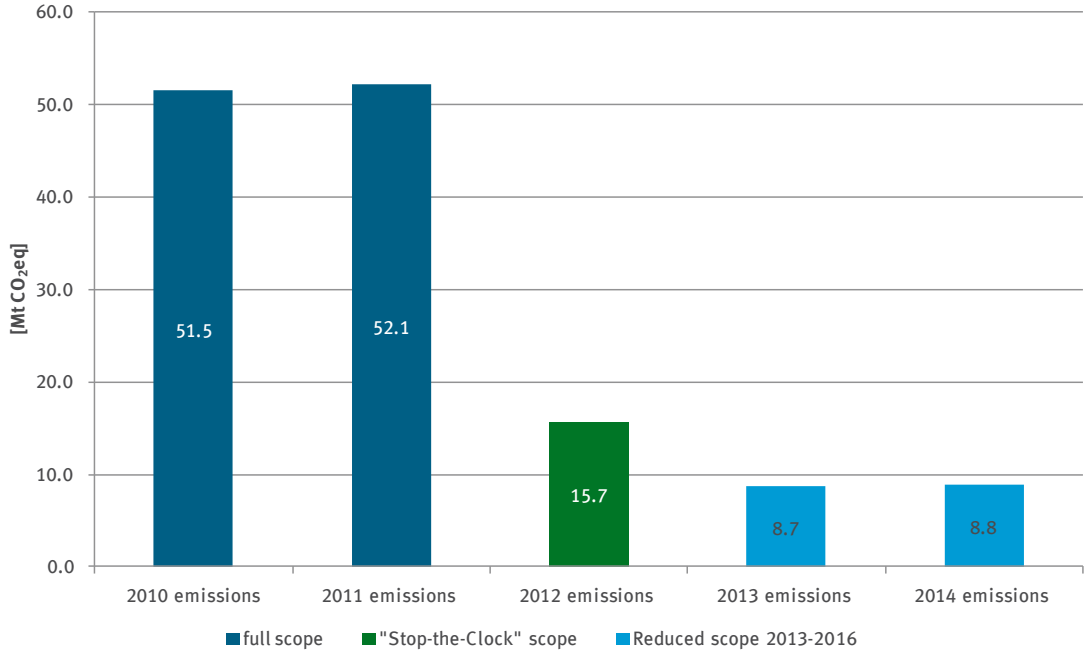
Table 50: Aviation, number of aircraft operators, 2013 emissions and 2014 VET entries divided into operator categories

Operator category	2014 VET vs 2013 VET	No. of operators	2013 emissions [kt CO_2eq]	2014 VET [kt CO_2eq]	2014 VET deviation from 2013 VET
Commercial	2013 VET › 2014 VET	17	4,651	4,169	-482
	2013 VET ‹ 2014 VET	25	3,994	4,639	644
	Comparison not possible	3	-	2	-
		45	8,646	8,810	162
Non-commercial	2013 VET › 2014 VET	8	17.5	13.2	-4.3
	2013 VET ‹ 2014 VET	11	21.6	24.3	2.7
	Comparison not possible	1	-	0.1	-
		20	39.0	37.5	-1.6
Total		**65**	**8,685**	**8,848**	**161**

As of 04/05/2015

Overall, the emissions from flights subject to emissions trading amount to about 8.8 million tonnes of carbon dioxide. The proportion of commercial operators in the emissions total is 99.6 percent, while the emissions from non-commercial aircraft operators have only a 0.4 percent share. Compared to 2013, emissions from 45 commercial aircraft operators increased by nearly two percent, the emissions from the 20 non-commercial operators fell by four percent.

52 In 2014 the emissions of intra Croatian flights were initially subject to emissions trading. However, they amounted to only 20 tonnes of carbon dioxide from aircraft operators administered by Germany.



As of 04/05/2015

Figure 22: Aviation (aircraft operators managed by Germany) trend of emissions subject to emissions trading 2010 to 2014

Figure 22 shows the EU ETS emissions in aviation administered by Germany since 2010. In 2010 and 2011, emissions of all flights starting or landing in the EEA had to be reported. The obligation to surrender emission allowances occurred for the first time in 2012.

Due to the introduction of „Stop the Clock“[53] the actual extent of emissions administered by Germany amounted to only 30 percent of the full scope[54]. In 2012, aircraft operators were able to choose to report their emissions in accordance with the full scope of the EU ETS or only the emissions for flights within the European Economic Area –provided that they return the free allocations for the remaining flights in this case. Aircraft operators with an allocation exceeding their 2012 emissions regarding the full scope therefore decided to report in accordance with the full scope in 2012. Since 2013, the share of emissions subject to emissions trading of aircraft operators managed by Germany amounted to only about 17 percent of the full scope[55].

4.5 Allocation status

Reporting year 2013

51 of the observed 60 operators receive a free allocation for the year 2013. Overall, the free allocation covers about 59 percent of the emissions. Non-commercial aircraft operators receive distinctly fewer emission allowances than commercial operators. Their 2013 allocation is only about four percent, while the allocation coverage for commercial aircraft operators is 59 percent. The amount of free allocations depends on the 2010 transport performance of the operators in tonne-kilometres. Non-commercial aircraft operators on average have a higher fuel consumption in relation to the transport performance. This is due to the use of generally smaller aircraft types, low capacity utilisation and the operation methods. Therefore, they are provided with a considerably lower free allocation than that of commercial aircraft operators.

53 Decision No. 377/2013/EU of the European Parliament and Council of 24 April 2013
54 Percentage calculated based on the emission estimates by Eurocontrol for aircraft operators administered by Germany
55 Percentage calculated based on the emission estimates by Eurocontrol for aircraft operators administered by Germany

Table 51: Aviation, number of aircraft operators, allocation amounts, 2013 VET entries and allocation coverage

Operator category	No. of operators	2013 VET [kt CO_2eq]	2013 allocation amount [1000 EUA]	2013 allocation deviation from 2013 VET [kt CO_2eq]	Allocation coverage
Commercial	45	8,649	5,140	-3,510	59.4%
Non-commercial	17	37.3	1.5	-36	4.0%
Total	**62**	**8,686**	**5,141**	**-3,545**	**59.2%**

As of 04/05/2015

Reporting year 2014

54 of the 65 operators considered obtained a free allocation for 2014. The allocation coverage has now been decreased to 58 percent compared to 2013.

Table 52: Aviation, number of aircraft operators, allocation amounts, 2014 VET entries and allocation coverage

Operator category	No. of operators	2014 VET [kt CO_2eq]	2014 allocation amount [1000 EUA]	2014 allocation deviation from 2014 VET [kt CO_2eq]	Allocation coverage
Commercial	45	8,810	5,129	-3,682	58.2%
Non-commercial	20	37.5	1.5	-36	4.1%
Total	**65**	**8,848**	**5,130**	**-3,718**	**58.0%**

As of 04/05/2015

5 States (Länder)

Table 53: Overview of verified emissions in 2013 per state (Land), by activities

2013 emissions [kt CO_2eq]		State (Land)																
	Activity	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
1	Combustion	17	0	36	57	0	28	5	10	104	1,303	438	4	0	0	85	12	2,100
2	Energy conversion ≥ 50 MW RTI	40,478	7,319	19,807	10,150	6,771	6,623	1,839	3,027	20,695	166,867	5,342	3,977	10,342	33,757	10,539	941	348,473
3	Energy conversion 20–50 MW RTI	249	191	647	982	123	449	220	48	785	1,085	278	136	208	180	159	135	5,876
4	Energy conversion 20–50 MW RTI, other fuels	0	0	10	8	0	0	0	0	43	71	0	0	0	0	0	28	160
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	1,195	0	1,222	8,266	24	2,644	0	0	2,612	0	26,095
8	Coking plants	0	0	0	0	0	0	0	0	0	2,865	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	1,311	0	138	145	2,406	41	89	0	4,435	13,186	6	0	4,507	64	0	41	26,371
11	Processing of ferrous metals	275	0	255	98	535	437	302	0	418	1,826	99	0	870	127	103	60	5,403
12	Processing of ferrous metals	0	0	0	0	0	0	264	0	0	684	0	0	0	0	0	0	948
13	Processing of non-ferrous metals	0	0	18	164	0	0	205	0	168	673	62	0	50	111	22	0	1,473
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	929	289	30	13	236	561	247	3,699
17	Ceramics production	102	0	84	737	44	23	0	0	240	337	151	0	25	168	99	119	2,127
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

2013 emissions [kt CO_2eq]		State (Land)																
	Activity	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
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
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	119	0	142
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	498	0	37	0	0	288	3,940	1,581	151	0	1,312	145	0	7,998
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		**48,275**	**7,510**	**28,853**	**23,189**	**9,879**	**8,726**	**4,121**	**3,368**	**32,228**	**214,776**	**12,742**	**8,255**	**16,876**	**36,495**	**20,982**	**2,970**	**479,244**

As of 04/05/2015

Table 54: Overview of 2014 VET entries in each state (Land), by activities

2014 VET [kt CO_2eq]		State (Land)																
	Activity	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
1	Combustion	17	0	36	59	0	22	5	7	139	1,272	426	4	0	0	88	11	2,085
2	Energy conversion ≥ 50 MW RTI	39,239	6,919	17,294	8,324	6,431	4,636	3,176	3,132	22,229	158,268	4,728	3,756	8,770	33,177	10,082	894	331,057
3	Energy conversion 20–50 MW RTI	221	169	579	921	118	425	204	44	733	1,017	298	102	221	137	151	117	5,456
4	Energy conversion 20–50 MW RTI, other fuels	0	0	10	13	0	0	0	0	42	60	0	0	0	0	0	28	153
5	Prime movers (engines)	0	0	0	13	0	0	0	0	43	0	0	0	0	0	0	0	56
6	Prime movers (turbines)	269	0	71	182	0	83	0	0	214	238	49	0	0	5	23	76	1,210
7	Refineries	3,715	0	2,783	3,394	0	0	1,175	0	1,142	7,936	22	2,448	0	0	2,370	0	24,984
8	Coking plants	0	0	0	0	0	0	0	0	0	2,861	0	0	975	0	0	0	3,836
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	1,537	0	115	144	2,409	39	90	0	4,430	13,198	17	0	4,869	88	0	41	26,977
11	Processing of ferrous metals	279	0	226	92	603	431	330	0	420	1,744	103	0	892	131	105	61	5,418
12	Processing of ferrous metals	0	0	0	0	0	0	261	0	0	693	0	0	0	0	0	0	954
13	Processing of non-ferrous metals	0	0	20	154	0	0	234	0	164	682	60	0	51	107	53	0	1,527
14	Production of cement clinker	1,267	0	3,441	3,731	0	324	0	0	1,072	5,239	805	1,171	0	0	1,555	994	19,598
15	Lime production	410	0	436	1,072	0	337	0	96	834	4,159	501	0	0	0	1,338	189	9,372
16	Glass production	127	0	130	753	0	12	0	21	357	992	283	37	13	241	579	247	3,792
17	Ceramics production	105	0	97	679	36	25	0	0	241	328	154	0	25	163	101	106	2,061
18	Production of mineral fibres	0	0	46	91	0	0	0	0	9	63	0	0	0	84	57	0	351
19	Gypsum production	93	0	19	83	0	0	0	0	21	31	0	0	0	22	0	0	269

2014 VET [kt CO_2eq]		State (Land)																
	Activity	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
20	Pulp production	0	0	0	15	0	0	0	0	4	0	0	0	0	0	74	43	135
21	Paper production	49	0	919	740	0	308	0	8	875	1,456	409	73	0	382	35	20	5,273
22	Carbon black production	0	0	0	0	0	0	0	0	134	541	0	0	0	0	0	0	674
23	Nitric acid production	0	0	0	0	0	0	0	168	0	45	436	0	0	53	29	0	730
24	Adipic acid production	0	0	0	0	0	0	0	0	0	24	0	0	0	0	120	0	144
25	Production of glyoxal and glyoxylic acid	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	12
26	Ammonia production	0	0	0	0	0	0	0	0	0	443	1,465	0	0	0	2,368	0	4,276
27	Production of bulk organic chemicals	0	0	47	534	0	39	0	0	276	4,187	1,571	150	0	1,345	152	0	8,301
28	Production of hydrogen and synthesis gas	45	0	0	74	0	0	0	0	16	420	447	117	0	0	664	0	1,782
29	Soda production	0	0	0	0	0	0	0	0	0	167	96	0	0	0	354	0	617
Total		**47,373**	**7,088**	**26,272**	**21,070**	**9,597**	**6,681**	**5,475**	**3,475**	**33,395**	**206,135**	**11,882**	**7,857**	**15,815**	**35,937**	**20,296**	**2,826**	**461,173**

As of 04/05/2015

Table 55: Overview of 2014 allocation amounts in each state (Land), by activities

2014 allocation amount [1000 EUA]		State (Land)																
	Activity	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
1	Combustion	81	0	29	29	0	86	4	7	115	1,100	418	4	0	0	159	3	2,035
2	Energy conversion ≥ 50 MW RTI	1,326	1,761	1,719	2,461	212	1,577	571	489	2,509	6,995	2,120	740	316	1,221	1,278	444	25,740
3	Energy conversion 20–50 MW RTI	126	117	458	595	77	317	153	76	604	721	221	64	195	111	80	104	4,019
4	Energy conversion 20–50 MW RTI, other fuels	0	0	75	62	0	0	0	0	24	23	0	0	0	0	0	15	199
5	Prime movers (engines)	0	0	0	15	0	0	0	0	49	0	0	0	0	0	0	0	64
6	Prime movers (turbines)	136	0	48	156	0	81	0	0	223	197	46	1	0	13	18	121	1,040
7	Refineries	2,001	0	2,201	2,948	0	0	1,404	0	1,037	6,968	18	2,085	0	0	2,318	0	20,980
8	Coking plants	0	0	0	0	0	0	0	0	0	1,478	0	0	291	0	0	0	1,770
9	Processing of metal ores	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	70
10	Production of pig iron and steel	2,985	0	141	150	3,888	49	73	0	6,028	24,139	8	0	6,177	88	0	45	43,770
11	Processing of ferrous metals	259	0	230	80	285	387	317	0	452	1,752	106	0	629	122	99	60	4,777
12	Processing of ferrous metals	0	0	0	0	0	0	214	0	0	737	0	0	0	0	0	0	951
13	Processing of non-ferrous metals	0	0	15	140	0	0	385	0	190	621	66	0	35	126	16	0	1,593
14	Production of cement clinker	1,355	0	2,892	3,318	0	249	0	0	1,037	5,153	716	1,007	0	0	1,754	918	18,398
15	Lime production	315	0	513	965	0	266	0	57	670	3,317	509	0	0	0	1,035	182	7,829
16	Glass production	99	0	133	673	0	9	0	7	302	847	195	34	9	215	478	203	3,205
17	Ceramics production	97	0	103	656	39	26	0	0	197	338	139	0	25	154	81	115	1,971
18	Production of mineral fibres	0	0	24	85	0	0	0	0	5	74	0	0	0	51	57	0	296
19	Gypsum production	73	0	21	70	0	0	0	0	18	26	0	0	0	18	0	0	226

2014 allocation amount [1000 EUA]		State (Land)																
	Activity	BB	BE	BW	BV	HB	HE	HH	MW	LS	NW	RP	SH	SL	SN	ST	TH	Total
20	Pulp production	0	0	9	16	0	0	0	0	8	0	0	0	0	0	44	21	99
21	Paper production	487	0	993	1,316	0	387	0	6	1,054	1,237	490	175	0	315	118	138	6,715
22	Carbon black production	0	0	0	0	0	0	0	0	92	466	0	0	0	0	0	0	558
23	Nitric acid production	0	0	0	0	0	0	0	283	0	169	243	0	0	27	34	0	757
24	Adipic acid production	0	0	0	0	0	0	0	0	0	226	593	0	0	0	250	0	1,069
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	532	1,530	0	0	0	1,796	0	3,857
27	Production of bulk organic chemicals	0	0	19	464	0	67	0	0	506	4,698	2,502	144	0	1,026	178	0	9,605
28	Production of hydrogen and synthesis gas	23	0	0	107	0	0	0	0	6	422	629	68	0	0	349	0	1,604
29	Soda production	0	0	0	0	0	0	0	0	0	225	104	0	0	0	776	0	1,105
Total		**9,362**	**1,878**	**9,624**	**14,306**	**4,502**	**3,501**	**3,120**	**926**	**15,126**	**62,531**	**10,659**	**4,323**	**7,677**	**3,487**	**10,919**	**2,370**	**164,310**

As of 04/05/2015

6 Main fuels by sectors

Table 56: Emissions and allocations* in 2014 for stationary installations in ETS using the main fuels: natural gas, lignite and hard coal (*no redistribution of waste gases from iron, steel and coke production)

Sector/Activity	Main fuel	2014 allocation amount [1000 EUA]	2014 VET [kt CO_2eq]
Energy installations	Lignite	2,677	164,292
	Hard coal	4,995	101,605
	Natural gas	15,596	29,564
Other combustion plants	Lignite	132	273
	Natural gas	106	86
Refineries	Natural gas	52	42
Iron and steel	Hard coal	38,818	24,942
	Natural gas	3,033	3,047
Non-ferrous metals	Hard coal	90	95
	Natural gas	706	719
Mineral industry	Lignite	4,193	5,314
	Hard coal	577	657
	Natural gas	5,053	5,788
Paper and pulp	Lignite	80	175
	Hard coal	178	525
	Natural gas	4,555	3,530
Chemical industry	Lignite	41	41
	Hard coal	1,039	593
	Natural gas	5,960	6,210
Total		87,883	347,498
Complement: main fuel is not natural gas, hard coal or lignite		76,427	113,675
Total		**164,310**	**461,173**

As of 04/05/2015

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