State aid for indirect CO_2 costs of emissions trading (electricity price compensation) in Germany for 2019

(EPC Report 2019)

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Editorial information

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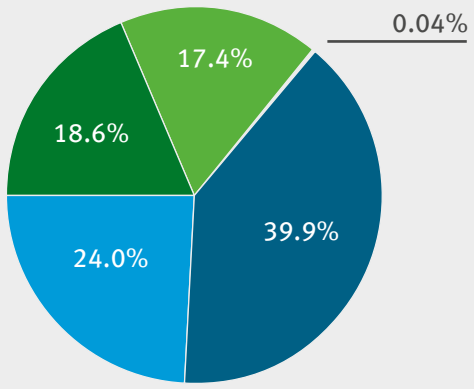
Summary

For the 2019 accounting year 328 undertakings submitted state aid applications for indirect CO_2 costs of emissions trading to the German Emissions Trading Authority at the German Environment Agency. Following verification of the applications, 322 undertakings with 902 installations received around €546 million in aid. The EUA price used to calculate the aid (see explanatory notes in Section 1, p. 5 onwards) amounted to €16.15 which means that the total approved state aid for 2019 amounted to €546 million, i. e. more than double that in 2018 (€219 million).

In certain circumstances, the so-called difference carried forward (see explanatory notes in Section 1, p. 6 onwards) was applied to determine the aid amount for the 2019 accounting year, as was the case in the previous accounting years. In 2019, this amounted to around €3.15 million (about €827,000 for the 2018 accounting year) and has already been included in the total aid allocation of €546 million. In 2019, 57 undertakings benefited from the difference carried forward due to the trends in production and electricity consumption in 96 of their installations.

As in the previous year, undertakings in the chemical industry received a 40 percent share, which was the largest share of the compensation. Undertakings in the iron and steel industry followed with 24 percent, the paper industry with about 19 percent, and the non-ferrous metal industry with approximately 17 percent. The clothing industry had a very small share of the total compensation with 0.1 percent and just five applications. Since the introduction of electricity price compensation in 2013 the shares of the individual industries have changed only slightly.



Industry (EPC)	Number of applications	EPC 2019*
Chemical industry	109	217.95
Iron and steel	50	131.25
Paper	105	101.64
Non-ferrous metals	53	95.00
Clothing	5	0.20
Total	**322**	**546.04**

* Prices in million euro
As of 07/12/2020

Figure 1: Distribution of state aid for electricity price compensation in 2019 for individual industries

Of the 902 installations for which aid has been granted, 478 participate in the European Emissions Trading Scheme (EU ETS). Thus their share of the total state aid is almost 68 percent (see Table 3). Many beneficiary installations, particularly in the chemical industry do not fall within the scope of the EU ETS while installations in the paper industry as well as the iron and steel industry are largely covered by the EU ETS.

As a basis for the 2019 state aid calculation, product-specific electricity consumption efficiency benchmarks (hereinafter called "benchmarks") are just as important as the so-called fallback factor: about half of the total state aid results from the manufacture of products for which a benchmark exists and from the manufacture of products where the fallback factor has been applied to their electricity consumption (see explanatory notes in Section 1, p. 5 onwards). The largest share of aid for the 2019 accounting year is held by the benchmarks for chlorine (17 percent) and primary aluminium (12 percent), as well as the fallback calculation elements of the sectors "Manufacture of paper and paperboard"[1] (14 percent) and "Manufacture of basic iron and steel and of ferro-alloys"[2] (11 percent).

1 Code 2112 as per NACE-Rev. 1.1
2 Code 2710 as per NACE-Rev. 1.1

Content

1 State aid for indirect CO_2 costs of the EU Emissions Trading Scheme

State aid for indirect CO_2 costs due to emissions trading should prevent the risk of "carbon leakage" to locations outside the geographical scope of the EU Emissions Trading Directive (EHRL)[3]. Indirect CO_2 costs are caused by the fact that electricity producers are passing on the cost of emission allowances to their customers via the electricity price. The state aid is intended to compensate undertakings for some of these costs in certain high electricity usage sectors and subsectors mentioned in Annex II of the EU State Aid Guidelines[4] applicable for the third trading period.

The European Commission has identified the sectors and subsectors in which it has detected a risk of indirect carbon leakage. These sectors include production processes with particularly high electricity usage and are subject to strong international competition (see Table 1)[5]. Thus, the approval of the application depends on the products manufactured by an undertaking. If these products are eligible for state aid, the assignment of an undertaking to a particular industry is not critical for granting the state aid. Since state aid is linked to the installations' electricity consumption, it does not matter whether the installations are covered by EU ETS or not. The granting of aid is based on the State Aid Directive[6] adopted by the Federal Ministry for Economic Affairs and Energy.

Since the aid is intended to offset part of the indirect CO_2 costs of the previous year, applications can be made in the following year, therefore, applications for the 2019 accounting year could be submitted between 01/03/2020 and 02/06/2020. The May deadline was then used as the final cut-off point.

Annex III of the EU State Aid Guidelines sets out product-specific benchmarks for some of the products eligible for aid. They specify the amount of electricity consumption in megawatt-hours per tonne of product produced in order to calculate the state aid. The aid calculation is therefore based on the tonnes of product produced (see Number 5.2.1 of the State Aid Directive). For products eligible for aid without a benchmark, the aid is based on the electricity consumption for the manufacture of these products (see Number 5.2.2 of the State Aid Directive). However, the electricity consumption is multiplied by a uniform fallback electricity efficiency benchmark factor (hereinafter called "fallback factor") which is 0.8.

Products with an identical benchmark manufactured within an installation are grouped together into "calculation elements" for further calculation. Affiliation to the same sector is crucial for the aggregation of fallback products into calculation elements.

According to the EU State Aid Guidelines applicable for the third trading period and the German State Aid Directive, a total aid amount per applicant is calculated by using these quantities, the emission allowance price to be applied (EUA price)[7], the CO_2 emission factor (0.76 tonnes of carbon dioxide per megawatt-hour) and the state aid intensity[8].

3 Article 10a(6), Directive 2003/87/EC of 13/10/2003, as of 25/06/2009 (EC Emissions Trading Directive).

4 European Commission Guidelines on certain State aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012 (Communication 2012/C 158/04, Official Journal of the European Union (OJ. EU) C 158 of 05/06/2012, p. 4), amended by Communication 2012/C 387/06 (OJ. EU C 387 of 15/12/2012, p. 5), as corrected by Communication 2013/C 82/07 (OJ. EU C 82 of 21/03/2013, p. 9).

5 Annex II of the EU State Aid Guidelines.

6 Directive on aid for companies in sectors or subsectors deemed to be exposed to a significant risk of carbon leakage due to EU ETS allowance costs passed on in electricity price (aid for indirect CO_2 costs) of 23/07/2013, official part of the Bundesanzeiger (Federal Gazette AT) 06/08/2013 B2, last amended by the second Amendment of Directive of 21/08/2018, Bundesanzeiger (Federal Gazette AT) 28/08/2017 B1.

7 The EUA price to be applied for an accounting year is determined from the previous year's average of the closing offer price of the reference contract on each trading day. For the 2019 accounting year, this was the ICE futures Europe with delivery in December of 2019 (see Section 5.1 k) of the State Aid Guidelines).

8 The following aid intensities (Ai) set out in the EU State Aid Guidelines under margin No. 26 apply: $Ai_{2013–2015} = 0.85$; $Ai_{2016–2018} = 0.8$; $Ai_{2019–2020} = 0.75$.

The German State Aid Directive for electricity price compensation stipulates that the CO_2 costs for the purchase of one gigawatt-hour of electricity per year per installation are subtracted from the undertaking's total aid amount. This retention is calculated based on the EUA price for 2019 (€16.15) and the CO_2 emission factor of 0.76 tonnes of carbon dioxide per megawatt-hour. This results in a CO_2 retention cost of €12,274 per installation for the purchase of one gigawatt-hour of electricity.

In certain circumstances, the term known as "difference carried forward"[9] also applies to determine the amount of aid for the 2019 accounting year. In principle, the aid is determined based on the accounting year data, however, this is limited by the aid which would have resulted based on the baseline data – as a rule the period between 2005 and 2011. If the amount of electricity actually purchased in a previous accounting year exceeded the aid based on the baseline data, the carryover would be credited as a positive balance to the difference account. If the amount of electricity for a later accounting year, in this case 2019, is lower than the amount of electricity based on the baseline data, the aid is increased by the difference carried forward. However, the increase is limited to the aid amount based on the baseline.[10]

Section 2 presents the evaluation methods used to compile this report. The results of the 2019 application process are presented and explained in Section 3.

In addition, Section 4 includes an evaluation to the interfaces of electricity price compensation and EU ETS. Sections 5 and 6 evaluate the source of electricity used by undertakings and the total electricity consumption of the respective undertakings or installations. Section 7 explains the results at the level of products used in eligible sectors and undertakings. Section 8 deals with the share of electricity price compensation in Germany's auction proceeds. Section 9 provides an outlook on electricity price compensation for the 2020 accounting year and an overview of the design of the amended EU State Aid Guidelines as a basis for electricity price compensation in Germany for the 4th trading period from the 2021 accounting year.

9 Difference carried forward in euros at the installation level pursuant to No. 5.2.1(a) and (b) of the State Aid Guidelines in conjunction with No. 1 of the Decree of 27/12/2013.

10 See DEHSt 2021, Section 3.5 Influence of basic baseline data and difference carried forward on the amount of aid.

2 Evaluation methods

2.1 Combining sectors into industries

For a more transparent analysis and presentation, this report combines sectors and subsectors eligible for aid into industries (see Table 1). This enables an unambiguous assignment to industries at a calculation element level (see Section 7). Each calculation element belongs to just one of the sectors and subsectors eligible for aid. At the undertaking level (see Section 3), the assignment usually depends on which sectors have the largest share of the aid amount. The assignment at the undertaking level was subsequently transferred to that undertaking's installations.

Table 1: List of sectors and subsectors eligible for aid according to NACE Revision 1.1 (2007) in accordance with the EU State Aid Guidelines (Annex II)

Sectors according to NACE[11] Revision 1.1	Name	Industry
1310	Mining of iron ores	Iron and steel
1430	Mining of chemical and fertiliser minerals	Chemical industry
1711	Spinning of cotton-type fibres	Clothing
1810	Manufacture of leather clothes	
211114	Parts of the industry "Manufacture of pulp": mechanical pulp	Paper
2112	Manufacture of paper and paperboard	
2413	Manufacture of other inorganic chemicals	Chemical industry
2414	Manufacture of other organic chemicals	
2415	Manufacture of fertilisers and nitrogen compounds	
2416 (Parts)	Parts of the industry "Manufacture of plastics in primary forms": ▸ 24161039 Low-density polyethylene (LDPE) ▸ 24161035 Linear low-density polyethylene (LLDPE) ▸ 24161050 High-density polyethylene (HDPE) ▸ 24165130 Polypropylene (PP) ▸ 24163010 Polyvinyl chloride (PVC) ▸ 24164040 Polycarbonate (PC)	
2470	Manufacture of man-made fibres	
2710	Manufacture of basic iron and steel and of ferro-alloys	Iron and steel
272210	Parts of the industry "Manufacture of steel pipes, steel tube fittings": seamless steel pipes	
2742	Aluminium production	Non-ferrous metals
2743	Lead, zinc and tin production	
2744	Copper production	

In Section 4, the installations are apportioned according to whether they are subject to emissions trading or not. The assignment to industries will continue to be based on the method mentioned above and not on assignments that may have originated from emissions trading evaluations.

11 NACE (Nomenclature générale des activités économiques dans les Communautés Européennes) Rev. 1.1 is the Statistical Classification of Economic Activities in the European Community, published together with Commission Regulation (EEC) No. 29/2002 of the Commission of 19/12/2001.

2.2 Allocation of the state aid amount at the calculation element level

Due to the retention per installation (see Section 1), the state aid amount cannot be allocated to the individual calculation elements without conversion. The retention per installation was therefore divided proportionally among an installation's calculation elements.

3 Results of the 2019 application process

For 2019, applications from 322 companies with 902 facilities were approved. The total amount of aid approved for 2019 was around 546 million euros (see Table 2). Six applications were rejected for various reasons such as insolvency proceedings or because the products manufactured were not eligible for aid.

The increase in aid of around €328 million compared to the previous year is mainly due to the higher EUA price for calculating the 2019 aid of €16.15, almost three times as high as for 2018 (€5.88). The shares of aid across the individual industries changed only slightly compared to 2018.

Table 2: Number of approved applications and number of installations according to industries and sum of aid paid in 2019

Industry (EPC)	Number of applications	Number of installations	EPC 2019*
Chemical industry	109	479	217,949,159.93
Iron and steel	50	161	131,249,172.39
Paper	105	139	101,638,947.24
Non-ferrous Metals	53	118	95,000,343.89
Clothing	5	5	201,444,63
Total	**322**	**5**	**546,039,068.08**

* Prices in euro
As of 07/12/2020

Table 2 shows the distribution of total aid given to individual industries. The chemical industry continues to have the largest share in the aid amount with about €218 million, a 40 percent share.

This is followed by the iron and steel industry with about €131 million, which amounts to a share of 24 percent. The paper industry accounted for about €102 million in 2019. Its 19 percent share is still about the third largest of the total aid. The non-ferrous metals industry received about €95 million for 2019, which is about 17 percent of the total 2019 aid. The clothing industry has a very small share of the 2019 electricity price compensation, about €201,000 or 0.04 percent.

Figure 2 shows the annual aid amount since 2013 divided into additional differentiated aid categories (bars). The aid category of less than €100,000 per application contains the smallest share of total aid per annum, with the largest share in each year being in the €1 million to €10 million category per application. Secondly, the figure shows the number of applications and undertakings in each of the aid categories since 2013 (dashed lines). The highest application numbers are in the two smallest aid categories, below €100,000 per application and €100,000 to €1 million per application. The figure clearly shows the trend of total aid depending on the applicable EUA prices. In 2013, this was higher than in the following accounting years at €7.94; in 2014, €4.68, a significantly lower EUA price, was relevant for calculating the aid amount. It increased again in 2015 and 2016 (2015: €6.17, 2016: €7.80) and subsequently remained at a similar price level in the accounting years 2017 (€5.40) and 2018 (€5.88). Compared to 2018, the EUA price has almost tripled to €16.15 in 2019. The number of applications in the individual aid categories has also changed over the years due to the fluctuations in the EUA price.

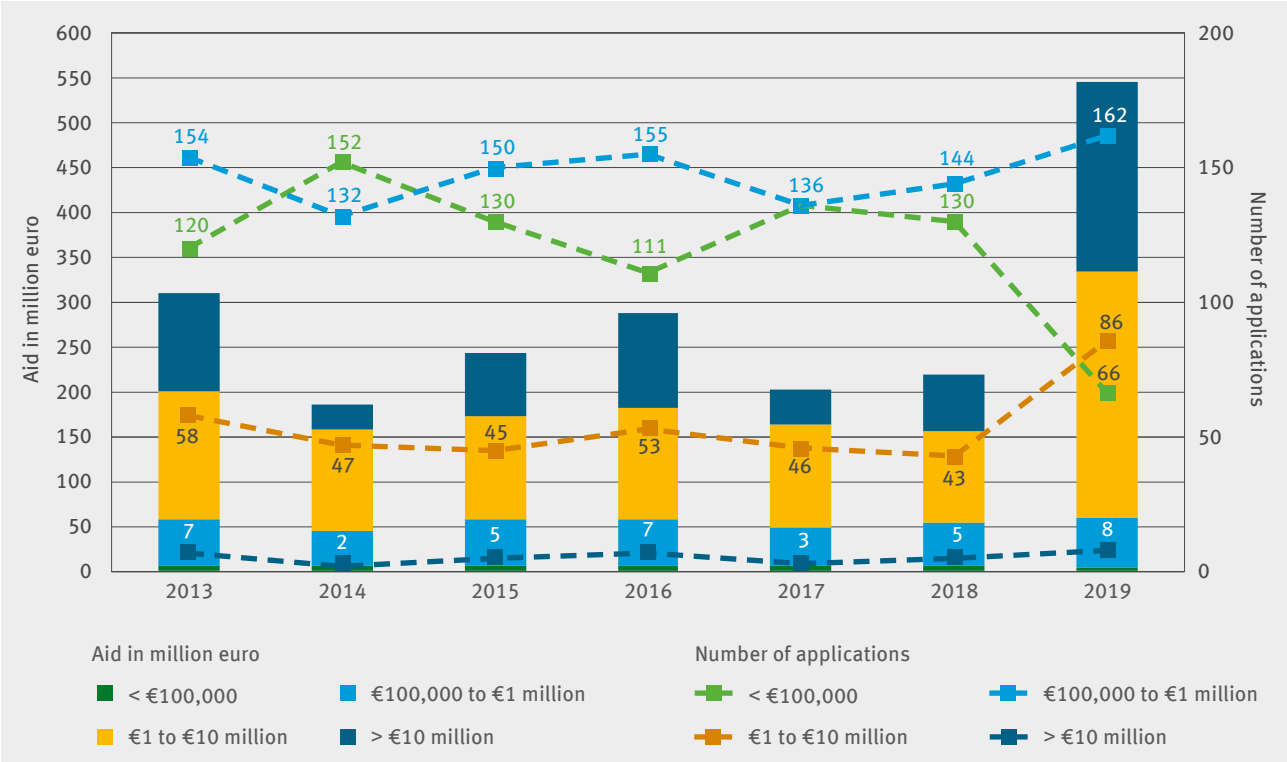


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Figure 2: Number of applications and total aid according to aid amount per application

The number of applications in the highest aid category (over €10 million) fell from seven undertakings to two between 2013 and 2014 and subsequently increased to seven undertakings in 2016 – the same as in the 2013 accounting year. In 2017, the number of applications fell to three due to the lower EUA price. The lowering of the aid intensity in 2017 further reinforced this effect. Compared to 2017, the number of applications in the highest aid category (over €10 million) increased by two applications in 2018, in line with the slightly increased EUA price compared to 2017. Due to the comparatively high EUA price in 2019, three applications were added in this aid category, despite a renewed reduction in the aid intensity, bringing the total to eight undertakings, which received approximately €211 million, i. e. 39 percent of the total aid for 2019. Despite the low number of applications, the undertakings in the highest aid category (over €10 million) received total aid of €89 million per year on average, or around 31 percent of the total aid paid out between 2013 and 2019.

Even in the smallest aid category, i. e. less than €100,000, the number of applications varied with the change in the appropriate EUA prices (and aid intensity) each year. The following statement can therefore be made for this category: at relatively high EUA prices, e. g. 2013 with €7.94, the number of applications from 120 undertakings was lower than in those years with a comparatively low EUA price, e. g. 152 applications in 2014. In 2019, the overall aid pay-outs were higher than in 2018, meaning that the number of applications in this category was halved, and around 49 percent of applications that belonged to the aid category below €100,000 in the previous year can now be found in the categories €100,000 to €1 million and €1 million to €10 million.

The number of applications in the €100,000 to €1 million category of aid averaging 148 applications per year is the largest compared to other aid categories. Only a small part of the total amount of aid was disbursed in this category with an average of €49 million or 17 percent. In line with EUA price fluctuations, i. e. at higher EU prices such as in 2019, a portion of the applications moved from the smallest aid category to this category.

After the highest aid category (more than €10 million), the €1 million to €10 million category was the group with the smallest number of applications, i. e. only 54 on average or 17 percent over all previous accounting years. However, this category has the largest share of total aid accounting for 50 percent on average. Fluctuations in the EUA price within the €1 million to €10 million category had only a small impact on the number of applications compared to other categories of aid in the years to date. However, due to the significant increase in the EUA price from 2018 to 2019, many applications in the smaller aid categories were moved into this category, doubling the number of applications in the €1 million to €10 million aid category.

While the total aid of the 2013 to 2019 accounting years differed significantly according to the fluctuating EUA price (see Figure 2 and Tables 10 to 15 in the Annex), the carbon dioxide amount used to calculate the aid for each of the years amounted on average to 46 million tonnes of CO_2[12]. This means that the high fluctuation in the total aid can be attributed mainly to the volatile EUA price and less to a changed carbon dioxide amount.

Figure 3 (analogous to Figure 2) shows the sum of the CO_2 amount used in the calculation of aid broken down by the CO_2 amount per application category (bars) and the number of applications in each of these categories (dashed lines).

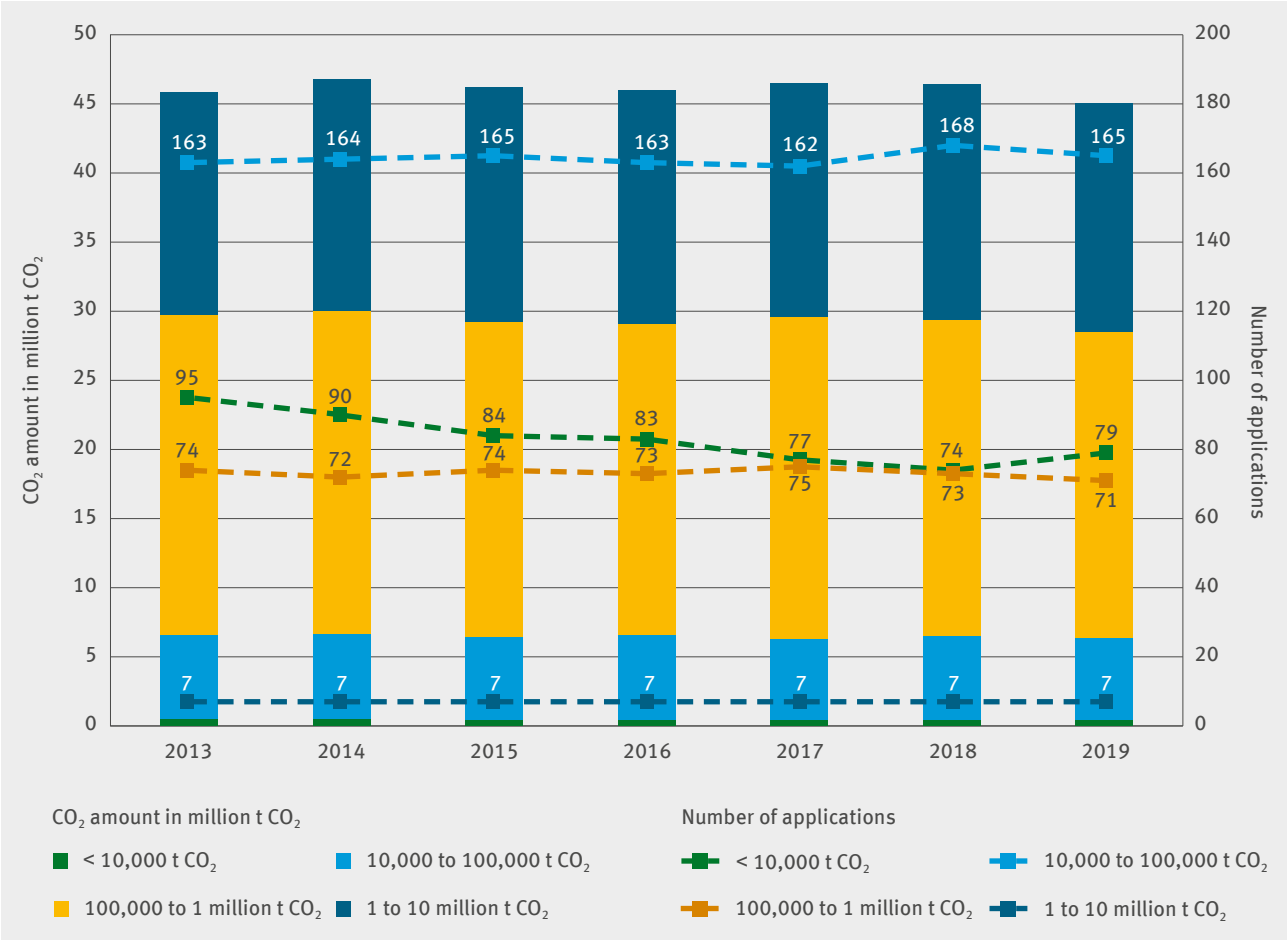

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Figure 3: Number of applications and total CO_2 amount used for the aid calculation, according to CO_2 amount per application

12 This value is determined using the disbursed aid sum, the EUA price Pt to be applied and the aid intensity Ait: the values for the EUA price result from the provisions of the State Aid Directive, i. e. P_{2013} = €7.94, P_{2014} = €4.68, P_{2015} = €6.17, P_{2016} = €7.80, P_{2017} = €5.40, P_{2018} = €5.88, P_{2019} = €16.15. The aid intensity is also stipulated, i. e. $Ai_{2013–2015}$ = 0.85, $Ai_{2016–2018}$ = 0.8, $Ai_{2019–2020}$ = 0.75.

The CO_2 category of less than 10,000 tonnes of carbon dioxide per application covers approximately 25 percent of the applications. At about one percent these applications account for the smallest share of the total amount of CO_2 used for calculating the aid. The category of 10,000 to 100,000 tonnes of carbon dioxide becomes the category with the smallest amount of CO_2: an average of 6.1 million tonnes of CO_2 per year or 13 percent of the total amount of CO_2 emissions of all applications. With an average of 164 applications per year or 50 percent of the applications, most undertakings are present here.

By contrast, the category of 100,000 to 1 million tonnes of carbon dioxide per application includes on average 73 applications per year or 22 percent of the total number which is comparatively few. However, the largest share amount can be found here at around 50 percent of the total CO_2 amount. In the category of 1 to 10 million tonnes of carbon dioxide, the number of annual applications has remained unchanged at seven since 2013.

Only slight changes can be observed in both the amount of CO_2 and the number of applications in the individual categories over time. On the other hand, at around 45.1 million tonnes of CO_2 per year, the 2019 accounting year recorded the lowest amount of carbon dioxide on which the aid calculation is based since the introduction of electricity price compensation.

The number of applications in the category less than 10,000 tonnes of CO_2 per application has significantly dropped over the years from 95 in 2013 to 74 applications in 2018. The amount of CO_2 underlying the aid calculation also fell by 15 percent in this category compared to 2013. With the comparatively high EUA price for the 2019 accounting year, the number of applications (five applications or seven percent) and the amount of CO_2 underlying the aid calculation, increased in the current accounting year compared to 2018. In this category, the effort required for preparing an application compared to the disbursed amount of aid and the retention per installation (CO_2 costs for one gigawatt-hour of electricity), may have played a crucial role in the decrease in the number of applications from 2013 to 2018 and the increase in 2019.

In the category of 10,000 to 100,000 tonnes of carbon dioxide per application, neither the number of applications nor the quantity of CO_2 on which the aid calculation is based has so far been subject to major fluctuations. Only in the 2018 accounting year did both the number of applications and the amount of CO_2 increase somewhat. Some applications which belonged to the category of less than 10,000 tonnes of carbon dioxide per application in the previous year can now be found in this category and have moved back into the smallest amount category in 2019.

An increase in the amount of CO_2 underlying the aid calculation over all previous accounting years, albeit marginally, can only be seen in the category 1 million to 10 million tonnes of carbon dioxide per application. Here, the CO_2 amount increased by around three percent from 16.1 million tonnes of CO_2 in 2013 to around 16.6 million tonnes of CO_2 in 2019.

4 Electricity price compensation and European emissions trading

Of the 322 undertakings that received aid in the 2019 accounting year, 902 installations produced products eligible for aid. Just over half of them (478 installations) participate in the emissions trading scheme (see Table 3). This means that the share of installations subject to emissions trading that are eligible for aid has not changed compared to the previous year.

In the chemical industry, 272 out of 479 installations (57 percent) are not subject to emissions trading. These installations received 67 percent of the aid in this industry. The reason for this is that many of the electricity-intensive processes do not discharge significant amounts of greenhouse gases and are therefore not subject to emissions trading. In addition, many chemical sites have centralised power and steam sources to which the emissions trading obligation is limited.

The same applies to the non-ferrous metal industry – about 75 percent of the installations here (88 out of 118) are not included in the emissions trading scheme. These are often installations that have no primary emissions (e. g. cold rolling or pressing plants – i. e. forming plants), or installations that do not achieve the required rated thermal input. However, these installations account for only a 12 percent share of the aid amount available to this industry. This is mainly because the major beneficiaries in the non-ferrous metal industry – the installations for aluminium production through electrolysis – are also subject to emissions trading.

Table 3: Total number of installations per industry in 2019, showing those subject to emissions trading and those that are not

Industry (EPC)	Number of installations	Of which		Share of aid in industry	
		ETS	Nicht-ETS	ETS	Nicht-ETS
Chemical industry	479	207	272	33%	67%
Iron and steel	161	113	48	93%	7%
Paper	139	128	11	94%	6%
Non-ferrous metals	118	30	88	88%	12%
Clothing	5	0	5	0%	100%
Total	**902**	**478**	**424**	**68%**	**32%**

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5 Source of electricity

The basis for calculating aid is a CO_2 emission factor of 0.76 tonnes of CO_2 per megawatt-hour of electricity, which is the same for all German undertakings. When no CO_2 costs are incurred in connection with the electricity consumed, no aid will be granted. This is the case, for example, when undertakings generate their own electricity from installations not subject to emissions trading. Figure 4 shows the share distribution of individual electricity sources in the total electricity consumption of those installations for which electricity price compensation has been granted. Overall, about one percent of total electricity consumption is not eligible for state aid because no relevant connected CO_2 costs have incurred. About 26 percent of electricity consumed is generated in the undertakings' own installations subject to emissions trading that have received aid. Approximately 73 percent of electricity consumption is electricity eligible for aid generated by other undertakings. According to the applicants, CO_2 costs in the electricity supply contract were explicitly identified for only a small part (four percent) of the third-party purchased electricity eligible for aid. For a large part, the CO_2 costs associated with eligible electricity purchased by third parties (79 percent), was certified using electricity labelling according to Section 42 of the German Energy Industry Act[13]. In addition, around 14 percent of the third-party purchased eligible electricity stems directly from an electricity exchange, which means that the stock exchange price that usually contains CO_2 costs had already been paid.

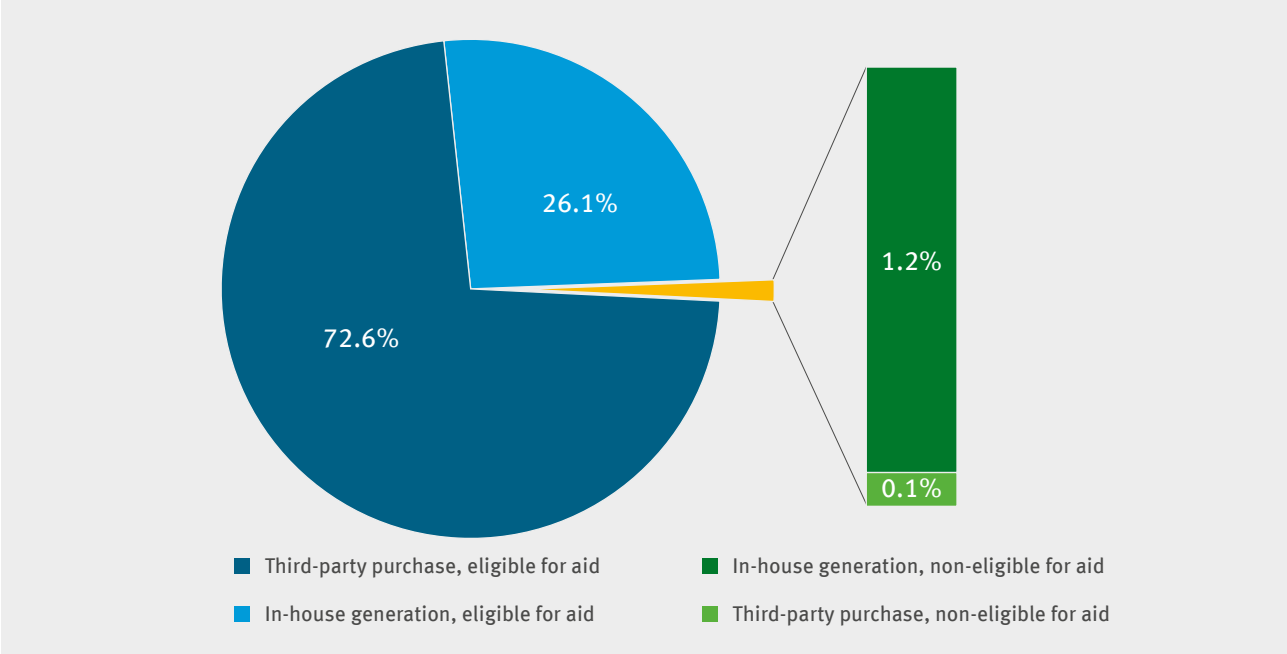

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Figure 4: Source of electricity in 2019

13 This means that it is not exclusively CO_2-free electricity (nuclear power or renewable energy), but part of the electricity supplied stems from fossil fuels. In this case, the electricity supplied within such an energy supply contract is fully eligible for aid.

Depending on the industry, the share of in-house generated electricity in the total electricity consumption varies quite significantly (see Figure 5). The clothing industry only purchases electricity from other undertakings (barely visible in Figure 5 due to the small volume). Hardly any electricity is produced in the non-ferrous metal industry either: only three percent of eligible electricity consumption is generated in-house. The share of in-house generation in the paper industry is about a quarter (24 percent) of the eligible electricity consumption. In the iron and steel industry, in-house generation makes up 42 percent of eligible electricity consumption. The in-house generated share in the chemical industry is about 28 percent.

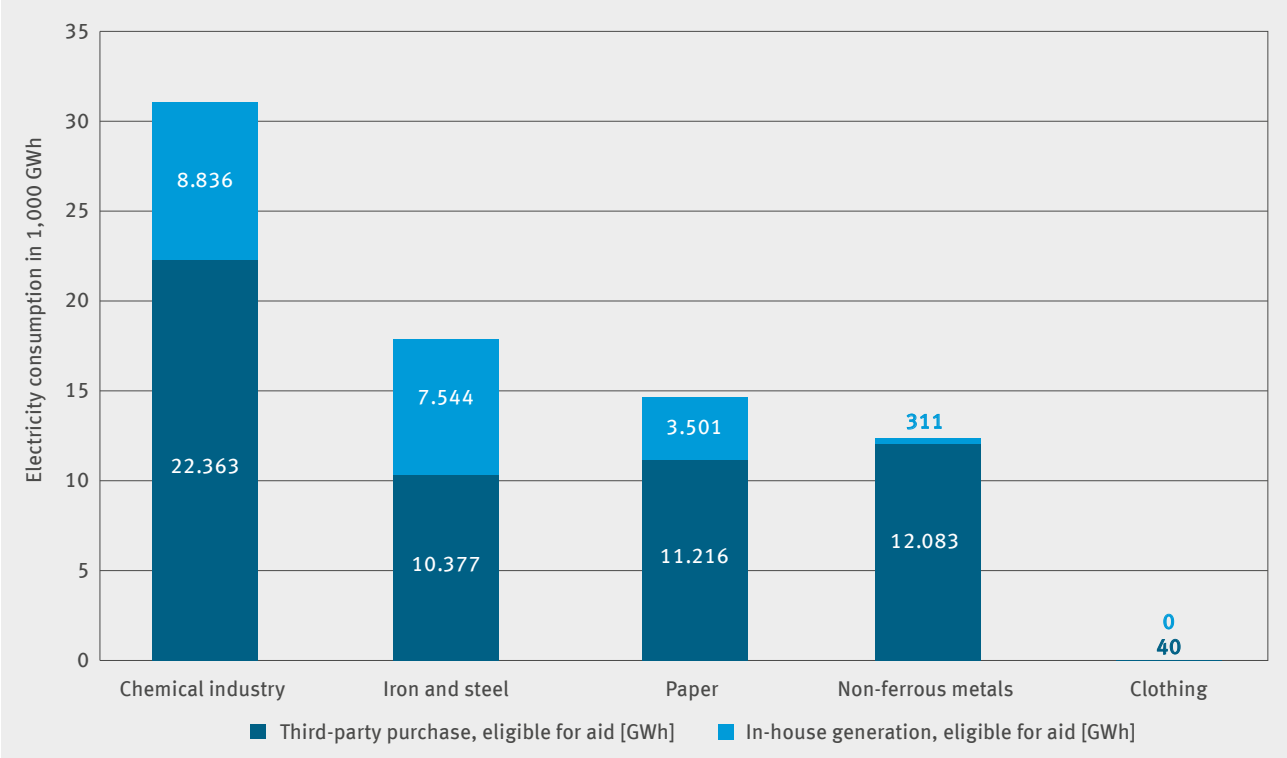

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Figure 5: Source of electricity in 2019 of eligible electricity consumption by industry

6 Electricity consumption

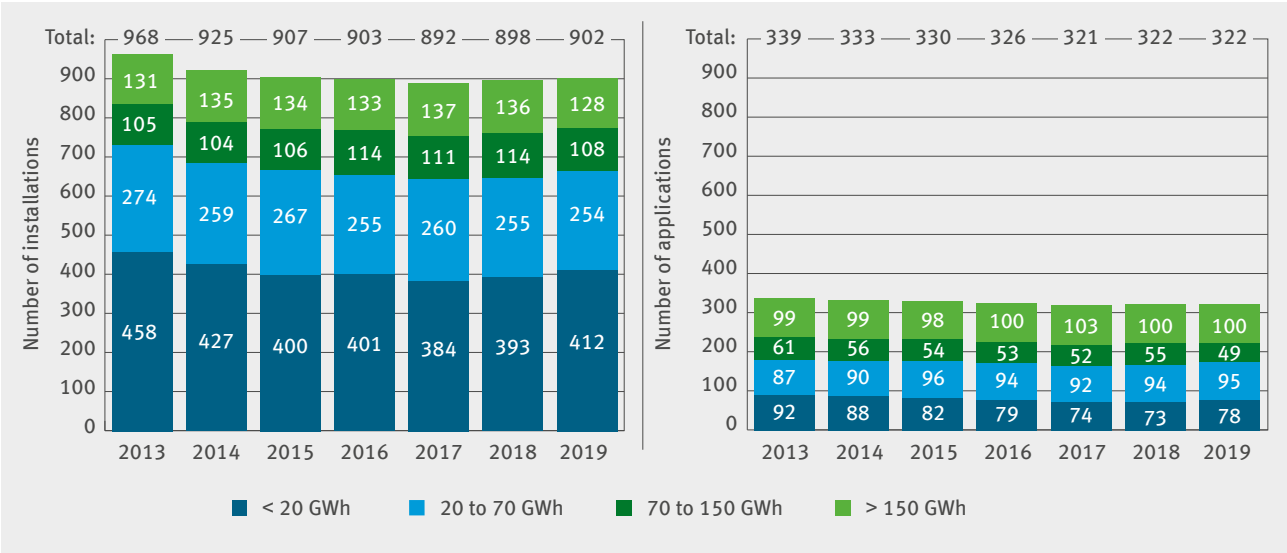
Figure 6 shows the number of installations and applications grouped according to the total electricity consumption of the respective undertakings or installations[14] for each year since 2013. The total electricity consumption is not just based on the eligible electricity consumption but may also contain electricity consumption for the production of non-eligible products. This serves to illustrate the actual size of the undertaking or the installation.

Looking at the entire period from 2013 to 2019, it is noticeable that in total, both the number of applications and the number of installations decreased relatively continuously until 2017. This is due to the development in the smallest category of electricity consumption with less than 20 gigawatt-hours per year, which, with an average of 411 installations and a share of 45 percent, comprises the majority of the eligible installations. For small-scale consumers, the number of installations dropped from 458 at the beginning (2013) to 384 in 2017 and rose again to a current 412 over the last two application years. The number of applications in this category also continued to decline until 2018 and increased significantly in 2019 (plus five).

Reasons for this trend could be the effort required for preparing an application compared to the disbursed amount of aid and the retention amounting to the CO_2 costs of one gigawatt hour of electricity, which are significantly influenced by the level of the EUA price in the corresponding application year. If the EUA price and the corresponding aid are higher, more small-scale consumers may apply for compensation of their indirect CO_2 costs.

For large-scale consumers with an electricity consumption of more than 150 gigawatt-hours per year, there were fewer installations than in the previous year, while the number of applications remained the same as in 2018. Between 2013 and 2018, the number of installations averaged 134, whereas in the 2019 accounting year it was 128. There have been only very slight fluctuations in the number of applications from large consumers since 2013.

In the categories 20 to 70 gigawatt-hours and 70 to 150 gigawatt-hours no clear trend can be identified.



As of 07/12/2020

Figure 6: Number of installations and undertakings applying by electricity consumption in 2013 to 2019

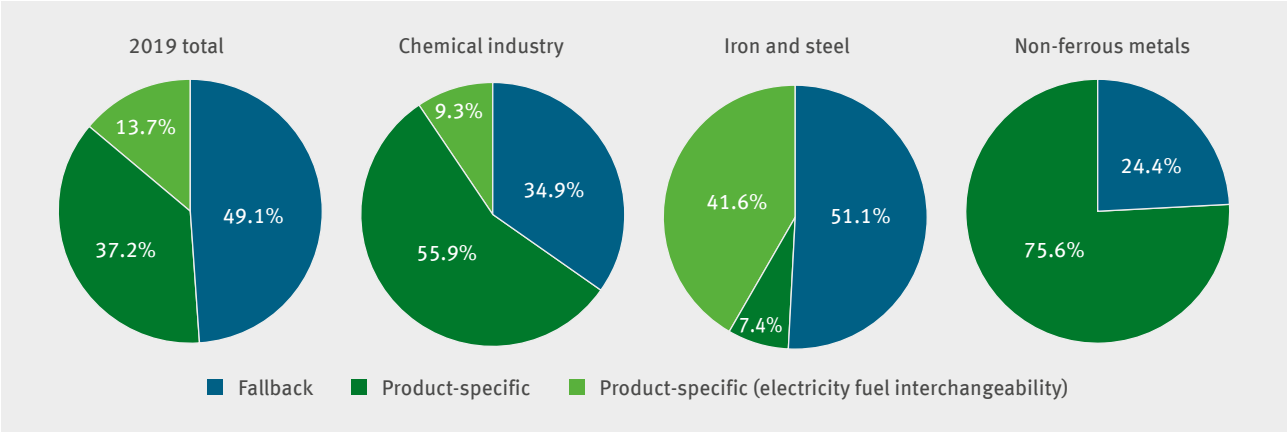
14 The categories are based on the Eurostat methodology "Energy statistics – electricity prices for domestic and industrial consumers, price components", Section 3.4. Statistical concepts and definitions, New Methodology (from 2007 semester 2 onwards), Industry, Volume IA, IB, IC, ID summarised ‹ 20 GWh, Volume IE 20 to 70 GWh, Volume IF 70 to 150 GWh, Volume IG more than 150 GWh, see https://ec.europa.eu/eurostat/cache/metadata/DE/nrg_pc_204_esms.htm (last accessed 14/02/2018).

7 Results at the product level

As described in Section 2, products manufactured within the same installation are combined to form calculation elements for the purpose of calculating aid. The prerequisite for combining various products into one calculation element is an identical benchmark, or they must belong to the same sector if they are fallback products. There are 19 product-specific benchmarks and 16 fallback combinations available. Overall, the aid decisions in 2019 were based on about 1,000 calculation elements.[15]

Figure 7 shows the shares for both the fallback approach and benchmark approach in the total amount of aid granted for 2019. Around 51 percent of the total aid was given for the manufacture of products for which a product-specific benchmark applies. The other 49 percent of the total aid was due to product production where the fallback factor was used for electricity consumption to determine the aid amount. The shares of total aid have not changed compared to the 2018 accounting year (see DEHSt 2020a).

Depending on the industry these shares are very different. There are no benchmarks in the mining and paper industries, and the aid amount is calculated using the fallback factor. In the non-ferrous metal industry, about 76 percent of the aid amount is determined using benchmarks. This figure is 65 percent in the chemical industry and around 49 percent for iron and steel.



As of 07/12/2020

Figure 7: Shares of fallback approach and benchmark approach in the 2019 total aid amount and in aid amounts for selected industries

In the chemical industry and the iron and steel industry, the EU State Aid Guidelines that apply to the third trading period provide compensation based on benchmarks while taking into account the interchangeability of electricity and fuels. Typically, these benchmarks are used in installations that are also subject to emissions trading. If a benchmark product is produced using a fairly high electricity consumption, the installation receives a higher electricity price compensation. However, if a product is manufactured in a fuel or heat energy-intensive way, for example using a large amount of steam, it receives more free allowances. However, benchmarks with interchangeability of electricity and fuels can also be used in cases when the emissions trading obligation does not apply.

In the chemical industry, most of the high electricity consumption products from installations that also participate in emissions trading are produced by using more heat than electricity, meaning that the resulting electricity price compensation is relatively low and the free allowances predominate. Therefore, the share of benchmarks with interchangeability of electricity and fuels in the overall aid amount in the industry is relatively low.

15 However, there was no application from the "1810 – Leather clothing" sector. The product benchmarks silicon carbide, high-carbon ferromanganese, carbon black and silico manganese were also not applied.

Within the iron and steel industry, electric steel plants in particular benefit from the electricity price compensation for technological reasons. Benchmarks taking into account the interchangeability of electricity and fuel also exist for the production of electrical steel; however, electricity use clearly dominates, even compared to other installations in the iron and steel industry which receive aid. This is reflected in the high share of benchmarks with interchangeability of electricity and fuel in the industry's overall aid amount.

Table 4 shows the shares of the individual product benchmarks in the total aid amount for the 2019 accounting year. Just as in the previous years, the production of chlorine (Cl_2) has the largest share (around 17 percent), followed by the production of primary aluminium (about 12 percent). Five other benchmarks account for 1.7 to 6 percent of the total aid amount. They include the benchmarks of the iron and steel industry (carbon steel, high-alloy steel, oxygen steel). The remaining eight product benchmarks account for a total of 3.7 percent of the total aid amount for 2019.

Table 4: Shares of benchmark calculation elements[15] in the 2019 aid amount

Product benchmark	Share of EPC 2019
Chlorine (Cl_2)	16.6%
Primary aluminium	118%
EAF (electrical arc furnace) carbon steel	6.1%
Hyperpure polysilicon	5.2%
EAF high-alloy steel	3.9%
Highly refined chemicals	2.0%
Oxygen steel	1.7%
Other eight benchmarks	3.7%
Total	**50.9%**

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Table 5 shows the shares of fallback calculation elements in the aid. The largest shares are held by sectors 2112 (Manufacture of paper and paperboard) with 14 percent and 2710 (Manufacture of basic iron and steel and ferro-alloys) with about 11 percent. Seven other sectors and subsectors have shares of between 1.7 and 5.5 percent of the aid. The remaining six sectors and subsectors account for three percent of the total aid. Once again, there were no significant changes in the ranking of the individual shares in the total aid.

Table 5: Shares of fallback calculation elements[15] in the 2019 aid amount

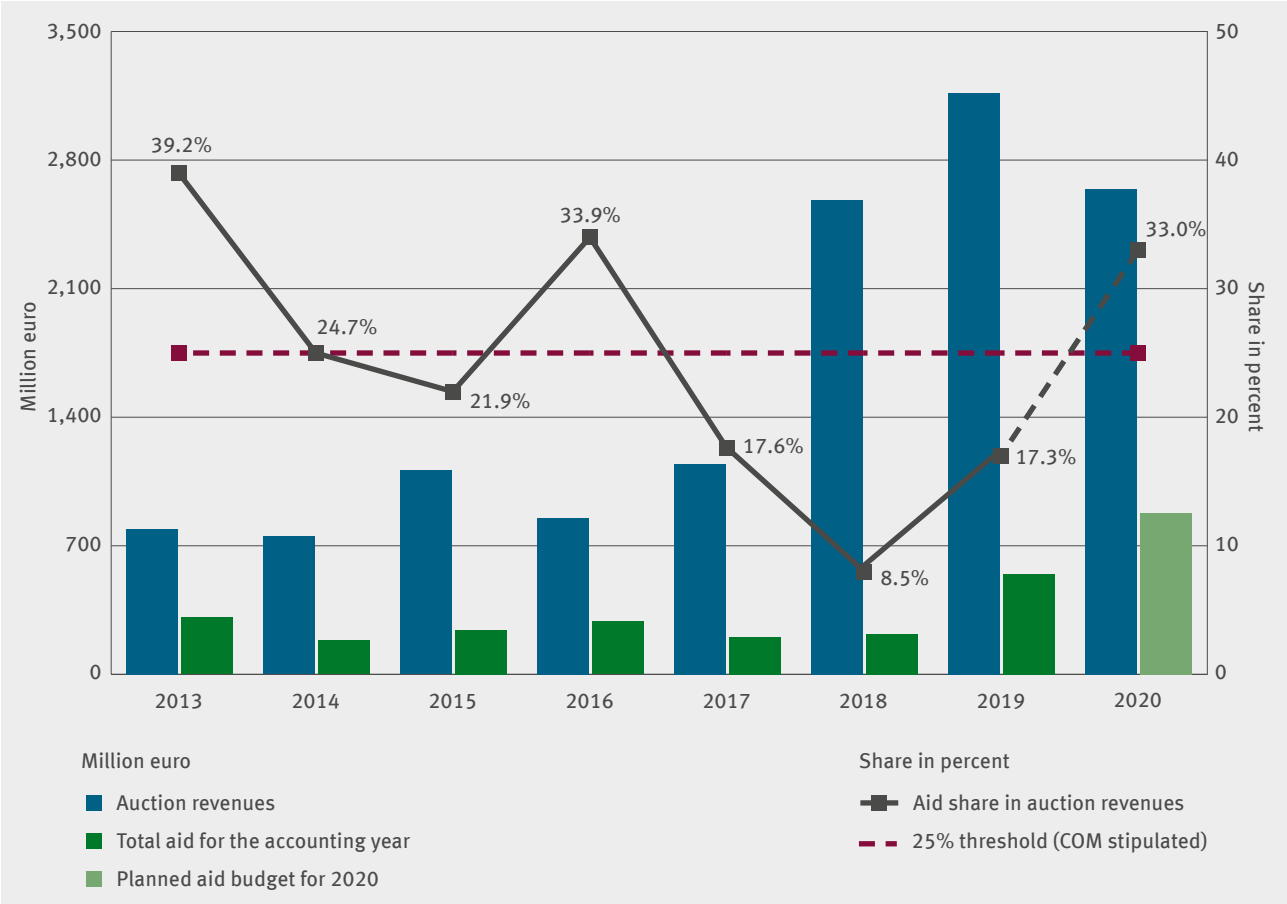
Fallback calculation element	Share of EPC 2019
Fallback 2112 Manufacture of paper and paperboard	14.3%
Fallback 2710 Manufacture of basic iron and steel and of ferro-alloys	10.7%
Fallback 2414 Manufacture of other organic basic chemicals	5.5%
Fallback 2111 (Subsector) mechanical pulp	4.3%
Fallback 2416 (Subsector) manufacture of plastics in primary forms	3.0%
Fallback 2413 Manufacture of other inorganic basic chemicals	2.6%
Fallback 2744 Copper production	2.1%
Fallback 2742 Aluminium production	2.0%
Fallback 2415 Manufacture of fertilisers and nitrogen compounds	1.7%
Other six sectors and subsectors (fallback)	2.9%
Total	**49.1%**

As of 07/12/2020

8 Share of electricity price compensation in auction revenues

According to Article 10a(6), the Emissions Trading Directive as amended in 2018 even before the start of the fourth trading period, specifies that the amount paid should not exceed 25 percent of the auction revenues of the Member State concerned. Otherwise, the Member State must justify why the share of the aid in the auction revenues exceeds this threshold. According to the European Commission[16], the share is calculated as the ratio of aid for a given reporting year to the auction revenues of the same year.

Since applications for electricity price compensation in Germany are subsequently submitted and granted, this means for this report that the reported aid for 2019 (accounting year) was applied for and granted in 2020. This value for 2019 is offset against the 2019 auction proceeds for determining the share. Thus the share for the 2019 accounting year is around 17 percent.



As of 16/12/2020

Figure 8: Disbursed aid in the accounting year (for 2020: estimated budget), auction revenues (EUA and aEUA) of the respective year and respective share since 2013

16 Cf. COM 2019, Table 4, page 22.

Figure 8 shows both the aid disbursed for the 2013–2019 accounting years and the auction revenues of the same years as bars, and the share of the annual aid disbursed in the auction revenues as lines. This share should be less than 25 percent, however the figure shows that this was not the case in 2013 and 2016. In those years, the share in some cases was well above the 25 percent threshold at 39 and 34 percent, respectively. In 2014, the threshold was only just below. For 2015, 2017, and 2018, the share was below the 25 percent threshold, and for 2019 it was also below the threshold at around 17 percent. Based on the planned aid budget for 2020, however, the share is expected to be well above the 25 percent threshold again at 33 percent in the 2020 accounting year.

What causes the shares of disbursed aid to vary in the auction revenues?

The amount of annual aid disbursed mainly depends on two factors: firstly, the aid intensity, which was highest in 2013–2015 with 85 percent of the volume of electricity eligible for compensation, then 80 percent for 2016 to 2018, dropping to 75 percent in 2019 and 2020. Secondly, the relevant EUA price. For electricity price compensation, this is determined based on the respective previous year's average of the daily settlement prices of the exchange-traded reference contract for European emission allowances (EUA). For all accounting years, this was the futures contract traded on the ICE in London with delivery in December of the following year.[17] Thus, the maturity of the reference contract corresponds to the electricity price compensation accounting year. Nevertheless, it has been shown that futures can only limitedly reflect the actual price trend in the maturity year (see below). The reference prices are shown in Table 6.

Table 6: EUA price relevant to aid calculation and aids disbursed since 2013

Year	2013	2014	2015	2016	2017	2018	2019	2020
EUA price (EPC calculation basis)*	7.94	4.68	6.17	7.80	5.40	5.88	16.15	25.20
EPC (aid disbursed)**	310.00	185.16	243.11	287.91	202.21	218.50	546.04	

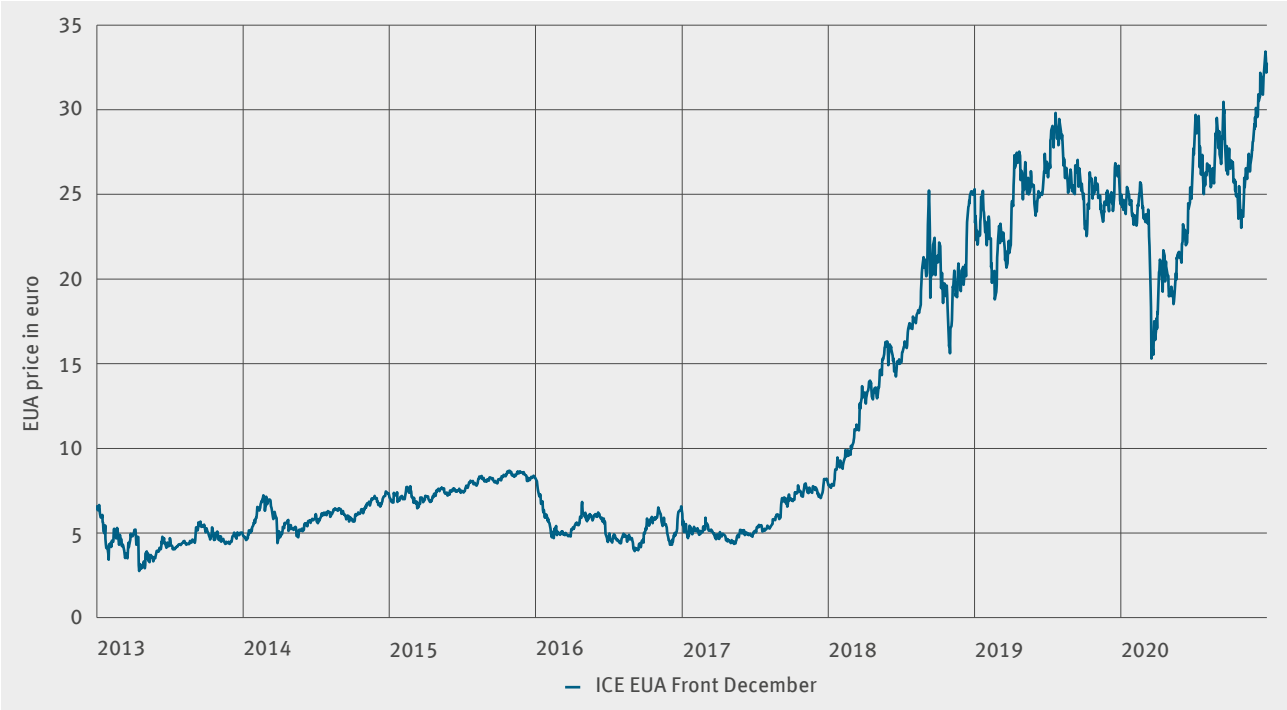
* Prices in euro
** Prices in million euro
As of 16/12/2020

Another possible factor with relevance to the aid amount is the quantity of CO_2 underlying the aid calculation (as a product of the relevant amount of electricity and emission factor), which has remained approximately the same since 2013 (compare Figure 3 and the accompanying text) and thus does not play a role in fluctuations of the aid share in the auction revenues.

The volume of the auction revenues depends on the auctioned quantity and the prices obtained. German auction volumes – as well as those of other Member States – have been falling successively since 2013 in line with the declining cap. However, due to the "backloading", there was a significant unscheduled reduction in 2014–2016 – a total of 900 million EUA[18] across Europe – in order to stabilise the price level. These auction volumes should have been returned to the market in 2019 and 2020 but have now been transferred to the Market Stability Reserve (MSR). The MSR entered into force in the beginning of 2019, and the EUA volume to be auctioned was reduced in line with the MSR mechanism in 2019, 2020 and 2021.

17 See 5.1 k of the State Aid Directive.
18 Germany accounted for about 175 million allowances.

Figure 9 shows the trend in the EUA price level since 2013. Between the beginning of 2013 and the end of 2017, the EUA price initially fluctuated within an interval of about three to eight euros. The price increased significantly after early 2018 with the benchmark contract (ICE EUA Front December) nearly reaching €30 in mid-2019. Due to strong turbulence on the international securities and energy markets caused by the COVID 19 pandemic, EUAs lost significant value in March 2020 and briefly fell to below €15. Subsequently, however, there was a strong upward movement and the EUA price exceeded the €30 mark early in July and reached a new all-time high of above €33 by the end of December 2020.



As of 31/12/2020

Figure 9: EUA price trend since 2013

Table 7 shows the annual volume-weighted average values per certificate achieved by German auction revenues.

Table 7: Volume-weighted annual average EUA price of German auctions (excluding aviation) and EUA price relevant for the aid calculation

Year	2013	2014	2015	2016	2017	2018	2019	2020
EUA price (German auctions)*	4.33	5.90	7.60	5.26	5.80	14.90	24.66	24.59
EUA price (EPC calculation basis)*	7.94	4.68	6.17	7.80	5.40	5.88	16.15	25.20

* Prices in euro
As of 16/12/2020

As a result, EPC calculation base and auction price are clearly drifting apart. The relevant calculation price for electricity compensation is determined from the average of the futures price in the previous year, so that there is a one-year delay between the relevant pricing for electricity price compensation and that for auction revenues. Certain market trends are thus not yet reflected in the price relevant to aid calculation. This becomes clear from a comparison of the prices in Tables 6 and 7. For example, the price to be applied for the 2019 EPC settlement year was €16.15, while the average price was €24.66 in the 2019 German auctions.

If the prices for aid calculation and from auctions were identical, the share of aid in the German auction revenues would be between 19 and 32 percent in the 2013–2020 period. If one were to take into account the EUA quantities not auctioned between 2014 and 2016 (backloading) and from 2019 (MSR) in the calculation of the auction revenues, the share would be between 16 and 22 percent (see Table 8). By default, this adjusted calculation approach also applies to taking into account the auction volume reductions starting in 2019 and equalling the withdrawn volume for the MSR for the following years.

Table 8: Shares of disbursed aid in the auction revenues according to different calculation methods

Year	2013	2014	2015	2016	2017	2018	2019	2020
Regular (see Figure 8)	39.2%	24.7%	21.9%	33.9%	17.6%	8.5%	17.3%	33.0%
Identical EUA price	21.4%	31.1%	27.0%	22.8%	19.0%	21.5%	26.4%	32.2%
Identical EUA price, without backloading/MSR	21.4%	19.3%	19.3%	18.4%	19.0%	21.5%	15.8%	18.4%

As of 16/12/2020

9 Outlook

The Energy and Climate Fund (ECF) provided a budget of €567 million for electricity price compensation for the 2019 accounting year. As in the past two accounting years, more than 96 percent of this budget has been exhausted, thus no budgetary reductions in the total state aid were necessary.

The application process for the 2020 accounting year began on 01/03/2021. Operators can submit applications by 31/05/2021. The EUA price to be applied in the aid calculation for the 2020 accounting year is €25.20. It is thus 56 percent higher than the 2019 price and will again lead to an increase in the overall level of total state aid. The Federal Ministry for Economic Affairs and Energy therefore provided €877.9 million for the 2020 accounting year.

The EU State Aid Guidelines, i. e. the current European legal basis for electricity price compensation for the third trading period, only regulates the compensation of indirect CO_2 costs of the EU ETS until and including the 2020 accounting year. Therefore, the European Commission revised the State Aid Guidelines for the fourth trading period and published them on 21/09/2020 (see EU 2020). The State Aid Guidelines provide the framework for the arrangement of electricity price compensation in Germany.[19] They include in particular: adjustments to the list of eligible sectors in accordance with Annex II; a constant maximum aid intensity of 0.75 for the entire 2021–2030 period; actual production volumes and electricity consumption as the basis for aid calculation; applicants' obligation to implement environmental offsets from a certain company size and the possibility of increasing the aid amount depending on the gross value added of the applicant companies.

19 The German State Aid Directive for electricity price compensation had not yet been published at the time of going to press.

10 Annex

The 2013–2018 figures published in the report may differ from previous publications due to retrospective amendments to aid payments because of legal actions such as appeals, lawsuits and reclamations.

Table 9: Number of approved applications and number of installations by industries and total aid disbursed in 2013

Industry (EPC)	Number of applications	Number of installations	EPC 2013*
Chemical industry	118	534	118,632,658.16
Iron and steel	54	164	76,584,425.06
Paper	111	147	63,028,256.58
Non-ferrous metals	49	115	51,359,198.42
Clothing	8	8	294,916.01
Total	**340**	**968**	**309,899,454.23**

* Prices in euro
As of 07/12/2020

Table 10: Number of approved applications and number of installations by industries and total aid disbursed in 2014

Industry (EPC)	Number of applications	Number of installations	EPC 2014*
Chemical industry	115	498	72,772,616.17
Iron and steel	52	159	45,135,327.21
Paper	110	146	35,167,223.57
Non-ferrous metals	49	115	31,677,160.50
Clothing	8	8	112,527.51
Total	**334**	**926**	**184,864,854.96**

* Prices in euro
As of 07/12/2020

Table 11: Number of approved applications and number of installations by industries and total aid disbursed in 2015

Industry (EPC)	Number of applications	Number of installations	EPC 2015*
Chemical industry	117	486	95,745,857.35
Iron and steel	51	160	58,605,040.37
Paper	107	142	46,157,796.95
Non-ferrous metals	47	111	42,172,046.56
Clothing	8	8	152,301.63
Total	**330**	**907**	**242,833,042.86**

* Prices in euro
As of 07/12/2020

Table 12: Number of approved applications and number of installations by industries and total aid disbursed in 2016

Industry (EPC)	Number of applications	Number of installations	EPC 2016*
Chemical industry	113	485	114,007,724.26
Iron and steel	50	160	68,370,993.50
Paper	107	142	54,182,766.43
Non-ferrous metals	48	108	50,518,085.52
Clothing	8	8	168,054.73
Total	**326**	**903**	**287,247,624.44**

* Prices in euro
As of 07/12/2020

Table 13: Number of approved applications and number of installations by industries and total aid disbursed in 2017

Industry (EPC)	Number of applications	Number of installations	EPC 2017*
Chemical industry	113	484	80,683,339.41
Iron and steel	50	155	48,816,383.67
Paper	104	138	36,962,447.49
Non-ferrous metals	47	107	34,993,017.35
Clothing	8	8	117,901.97
Total	**322**	**892**	**201,573,089.89**

* Prices in euro
As of 07/12/2020

Table 14: Number of approved applications and number of installations by industries and total aid disbursed in 2018

Industry (EPC)	Number of applications	Number of installations	EPC 2018*
Chemical industry	113	486	87,017,135.01
Iron and steel	50	156	52,563,563.19
Paper	103	139	40,725,628.78
Non-ferrous metals	50	111	38,077,941.46
Clothing	6	6	101,397.23
Total	**322**	**898**	**218,485,665.67**

* Prices in euro
As of 07/12/2020

Table 15: Number of approved applications and number of installations by industries and total aid disbursed in 2019

Industry (EPC)	Number of applications	Number of installations	EPC 2019*
Chemical industry	109	479	217,949,159.93
Iron and steel	50	161	131,249,172.39
Paper	105	139	101,638,947.24
Non-ferrous metals	53	118	95,000,343.89
Clothing	5	5	201,444.63
Total	**322**	**902**	**546,039,068.08**

* Prices in euro
As of 07/12/2020

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