
Renewables cut German electricity costs and emissions – lack of momentum seen in buildings and transport sectors

Press release

Record amounts of renewable energy and historically low coal-fired power generation resulted in a significant drop to Germany's greenhouse gas emissions in 2024. This allowed Germany to meet its national climate goal for the year, though it failed to achieve EU climate targets due to lack of progress in the areas of buildings and transport. In order to transfer the positive momentum seen in the electricity sector to the demand sectors, investment incentives for climate-neutral technologies and measures to safeguard attractive electricity prices are essential.

Berlin, 7. January 2025. Germany's greenhouse gas emissions dropped significantly in 2024, falling by 18 million tonnes or 3 percent compared with the previous year to a total of 656 million tonnes of CO₂¹. This was the third consecutive year in which emissions fell, reaching a historic low, even though the decline slowed sharply compared with last year. The figures are based on preliminary calculations by Agora Energiewende, which the think tank presented in its annual report for the energy year 2024. They show that Germany overachieved its annual reduction target under the Climate Protection Act by 36 million tonnes of CO₂. However, due to insufficient emissions reductions in buildings and transport, Germany missed European climate targets agreed as part of the Effort Sharing Regulation (ESR) by an estimated 12 million tonnes of CO₂. Compared with the reference year 1990, Germany's greenhouse gas emissions were down by a total of 48 percent in 2024.

The decline in emissions resulted mainly from the positive contribution made by the energy sector, which accounted for more than 80 percent of the cuts: In 2024, coal-fired power plants with a total capacity of 6.1 gigawatts were shut down, which corresponded to 16 percent of Germany's installed coal capacity. The loss in capacity was offset by record renewable energy generation amounting to 55 percent of gross electricity consumption and increased imports, 49 percent of which came from renewables. Despite stable electricity demand, the exchange price for electricity fell by an average of 18 percent or 17 EUR/MWh to 78 EUR/MWh compared with 2023.

"Climate protection measures taken in recent years are increasingly having an effect on the electricity sector," said Simon Müller, director of Agora Energiewende Germany. "With a significant increase in renewable energy and the positive trend in grid expansion, Germany is paving the way for a successful transformation in all sectors. At the same time, the country is increasingly benefiting from falling emissions and cheaper prices on the electricity exchange."

Unlike in the electricity sector, there was no structural progress in the demand sectors industry, buildings and transport. On the contrary, investments in climate-neutral technologies such as heat pumps or electric cars declined compared with the previous year. In industry, emissions rose slightly by 3 million tonnes of CO₂ last year, despite economic stagnation, mainly due to increased consumption of fossil fuels by heavy industry. The

¹ For better readability, the precise term CO_{2-eq} is not used: This refers to all greenhouse gas emissions, including substances such as methane and nitrous oxide, which are included in the emissions balance as CO₂ equivalents.

slight emission reductions of 2 million tonnes of CO₂ in the buildings sector resulted mainly from the reduced heating demand due to mild weather. If the weather had remained the same as in 2023, emissions would have increased. In the transport sector, too, only a small reduction of 2 million tonnes of CO₂ was achieved compared with the previous year – mainly due to lower heavy goods traffic as a result of the weak economy. At the same time, however, passenger vehicle traffic increased. Overall, with emissions of 144 million tonnes of CO₂, the transport sector missed the annual target defined in the Climate Protection Act by a wide margin of 19 million tonnes of CO₂. Due to the failure to meet the targets for buildings and transport, the German government will have to buy emission allowances from other EU member states in the foreseeable future or face possible fines – amounting to a budgetary risk in the billions of euros.

"One key reason for the lack of structural changes in the industry, buildings and transport sectors that would contribute to climate protection is the sense of uncertainty among households and companies. This led to a general reluctance to invest – despite an overall decline in electricity costs in 2024," said Müller. Sales of heat pumps and new registrations of electric cars fell by 44 and 26 percent respectively compared with the previous year. "In the next legislative cycle, it is important to transfer the momentum for change seen in the electricity sector to the demand sectors. Policies that ensure social balance and enable households and businesses to invest in climate neutrality are central to this. The coming legislative period is crucial for making the necessary investments so Germany can achieve its national and European climate targets."

Cutting emissions with renewables, electricity imports and flexible electricity use

Despite a slight increase in electricity demand, emissions in the energy sector fell to 183 million tonnes of CO₂ in 2024, a significant drop of 18 million tonnes (-9 per cent) compared with 2023. Growing electricity generation from renewable sources (+12 TWh) and a rise in electricity imports from neighbouring European countries (+12 TWh) significantly reduced electricity generation from conventional power plants in Germany. Almost half of electricity imports (49 percent) came from renewable sources and accounted for a total of 5 percent of Germany's electricity consumption. As in the previous year, nuclear energy supplied around a quarter of electricity imports. German households and companies benefit from such imports, in particular through lower electricity prices. In addition, the pan-European electricity exchange strengthens security of supply, reduces the use of fossil fuel power plants and thus lowers emissions from European electricity generation. A total of 210 TWh of conventional electricity were produced in Germany in 2024; this corresponds to a decline of 11 percent, which is mainly due to a drop in coal-fired power generation (-16 percent compared with 2023). Gas-fired power generation, on the other hand, remained unchanged.

The exchange price of electricity fell by an average of 18 percent, or 17 EUR/MWh, to 78 EUR/MWh compared with 2023. Consumer electricity prices for industry and households also fell in 2024, because of continued price adjustments compared with the high values in 2022/2023. Significant savings are possible, especially with new customer contracts for private households: For example, a household with an annual consumption of 3500 kWh could save about 426 euros by signing a new contract at 28.7 ct/kWh compared with the current average charge.

Last year also saw increased volatility on the electricity exchange due to the rise in renewable electricity fed into the grid. "Periods with ample wind and sunshine result in a lot of renewable electricity, which can lead to low or even negative electricity prices. Our calculations show that such periods occur much more frequently over the course of the year than a "Dunkelflaute" – a period of little wind or sunshine. Overall, the price-lowering effect of such periods with high renewables generation is twice as significant as the price peaks seen during a Dunkelflaute," said Müller. The potential of such periods with a lot of cheap renewable

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electricity should be harnessed by increasing the flexibility of consumption. "This requires more electricity storage, faster installation of smart meters and incentives for more flexible demand from large-scale industrial consumers. A reform of grid charges is crucial here, because the current price structure really hampers flexibility."

Wholesale prices for gas fell overall in 2024 compared with the high levels seen due to the energy crisis in 2021-23. However, prices rose again in the second half of the year, partly due to developments on the global LNG markets. This shows that stable and low prices in the long term are only possible by consistently switching from fossil fuels to renewable energy.

Solar boom and new records in auctions and permitting for onshore wind

The positive trend in the expansion of renewable energy continued in 2024. Its contribution to gross electricity consumption rose to 55 percent. For solar PV, the record increase of 2023 was once again exceeded, with capacity additions of around 16 gigawatts. For onshore wind, the newly installed capacity was again too low, at 2.3 gigawatts. However, auction results and permitting show a clear trend reversal: in 2024, 11 gigawatts of new onshore wind turbines were awarded in auction, a new record. The number of permits for new onshore wind projects even rose to almost 13 gigawatts, almost three times as high as two years ago. The auctions for offshore wind were also successful with awards for 8 gigawatts of new capacity.

Slight increase in industrial emissions, despite economic stagnation

Greenhouse gas emissions from industry in Germany amounted to 158 million tonnes of CO₂ in 2024, a slight increase of 3 million tonnes, or two percent, compared with the previous year. Overall, the effect of the slightly increased consumption of fossil fuels in energy-intensive industry outweighed the general decline in production across all industries. Nevertheless, emissions were 10 million tonnes of CO₂ below the indicative annual target for the sector.

A look at electricity prices for industry reveals a more mixed picture: Compared with 2023, the price of electricity for industrial customers fell because of lower procurement costs and the significantly reduced electricity tax. This means that the electricity price for smaller industrial and commercial enterprises is back at the level of 2021. Large consumers continue to pay significantly more than before the energy crisis.

"Rising industrial emissions combined with a stagnating economy show how urgently we need structural measures for climate protection. Industry in particular has enormous potential to switch from fossil fuels to electricity-based processes," said Müller. The last coalition government of Social Democrats, Greens and Free Democrats established important framework conditions such as carbon contracts for difference, the start of the implementation of the European IPCEI funding programme for hydrogen or the approval of Germany's hydrogen core grid, he said. Nevertheless, there remains a reluctance to invest, which is fuelled by concerns that energy prices might rise again. "2024 shows a clear recovery in electricity prices, yet prices for particularly energy-intensive companies are still well above pre-crisis levels. Electricity is also still too expensive compared with gas. For a climate-neutral recovery of the economy, further measures are therefore needed in the next legislative period, including a reduction in electricity tax, a fundamental reform of grid fees and unbureaucratic incentives for investments in climate neutrality and flexibility," said Müller.

Hardly any reduction in emissions from buildings and transport

The buildings sector again saw no significant reduction in emissions in 2024. Compared with the previous year, only 2 million tons of CO₂ fewer were emitted. Instead of the maximum amount of 96 million tonnes of CO₂ set out in the Climate Protection Act, a total of 105 million tonnes of CO₂ were emitted by the building sector. The slight emission reductions are mainly due to the continued decline in heating energy demand because of mild weather. In contrast, there was little progress in achieving structural changes: Heat pump sales fell by 44 percent year-on-year to around 200,000 heat pumps, and the weakness of the construction industry led to a historically low rate of energy-efficient renovations of 0.61 percent in the last quarter.

"Emission reductions in the building sector are essential for achieving Germany's climate targets. The Buildings Energy Act of 2023 created a solid foundation that needs to be further built on in the coming legislative period. Citizens need urgent clarity so that they can proceed with replacing their heating systems. At the same time, it is important to cushion social hardship in the transition and to provide targeted investment support to households in need," said Müller. "Retaining the central elements of the Building Energy Act, in particular the 65 percent renewable energy rule, creates confidence and investment security – including for German heating firms, which have already invested massively in increasing their production capacities for heat pumps." In addition, a more nuanced design of the subsidy for private households, an increase in federal funding for efficient heating networks (BEW), the introduction of a permanent electricity price for heat pumps and increased support for large-scale heat pumps and climate-neutral CHP facilities are important building blocks, he said.

In the transport sector, emissions fell slightly compared with 2023 by one percent, or 2 million tons of CO₂, to a total of 144 million tons of CO₂. This means that emissions were once again far above the indicative annual target of 125 million tonnes of CO₂ set by the Climate Protection Act. The decline in heavy goods traffic by one percent was mainly due to the weak economy, while passenger vehicle traffic increased slightly. With around 347,000 newly registered electric cars, significantly fewer fully electric cars were registered by the end of November than in the same period last year – and far fewer than would be necessary for the target of 15 million electric cars by 2030. On the other hand, the six percent increase in passenger numbers in local public transport in the first half of the year, mainly due to the introduction of the flat-rate *Deutschlandticket* (Germany ticket) in May 2023, is encouraging. Nevertheless, the transport sector is currently not on track in terms of climate, industry or social policy. To change this, additional measures and a clear strategy are needed in the next legislative period. These include, for example, a timely reform of taxes, levies and subsidies for passenger cars based on CO₂ emissions – from vehicle and company car taxation to CO₂ prices coupled with a climate bonus (*Klimageld*) and car tolls based on the polluter-pays principle. It is also important to support the transformation of the auto industry and create a strong domestic market for electric vehicles. This can include measures to ramp up electric mobility in commercial fleets, economic incentives that make smaller electric vehicles in particular cheaper, and a continued rapid expansion of charging infrastructure.

An effective policy mix and a solid financing basis for the transformation

For successful climate and energy policies in the next legislative period it is crucial to put the financing of the transformation across all sectors on a structurally sound foundation. This includes various elements, such as targeted support to enable private investments, relief measures for citizens and companies in transition, public infrastructure investments – especially at the municipal level – and international climate finance to reliably advance climate action worldwide in geopolitically challenging times.

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"Our latest analyses clearly show that climate protection constitutes the basis for a competitive economy, increases energy security and can strengthen social inclusion. For the coming legislative period it is therefore crucial that Germany stays on the ball when it comes to climate and energy policy. The prerequisites for this are an effective policy mix and a solid financial basis for the transformation," said Müller. "Climate protection remains a generational task for which courageous political decisions and resolute, non-partisan cooperation between businesses, civil society and politics are now needed more than ever."

The German-language study "Die Energiewende in Deutschland: Stand der Dinge 2024" summarises the main developments in the country's energy transition and climate targets of the past year. It includes an English summary and can be downloaded for free at www.agora-energiewende.de.

 **About Agora Energiewende:**

Agora Energiewende develops scientifically sound and politically feasible concepts for a successful pathway to climate neutrality – in Germany, Europe and internationally. The organisation which is part of the Agora Think Tanks works independently of economic and partisan interests. Its only commitment is to climate action.