Finanzgruppe
Deutscher Sparkassen- und Giroverband

Standpunkte
Der Chefvolkswirte

Current Challenge: CO_2 Pricing

The competitiveness of German and European industry is suffering from persistently high energy costs. Compared to the U.S. and China in particular, Europe has long lagged behind in terms of high energy costs, and we continue to fall further behind. The war in Iran heightens the urgency of finding sustainable solutions to the structural flaws in the energy markets. The political framework conditions in the energy markets must be reliable. This raises the question now more than ever of how energy prices can be lowered to ease the burden on businesses and households. Rising CO_2 taxes will exacerbate the problem in the future. The chief economists of the Sparkassen-Finanzgruppe see a need for action here.

- It is necessary to distinguish between the European and national emissions trading systems. Unnecessary price spikes must be avoided during the transition.
- The framework conditions for low-carbon technologies must be improved. The merit-order principle needs to be reevaluated.
- Investments in decarbonization technologies within the emissions trading system should be taken into account and provide relief.
- We should continue to adhere to the targets for expanding renewable energy. The expansion of renewable and low-carbon energy sources must be accelerated.

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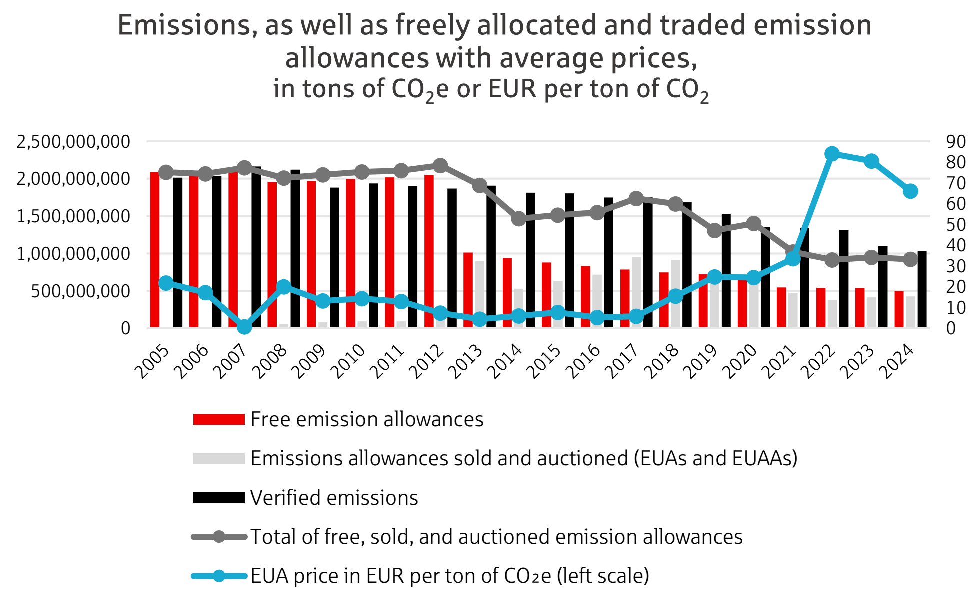
Regulated Emissions Trading – Europe and Germany

The European Emissions Trading System

Desired effect of CO_2 regulation?

The European Union Emissions Trading System (EU ETS I) celebrated its 20th anniversary in 2025. The European Commission established the system to use a market-based instrument to reduce emissions from energy-intensive sectors, such as power plants or energy-intensive (20 MW) combustion plants.

During the first two trading periods, up to and including 2012, emissions allowances were issued primarily for free. Only very small quantities were traded at auctions or on the exchange. Many industries benefited from this, as emissions in many years were lower than the number of free allowances allocated. To this day, approximately 40 percent of verified emissions are allocated for free. Consequently, emissions initially declined only very slightly. In the third trading period, beginning in 2013, free allocation was discontinued for some sectors, including the energy sector. From 2014 to 2021, emission allowances from the voluntary market could also be offset-though only under certain conditions.



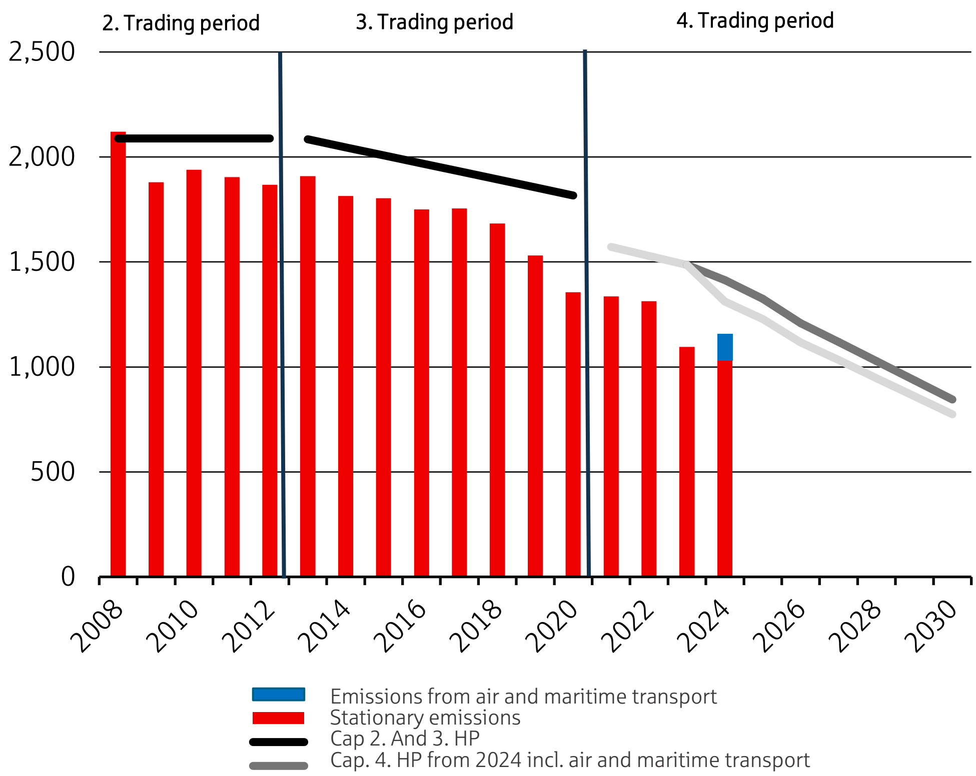
Source: European Environment Agency, LBBW Research

In 2026, the first steps were taken to introduce a Carbon Border Adjustment Mechanism (CBAM) for particularly CO_2-intensive products from third countries. At the same time, the phase-out of free European Union Allowances (EUAs) began in the relevant sectors. A gradual phase-out of free allowances is also planned for the remaining facilities over the coming years.

If companies wish to continue benefiting from free allowances, they must implement the measures recommended in mandatory energy audits or by energy management systems. In addition, particularly CO_2-intensive facilities must submit climate neutrality plans. Otherwise, they face cuts of 20 percent.

Free allocation is based on sector-specific benchmarks that are regularly adjusted to reflect technological progress and actual emissions data. Continuous efficiency gains across sectors cause these benchmarks to decline- and with them, the number of free allowances. Plant operators who do not consistently invest in decarbonization in line with their benchmark are particularly affected. While the phase-out of free EUAs leads to rising demand on the exchange, supply decreases due to the linear reduction of available EUAs- the so-called cap.

Total Cap and Emissions in the EU ETS

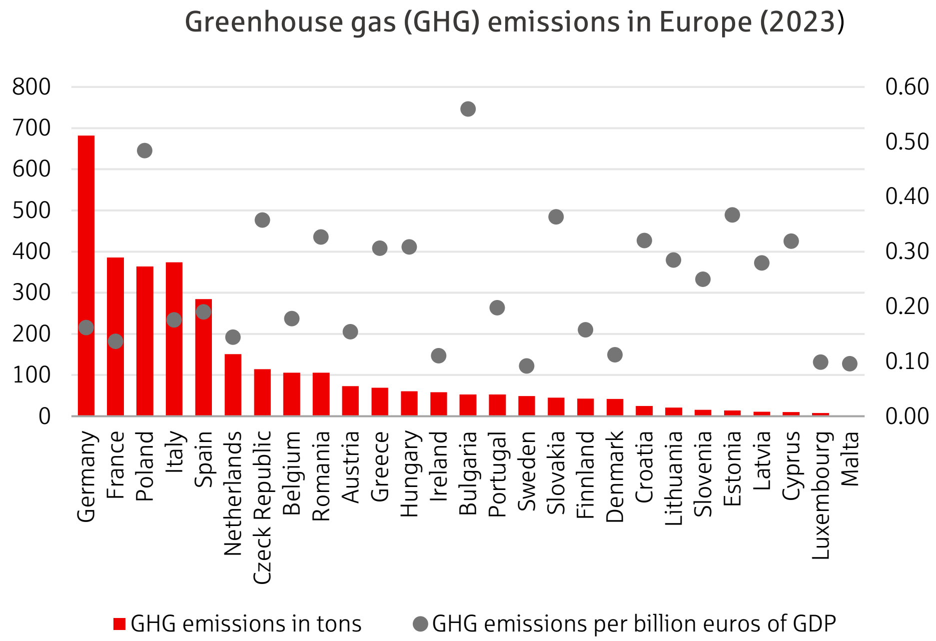


Source: UBA, LBBW Research

At the start of 2026, the price of European emissions allowances averaged 86 euros per ton of CO_2. In the medium term, however, further price increases are expected, particularly as demand pressure rises, as described. These costs are typically passed on, thereby influencing electricity prices as well as the prices of steel, cement, paper, glass, and several other energy-intensive products.

High greenhouse gas emissions in Germany

Germany plays a special role in the EU ETS I. As the most industrialized and largest country in the EU, it accounts for the largest share of emissions within the EU in absolute terms. Nevertheless, despite an enormous diversity of products and facilities, the country's industry manages to keep emissions per unit of GDP in the lower middle range compared to other European countries. Approximately 1,700 of the roughly 10,000 stationary installations are operated in Germany. They generate about 20 percent of the emissions covered by the EU ETS I.



Source: EU-Parlament, Eurostat, LBBW Research

National Emissions Trading

In addition to the EU ETS, Germany and other EU member states have introduced national emissions trading systems (nEHS) or emissions levy systems in recent years. The German nEHS covers emissions from fossil fuels used primarily in the building and transportation sectors, as well as in smaller combustion plants. Households and small businesses are indirectly affected by this- for example, through fuels purchased at gas stations and the generation of space and process heat from fossil fuels. After being postponed by one year, a European Emissions Trading System II is set to take effect in 2028 for these very sectors and replace the national systems by 2031.

Since January 1, 2026, the price in the German nEHS has ranged from 55 to 65 EUR. In weekly auctions, companies subject to emissions trading can acquire emission allowances by submitting bids. It is anticipated that significant price pressure will arise due to insufficient decarbonization in the building and transportation sectors. Since 2026, a cap (maximum number of emission allowances issued) has also been in effect in the nEHS.

Specifically, this means that in 2025, Germany still issued (unlimited) over 270 million allowances in the nEHS. In 2026, however, this number will be limited to 215 million allowances. Therefore, it is expected that the price will stabilize at 65 EUR per ton of CO_2, at least in the second half of the year.

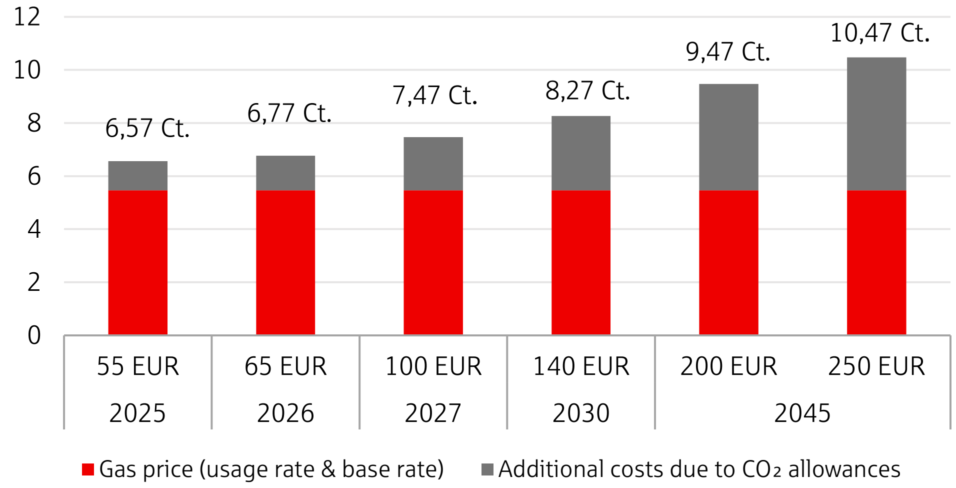
CO_2 – a cost driver, yes or no?

Gas as a cost driver

Rising CO_2 costs will be felt by businesses and households in various ways in the coming years and have now become abundantly clear in light of the war in Iran. The portion of the CO_2 tax is already shown on gas bills today. The same applies to oil. Both fossil fuels fall under the nEHS and, in the future, the EU ETS II. Gasoline and diesel also fall under the nEHS. On the gas station receipt, however, the costs for CO_2 are merely part of the gross price; they are not listed separately. The situation is similar with levies from the EU ETS I. The costs are factored into the cost calculation of the manufactured products and increase the price for the consumer. Glass, paper, cardboard, and- most crucially- electricity will therefore become more expensive if decarbonization efforts in companies do not progress. To obtain a more concrete picture of the monetary impact, the nEHS and the EU ETS I are considered separately.

A price per ton of CO_2 is not easily grasped. What is of interest to affected households and businesses is how this price, under different price trends, affects or will affect utility or operating costs- such as the cost of running a heating system for space heating. The following chart illustrates the impact of CO_2 as a cost component of the gas price for non-residential customers (based on the average raw material price, including transportation, distribution, and utility margins, excluding third-party costs). It is assumed that the gas price will remain unchanged at 5.47 cents until 2045. This corresponds to the average calculated by Destatis for the first half of 2025. As can be seen, the share of CO_2 costs is just 1.1 cents, or about one-fifth of the gas price. However, at a price of 250 EUR per ton of CO_2, a ratio of nearly one to one would be achieved.

Trend in CO_2 costs per kWh of gas and total price
excluding other third-party costs (taxes, grid fees, etc.)



Source: Destatis, LBBW Research

According to this, a company with a space heating requirement of 870,000 kWh would already be paying over 45,000 EUR for gas and CO_2 (based on 55 EUR) today. Additional third-party costs have not yet been taken into account. If the CO_2 price rises to 140 EUR, an additional 15,000 EUR will be added.

The situation is very similar for residential customers. However, the average price per kWh of gas, including CO_2 costs, for residential households in the first half of 2025 was 9.37 cents (excluding other third-party costs). With a CO2 price of 250 EUR per ton of CO_2, the cost per kWh rises to 13 cents. However, due to their low consumption volumes, residential households pay a base rate that is nearly twice as high as that of commercial customers. For a 150-square-meter apartment in an older building, the gas demand for heating and hot water is approximately 25,000 kWh. With a CO_2 price of 140 EUR, heating costs would rise from the current level of about 2,300 EUR (55 EUR per ton of CO_2) to nearly 3,000 EUR.

The price of gas, including CO_2 costs, could become a significant cost driver for buildings and process heat in smaller facilities. This would further exacerbate the already existing problem of high energy prices. Heat pumps, large-scale heat pumps, and district heating already represent mature technological alternatives to the use of gas for most applications in the areas of space heating and process heat in smaller facilities. In the current geopolitical environment, it also makes more sense than ever to move away from raw materials for which there is a high degree of dependence on other countries. Price spikes in the raw materials markets then lose their relevance and allow for more predictable cost calculations.

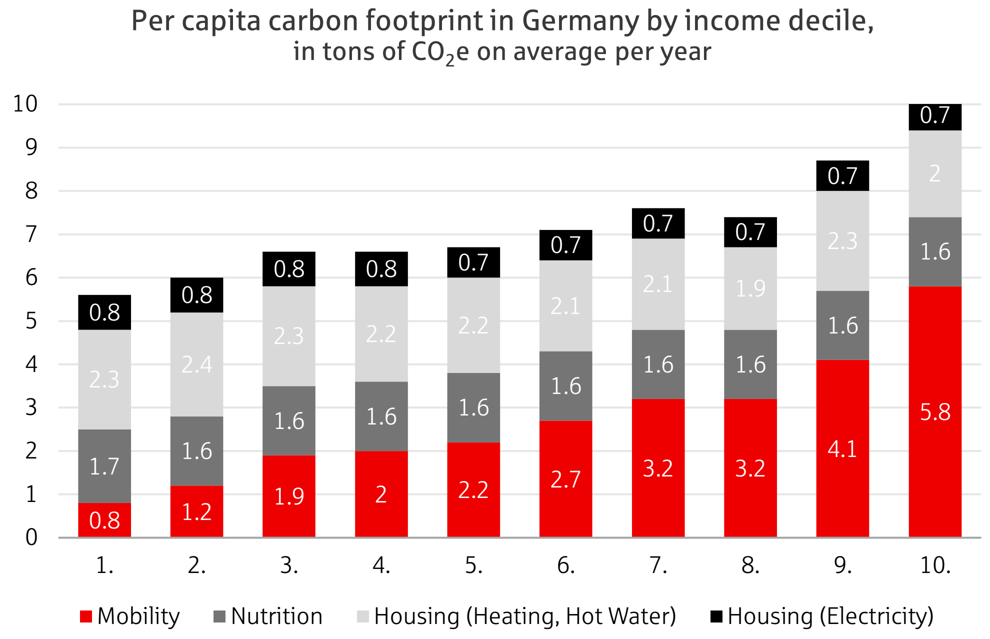
The nEHS also covers the CO_2 emissions generated by the sale of gasoline and diesel at gas stations. Each liter of gasoline produces approximately 2.37 kg of CO_2. For diesel, the figure is 2.65 kg. The following table shows a simulation of the cost increase per liter through 2045.

Theoretical trend in the cost of CO_2 per liter of gasoline and diesel in EUR

	2025	2026	2027	2030	2045	
CO_2-Price	55 EUR	65 EUR	100 EUR	140 EUR	200 EUR	250 EUR
Gasoline	0,13035	0,15405	0,237	0,3318	0,474	0,5925
Diesel	0,14575	0,17225	0,265	0,371	0,53	0,6625

Source: Bundestag, LBBW Research

Even though the impacts of the nEHS can be viewed as highly critical, it is important to clearly distinguish between the building and transportation sectors. Access to heat is essential for a dignified life. The following chart illustrates that both electricity and heat in the residential sector dominate the carbon footprint of very low-income households, while the mobility sector accounts for only a very small portion of the carbon footprint hereAccording to this, they are particularly hard hit by an increase in the CO_2 tax in terms of gas and electricity costs, even though landlords are required to cover part of these taxes- to a greater or lesser extent- depending on the CO_2 emissions per square meter per year. Low-income households typically live in small living spaces, often in poorly renovated buildings. As income increases, so does living space per person, but so does the energy efficiency of the property. Mobility only begins to play a role in the carbon footprint as income rises. In high-income households, mobility is the undisputed primary driver. Heavy and high-horsepower vehicles, as well as the use of a second car, play decisive roles here.



Source: DIW, LBBW Research

Starting in 2028, the nEHS will be based on the EU ETS II. However, due to the recent one-year postponement and the provisions of the Federal Emissions Trading Act, the nEHS will initially be benchmarked against the EU ETS I for 2027. We expect the CO2 price in the EU ETS I to average between 90 and 95 EUR next year. This would result in a price jump from 2026 to 2027 of about 30 EUR- from the current peak price in national emissions trading of 65 EUR to 90 to 95 EUR in the EU ETS I in 2027. Starting in 2028, however, the reference will change again as the EU ETS II comes into effect. The European Commission plans to initially stabilize the price at 45 EUR (reference year 2020). Adjusted for inflation, this would correspond to around 60 EUR in 2028. As a result, the price would fall again.

Interim Conclusion

Maintain the price range of 55 to 65 euros

The transition outlined in the previous section- from the EU ETS I reference in 2027 to the EU ETS II reference in 2028- should be avoided. It would make sense to maintain the current price range of 55 to 65 euros for another year. This would ensure continuity and predictability for businesses and households.

There is a particular need for action in the building sector. The effects of higher energy costs hit vulnerable households particularly hard. Findings from a study by the Federal Environment Agency show that a climate allowance is not the solution to the problem and can only serve as a stopgap measure. Furthermore, the study points out that a per-capita distribution in accordance with the EU ETS Directive is only compatible with positive environmental benefits.

It would be effective to develop subsidy programs funded by revenues from the national emissions trading scheme (2025: approximately €16 billion) and aimed at renovating buildings occupied by low-income residents. Subsidies should be based on the extent to which energy efficiency is improved, rather than on the technology used. This would ensure that every euro spent delivers the greatest possible benefit. For owner-occupied properties, direct subsidies, scaled according to household income, similar to the new electric vehicle incentive, would be sensible. For rental apartments, the renovation must make economic sense for the property owner. Passing on costs to tenants must be prohibited for a period to be defined. The increase in value resulting from the renovation must be taken into account. Real estate appraisers are already working on integrating GEG requirements into property valuations. This would ensure that revenues from emissions trading would, on the one hand, reduce energy consumption in the building sector and, on the other hand, permanently stabilize costs for vulnerable households.

High CO_2 taxes at the gas station can be expected of high-income households. However, it would be better if, similar to gas bills, gas station receipts also listed the CO_2 tax, thereby raising consumer awareness. In addition, a CO_2 tax should be introduced for CO_2-intensive vehicles that are heavy and/or have high horsepower. This model is already being successfully implemented in other EU member states, such as France. Social considerations, such as vehicles for people with physical disabilities or families with three or more children, are taken into account. A corresponding framework would provide an economic incentive to purchase an electric vehicle without imposing a ban. Only a few low-income households would be affected in this case. To ensure access to e-mobility for all households, subsidy programs with income-based tiers should also be implemented here. These could in turn be financed from the additional tax revenue generated. This approach would also provide the European automotive industry with a boost toward e-mobility.

The European Emission Trading System

The challenges facing companies subject to the EU ETS I are far greater. In addition to electricity and heat generation, energy-intensive industries include the chemical, steel, glass, paper, and ceramics sectors, as well as cement production and oil refineries. Some pharmaceutical companies and food manufacturers are also affected.

Emissions from facilities in Germany by industry
(Greenhouse gas emissions 2024)

	Emissions (Mio. t CO_2 a*)							
Name of the industry sector	Number of facilities 2024	Average 2008–2012**	Average 2013–2020 ***	2020	2021	2022	2023	2024
Energy facilities	**878**	**344,8**	**305,9**	**205,5**	**234,9**	**241,8**	**188,5**	**170,6**
Industrial plants	**838**	**105,4**	**123,8**	**114,6**	**119,8**	**112,2**	**101,0**	**102,1**
Other combustion plants	50	0,2	0,6	0,5	0,5	0,5	0,5	0,5
Refineries	22	26,9	24,7	22,9	22,5	23,5	21,3	21,8
Iron and steel	115	31,1	36,3	31,5	35,4	33,2	32,5	33,1
Non-ferrous metals	38	0,1	3,2	3,1	3,1	2,7	2,1	2,5
Mineral processing	289	34,6	35,3	34,4	35,6	33,6	28,5	27,0
Industry	130	6,2	5,7	5,2	5,3	4,7	3,9	4,0
Paper and pulp	194	6,3	18,0	17,0	17,3	14,1	12,1	13,3
Total	1.716	450,2	429,7	320,1	354,8	354,0	289,5	272,7

* Including emissions from facilities that were no longer subject to emissions trading in 2024.
** Scope of the second trading period of the EU ETS 1.
*** Scope of the 3rd trading period of the EU ETS 1.
Source: Federal Environment Agency, German Emissions Trading Authority

While the energy sector has managed to reduce CO_2 emissions by 35 million tons over the past five years, very little progress has been made, particularly in the refining and iron and steel production sectors.

Many studies now indicate that the cost-effective operation of carbon-neutral or low-carbon technologies is not feasible under current conditions. A study by the German Federal Environment Agency (UBA) concludes that this would require lower costs for electricity and hydrogen (H_2) and a higher carbon price. In addition, a sufficient supply of renewable energy and sufficient H2 would have to be ensured. Furthermore, market-ready technologies are not yet available for a wide range of industrial applications. This means that they are neither scalable nor economically viable at this time. A study by Fraunhofer ISI supports the findings of the UBA study. Although only decarbonization technologies in the food sector were examined, the conditions identified by Fraunhofer ISI- which are linked to a successful transformation- are more concrete, and the study is also more recent (to be published in late 2025). An electricity price of 60 EUR/MWh (including all levies, taxes, and surcharges) as well as full compensation for CO_2 costs incurred via the electricity price would therefore be necessary to be more economical than fossil fuel technologies based on the current state of the art.

To better understand the key challenges of decarbonization, five sectors are examined separately: energy, refining, iron and steel, chemicals, and the mineral processing industry.

Designing decarbonization by sector

1. **Energy sector**
   The necessary technologies are largely available at a high level of maturity. For example, work is currently underway to develop increasingly powerful wind turbines, and PV modules have also become more efficient over the past few years. The limiting factor for the energy sector at present is the expansion of transmission and distribution grids, as well as the provision of secure baseload capacity. The power plant strategy calls for the tendering of 12 GW of additional capacity. All power plants are to be hydrogen-compatible and fully converted by 2045. German power plants are already testing the blending of hydrogen into existing gas pipelines. While the International Energy Agency (IEA) rates the technology maturity for transporting hydrogen in trucks or on ships at a high level of 10, it currently stands at 9 for pipelines and at just 8 for the use of pure hydrogen in gas-fired power plants. Of course, there are still 20 years left for further research and development. However, the low-hanging fruit in the energy sector has already been harvested. Further steps toward decarbonization will require greater investment.

   With regard to emissions trading:
   The new gas-fired power plants will only operate at full capacity on a few days and cannot be run economically under these conditions. Additional burdens must be avoided so as not to drive up electricity prices unnecessarily. A way must be found to exempt power plant operators from purchasing CO_2 emission allowances for gas-fired power plants until 2045 in exchange for providing reserve power and the resulting security of supply. Furthermore, green hydrogen must be deployed as soon as possible. Currently, it is not defined what exactly "H2-ready" means in relation to the new gas-fired power plants to be built. To ensure greater planning certainty, companies (EnBW's statement in the Bundestag's lobby register) as well as the German Association of the Gas and Water Industry are calling for standardization of the term "H2-ready." At the same time, it must be ensured that economically viable solutions are not ruled out by standardization. One way to offset CO_2 emissions nonetheless would be for the federal government to purchase voluntary emission allowances. However, this would also need to be supported by the EU.

2. **Refiniries**
   Refineries convert crude oil into products such as gasoline, diesel, and kerosene. They also produce chemicals like ethylene, as well as

gray hydrogen. This process requires process heat, which is generated by gas in most cases. The current product range will largely disappear from the market by 2050. Operators face the challenge of offering sustainable kerosene- known as Sustainable Aviation Fuels (SAF)- e-fuels, or green hydrogen instead of fossil fuels in the future. However, this requires sufficient renewable energy. The consistent expansion of renewable energy sources and the construction of the hydrogen backbone network are two essential elements in the transformation of refineries

With regard to emissions trading:
Europe depends on the basic materials industry if it is to avoid falling into new or further dependencies. It is necessary to establish a link between the availability of renewable energy- for hydrogen production, or alternatively the volume of hydrogen imported from abroad- the maturity of the required technology, and the availability of emission allowances (the current EU ETS I is set to expire in 2040).

3. **Iron and Steel**

Steel is a raw material used in many industries, such as the construction sector and the automotive industry. The most common method of steel production is in a blast furnace. This process is highly carbon-intensive, which is why the iron and steel sector accounted for over 10 percent of industrial emissions in 2024. The industry currently has two decarbonization methods at its disposal, including the production of steel from scrap steel and sponge iron in an electric arc furnace (EAF), although this process typically requires the addition of natural gas in addition to electricity. Nevertheless, the process is significantly lower in CO_2 emissions than the conventional method. Alternatively, steel can be produced using the direct reduction process. This requires green hydrogen. The challenges of both processes are, on the one hand, the high operating costs, as both hydrogen and electricity are very expensive. Furthermore, hydrogen is not available in sufficient quantities. On the other hand, there is a lack of leading markets for green steel. One starting point would be the use of green steel in public tenders
A recent example illustrates just how difficult the transition is proving to be in Germany. In 2024, ArcelorMittal was awarded a contract under the so-called Climate Protection Agreements. In the fall of 2025, the company announced that it had to abandon the project because, despite substantial funding commitments, it could not be implemented economically. Instead, the first electric arc furnace is now being installed in France. According to the operator, the site conditions there are better.

The preparations made so far for the implementation of CBAM have yielded some modest success at the international level. Some of the largest importers into the EU, including Turkey, are in the process of introducing their own carbon tax. Although the price will likely be lower than Europe's at first, this would slightly improve the position of industry here. However, aside from these diplomatic successes, this instrument- which is critical from an international trade perspective- is unlikely to have much chance of further implementation given the tense geopolitical situation

Furthermore, the introduction of the CBAM is unlikely to eliminate the competitive disadvantage faced by EU industry, as the scheme applies only to raw materials and not to the finished products manufactured from them. As a result, it could become more attractive for manufacturers in the EU to relocate production to a non-European location. There, the finished product would be assembled and could then be imported into Europe without requiring carbon offsetting.

With regard to emissions trading:
As with refineries, it would make sense to link the availability of emission allowances to that of hydrogen. In addition, consideration should be given to whether investments in low-carbon technologies could be offset under the EU ETS I. Admittedly, this would amount to premature recognition for emissions that have not yet been reduced. Nevertheless, combined with subsidies, this could provide the necessary impetus.

4. Mineral Processing Industry

The cement industry faces what is arguably its greatest challenge. Coal is still frequently used to heat the kilns to 1,600 degrees. Nevertheless, it accounts for only a small portion of emissions. About two-thirds of CO_2 emissions are released during the burning of the rock. Germany's largest cement manufacturer, Heidelberg Materials, has been offering the first "near-zero" cement since the end of 2025. This is possible because the CO_2 produced during combustion is captured and stored (Carbon Capture and Storage, CCS).

With regard to emissions trading:
Carbon dioxide storage is currently the only viable option for the cement industry, and it is also essential for many other industries. The scientific community now agrees that climate neutrality is only achievable through the integration of CCS, Carbon Capture and Utilization (CCU), and negative emissions (the technical or natural removal of CO_2 from the atmosphere). Therefore, it would make sense if investments in these technologies could be offset against the EU ETS. This would also provide relief for the cement industry, provided

it continues to invest in decarbonization solutions. In early 2026, the German government paved the way for CO_2 storage on the seabed- an important political signal for energy-intensive industries.

5. **Chemistry**

   The chemical industry has its back against the wall. Fossil fuels are used to generate energy and (so far) have also provided raw materials for the petrochemical industry. End products include medicines, fertilizers, and plastics. On the one hand, the industry is seeking alternatives to replace fossil carbon components with biomass, recycled materials, or alternatives based on green hydrogen. On the other hand, CO_2 capture is also considered a potential way to reduce unavoidable emissions in the chemical sector. A 2021 study by Leiden University and Delft University of Technology concluded that, despite rising production figures since 1990 (up 80 percent), energy consumption has been reduced by around 20 percent. This is attributable to both improved energy efficiency and optimized production processes.

   With regard to emissions trading:

   CO_3 capture and storage, as well as green hydrogen, are among the most promising- but also the most expensive- solutions for decarbonization in this industry. Preserving the industry while simultaneously investing in research and development and new technologies is a Herculean task. The chemical industry, too, requires the continued and rapid expansion of renewable energy, storage technologies, and grids.

Sectors that are difficult to decarbonize typically have a high demand for renewable energy, either for the direct electrification of processes- such as electric arc furnaces- or for the production of green hydrogen, synthetic fuels, or raw materials- such as ammonia, methanol, SAF, or e-fuels. In addition to renewable energy and hydrogen, carbon capture and storage plays a major role. This requires significant investment. To facilitate this, investments in EU ETS I should be eligible for consideration if they can lead to substantial CO_2 reductions in the long term.

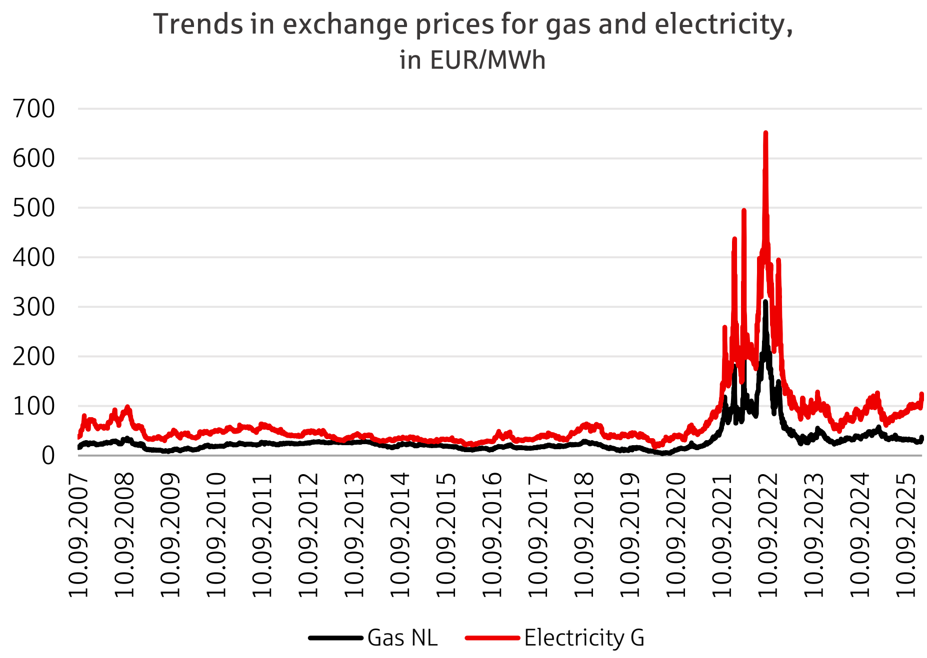
Lowering electricity prices to boost competitiveness

Germany is struggling with high energy prices. Prices have not returned to the levels seen before the outbreak of Russia's war of aggression in Ukraine. Even back then, however, prices were already higher than in China or the United States. The war in Iran is further exacerbating this situation.

A reduction in electricity prices is urgently needed!

Electricity price subsidies, such as the much-discussed industrial electricity price, can provide short-term relief. However, this measure is only a stopgap and should be used only in the short term, as the subsidy does nothing to address the root of the problem- high energy prices.

Furthermore, conditions should be attached to the granting of electricity price subsidies. For example, electricity would be subsidized only for low-carbon or fully electric facilities. Another possibility would be to offset the CO_2 tax on electricity.



Source: Bloomberg

The merit-based hiring principle must be reviewed immediately!

The price of electricity is determined by the merit order. This determines the order in which power plants are used in short-term electricity trading and sets the price. The power plant with the lowest marginal cost- that is, the cost per additional kWh- is used first. As a rule, these are renewable energy sources, since their marginal costs are virtually zero. No fossil fuels need to be purchased and processed, nor do emission allowances need to be acquired, to generate one kWh of electricity. If electricity from renewable sources is insufficient to meet demand, coal- and gas-fired power plants are also considered. The latter factor CO_2 costs into their variable costs in the merit order, which leads to an increase in electricity prices. If electricity is cheaper in neighboring European countries, it is imported from there.

Under the merit order principle, the last power plant needed to meet the electricity demand sets the price, which then applies to all suppliers. Electricity is therefore particularly expensive when gas is used. The merit order is thus suitable for producing electricity cost-effectively every hour and for setting transparent price signals for the daily operation of generation facilities. Due to the high contribution margins for renewable energies, it was also suitable for creating incentives for investment in these technologies. However, as the share of renewable energy increases, the incentive effect diminishes. Furthermore, the principle is not suitable for ensuring security of supply. As long as the share of fossil fuels remains high, rising CO_2 prices will cause the merit order principle to lead to rising electricity prices, which will impose additional burdens as electricity is expanded as an energy source for households and businesses. Consequently, to cap electricity prices for consumers and maintain long-term investment incentives for renewable energy, the merit-order principle must be reevaluated. In light of the price spikes caused by the war in Iran, an adjustment to the merit-order principle becomes all the more urgent.

A 2025 study by Agora concludes that the continued expansion of renewable energy will lower electricity prices regardless of electricity demand. The more renewable energy is available, the less often fossil fuel power plants will need to be used. Only then can electricity prices truly be decoupled from gas prices. An example of this is June 6, 2025, a day with high solar and wind generation. While the day-ahead price for gas had stabilized at around 36 EUR/MWh in the days before and after, the price for electricity (day-ahead) plummeted from over 38 EUR to just over 7 EUR/MWh.

The study did not take into account the costs of the necessary grid expansion. While the reduction in electricity costs amounted to 12 to 14 billion euros per year, this does not go far enough. The so-called system costs- that is, grid expansion as well as investments in battery storage, reserve power plants, and electrolysers- must also be taken into account. However, investments can be better spread out over the next 20 years with a gradual expansion of renewable energy. If everything is needed within just 5 to 10 years, system costs will rise correspondingly quickly.

A study conducted by Aurora on behalf of EnBW addresses this topic. It seeks to optimize the system costs of the energy transition. Savings of 14.7 billion euros per year were projected in a final scenario. Aurora also advocates expanding onshore wind capacity but sees less need for offshore and PV capacity as well as electrolysers. Instead, the study proposes increased use of gas/hydrogen power plants. However, this would lead to higher electricity prices. Furthermore, the study does not take into account that renewable energies are indispensable in energy-intensive sectors, including for the production of hydrogen or the electrification of steam crackers in the chemical industry.

What is certain is that renewable energy sources should cover the load for as many hours as possible in order to minimize the number of hours or days during which we rely on gas or coal. At the same time, system costs should be optimized so as not to unnecessarily drive up grid fees and the costs incurred by utilities. One example of this is the underground cables currently planned for the Südlink transmission grid. Switching to overhead cables could save 20 billion euros

Another opportunity to cut costs and thereby reduce electricity prices for end consumers arises from the expiration of the current EEG subsidies. The approval for subsidies granted under the EEG will expire on December 31,

2026. Subject to approval under EU state aid law by the European Commission, this means that a new EEG regulation will take effect in early 2027. At the same time, the Internal Electricity Market Directive requires that state support mechanisms be two-way. On the one hand, revenue risks for plant operators resulting from low prices should be mitigated. On the other hand, the state should have the right to skim off revenues if they exceed a specified value. Such contracts are also known as Contracts for Differences (CfD). This two-way mechanism reduces support costs, which should also be reflected in electricity costs via the EEG surcharge. It also makes revenues predictable, which is particularly important for investors and financiers.

Depending on their structure, CfDs have varying effects on the use of renewable energy. Put simply, there are two different models: production-linked and production-independent CfDs. Production-linked CfDs are based on the price of the amount of electricity sold. If the revenue exceeds the agreed price, the government collects the difference. If it falls below the agreed price, the government compensates for the difference. Currently, an approach using a price corridor- which safeguards against excess profits and losses by setting a lower and upper limit- is the most likely option.

However, in its current form, the mechanism could also create perverse incentives. For example, to avoid being charged a levy when electricity prices are high, plant operators might choose to charge connected battery storage systems instead of supplying electricity to the market. This would drive prices even higher. Since supply is already tight during periods of high electricity prices, this could result in the need to deploy even more conventional power plants to generate the required amount of electricity. Furthermore, in such a scenario, CO_2 emissions in the electricity mix would also rise. Withholding volumes through production-based CfDs creates further perverse incentives to repurchase these volumes in intraday trading, which would be systemically inefficient. As a result, distortions in electricity prices are to be expected.

Production-independent CfDs offer an alternative. Similar to the capacity market, plant operators would secure fixed payments for installed capacity through tenders. The next step is to determine how high the revenues of a reference plant- to be specified- would be. These reference plants must include a production forecast based on data (e.g., weather models). Revenues exceeding the reference value may remain with the plant operator. This creates an incentive to feed electricity into the grid, particularly when electricity prices are high, and to operate the plants efficiently. Accordingly, the design of support mechanisms can also have an impact on the electricity price that must be taken into account.

But by how many cents would the electricity price per kWh decrease if, for example, the CO_2 price were offset? The CO_2 content of our electricity mix was 363 g/kWh in 2024. At an average EUA price of 65.58 EUR per ton of CO_2

in 2024, this would have amounted to 2.4 cents per kWh. However, in 2023 the figure was still 386 g/kWh, and in 2022 it was as high as 433. If the share of renewable energy in the electricity mix were to reach 80 percent by 2030 and the shares of natural gas, hard coal, and lignite were to decrease evenly, the CO_2 content of the electricity mix could be around 165 g/kWh. The CO_2 price could rise to as much as 150 EUR per ton, and yet the price per kWh would still be exactly 2.4 cents. However, for this to happen, it is essential to expand renewable energy as planned. If the CO_2 price is diluted—for example, through further front-loading- or offset, it loses not only credibility but, above all, effectiveness. Renewable energy would be expanded more slowly, and frontloading would lead to a significantly steeper rise in the CO_2 price after 2030. The CO_2 content of the electricity mix would exceed 165 g and would consequently be more expensive for German consumers.

For this explanation, it is important to understand how the wholesale price of electricity is determined. Only about 20 to 25 percent of the daily electricity demand is traded on the exchange. The majority is covered by over-the-counter, typically long-term supply contracts. Over-the-counter forward contracts can sometimes be arranged up to six years in advance. This means that about 75 to 80 percent of electricity consumers have a predictable electricity price through long-term contracts. The remaining 20 to 25 percent cover their electricity needs through the exchange, mostly in the day-ahead market (for the following day) or the intraday market (for the same day).

Nevertheless, wholesale prices are considered an indicator of the overall electricity market. Prices are determined by the volume of buy and sell orders, as well as the delivery time. The exchange determines the wholesale price for every hour of the day, as well as which power plants are awarded the contract. The allocation process follows the so-called merit order, meaning that allocation is based on cost-effectiveness. The basis for allocation is the so-called marginal cost, i.e., the cost incurred for an additional kWh of electricity. The cheapest- and thus most advantageous- power plants are allocated first. These are typically renewable energy sources, as their variable costs are nearly zero euros. Next in line in Germany are coal and gas. Depending on the price of raw materials and the corresponding CO_2 costs, it may sometimes be coal-fired power plants and sometimes gas-fired power plants that are allocated second. Most of the time, however, it is gas. The last power plant needed to meet electricity demand sets the price for all power plants. That is why the price of gas also drives the price of electricity. The less coal and gas are used, the lower wholesale prices become. So it is not a matter of producing as much electricity as possible to create the largest possible supply, but rather of finding a balance in the electricity market. This is because the oversupply of renewable energy- mostly during the summer months- is also problematic. Prices are increasingly negative, which makes investing in renewable energy less attractive.

Conclusion

"Europe's emissions trading system is an ally, not an enemy, of industrial competitiveness," read a headline from Bruegel in early January 2026. But the truth is also that the price of CO_2 is undeniably a driver of energy and electricity costs. Fossil fuels are and will remain the main cost component. Nevertheless, the effects of further price increases must be mitigated through structural reforms. The current price increases in the wake of the war in Iran further heighten this urgency.

The European Emissions Trading System was designed 20 years ago based on the "one size fits all" principle. However, it has since become clear that different sectors face unique challenges. Opportunities must be created for companies that currently have no technological solutions available to them. This could mean, for example, extending free allocation. At the same time, the incentive to continue researching and developing low-carbon technologies must be maintained.

Organize emissions trading on an industry-specific basis

Emissions trading is the only market-based and truly technology-neutral system for reducing CO_2 emissions in the EU. Undermining it would weaken its credibility and block the path to climate neutrality. In this context, the continued decarbonization of the electricity sector must be emphasized. Renewable energy is needed for the industry to meet its targets. An electricity mix with more renewable energy also leads directly to lower CO_2 costs.

Disclaimer

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