BACKGROUND // AUGUST 2026

Renewable Energy in Germany

Data on developments in 2025

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Content

Development of renewable energies in 2025

The Working Group on Renewable Energy Statistics (AGEE-Stat) assesses regularly the use of renewable energy on behalf of the Federal Ministry for Economic Affairs and Energy (BMWE). Based on the currently available data, the AGEE-Stat publishes this first official report on the development of renewable energy in the previous year. It describes the findings for the electricity, heating and transport sector for the year 2025, supplemented by figures on the economic effects and emissions avoided by renewable energies. In addition, the appendix presents key weather indicators to help put these developments into perspective.

The data presented here are provisional and will be updated in the course of the year as further statistics become available. It is used for the Federal Government's national and international reporting obligations.

Key facts:

Share of renewables in gross electricity consumption rises from 54.4 % to 55.1 %
Thanks to the continued expansion of new solar installations and despite weather-related declines in electricity generation from wind and hydropower, the share of renewable energies continued to rise. With 290.2 TWh generated, renewables covered 55.1 % of Germany's gross electricity consumption.

Share of renewables in final energy consumption for heat: 19.0 %
The use of renewable energy for heating purposes increased significantly in 2025: With 209.8 TWh, 6 % more green heat was generated than in 2024. A key reason for the increase were lower winter temperatures, which also lead to higher fossil fuel consumption. The renewable share of energy consumption for heating and cooling therefore rose only slightly from 18.2 % to 19.0 %.

Share of renewables in final energy consumption in transport: 8.0 %
In 2025, more biofuels were consumed (up 9 %), and significantly more renewable electricity was used in transport (up 12 %) than in the previous year. Fossil fuel use also increased, resulting in a moderate increase in the share of renewable energies in the transport sector from 7.4 % to 8.0 %.

Renewables cover 23.8 % of gross final energy consumption
The still modest growth of renewable energies in the heating and transport sectors is reflected in a comparatively slow increase in the overall share of renewable energies in gross final energy consumption. The total share, calculated in accordance with the EU Directive, rose from 22.5 per cent in the previous year to 23.8 per cent in 2025.

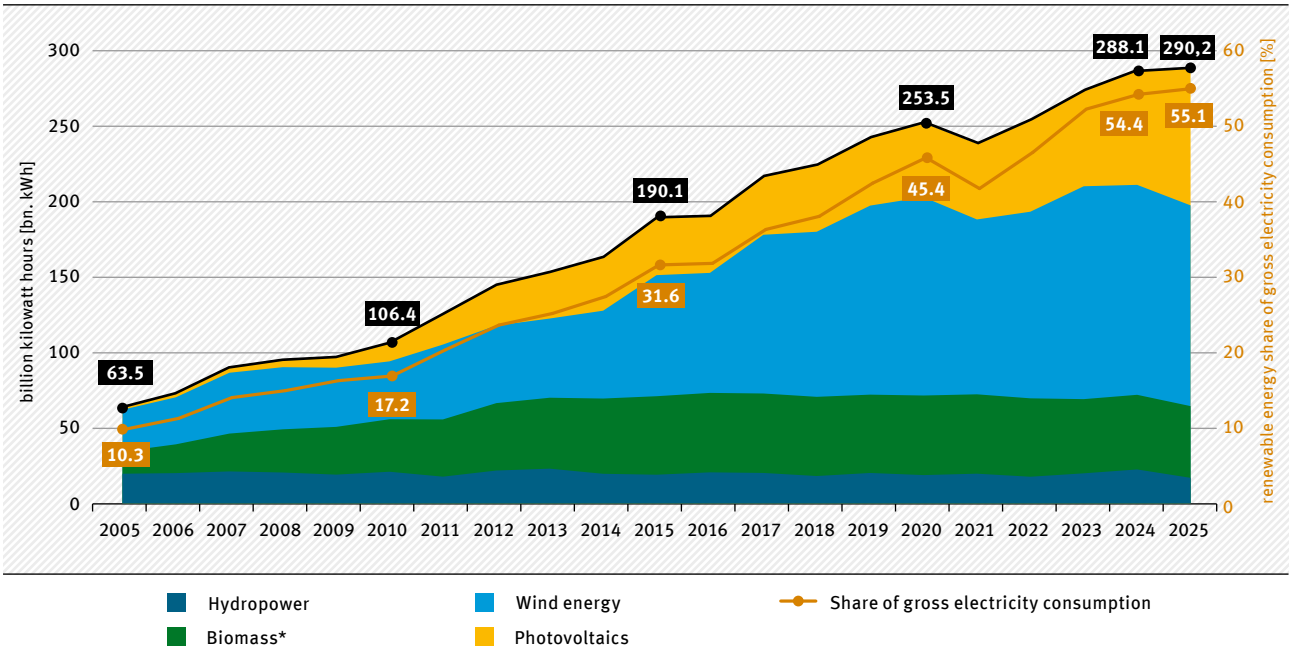
Renewables avoid 265 million tonnes of greenhouse gas emissions
The use of renewable energies reduces the consumption of fossil fuels, thereby cutting greenhouse gas and air pollutant emissions. The climate protection contribution of renewable energies was around 265 million tonnes of CO_2 equivalents in 2025 – approximately 5 million tonnes more than in the previous year.

Almost €38 billion invested in new renewable energy installations
With €37.6 billion invested in renewable energies, the record figure from 2023 was nearly matched. The main drivers were new installations of photovoltaic, wind power and heat pumps. Economic impulses from the operation of existing installations amounted to €22.9 billion.

Surge in solar electricity: renewables cover 55.1 % of electricity consumption

Figure 1

Development of electricity generation from renewable energy sources



* including solid and liquid biomass, biogas, biomethan, landfill gas, sewage gas, sewage sludge and the biogenic fraction of waste

Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

With 290.2 terawatt hours (TWh), slightly more electricity was generated from renewable energy sources in 2025 than in the previous year. Strong growth in electricity generation from photovoltaic installations offset weather-related declines in wind energy and hydropower. Whilst the total amount of renewable electricity increased slightly (up 1 %), overall electricity consumption was slightly lower than in 2024. Fossil fuel electricity generation grew minimally and electricity imports decreased. The share of renewable energy in gross electricity consumption in 2025 stood at 55.1 %, just above the previous year's figure of 54.4 %.

Wind and solar energy accounted by far for the largest share of renewable electricity generation in 2025. Together, the two technologies contributed more than three-quarters (78 %) of renewable electricity.

The remaining 22 % was provided by biomass, hydropower and geothermal energy.

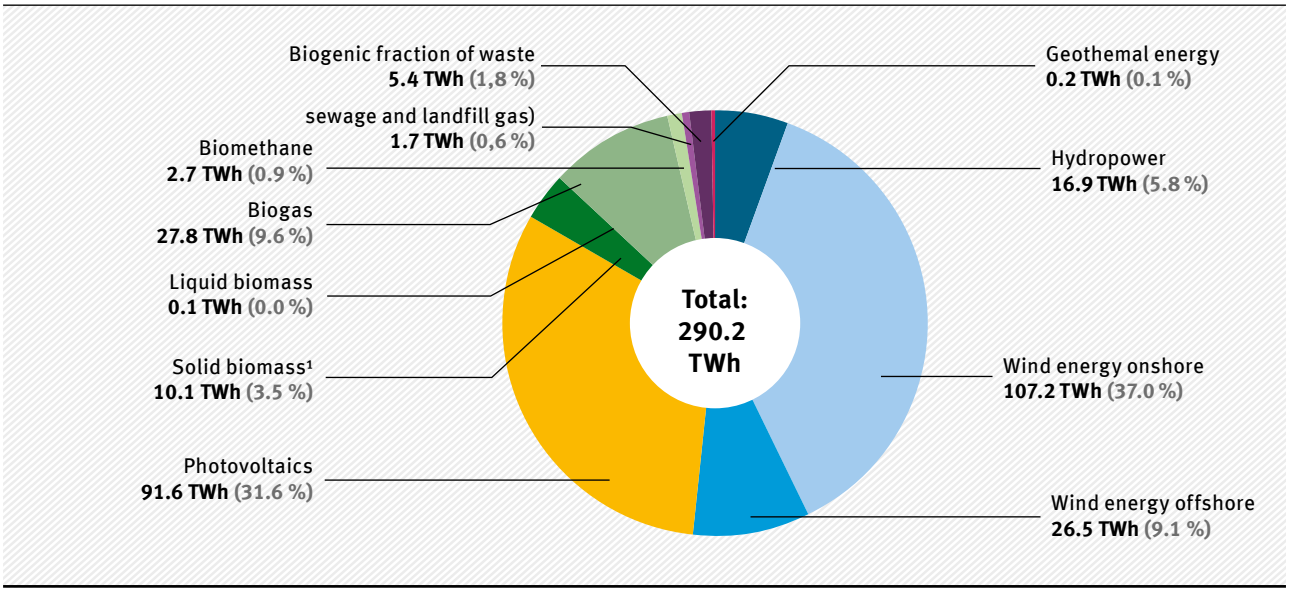
In total, around 133.7 TWh of electricity was generated by wind energy. Thus, wind energy remains the most important energy source in the German electricity mix. However, wind power generation fell for the second consecutive year due to unfavourable weather conditions (down -4 %). By contrast, solar electricity generation rose significantly (plus 21 %) in 2025 due to continued expansion of new PV installations and sunny weather. At 91.6 TWh, photovoltaic is now the second most important energy source for electricity generation, ahead of natural gas and lignite.

Due to an exceptionally dry year, electricity generation from hydropower was considerably below the previous year's level. Electricity generation from biomass and biogenic waste also remained slightly below the previous year's level

Figure 2

Electricity generation from renewable energy in 2025

figures in TWh (percentage share in brakets)



¹ incl. sewage sludge

Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

Photovoltaics

Electricity generation from PV installations rose by 21 % to 91.6 TWh in 2025 (2024: 75.9 TWh). This figure includes both electricity fed into the grid and locally self-generated and consumed electricity. The overall strong growth was achieved through a combination of favourable weather conditions and many new PV installations.

At the end of 2025, photovoltaic installations with a total gross capacity of almost 120,000 MW were installed in Germany. The total capacity of PV installation grew by around 17,600 MW, or 17 %. The record installation of the previous year was just missed, but overall, installed capacity has almost doubled in the last four years.

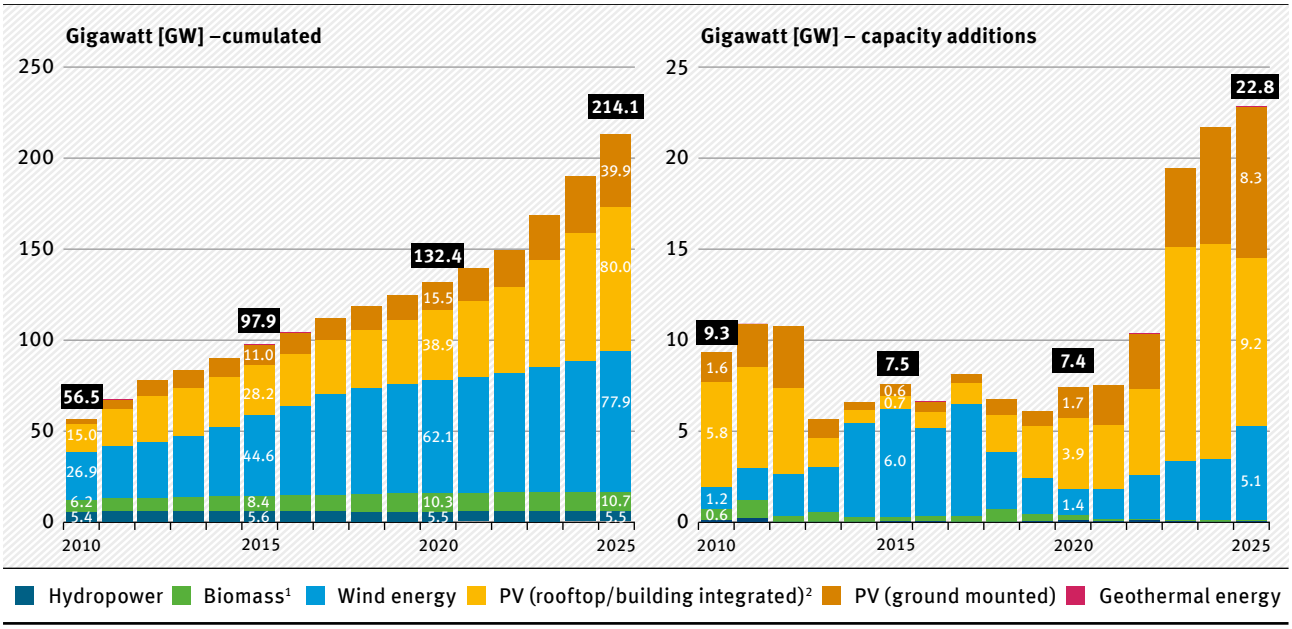
According to first data from the Federal Network Agency, 46 % of the total 2025 additions (approx. 8,100 MW) were installed as building-integrated solar installations (on rooftops or as facade systems). Ground-mounted installations accounted for just over 47 % of additions (approx. 8,300 MW). Whereas building installations dominated in previous years, the split was approximately equal in 2025.

In addition, around 1.3 million so-called balcony solar (i.e. plug-in solar) installations are estimated to have been installed in 2025. Owing to their comparatively small size, this high number of installations corresponds to a capacity addition of only around 1,250 MW, or approximately 7 % of newly added PV-capacity. According to AGEE-Stat, around 4.2million balcony solar installations with a capacity of approximately 3,700 MW are currently installed, representing around 3 % of total installed PV capacity.

In order to achieve Germany's climate protection targets, the Renewable Energy Sources Act (EEG) sets a PV installation target of 215 GW by 2030. The interim target of 128 GW set for 2026 is currently within reach. However, in the subsequent years until 2030, further annual additions of around 20 GW will be necessary.

Figure 3

Development of the installed capacity for electricity generation from renewable energy



1 including solid and liquid biomass, biogas, biomethane, landfillgas, sewagegas and sewage sludge, as well as the biogenic fraction of waste

2 building integrated PV-systems including plug-in systems

Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

Wind energy

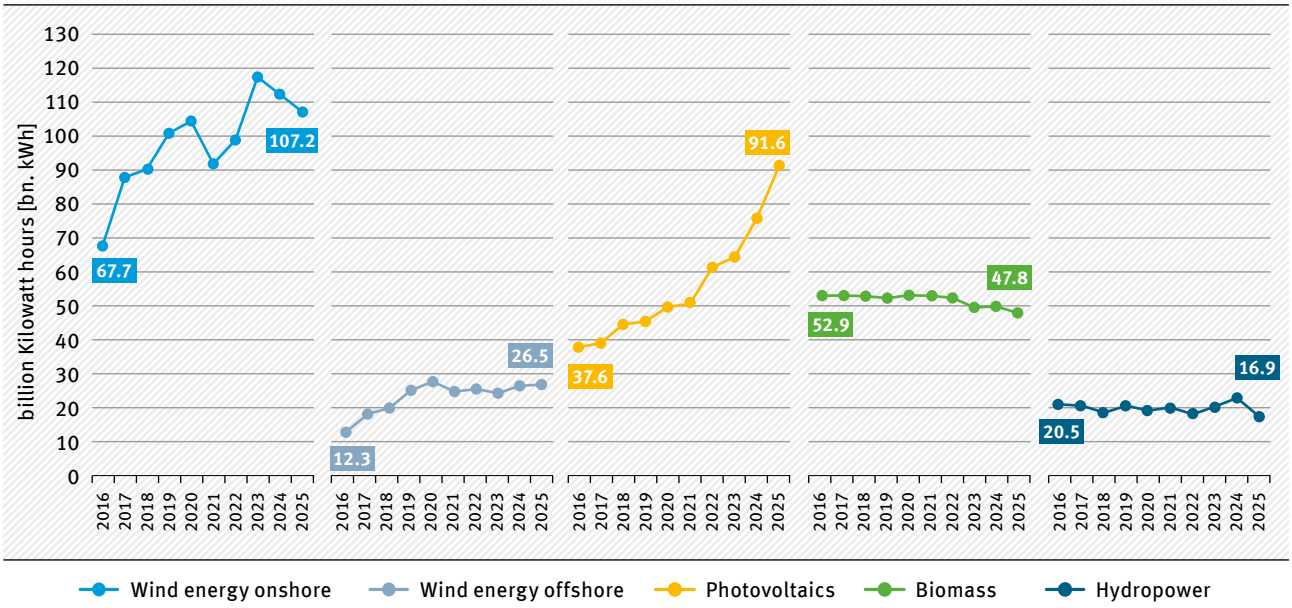
Wind energy remains the most important energy source in the German electricity mix in 2025. Onshore and offshore wind turbines generated 133 . 7 TWh of electricity. This represents a decline of 4 % compared with the previous year (139.8 TWh). This decline can be attributed to comparatively unfavourable wind conditions, which could not be offset by newly installed capacity. As a result, following the very windy year of 2023, wind electricity generation fell for the second consecutive year. Generation onshore fell by 6 % to 107.2 TWh. On the other side, offshore generation increased slightly by 2 % to 26.5 TWh.

Compared with the previous year, the number of new onshore wind turbines grew significantly. Net additions of 4,610 MW represented an increase of 80 % (2024: 2,565 MW). On the basis of granted building permits, a further acceleration of expansion is expected for future years. For offshore wind energy, 518 MW of new capacity was connected to the grid by the end of 2025. Further additions are expected in 2026, as new offshore wind farms are close to completion and grid connection.

At the end of 2025, wind turbines with a total capacity of over 68,100 MW onshore and 9,700 MW offshore were installed. To achieve the EEG 2023 expansion target of 115 GW onshore by 2030, however, a considerable acceleration in the pace of capacity expansion is necessary.

Figure 4

Development of electricity generation from renewable energy sources in the last 10 years



Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

Biomass, hydropower and geothermal energy

Whilst the energy transition in the electricity sector focused on photovoltaics and wind energy, electricity generation from biomass, hydropower and geothermal energy remained virtually constant over the past ten years. Whilst their share of the total amount of renewable electricity generated was still over 50 per cent in 2010, this figure currently stands at just 22 per cent. Despite this declining share, in particular biomass continues to play an important role as an energy source that is not dependent on weather conditions and can be deployed to meet demand.

Electricity generation from biomass fell by around 4 % compared with the previous year. A total of 47.8 TWh was generated from solid, liquid and gaseous biomass and the renewable fraction of municipal waste in 2025 (2024: 49.7 TWh). All biomass sources together account for around 16 % of total renewable electricity. Almost two-thirds of electricity from biomass is generated from biogas and biomethane (30.5 TWh). A further 10.1 TWh was generated from the combustion of solid biomass, and 5.4 TWh from the incineration of biogenic waste.

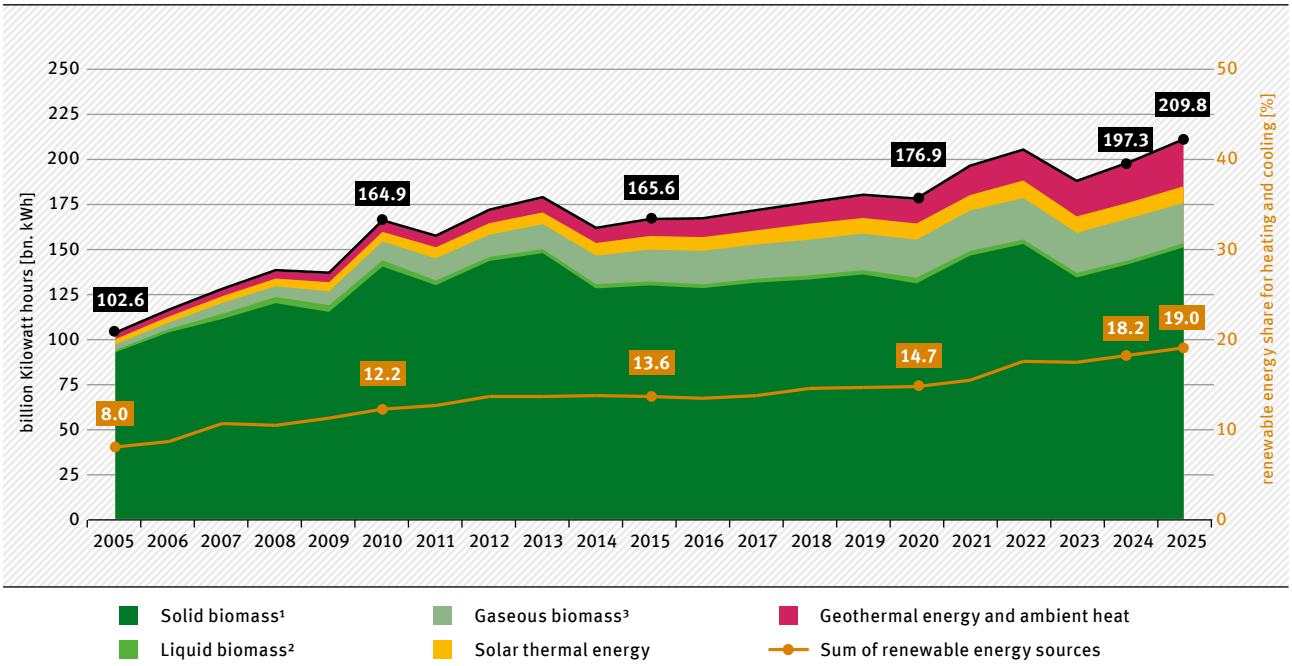
Hydropower also makes a relatively constant contribution to renewable electricity generation. As the installed capacity has changed little in the past 30 years, weather conditions primarily determine annual electricity production. While the year 2024 was exceptionally rainy, 2025, on the contrary, proved to be particularly dry. Consequently, with only 16.9 TWh, electricity generation was 25 per cent lower than in 2024 (22.5 TWh). In 2025 hydropower accounted for around 6 per cent of renewable electricity generation.

The amount of electricity generated from geothermal energy remained at around 0.2 TWh in 2025. Its share of renewable electricity generation remains below 0.1 %.

Heat generation from renewable energies increases

Figure 5

Development of the energy consumption from renewable energy for heating and cooling purposes



¹ incl. sewage sludge and the biogenic fraction of waste
² incl. biofuels used in agriculture, construction and military
³ biogas, biomethane, sewage- and landfillgas

Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

According to first data available, the amount of renewable energy used in the heat sector increased significantly in 2025. However, the share of renewable energy in final energy consumption for heating and cooling rose only slightly because the use of fossil fuels also increased. At 19.0 %, the share is 0.8 percentage points above the 2024 value (18.2 %). This development can be explained with colder weather, which lead to a significantly increased overall demand for space heating.

Overall, the use of renewable energy sources increased and now stands at 209.8 TWh which is 6 % higher than in the previous year .

The higher demand for space heating particularly affected the use of biomass: wood , gaseous and liquid biofuels, and biogenic waste generated around 5 % more renewable heat in 2025 than in 2024.

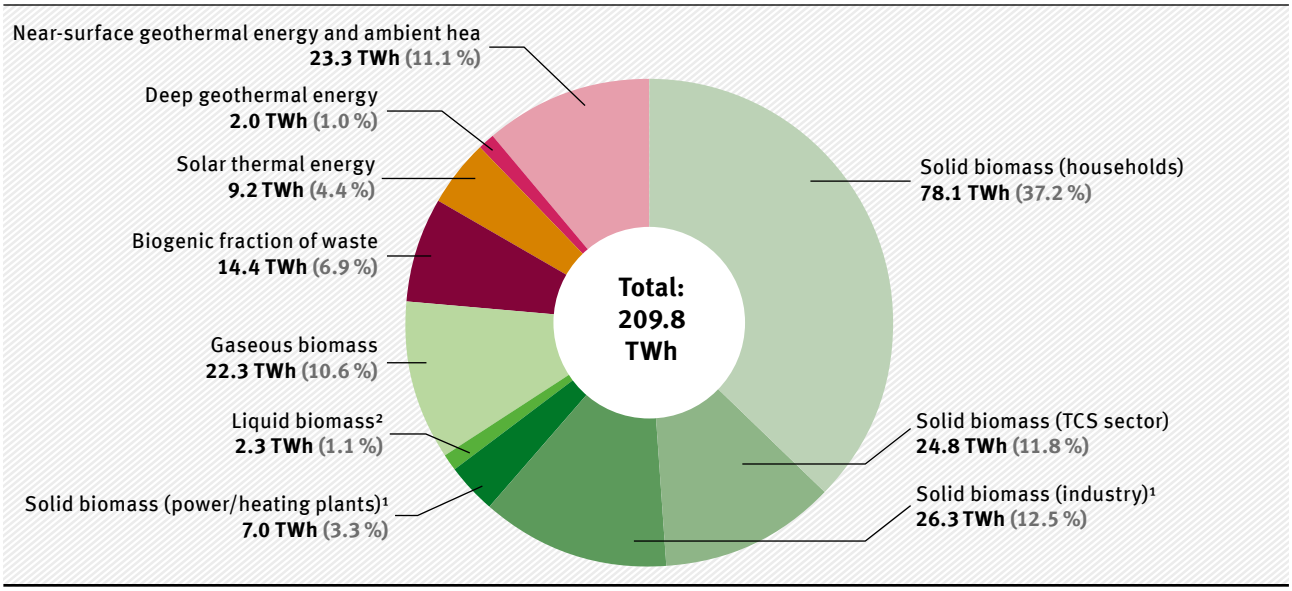
Growth was even more pronounced, at plus 17 %, in energy supply from geothermal energy and ambient heat – primarily due to the increasing use of electric heat pumps. The use of heat from solar thermal installations also grew by around 5 % due to sunny weather conditions

Biomass

With a share of nearly 84 %, biomass (including the biogenic fraction of waste) remained by far the most important renewable heat source. The total amount of heat provided from biomass rose from 166.8 TWh in 2024 to 175.3 TWh in 2025. With over three-quarters of the total, solid biomass – predominantly firewood and other energetically used timber assortments – provided the largest share of heat from biomass (136.2 TWh). This was followed by heat from biogas and biomethane (19.9 TWh) and biogenic waste (14.4 TWh).

Figure 6

Final energy consumption from renewable energy for heating and cooling purposes in 2025
figues in TWh (percentage share in brakets)



¹ incl. sewage sludge
² incl. biofuels used in agriculture, construction and military

Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

Geothermal energy and ambient heat

According to the German Heat Pump Association (BWP), the heat pump market recovered significantly in 2025. For the first time ever, nearly half of all new heating systems delivered by manufacturers in Germany were heat pumps. With around 299,000 heat pumps (for room heating) sold, 55 % more units were purchased than in the previous year. Sales of domestic hot water heat pumps rose by 20 % to 49,500 units in total. As a result of new installations, the total number of heat pumps increased by around 15 % compared with the previous year. By the end of 2025, the total number of installed heat pumps for using ambient heat and near-surface geothermal energy stood at around 2.2 million units. Their increasing prevalence is also reflected in an increase in heat utilisation: together with deep geothermal installations, a total of 25.4 TWh of heat was generated in 2025, around 17 % more than in the previous year (2024: 21.7 TWh). Geothermal energy and ambient heat now account for around 12 % of renewable heat.

Solar thermal energy

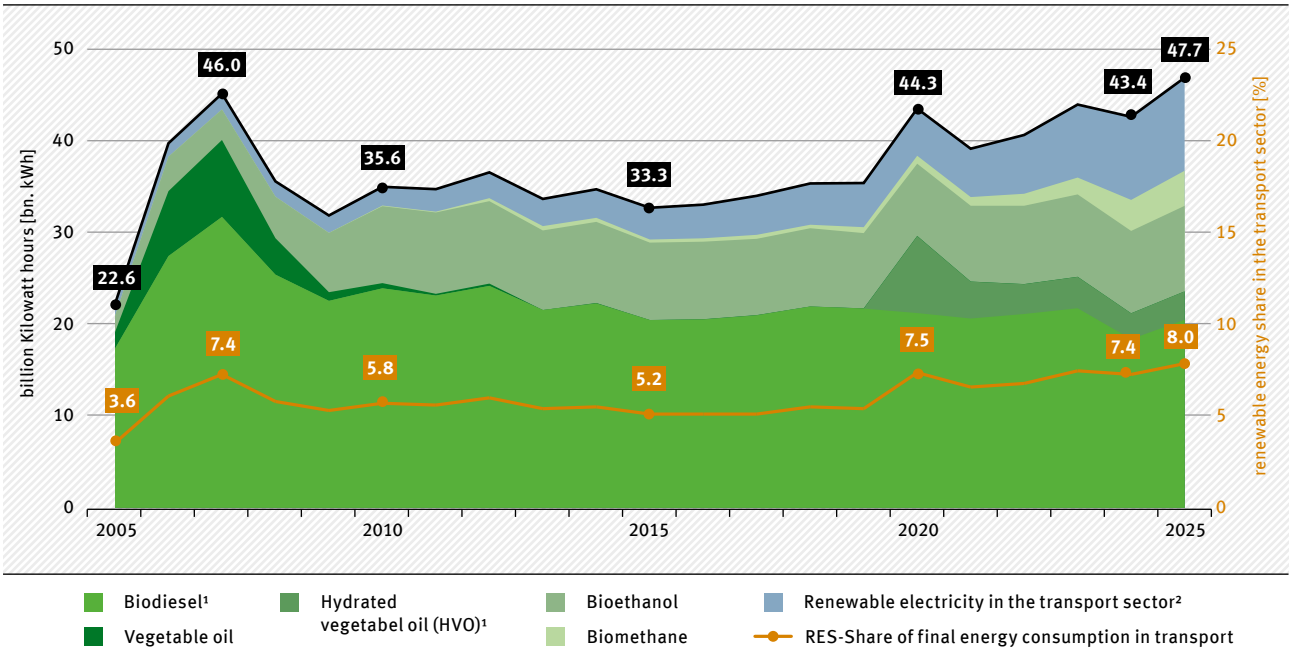
In solar thermal energy, the declining trend of the previous last two years continued. According to the German Solar Industry Association (BSW Solar), the newly installed collector area in 2025 totalled around 151,500 square metres, a decline against the previous year. For the first time, the installation of evacuated tube collectors (89,000 m²) surpassed that of flat plate collectors (62,500 m²). Taking into account the decommissioning of old installations reaching their end of service life, the total installed collector area fell from 22.2 to 21.8 million square metres.

The global irradiation in 2025 was above average and influenced not only electricity production from photovoltaic plants positively but also increased solar thermal heat generation. Despite the declining installation stock, generation stood at 9.2 TWh, around 5 % above the previous year's figure (2024: 8.8 TWh).

Share of renewables in the transport sector rises slowly

Figure 7

Development of the final energy consumption from renewable energy in the transport sector



¹ consumption in transport sector, without use in agriculture and forestry, building sector and military
² calculation based on share of renewable electricity consumption of respective year

Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

In 2025, the transport sector remains the area with the lowest use of renewable energy. Their share in total final energy consumption rose from 7.4 % in 2024 to 8.0 % in 2025. Overall, final energy consumption from renewable energy sources in transport increased by around 10 % (to 47.7 TWh), whilst total final energy consumption (renewable & fossil) in transport also grew by around 2 % to 599 TWh.

The use of renewable electricity in transport continues to expand. In 2025, 12 % more renewable electricity was used in transport than in the previous year. The use of biofuels increased by around 9 %. For the first time, RED-certified renewable hydrogen was also consumed in very small quantities (approx. 0.005 TWh) in the year 2025.

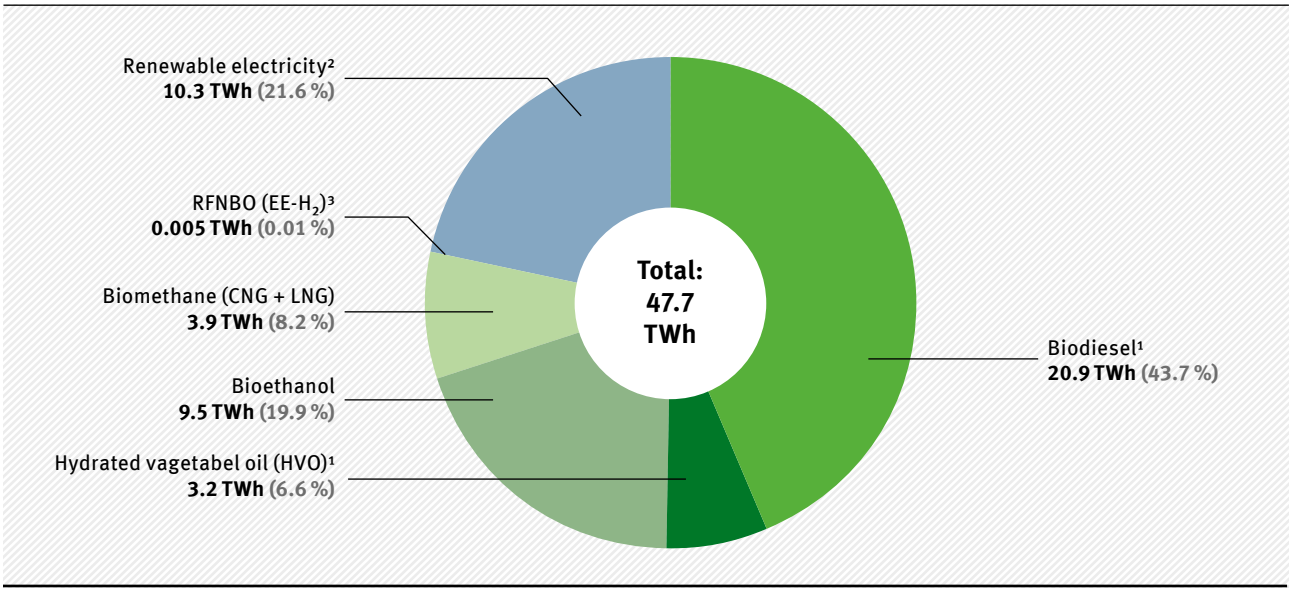
Biofuels

Based on an extrapolation of preliminary monthly data from the Federal Office of Economics and Export Control (BAFA), total biofuel sales in 2025 amounted to around 37.4 TWh, significantly above the 2024 level (34.2 TWh). Sales of biodiesel and hydrated vegetable oil (HVO) increased noticeably in 2025, primarily as a result of changes to the 38th Federal Emission Control Act Regulation (38. BImSchV), which had led to very low sales in 2024, At around 24.0 TWh, approximately 11 % more biodiesel and HVO was sold than in the previous year. Bioethanol sales grew by around 4 % to approximately 9.5 TWh. The use of biomethane as fuel (CNG+LNG) was approximately 13 % above the previous year's figure, now at 3.9 TWh. In 2005 vegetable oil was only used in extremely small quantities, in the transport sector.

Figure 8

Development of the final energy consumption from renewable energy in the transport sector in 2025

figues in TWh (percentage share in brackets)



¹ consumption in transport sector, without use in agriculture and forestry, building sector or military
² calculation based on share of renewable electricity consumption in 2025
³ RFNBO = Renewable Fuels of Non-Biological Origin (incl. H_2)

Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

Renewable electricity in the transport sector

In addition to biofuels, electricity consumption in the transport sector in combination with the growing share of green electricity in the German electricity mix – contributes to the energy transition in the transport sector.

According to the Federal Motor Transport Authority (KBA), a total of 856,589 (2024: 572,672) new vehicles with electric powertrains (battery electric, plug-in hybrid, fuel cell) were registered in Germany in 2025. This represented 30.0 % (2024: 20.3 %) of all new passenger cars registered. A total of 19.1 % (2024: 13.5 %) of all newly registered passenger cars were purely battery-electric (545,142 vehicles).

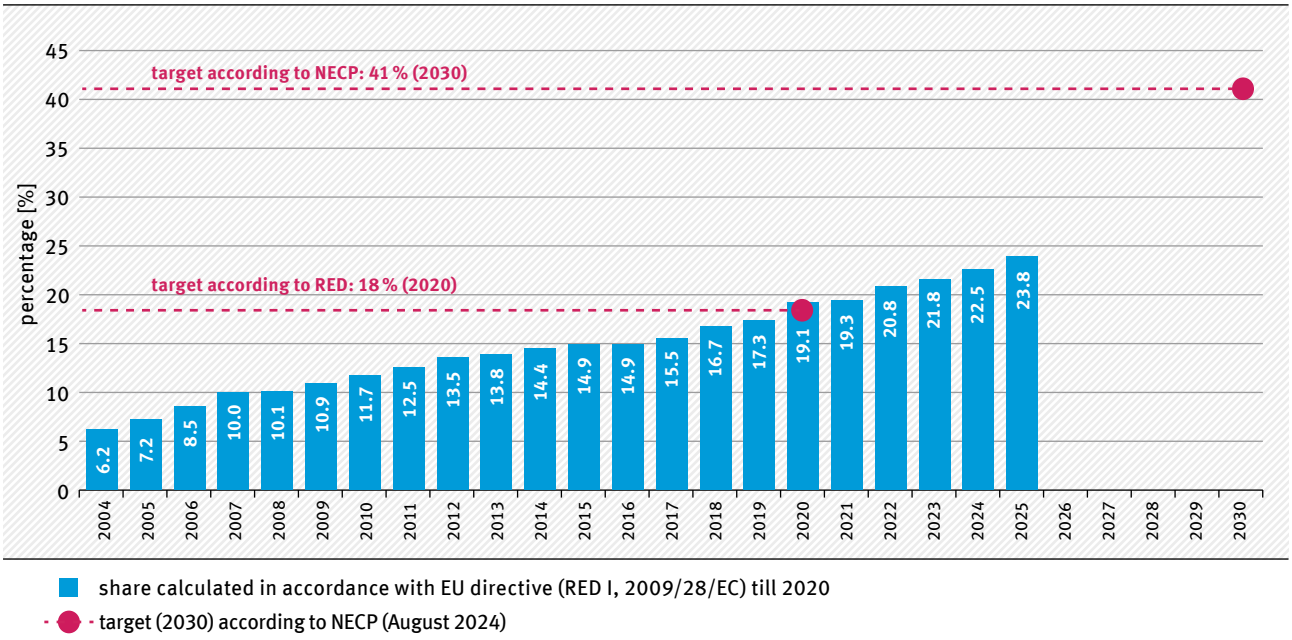
Total electricity consumption in road transport increased by around 23 % compared with the previous year. At approximately 7.7 TWh, it still remains below electricity consumption in rail transport (11.5 TWh). Road and rail transport together account for 4 around 4 % of Germany's gross electricity consumption.

Higher electricity consumption alongside more green electricity in the electricity mix also drives up the calculated consumption of renewable electricity in transport: in 2025, around 10.3 TWh of renewable electricity was used in transport, approximately 12 % more than in the previous year (2024: 9.2 TWh). Overall, the consumption of electricity from renewable sources contributes around 22 % (2024: 21 %) to final energy consumption from renewable energy in the transport sector.

Share of renewable energies in gross final energy consumption

Figure 9

Share of renewable energy in final electricity consumption according to the "EU Renewables Directive (RED)"



Source: Working Group on Renewable Energy Statistics (AGEE-Stat), February 2026

The EU Renewable Energy Directives (2009/28/EC, 2018/2001/EC and 2023/2413/EC) established binding targets: whilst an EU-wide share of 20 % renewable energies in gross final energy consumption was to be achieved by 2020, the target for 2030 was raised significantly to 42.5 to 45 % as part of the "Fit for 55" climate and energy policy package.

Within this framework, Germany committed to a national target contribution of 41 % renewable energies in gross final energy consumption by 2030, according to the updated Integrated National Energy and Climate Plan (NECP) of 2024. Progress towards achieving this target is assessed in accordance with the Governance Regulation (2018/1999) by means of an indicative trajectory, which envisages a share of 27.9 % in 2025 and 33.0 % in 2027.

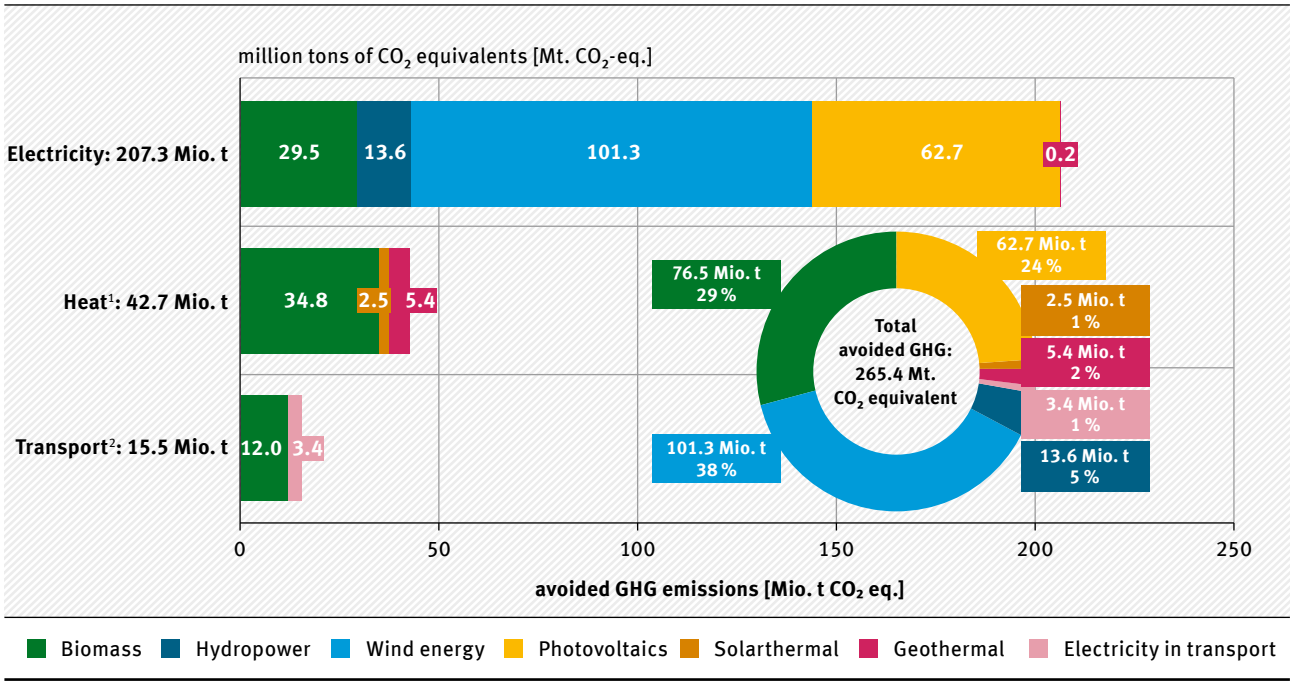
According to an evaluation of currently available provisional data, the share of renewable energy in Germany's gross final energy consumption rose to approximately 23.8 % in 2025. The increase of 1.3 percentage points compared with the previous year is attributable primarily to the electricity sector. The modest momentum in the heat and transport sectors dampened the positive development in recent years. In order to align with the indicative trajectory specified above, the pace of the transition to renewable energies must therefore increase significantly.

The basis for calculating the share is subject to the applicable calculation rules of the EU Renewable Energy Directives (RED), which provide for, inter alia, normalisation of wind and hydropower generation, specific requirements in the field of bioenergy or specific multipliers in the transport sector. This means that the sectoral share values calculated in accordance with the EU Directive differ from the shares calculated using national methodology for the electricity, heat and transport sectors presented earlier in this publication.

Renewables avoid 265 million tonnes of greenhouse gases

Figure 10

Avoided greenhouse emissions by using renewable energy in 2025



[1] excluding charcoal
[2] biogenic fuels and electricity in the transport sector, based on provisional data from the federal office for agriculture and food (BLE) for the year 2024 and the fossile fuels baseline values according to section 3 and 10 of the 38. BImSchV.

Source: German Environment Agency / Umweltbundesamt (UBA), February 2026

The expansion of renewable energies contributes significantly to achieving climate protection targets. By replacing fossil fuels with renewable energy, energy-related greenhouse gas emissions from coal, gas and oil are being avoided.

In total, around 265 million tonnes of CO_2 equivalents were avoided in 2025 through the use of renewable energies, which is an increase of approximately 4 million tons compared with 2024. For the first time the increase is primarily attributable to the heat and transport sectors. Wind power remained the largest contributor to emission avoidance with 101 million tonnes of CO_2 equivalents. Overall, the strongly dominant electricity sector accounted for around 207 million tonnes of CO_2 equivalents. In the heat sector, 43 million tonnes of CO_2 equivalents were avoided. In the transport sector, biofuels and the use of electricity in road transport avoided around 15 million tonnes of CO_2 equivalents.

The calculations of emission avoidance through the use of renewable energies are based on a holistic approach. The emissions caused by energy supply from renewable energies are offset against those avoided by substituting fossil fuels.

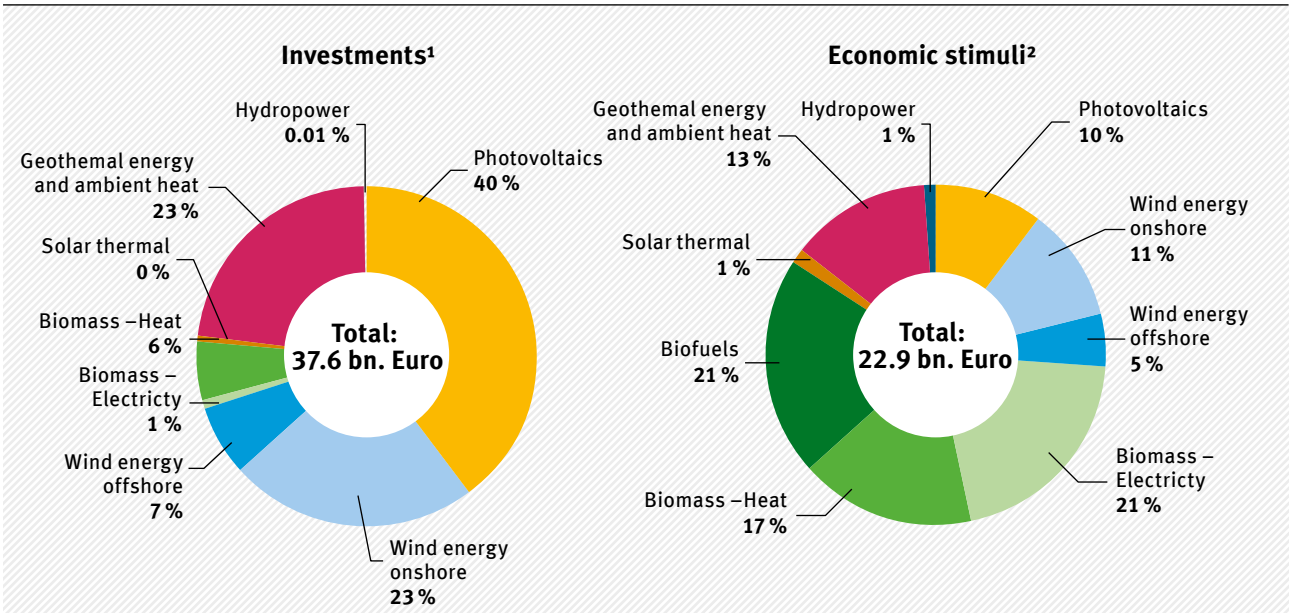
Upstream process chains for the extraction and supply of energy sources, as well as for the manufacturing and operation of installations (excluding decommissioning) are taken into account.

The publication „Emissionsbilanz Erneuerbarer Energieträger / Emission balance of renewable energy sources“ is available at following link (in German only): https://www.umweltbundesamt.de/publikationen/emissionsbilanz-erneuerbarer-energietrager-2024

Economic effects

Figure 11

Economic effects of renewable energy technologies in 2025



¹ mainly investments in new capacity and the expansion of existing installations. Investments from all relevant actors are included (utilities, industry, service and trade sector and private households).
² economic stimuli include all relevant (economic) input in service and maintenance of renewable energy installations, as well related fuels (e.g. biomass or turnover from biofuels)

Source: Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW), February 2026

In 2025 the accelerated expansion of renewable energies led to increased investments in renewable energy installations. According to preliminary calculations investments increased by 11 %, or 3.8 billion Euros and amounted to 37.6 billion Euros in 2025 (2024: 33.8 billion Euros).

This growth is primarily attributable to the sharp increase of investments in onshore wind turbines and heat pumps. The former surpassed its previous record of € 7.4 billion from 2017 by around € 1.4 billion. Investments in heat pumps recovered significantly in 2025, following the sharp decline in the previous year. In total investments of € 8.6 billion were made a value only € 200 million below the 2023 record. Also the investments in biomass heating boilers increased compared to the previous year. However, photovoltaic, offshore wind, solar thermal, biomass electricity generation installations and hydropower plants all recorded declining investments.

In 2025, 40 % of total investment, went to photovoltaic (compared to 50 % in 2024), 30 % went to onshore and offshore wind turbines (2024: 27 %), 23 % went to geothermal energy and ambient heat (2024: 16 %) and 6 % went to biomass installations for heat use (2024: 5 %).

The economic impulses from operating renewable energy installations (including revenue from biofuel sales) exceeded the previous year's figure slightly: they increased from € 22.6 billion in 2024 to € 22.9 billion in 2025.

Sources

AGEB	Working Group on Energy Balances, Berlin
AGEE-Stat	Working Group on Renewable Energy Statistics
Argus	Argus Media Germany GmbH, Hamburg
BAFA	Federal Office of Economics and Export Control, Eschborn
BDEW	German Association of Energy and Water Industries, Berlin
BLE	Federal Agency for Agriculture and Food, Bonn
BMWE	Federal Ministry for Economic Affairs and Energy, Berlin
BNetzA	Federal Network Agency, Bonn
BSW	Federal Association of the Solar Industry, Berlin
BWP	Federal Heat Pump Association, Berlin
DEPV	German Energy Wood and Pellet Association, Berlin
DWD	Germany's National Meteorological Service, Offenbach
FNR	Agency for Renewable Resources, Guelzow
GeotIS	Geothermal Information System for Germany, Hannover
GZB	International Geothermal Center, Bochum
KBA	Federal Motor Transport, Flensburg
StBA	Federal Statistical Office of Germany, Wiesbaden
	The German Gas and Hydrogen Industry, Berlin
TI	Thuenen Institute, Hamburg
UBA	German Environment Agency, Dessau-Roßlau
ZSW	Center for Solar Energy and Hydrogen Research Baden-Württemberg, Stuttgart

Annex

Graphics and tables on the development of renewable energies in Germany (February 2026)

Table 1

Gross electricity production from renewable energies

	Renewable energies 2024		Renewable energies 2025	
	Gross electricity consumption in GWh	Share in the gross electricity consumtption[4] in %	Share in the gross electricity consumtption4 in %	Share in the gross electricity consumtption[4] in %
Hydropower[1]	22,481	4.2	16,897	3.2
Wind energy (onshore)	113,749	21.5	107,225	20.4
Wind energy (offshore)	26,064	4.9	26,458	5.0
Photovoltaics	75,878	14.3	91,591	17.4
Biogenic solid fuels[2]	10,259	1.9	10,126	1.9
Biogenic liquid fuels	101	0.02	82	0.02
Biogas	29,268	5.5	27,785	5.3
Biomethane	2,796	0.5	2,713	0.5
Sewage gas	1,531	0.3	1,533	0.3
Landfill gas	198	0.04	158	0.03
Biogenic fraction of waste[3]	5,544	1.0	5,357	1.0
Geothermal energy	215	0.04	225	0.04
Sum	**288,084**	**54.4**	**290,150**	**55.1**

[1] in pumped storage power plants only electricity production from natural inflow
[2] including sewage sludge
[3] biogenic fraction of waste in waste incineration plants set with 50 per cent
[4] related to the gross electricity consumption, 2024: 529,4 TWh, 2025: 526,9 TWh, fossil gross electricity production according to AGEB, preliminary estimate

Table 2

Installed power for the generation of electricity from renewable energies

	Hydro-power	Wind energy		Photo-voltaics	Geo-thermal energy	Solid biomass[1]	Liquid biomass	Gaseous biomass[2]	Total
		on-shore	off-shore						
	Megawatt (MW)								
2005	5,210	18,248	-	2,056	0	1,805	60	1,074	28,453
2006	5,193	20,474	-	2,899	0	2,048	177	1,422	32,213
2007	5,137	22,116	-	4,170	3	2,045	295	1,666	35,432
2008	5,164	22,794	-	6,120	3	2,141	341	1,889	38,452
2009	5,340	25,697	35	10,566	4	2,190	412	2,991	47,235
2010	5,407	26,823	80	18,006	4	2,264	410	3,548	56,542
2011	5,625	28,524	188	25,916	4	2,297	345	4,520	67,419
2012	5,607	30,711	268	34,077	15	2,272	277	4,918	78,145
2013	5,590	32,969	508	36,710	25	2,553	263	5,150	83,768
2014	5,580	37,620	994	37,900	28	2,533	232	5,439	90,326
2015	5,589	41,297	3,283	39,224	28	2,554	232	5,643	97,850
2016	5,629	45,283	4,152	40,679	34	2,578	231	5,850	104,436
2017	5,627	50,174	5,406	42,293	34	2,605	230	6,147	112,516
2018	5,347	52,328	6,393	45,207	34	2,630	230	6,802	118,971
2019	5,396	53,187	7,555	48,864	39	2,652	231	7,112	125,036
2020	5,454	54,256	7,874	54,471	39	2,595	231	7,494	132,414
2021	5,489	55,887	7,874	60,204	46	2,627	201	7,592	139,920
2022	5,569	57,988	8,216	67,972	51	2,615	196	7,649	150,256
2023	5,607	60,971	8,473	84,082	50	2,594	192	7,715	169,684
2024	5,496	63,535	9,215	102,364	50	2,611	187	7,800	191,258
2025	5,497	68,145	9,733	119,952	65	2,654	178	7,866	214,090

[1] including biogenic fraction of waste
[2] biogas, biomethane, landfill gas and sewage gas

Table 3

Final energy consumption of renewable energies for heat

	Renewable energies 2024		Renewable energies 2025	
	Final energy Consumption in GWh	Share in Final energy Consumption[8] in %	Final energy consumption in GWh	Share in the final energy consumption[8] in %
biogenic solid fuels (households)[1]	71,089	6.5	78,088	7.1
biogenic solid fuels (TCS)[2]	22,681	2.1	24,766	2.2
biogenic solid fuels (Industry)[3]	26,324	2.4	26,324	2.4
biogenic solid fuels (HS/HPS)[4]	6,800	0.6	7,021	0.6
biogenic liquid fuels[5]	2,184	0.2	2,340	0.2
Biogas	15,944	1.5	15,427	1.4
Biomethane	4,795	0.4	4,505	0.4
Sewage gas	2,326	0.2	2,326	0.2
Landfill gas	62	0.01	60	0.01
Biogenic share of waste[6]	14,623	1.3	14,396	1.3
Solar thermal energy	8,804	0.8	9,238	0.8
Deep geothermal energy	1,914	0.2	2,030	0.2
Near-surface geothermal energy, ambient heat[7]	19,774	1.8	23,327	2.1
Sum	**197,320**	**18.2**	**209,848**	**19.0**

[1] predominantly wood including wood pellets
[2] TCS = trade, commerce, services
[3] including sewage sludge
[4] including sewage sludge (HS=heating stations, HPS = heating power stations)
[5] including biofuels for agriculture and forestry, building trade and military
[6] biogenic fraction of waste in waste-incineration-plants with 50 per cent put
[7] for by heat pumps usable made renewable heat (air-water, waste-water- and sole-water heat pumps and industrial water and gas heating pumps)
[8] without electricity for heat, related to EEV for space heating, warm water and process heat, 2024: 1.086,8 TWh, 2025: 1.106,2 TWh, according to AGEB (preliminary estimate)

Table 4

Final energy consumption of renewable energies in the traffic sector

	Renewable energies 2024		Renewable energies 2025	
	Final energy consumption in GWh	Share in final energy consumption[5] in %	Final energy consumption in GWh	Share in final energy consumption[5] in %
Biodiesel[1]	18,725	3.2	20,861	3.5
HVO[2]	2,858	0.5	3,152	0.5
Vegetable oil	-	-	-	-
Bioethanol	9,142	1.6	9,496	1.6
Biomethane	3,442	0.6	3,898	0.7
RFNBO (EE-H_2)[3]	-	-	5	0.001
Renewable electricity consumption[4]	9,222	1.6	10,329	1.7
Sum	**43,389**	**7.4**	**47,741**	**8.0**

[1] consumption of biodiesel in the traffic sector, without agriculture and forestry, construction trade and military
[2] HVO = Hydrated Vegetable Oil (pure or blended)
[3] RFNBO = Renewable Fuels of Non-Biogenic Origin (incl. hydrogen)
[4] calculated with the share of renewable energies in the gross electricity consumption of the respective year,
[5] total electricity consumption in traffic; 2024: 587,5 TWh, 2025: 599,4 TWh according to AGEB (preliminary estimate)

Table 5

Investment in the installation of renewable energy plants in Germany

	Hydro-power	Wind energy		Photo-voltaicss	Solar thermal energy	Geo-thermal energy & ambient heat	Biomass			Total
		onshore	offshore				elec-tricity	heat	fuels	
	millionen Euro									
2010	350	2,110	450	19,580	990	960	2,240	1,210	-	27,890
2011	300	2,860	610	15,860	1,060	990	3,120	1,320	-	26,120
2012	200	3,550	2,440	11,980	950	1,060	790	1,500	-	22,470
2013	130	4,490	4,270	3,380	860	1,090	700	1,560	-	16,480
2014	90	7,060	3,940	1,450	790	1,080	670	1,320	-	16,400
2015	80	5,370	3,680	1,480	800	1,010	220	1,290	-	13,930
2016	60	6,910	3,370	1,570	700	1,210	270	1,230	-	15,320
2017	60	7,450	3,400	1,660	540	1,320	280	1,230	-	15,940
2018	120	3,390	4,100	2,580	490	1,520	390	1,240	-	13,830
2019	110	1,650	2,130	3,370	440	1,410	350	1,260	-	10,720
2020	100	2,190	80	4,920	530	1,920	320	1,940	-	12,000
2021	70	2,990	280	5,230	550	2,530	250	2,730	-	14,630
2022	70	3,830	1,510	8,140	690	4,590	250	3,650	-	22,730
2023	10	5,960	1,880	18,540	420	8,850	290	2,770	-	38,720
2024	6	5,470	3,580	17,020	240	5,360	330	1,770	-	33,776
2025	4	8,820	2,530	15,010	170	8,640	300	2,080	-	37,554

Source: Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW), February 2026

Table 6

Economic impulses by the operation of renewable energy plants in Germany

	Hydro-power	Wind energy		Photo-voltaics	Solar thermal energy	Geo-thermal energy & ambient heat	Biomass			Total
		onshore	offshore				elec-tricity	heat	fuels	
	millionen Euro									
2010	170	970	20	770	170	620	2,880	2,880	2,920	11,400
2011	190	1,060	30	1,040	190	730	3,320	2,870	3,690	13,120
2012	190	1,200	60	1,250	210	820	4,080	3,120	3,720	14,650
2013	200	1,360	130	1,360	230	900	4,200	3,320	3,050	14,750
2014	200	1,550	210	1,400	240	870	4,500	3,030	2,640	14,640
2015	200	1,730	280	1,420	260	1,010	4,650	3,180	2,440	15,170
2016	210	1,890	350	1,440	270	1,120	4,640	3,360	2,560	15,840
2017	210	2,080	420	1,470	290	1,220	4,670	3,390	2,710	16,460
2018	210	2,230	500	1,500	300	1,280	4,670	3,340	2,700	16,730
2019	220	2,300	560	1,540	310	1,410	4,780	3,350	2,830	17,300
2020	230	2,310	600	1,600	320	1,520	4,830	3,370	3,540	18,320
2021	230	2,310	620	1,670	330	1,820	4,650	3,830	4,970	20,430
2022	230	2,300	650	1,760	340	1,900	4,850	5,120	6,750	23,900
2023	240	2,280	760	1,950	350	2,240	4,890	5,250	5,150	23,110
2024	240	2,320	940	2,210	360	2,570	4,920	4,780	4,290	22,630
2025	240	2,480	1,120	2,390	360	3,020	4,720	3,840	4,720	22,890

Source: Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW), February 2026

Table 7

Avoided greenhouse gas emission by using renewable energies

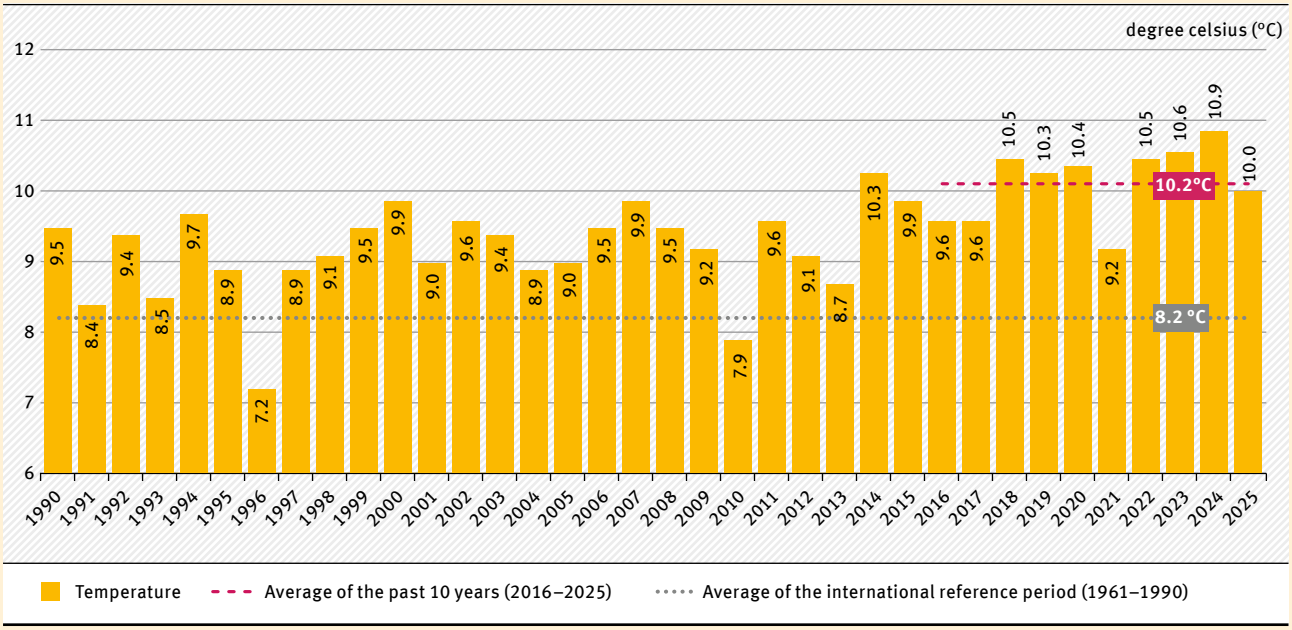
	Hydro-power	Wind energy		Photo-voltaics	Solar thermal energy	Geo-thermal energy & ambient heat	Biomass			Total
		onshore	offshore				electric-ity	heat	fuels	
	million tons of CO_2-equivalents									
2010	16.9	27.7	0.1	8.2	1.5	0.8	21.2	29.8	6.7	113.0
2011	14.9	38.0	0.4	14.3	1.8	0.8	23.9	28.4	6.5	129.1
2012	16.8	33.9	0.5	16.8	1.8	1.0	24.9	30.5	7.1	133.2
2013	16.4	36.7	0.7	18.3	1.9	1.2	23.6	31.1	6.5	136.4
2014	15.6	43.6	1.1	23.6	2.0	1.3	29.0	28.3	6.7	151.3
2015	14.9	53.5	6.1	25.6	2.0	1.4	29.2	29.6	6.4	168.5
2016	15.9	49.8	9.1	25.0	2.0	1.6	29.2	29.8	7.0	169.4
2017	15.0	61.7	12.5	25.0	2.0	1.8	27.9	29.5	7.3	182.7
2018	13.8	65.4	14.2	28.5	2.5	2.1	29.3	31.6	7.6	195.0
2019	16.4	77.5	19.3	32.0	2.4	2.6	32.2	31.7	7.4	221.4
2020	15.2	80.0	21.2	35.0	2.5	2.9	32.7	31.1	11.2	231.7
2021	15.9	70.1	18.9	35.1	2.4	3.3	32.5	34.6	10.5	223.1
2022	14.3	75.6	19.5	42.7	2.7	3.4	32.0	36.7	11.3	238.3
2023	16.1	89.4	18.4	44.4	2.5	4.1	30.6	32.6	12.9	250.9
2024	18.1	85.9	20.0	52.0	2.3	4.7	30.5	33.5	13.6	260.7
2025	13.6	80.9	20.3	62.7	2.5	5.4	29.5	34.8	15.5	265.4

Source: German Environment Agency / Umweltbundesamt (UBA), February 2026

Further information including time series data respective graphics can be found here: https://www.umwelt-bundesamt.de/themen/klima-energie/erneuerbare-energien/erneuerbare-energien-in-zahlen.

Figure 12

Average yearly temperature in Germany (1990–2025)

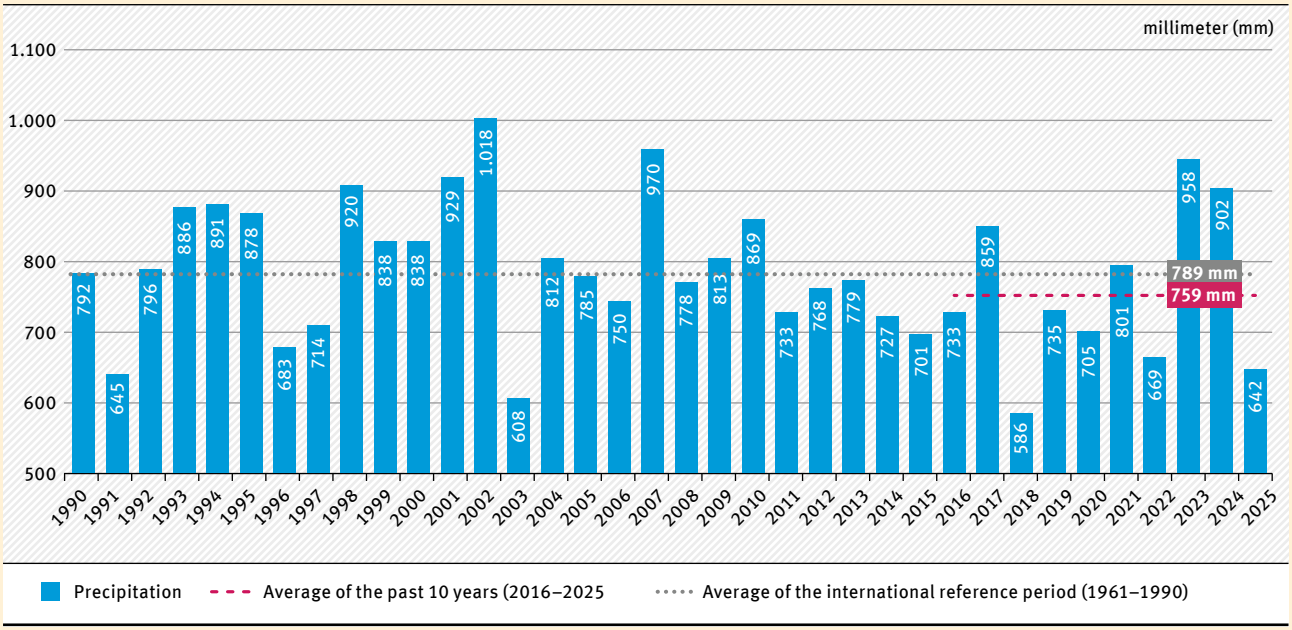


With 10 °C, the year 2025 was approximately 1.8 °C warmer than the average of the international climate reference period (1961–1990).

Source: German National Meteorological Service (DWD)

Figure 13

Average precipitation in Germany (1990–2025)

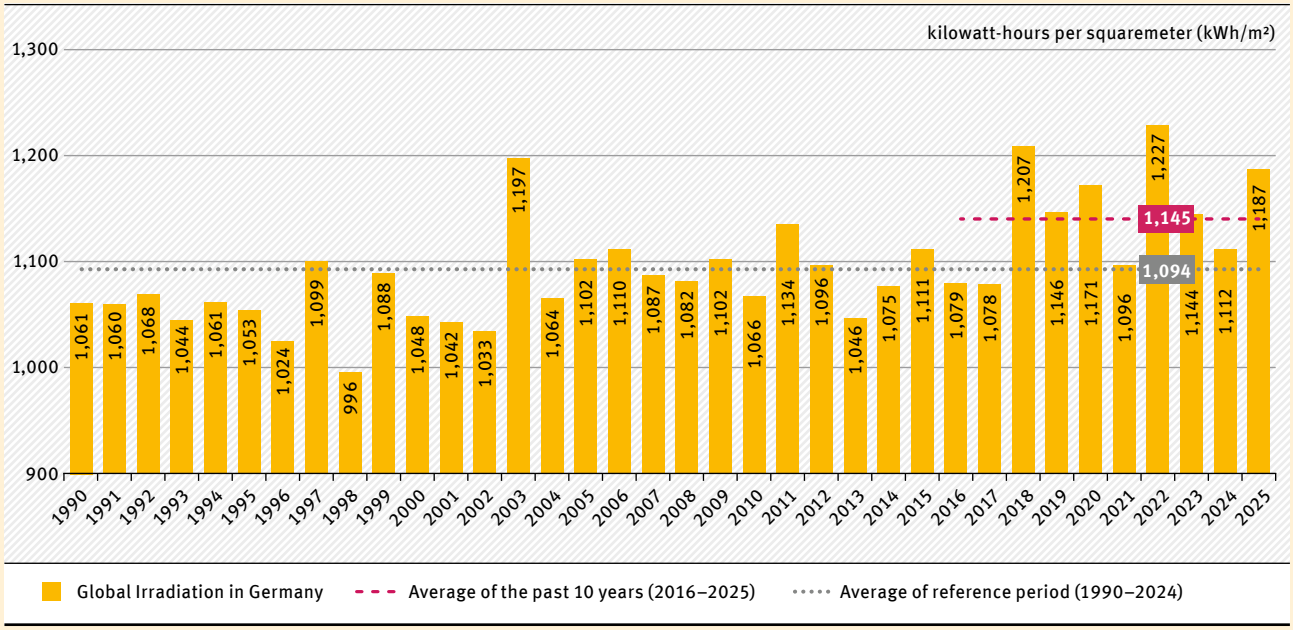


At approximately 642 mm, precipitation in 2025 was significantly below the long-term average (789 mm). However, the last ten years have generally been characterized by relatively low precipitation, with an average of 765 mm.

Source: German National Meteorological Service (DWD)

Figure 14

Average global radiation in Germany (1990–2025)

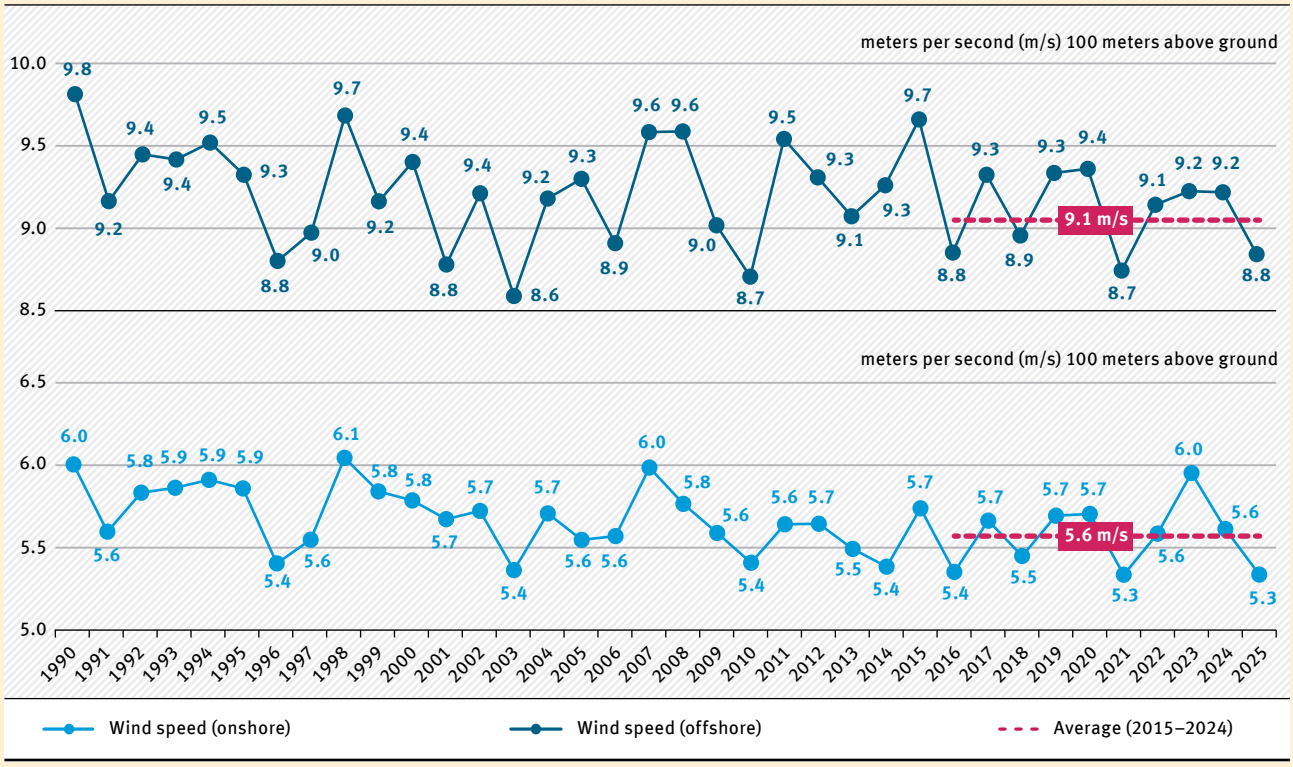


Global solar irradiance is a measure of the sum of direct and diffuse solar radiation per unit area and is thus a direct indicator of the output of PV and solar thermal systems. The DWD has been systematically providing data on global solar irradiance since 1983. A new record of 1,227 kWh/m² was set in 2022. In 2025, global solar irradiance stood at 1,187 kWh/m², making it the fourth-highest value since 1990.

Source: German National Meteorological Service (DWD))

Figure 15

Average wind speed at 100 metres (1990–2025)



Annual average windspeed 100 meters above ground in Germany and northern Germany.

Source: Working Group on Renewable Energy Statistics (AGEE-Stat) based on ERA5 data

Glossary

Gross energy consumption according to EU Directives

The EU Directive 2009/28/EG and amendments contains detailed instruction for the calculation of the share of renewable energies in the gross final energy consumption: Thus, the effects of climatic fluctuations are considered in the electricity output when calculating the contributions of wind and water power. Due to this "normalization" the values for wind and hydropower does no longer correspond to the actual output of the respective year, but aims to reflect national long term development efforts better. Furthermore the directive, only considers liquid bioenergy carriers and biofuels which fulfil specific sustainability criteria.

Gross electricity production

The gross electricity production comprises the total electricity quantity of a country produced. After deducting the own consumption of the production plants there remains the net electricity production.

Gross electricity consumption

The gross electricity consumption corresponds to the sum of the total national gross electricity production (wind, water, sun, coal, oil, natural gas and others) including electricity flows from abroad and minus the electricity flows to abroad. The net electricity consumption corresponds to the gross electricity consumption minus own consumption of power plants and net and storage loss.

CO_2 equivalents

The unit for the greenhouse potential of a gas shows which quantity of CO_2 in a period under consideration of 100 years would develop the same greenhouse effect as the considered comparison gas. The equivalence factors used follow the values from the IPCC Fourth Assessment Report Climate Change 2007 for the national emission report.

Final energy

The final energy is the part of primary energy reaching the consumer after deduction of the transmission and conversion loss which will be then available for further use. Forms of the final energy are e.g. district heating, electricity, hydrocarbons as petrol, kerosene, heating oil or wood and various gases such as natural gas, biogas and hydrogen.

Renewable energies

Energy sources that are available indefinitely on a human timescale. Virtually all renewable energies are ultimately powered by the sun. According to the current state of scientific knowledge, the sun's foreseeable lifespan is more than a billion years and is virtually unlimited from our human perspective. The three primary sources are solar radiation, geothermal energy and tidal power. These can be utilised either directly or indirectly in the form of biomass, wind, hydropower, ambient heat and wave energy.

Primary energy

Primary energy is the mathematically usable energy content of a naturally present energy carrier before it will be subjected to a conversion. The primary energy carriers include exhaustible energy carriers (e.g. hard and brown coal, natural oil, natural gas, splitable material such as uranium ore) and renewable energies (sun energy, wind energy, water power, earth heat and tidal energy). Primary energy is converted into a further stage of the energetic row in power plants or refineries. Thereby conversion loss occurs. A part of the primary energy carriers comes also to the non-energetic consumption (e.g. crude oil for the plastics industry).

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