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Status of Onshore Wind Energy Development in Germany

Year 2025

On behalf of

BWE
Bundesverband WindEnergie

VDMA
Power Systems

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Year 2025

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Contents

Preliminary note

The analysis is based on data from the Market Master Data Register (MaStR), on publications by the Federal Network Agency (BNetzA) in connection with onshore wind energy tenders, as well as on our own research. The data has been checked for plausibility, partially supplemented and in some cases corrected. Findings on repowering are largely based on our own research and interviews with stakeholders. Shutdowns of wind turbines were partially added where reports confirm them, but final shutdown has not yet been registered. The temporal allocation of permits is based on the initial permit date. A later modification date resulting from changes to the permitted wind turbine does not affect the temporal allocation of the permit. The analysis also includes wind turbines permitted during the period under review that have not yet been entered in the MaStR, but for which the author has the official approval documents.

The evaluation includes wind turbines with a minimum capacity of 100 kilowatts (kW). Wind turbines are considered decommissioned from a generator capacity of 80 kW.[1]

This publication has been released before the deadline[2] for register entries has expired. Further reports that may increase the number of permits, commissioning and shutdowns are therefore possible. Delayed registrations and subsequent changes to register entries may also result in discrepancies from the situation presented here for the 2025 calendar year.

[1] Small wind turbines play only a minor role in Germany. In 2025, according to the register, 91 wind turbines with only 553 kW (approximately 0.5 MW) of capacity were commissioned. By the end of 2025, 1,052 small wind turbines (up to 80 kW generator capacity) with a total capacity of 9.4 MW were registered as “in operation” nationwide.

[2] Section 5 of the MaStR Ordinance provides that registration must take place within one month of commissioning. The one-month period also applies to provisional and final shutdowns as well as “approvals” under the Federal Immission Control Act. The final data retrieval from the MaStR for this analysis took place on 14/01/2026 (14:00).

Summary

The year 2025 stands out due to an exceptional upward trend in both commissionings and permits issued for new onshore wind turbines. Newly installed wind energy capacity grew by more than 50 percent compared to the previous year, making 2025 the second-best year for expansion in Germany's history. The volume of newly permitted wind energy capacity actually reached a new all-time high.

In 2025, 20,765 megawatts (MW) of wind energy capacity was permitted by the authorities. Compared to the previous year, which had held the record until now, the capacity volume increased by 48 percent. Never before has more wind energy capacity been permitted in Germany than in this year. Nearly 30 percent of the permitted capacity comes from North Rhine-Westphalia (5,942 MW), which, for the third year in a row, leads the federal state ranking. In second-placed Lower Saxony, 5,211 MW were permitted. In addition, Bavaria, Brandenburg, Hesse, Mecklenburg-Vorpommern and Rhineland-Palatinate each recorded more than 1,000 megawatts of newly permitted wind energy capacity. Despite the unprecedented number of permit decisions, the procedure duration in the vast majority of federal states has fallen significantly once again. On a national average, permit procedures completed in 2025 took just under 17 months, a decrease of 28 percent compared to the previous year.

The abundance of new permits also affected the tender rounds. The volume of capacity auctioned in 2025 was fully awarded by the Federal Network Agency. The awarded volume (14,445 MW) increased by 30 percent compared to the previous year. The persistently high number of permits already suggests that the bidding rounds in the coming year will also be heavily oversubscribed.

With 958 newly commissioned wind turbines and 5,232 MW of capacity, 2025 is the second-best year in German expansion statistics. In terms of capacity, gross expansion increased by 58 percent compared to the previous year. Here too, North Rhine-Westphalia leads the state comparison by a clear margin with 1,358 MW. Lower Saxony (1,133 MW) and Schleswig-Holstein (790 MW) follow in second and third place. The repowering share of newly installed capacity amounts to nearly 30 percent – a decrease of seven percentage points compared to 2024. Grid exits, at 456 decommissioned turbines and 631 MW of capacity, are currently just under one fifth below last year’s decommissionings, although experience suggests figures are likely to rise in the near future due to late reporting.

Net expansion amounts to 4,602 MW. By the end of the year, the fleet increased by 502 to a current total of 29,226 wind turbines.

At the end of 2025, the total installed capacity of wind turbines amounted to 68,067 MW. Of this, around 12,600 MW of capacity no longer has an entitlement to remuneration under the Renewable Energy Sources Act (EEG). The average age of the windpark in Germany is 15.5 years. Wind turbines in Saxony have the highest operating age (Ø 20.8 years). The youngest windpark is connected to the grid in Saarland, with an average of 11.5 years of operation.

In 2025, onshore wind turbines generated 106.5 billion kilowatt-hours (kWh) of electricity. Although the amount of electricity fell by five percent due to a very low-wind spring, onshore wind energy remained the most important energy source for electricity generation in Germany, with a share of 24 percent.

Table 1: Status of onshore wind energy development

Year 2025	Wind turbines	Capacity [MW]
Newly permitted	3,310	20,765
Gross expansion	958	5,232
Thereof repowering	279	1,548
Decommissioned	456	631
Net expansion	502	4,602
Total fleet as of 31/12/2025	29,226	68,067

1 Commissioning of new wind turbines

In 2025, 958 onshore wind turbines with a total electrical capacity of 5,232 MW were commissioned in Germany. Nearly 30 percent of the newly installed wind energy capacity was realised as part of repowering. In terms of installed capacity, this is the second-best gross expansion in Germany's history. Only in 2017 was more new capacity connected to the grid, at just over 5,500 MW.

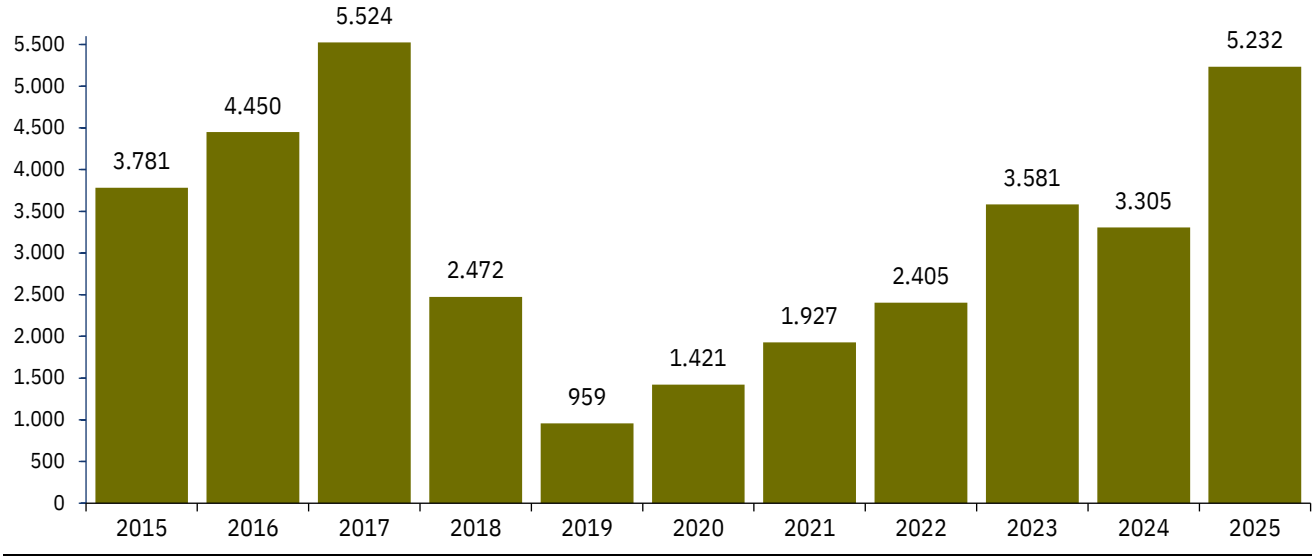

Figure 1: Wind energy capacity commissioned onshore each year (gross expansion)
Data: MaStR; figures in megawatts

After deducting the decommissionings reported (456 WEA, 631 MW), net additions amount to 4,602 MW or 502 wind turbines.

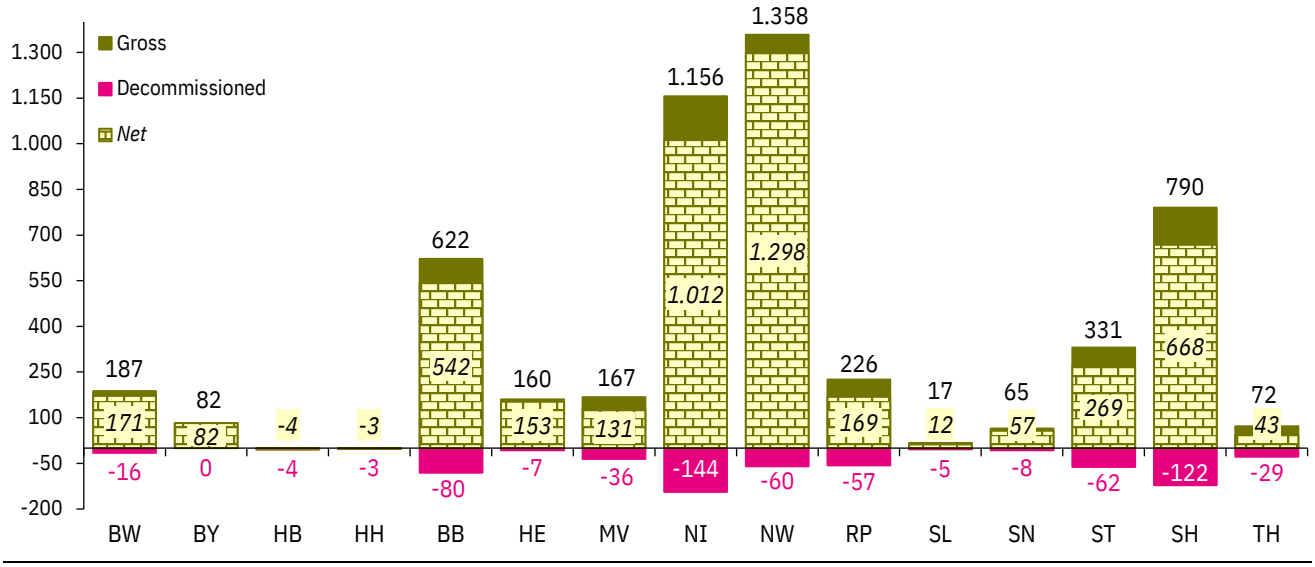

Figure 2: Gross/net expansion of wind energy capacity in the year 2025 by federal state
Data: MaStR; figures in megawatts

1.1 Regional distribution of commissioning

The most wind energy capacity in 2025 was installed in North Rhine-Westphalia (1,358 MW). Lower Saxony also recorded a capacity expansion of more than 1,000 MW. In third place is Schleswig-Holstein, where wind turbines with a capacity of 790 MW were connected to the grid. Only 13 wind turbines each were commissioned in Saxony and Thuringia, while in Saarland the figure was just three. There was no growth in Berlin in 2025. In Bremen and Hamburg, installed capacity actually declined slightly.

The increase in expansion compared to the same period last year was not uniform across all federal states. Many regions are recording a significant increase in capacity. Capacity growth remained below average in Hesse, Rhineland-Palatinate, Saxony-Anhalt and Schleswig-Holstein.

Table 2: Commissioning of new wind turbines/capacity in the first half of 2025; data: MaStR

Federal state [Abbreviation]	Wind turbines	Capacity [MW]	Share of total expansion [MW]	Change compared to 2024 [MW]	Ø Hub height [m]	Ø Rotor diameter [m]	Ø Generator capacity [MW]
Baden-Wuerttemberg [BW]	36	187.2	3.6%	69.0%	161	155	5.20
Bavaria [BY]	17	82.5	1.6%	65.4%	163	147	4.85
Brandenburg [BB]	108	622	11.9%	72.8%	158	154	5.76
Hesse [HE]	28	160.1	3.1%	34.9%	166	156	5.72
Mecklenburg-Vorpommern [MV]	29	167.1	3.2%	87.2%	163	156	5.76
Lower Saxony [NI]	209	1,156.0	22.1%	65.8%	147	153	5.53
North Rhine-Westphalia [NW]	262	1,359.7	26.0%	79.6%	145	148	5.18
Rhineland-Palatinate [RP]	41	225.5	4.3%	9.6%	162	157	5.50
Saarland [SL]	3	16.8	0.3%	71.4%	166	162	5.60
Saxony [SN]	13	64.8	1.2%	171.6%	165	148	4.98
Saxony-Anhalt [ST]	56	330.9	6.3%	20.5%	165	155	5.91
Schleswig-Holstein [SH]	143	789.9	15.1%	37.6%	110	146	5.52
Thuringia [TH]	13	71.6	1.4%	105.2%	167	154	5.51
Germany	958	5,232.5	100%	58.3%	146	151	5.46

In the southern region[3], 94 new wind turbines with a total capacity of 499 MW were connected to the grid, most of them in the area of Rhineland-Palatinate (213 MW) and in Baden-Wuerttemberg (187 MW). The southern region's share of annual gross expansion amounts to nearly ten percent, meaning commissionings there rose by 46 percent compared to 2024 (67 wind turbines; 342 MW). However, the specific growth remains significantly below the nationwide increase (58%).

1.2 Wind turbine configuration

For several years now, there has been strong momentum in the development of generator capacity in new wind turbines, which is also reflected in the commissioned wind turbines. While the average generator capacity of wind turbines commissioned in 2015 was still 2.7 MW, this value exceeded the five-megawatt threshold for the first time in new wind turbines in 2024. Currently, the average generator capacity is 5.46 MW – meaning it has doubled over the past ten years. 70 percent of this year's new wind turbines have a generator capacity of more than 5.5 MW. By contrast, wind turbines with up to 3.5 MW account for nearly three percent of gross expansion.

[3] The geographical area fully includes Baden-Wuerttemberg and Saarland. Bavaria and Rhineland-Palatinate are also largely covered by the regional boundary, with the exception of a few districts in the far north. In Hesse, five districts (south of the Main River) and the independent city of Darmstadt are part of the southern region; see Section 3 No. 43c in conjunction with Annex 5 EEG.

Rotor blade lengths have increased by 45 percent over the past decade. Accordingly, hub heights have also grown during the same period – in this case by nearly one fifth.

This trend will continue in wind turbine configurations in the coming years, as the most recently permitted but not yet realised wind turbines already have an average generator capacity of 6.3 MW. The average hub height has exceeded the 158-metre mark in this segment. The mean rotor diameter of the wind turbines permitted in 2025 exceeds the 160-metre mark (see Section 5.3).

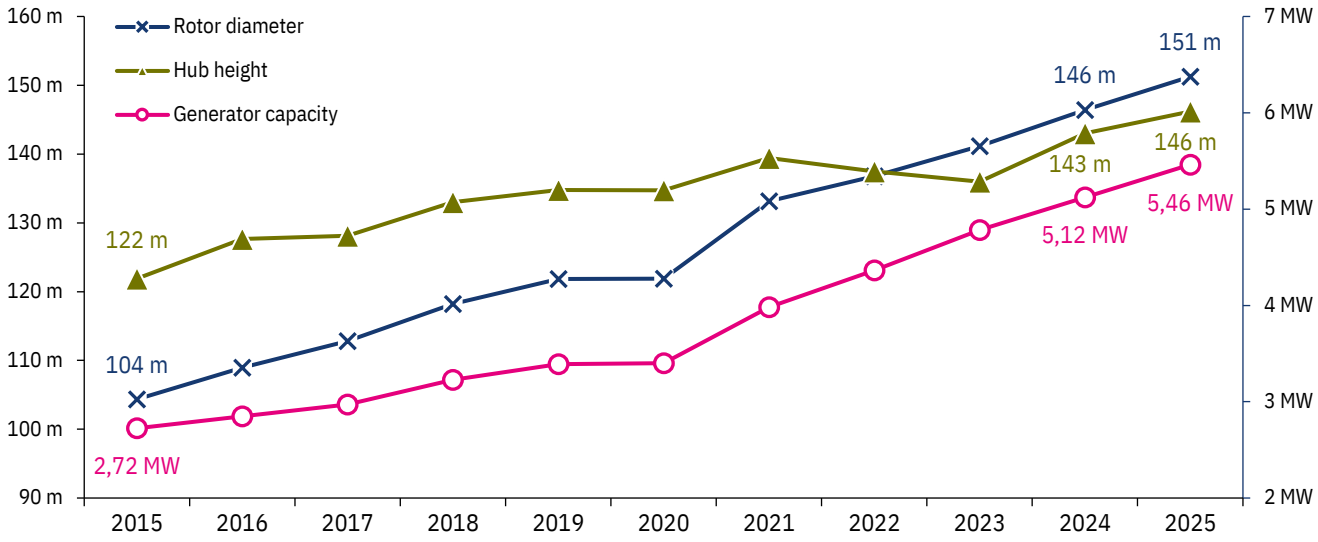

Figure 3: Average configuration of wind turbines commissioned each year
Data: MaStR, own research; figures in megawatts and metres

1.3 Realisation period

The period from the issuance of the (initial) permit to the commissioning of the wind turbines, referred to here as the realisation period, has grown continuously in recent years. Whereas in the years 2011 to 2017[4] it typically took just under a year to connect a wind turbine to the grid after permit, this step most recently took more than twice as long. In 2025, wind turbine realisation took on average 29 months (median 27 months), rising by another month compared to the average duration of wind turbines realised in the three years prior. The shortest realisation period was six months, while the longest stretched over almost ten years (118 months).

The persistently long realisation periods of recent years are partly due to the tendering system, as it takes an average of six months[5] from (initial) permit to the award of the bid. Once the new wind turbines under consideration were awarded bids, it then took an average of 21 months for them to be commissioned. The time delay is also due to the fact that a considerable number of wind turbines undergo changes to the original permit – either because the capacity is increased or a type change is carried out, sometimes in combination with a change of manufacturer. Such subsequent changes to the originally permitted situation can be identified in 34 percent of the wind turbines commissioned in 2025, with 13 percent more capacity (+225 MW) being realised than originally permitted. Lengthy legal proceedings against the permit can also cause delays in the realisation process. In addition, there have been increasing indications that wind turbines are being constructed but, due to grid connection problems, can only be commissioned significantly later. All these circumstances have an impact on the realisation period, as by definition any time spent after the granting of the initial permit is counted as part of the realisation phase.

[4] More detail on this period: FA Wind (2023), Typische Verfahrenslaufzeiten von Windenergieprojekten - Empirische Datenanalyse für den Zeitraum 2011 bis 2022.
[5] Median 3.7 months; data basis 8,369 wind turbines that received a bid in the years 2018 to 2025. Installations that were re-awarded a bid after expiration of deadlines are not included.

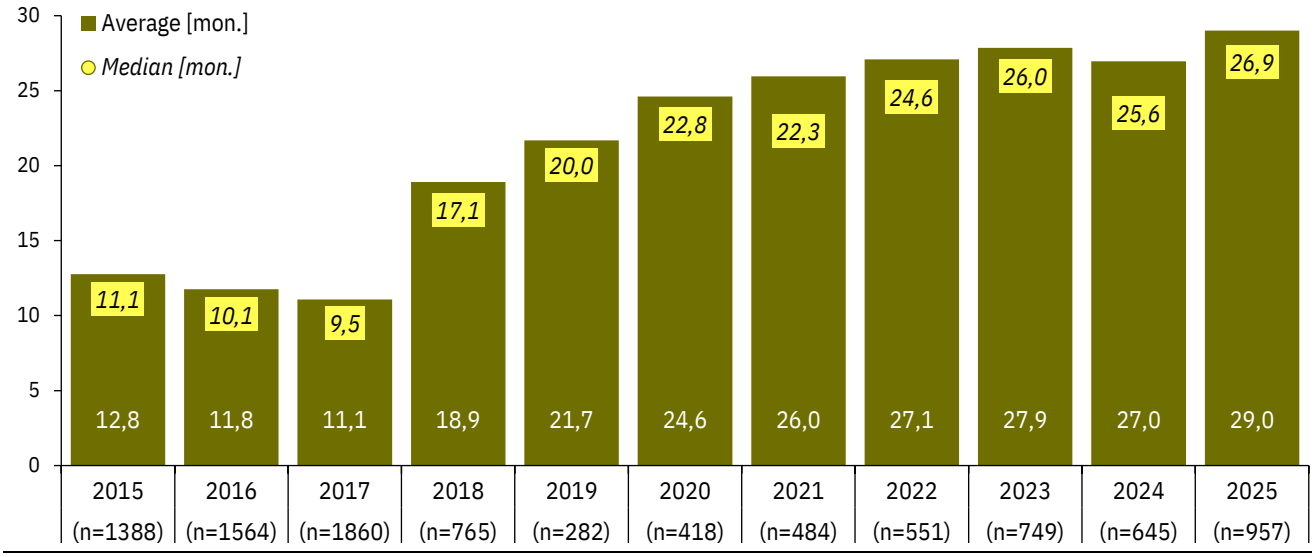

Figure 4: Realisation period (permit to commissioning) of wind turbines commissioned each year
Data: MaStR, own research; figures in months

2 Repowering and decommissioning

Half of Germany's existing fleet of wind turbines has been in operation for at least 15 years. Around 10,400 wind turbines are currently already over 20 years old. As wind turbines age, the question increasingly arises whether the existing site can continue to be used with modern, higher-capacity machines (repowering), or whether the old wind turbines will be decommissioned without replacement at the end of their technical service life.

2.1 Repowering

279 wind turbines with 1,548 MW of capacity were commissioned in 2025 as part of repowering. With respect to installed gross capacity, the repowering share amounted to nearly 30 percent.

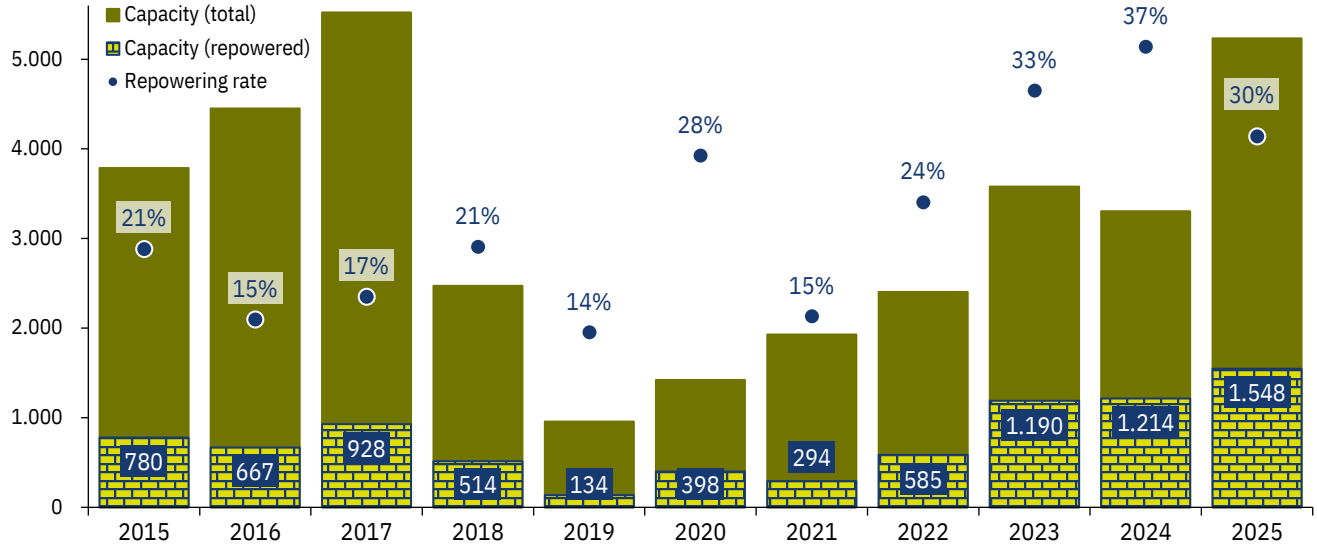

Figure 5: Share of repowering capacity in annual commissioning
Data: MaStR, own research; figures in megawatts

Repowering projects were implemented in 12 federal states. 28 percent of the capacity realised through this was located in Lower Saxony (430 MW). Nearly one fifth of the repowered capacity was installed in North Rhine-Westphalia (299 MW) and Saxony-Anhalt

(275 MW) respectively. Saxony-Anhalt also recorded the highest repowering share at 83 percent, followed by Saxony (59%) and Rhineland-Palatinate (46%).

Table 3: Regional distribution of repowering in 2025; data: MaStR, own research

Federal state	Wind turbines	Capacity [MW]	Share of total expansion in state [MW]
Baden-Wuerttemberg	1	4.2	2.2%
Bavaria	1	5.6	6.7%
Brandenburg	20	112.4	18.1%
Hesse	5	28.0	17.5%
Mecklenburg-Vorpommern	7	39.9	23.9%
Lower Saxony	77	430.3	37.2%
North Rhine-Westphalia	57	299.0	22.2%
Rhineland-Palatinate	19	104.6	46.4%
Saxony	8	38.3	59.1%
Saxony-Anhalt	47	275.3	83.2%
Schleswig-Holstein	34	192.4	24.4%
Thuringia	3	18.0	25.1%
Germany	279	1,547.9	29.6%

2.2 Decommissioning

For the year 2025, 456 wind turbines with 631 MW capacity have so far been registered as permanently decommissioned. Compared to 2024, this represents a decrease of nearly 16 percent in terms of capacity. Based on past experience, the figures are likely to increase in the coming weeks due to late reporting. Nevertheless, there is still no clear wave of decommissioning that might have been expected as a result of the 10,400 existing wind turbines that are no longer supported. The volume of decommissioned wind turbines so far correlates more closely with the level of repowering activity, suggesting that older wind turbines are mainly being taken offline as replacements for new ones.

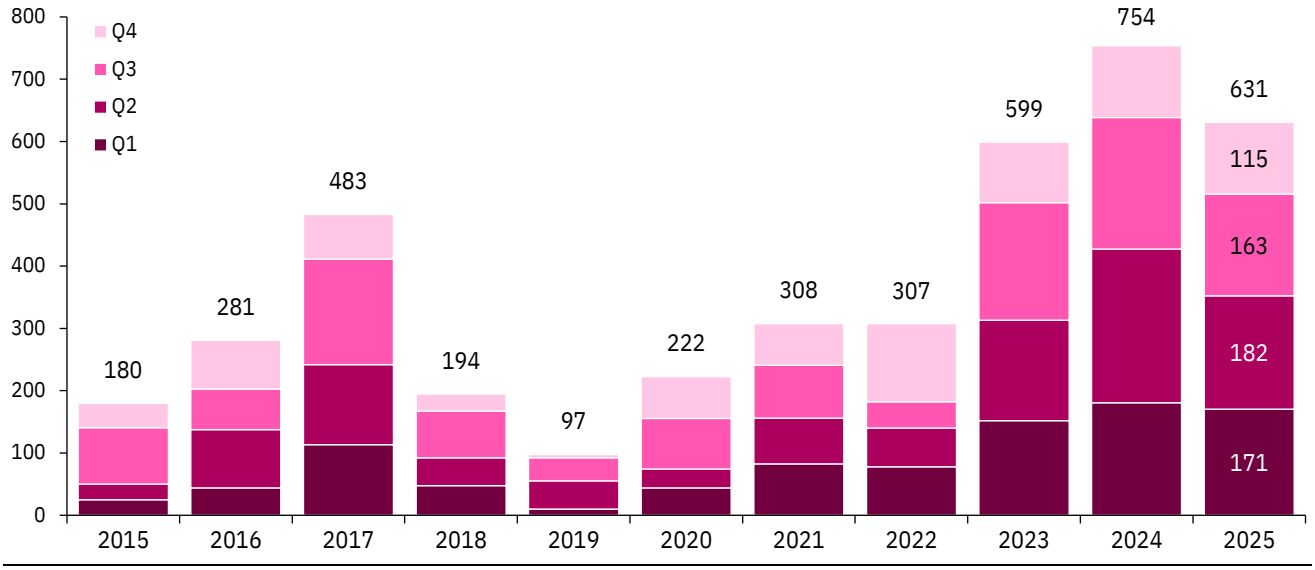

Figure 6: Wind energy capacity decommissioned per quarter
Data: MaStR, AnlReg; figures in megawatts

The average age of the wind turbines decommissioned in 2025 was 23 years in operation. The shortest operating period was just under seven years, while the longest spanned almost 35 years. 60 percent of the decommissionings involved a generator capacity between one and two megawatts. Most of the capacity was decommissioned in Lower Saxony (144 MW), followed by Schleswig-Holstein (122 MW) and Brandenburg (80 MW).

Table 4: Regional distribution of decommissioned wind turbines in 2025; data: MaStR

Federal state	Wind turbines	Capacity [MW]	Installation age [years]
Baden-Wuerttemberg	12	15.9	21.5
Brandenburg	52	80.4	22.7
Bremen	2	3.6	20.9
Hamburg	6	3.3	29.0
Hesse	11	7.0	26.6
Mecklenburg-Vorpommern	45	35.8	26.1
Lower Saxony	93	143.8	22.6
North Rhine-Westphalia	51	60.1	23.0
Rhineland-Palatinate	34	56.9	22.0
Saarland	3	4.5	20.3
Saxony	7	7.5	25.8
Saxony-Anhalt	42	61.7	23.0
Schleswig-Holstein	78	121.7	23.0
Thuringia	20	28.7	22.3
Germany	456	630.8	23.2

Since 2015, 3,380 wind turbines with a total capacity of 4,050 MW have been decommissioned. The largest amount of wind energy capacity taken offline during this period was in Lower Saxony (1,223 MW), followed by Schleswig-Holstein (941 MW) and North Rhine-Westphalia (500 MW).

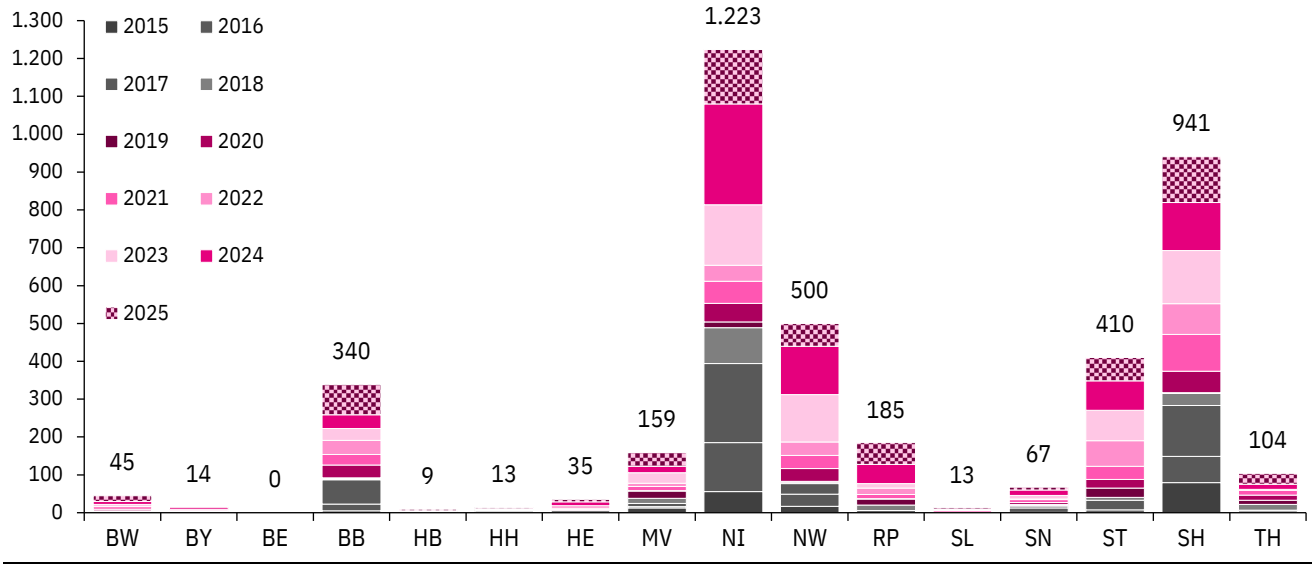

Figure 7: Wind energy capacity decommissioned between 2015 and 2025 by federal state
Data: MaStR, AnlReg; figures in megawatts

3 Total fleet of onshore wind turbines

At the end of 2025, according to the Market Master Data Register, 29,226 wind turbines with a capacity of 68,067 MW were in operation. When looking at the ratio of installed wind energy capacity to land area (wind turbine density), it becomes clear that by far the largest federal state, Bavaria – aside from Berlin – has by far the lowest wind turbine density. With only 39 kilowatts[6] per square kilometre (kW/km²) of land area, the specific figure in Bavaria is six times lower than in the significantly more densely populated North Rhine-Westphalia.[7] Among the coastal states, Mecklenburg-Vorpommern stands out. Despite comparable wind conditions[8], wind turbine density in this second-largest coastal state is significantly lower than in Lower Saxony, at 168 kW/km². Compared to Schleswig-Holstein, Mecklenburg-Vorpommern lags behind its neighbouring state by a factor of 3.6. The highest area-specific wind turbine figure is recorded in Schleswig-Holstein at 608 kW/km², followed by Bremen and Brandenburg. Nationwide, the average wind turbine density in the end of 2025 was 190 kW/km².

3.1 Regional distribution of existing wind turbines

The most wind energy capacity is installed in Lower Saxony (13,900 MW), followed by Schleswig-Holstein (9,600 MW), Brandenburg (9,500 MW) and North Rhine-Westphalia (9,000 MW). The average generator capacity of existing wind turbines is 2.33 MW – that is, less than half the capacity of today's new wind turbines. The average total height of existing wind turbines is 147 metres, while wind turbines commissioned in 2025 have an average total height of 222 metres.

As of the end of the year, wind turbines were in operation in 273 out of 294 rural districts. Additionally, wind turbines were located in 43 (of 107) independent cities. In terms of wind turbine density per district area[9], Dithmarschen in Schleswig-Holstein leads the national comparison with 1,656 kW/km². Second place goes to the Schleswig-Holstein district of Nordfriesland with an wind turbine density of 1,222 kW/km². Although more wind energy capacity is connected to the grid in Nordfriesland than in the neighbouring district, its much larger area results in a lower wind turbine density than in Dithmarschen. Third place goes to the district of Paderborn (1,156 kW/km²) in North Rhine-Westphalia. Among the independent cities, Emden (Lower Saxony) has the highest area-specific installation density at 1,688 kW/km², followed by Salzgitter, also Lower Saxony, (932 kW/km²) and Bremerhaven (824 kW/km²).

[6] The unit kilowatt was chosen because using megawatts per square kilometre would result in values mostly below 1 (conversion factor 1,000 to megawatt).
[7] In 2022, Bavaria had a population density of 190 inhabitants per square kilometre (inh./km²), while in NRW the population density was 532 inh./km², nearly three times higher; source: Statistische Ämter des Bundes und der Länder, Fläche und Bevölkerung nach Ländern.
[8] See FA Wind und Solar (2025), Gütefaktoren von Windenergieanlagen an Land, Section 1.2.
[9] The city states were not included in this analysis, as they do not have district structures.

Table 5: Regional distribution of existing wind turbines as of 31/12/2025; data: MaStR, own research

Federal state	Wind turbines	Capacity [MW]	Share of total fleet [MW]	Installation density [kW/km²]
Baden-Wuerttemberg	823	2,058	3.0%	58
Bavaria	1,171	2,760	4.1%	39
Berlin	6	17	0.02%	19
Brandenburg	4,124	9,525	14.0%	321
Bremen	83	198	0.3%	472
Hamburg	61	121	0.2%	161
Hesse	1,197	2,792	4.1%	132
Mecklenburg-Vorpommern	1,829	3,931	5.8%	168
Lower Saxony	6,272	13,976	20.5%	293
North Rhine-Westphalia	3,871	9,074	13.3%	266
Rhineland-Palatinate	1,792	4,327	6.4%	218
Saarland	218	564	0.8%	219
Saxony	858	1,418	2.1%	77
Saxony-Anhalt	2,745	5,786	8.5%	283
Schleswig-Holstein	3,316	9,624	14.1%	609
Thuringia	860	1,896	2.8%	117
Germany	29,226	68,067	100%	190

12 percent of the existing fleet of wind turbines in Germany has a generator capacity of up to 750 kW. However, these wind turbines contribute only three percent to total generation capacity. Nearly one third of existing wind turbines falls into the 1 to 2 MW capacity category. This segment accounts for 25 percent of the total installed capacity. Just over one fifth of existing wind turbines are equipped with generator capacities between 2 and 3 MW. Over a quarter of active wind turbines have been installed with more than 3 MW. The high operating age of the 14,800 wind turbines with up to 2 MW generator capacity highlights the considerable repowering potential that could be harnessed in the coming years.

Table 6: Capacity categories of existing wind turbines as of the end of 2025; data: MaStR

Capacity categories	Wind turbines	Capacity [MW]	Share [wind turbines]	Share [capacity]	Installation age [years]
P ≤ 750 kW	3,591	1,872	12.3%	2.8%	27.3
750 < P ≤ 1,000 kW	1,845	1,633	6.3%	2.4%	20.3
1,000 < P ≤ 2,000 kW	9,389	16,737	32.1%	24.6%	20.4
2,000 < P ≤ 3,000 kW	6,614	16,421	22.6%	24.1%	11.5
3,000 < P ≤ 4,000 kW	4,723	15,526	16.2%	22.8%	9.0
P > 4,000 kW	3,064	15,877	10.5%	23.3%	2.6

3.2 Age structure of existing wind turbines

At the end of 2025, the windpark in operation had an average age of 15.5 years. Figure 8 breaks down installed wind energy capacity by year of commissioning. In December 2025, 1,800 MW of capacity installed before the turn of the millennium still remained in operation. Together with capacity that was installed between 2000 and 2005 and is still online, the volume of wind energy capacity no longer supported since the beginning of 2026 totals to 12,650 MW (magenta bars, Figure 8).

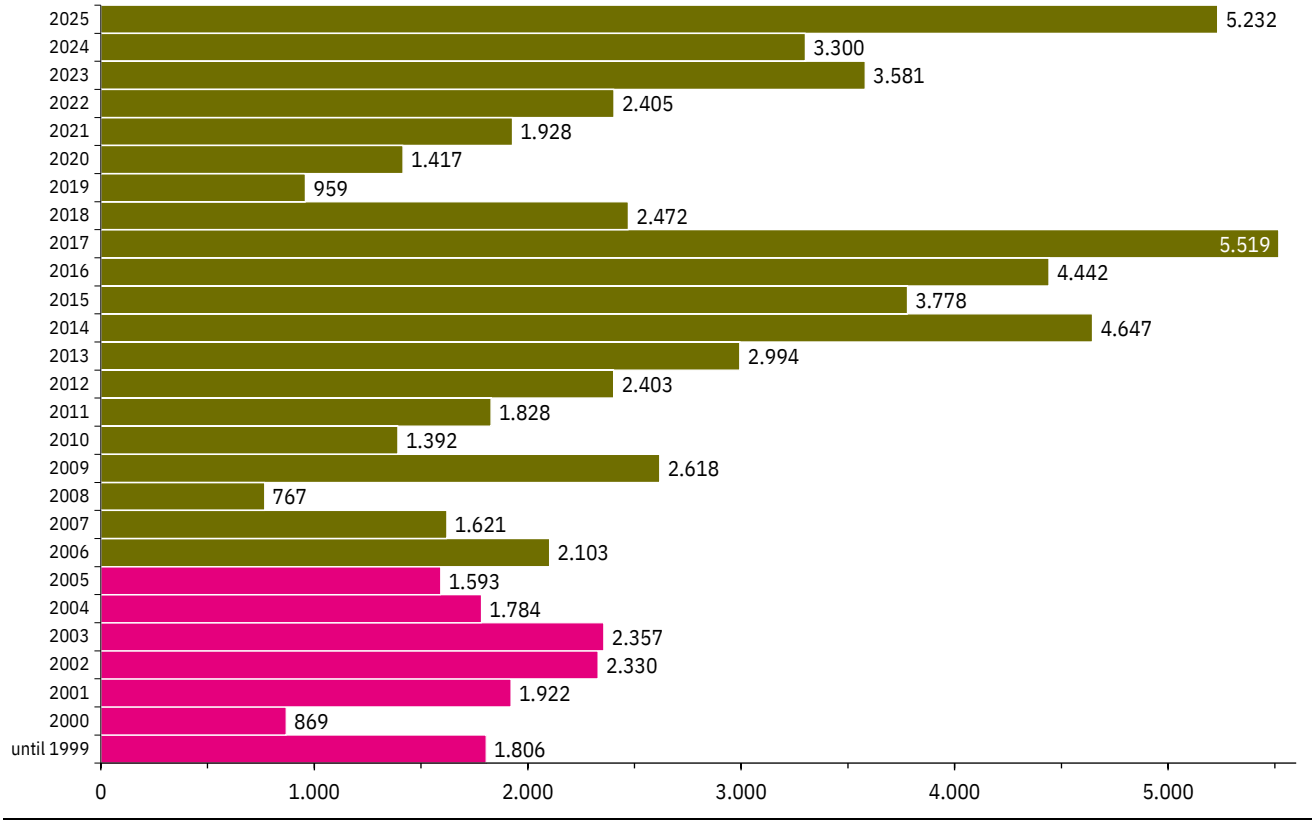

Figure 8: Installed wind energy capacity by year of commissioning (magenta = no longer supported)
Data: MaStR; figures in megawatts

Nearly one fifth of the wind energy capacity installed as of the end of 2025 has been in operation for at least 20 years. A further 12 percent has been operating for between 15 and 20 years. Almost one quarter of capacity nationwide has been generating electricity from wind energy for 10 to 15 years. 46 percent of installed generation capacity has been in operation for up to ten years.

The age structure of the windpark varies considerably across the federal states. In Saxony, for instance, the share of wind energy capacity that will no longer be eligible for support is 44 percent – more than twice the national average (19%). Saxony also has the oldest windpark in the country, with an average age of 20.8 years. In Brandenburg, Mecklenburg-Vorpommern, Lower Saxony and Sachsen-Anhalt as well, the share of wind energy capacity that will reach the end of its support period by year's end is above the national average. Of the capacity commissioned between 2006 and 2010 that will lose its EEG support within the next five years, Brandenburg, Saxony and Sachsen-Anhalt all have above-average shares still in operation. In Saxony, 61 percent of installed capacity will lose its entitlement to EEG remuneration by the end of 2029. In Sachsen-Anhalt, more than half (52%) will reach the end of its support period by then.

The youngest windparks – apart from Berlin[10] – are found in Saarland (Ø 11.5 years) and Bavaria (13.5 years). There, only 13 percent (Saarland) and 16 percent (Bavaria) of wind energy capacity is older than 15 years.

In most federal states, the largest share of capacity was connected to the grid between 2011 and 2020. In these ten years, three quarters of the local capacity was installed in Bavaria and Saarland respectively; in Hesse, it was over 60 percent of the current fleet. More than half of regional wind energy capacity was commissioned within the decade in Baden-Wuerttemberg, Rhineland-Palatinate and Thuringia.

[10] The six wind turbines currently in operation in Saarland have been running for an average of 10.3 years.

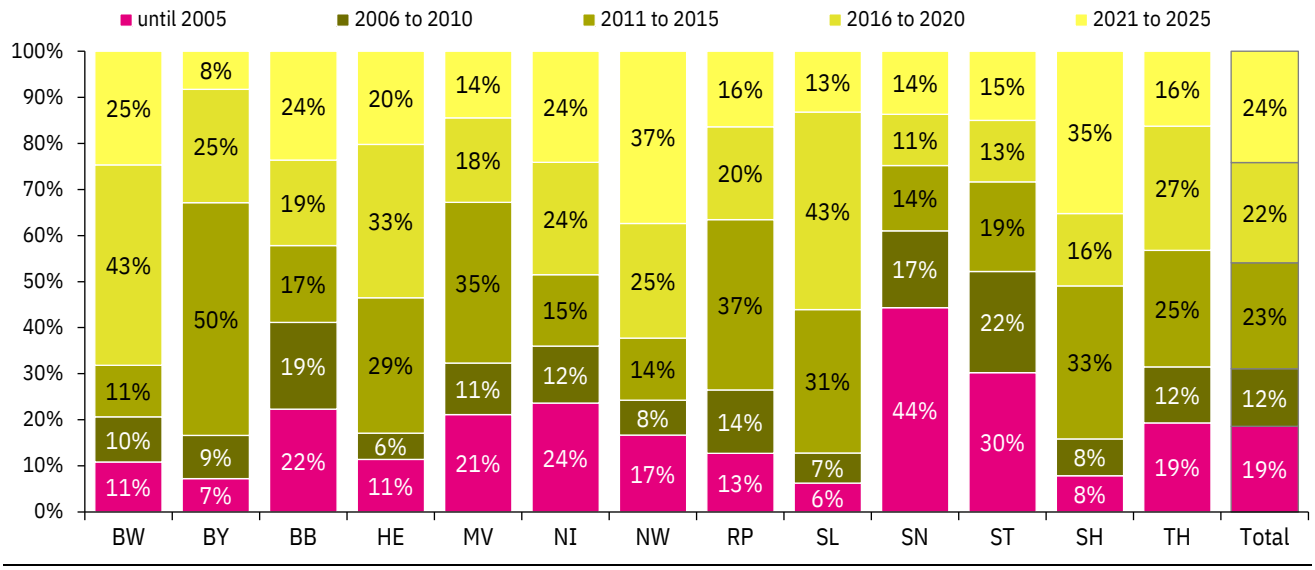

Figure 9: Age structure of wind energy capacity installed at the end of 2025 by year of commissioning
Data: BNetzA

4 Auction results

In 2025, the Federal Network Agency has conducted four tendering rounds for onshore wind turbines. All tenders were significantly – and increasingly – oversubscribed, which is why the Federal Network Agency was able to allocate the entire auction volume (14,430 MW) in the form of bids.

As a result of the high level of competition in the tender rounds, the volume-weighted award value fell to 6.63 ct/kWh this year; a decrease of almost nine percent compared to the average award value in the previous year. The maximum bid value for 2025 was set by the Agency at 7.35 ct/kWh,[11] remaining unchanged for three years in a row.[12]

Table 7: Development of bid values for onshore wind energy; data: BNetzA

Year	Permitted maximum value [ct/kWh]	Volume-weighted award value [ct/kWh]
2019	6.20	6.14
2020	6.20	6.11
2021	6.00	5.88
2022	5.88	5.81
2023	7.35	7.33
2024	7.35	7.26
2025	7.35	6.63

Figure 10 shows the capacity volumes tendered in the individual bid dates since 2020, how much wind energy capacity was bid for them, and how much of this received an award.

[11] See BNetzA, decision (Ref. no.: 4.08.01.01/1#36) dated 17/12/2024.
[12] For the year 2026, the maximum bid value was reduced to 7.25 ct/kWh, see BNetzA, decision (Ref. no.: 4.08.01.01/1#63) dated 12/12/2025.

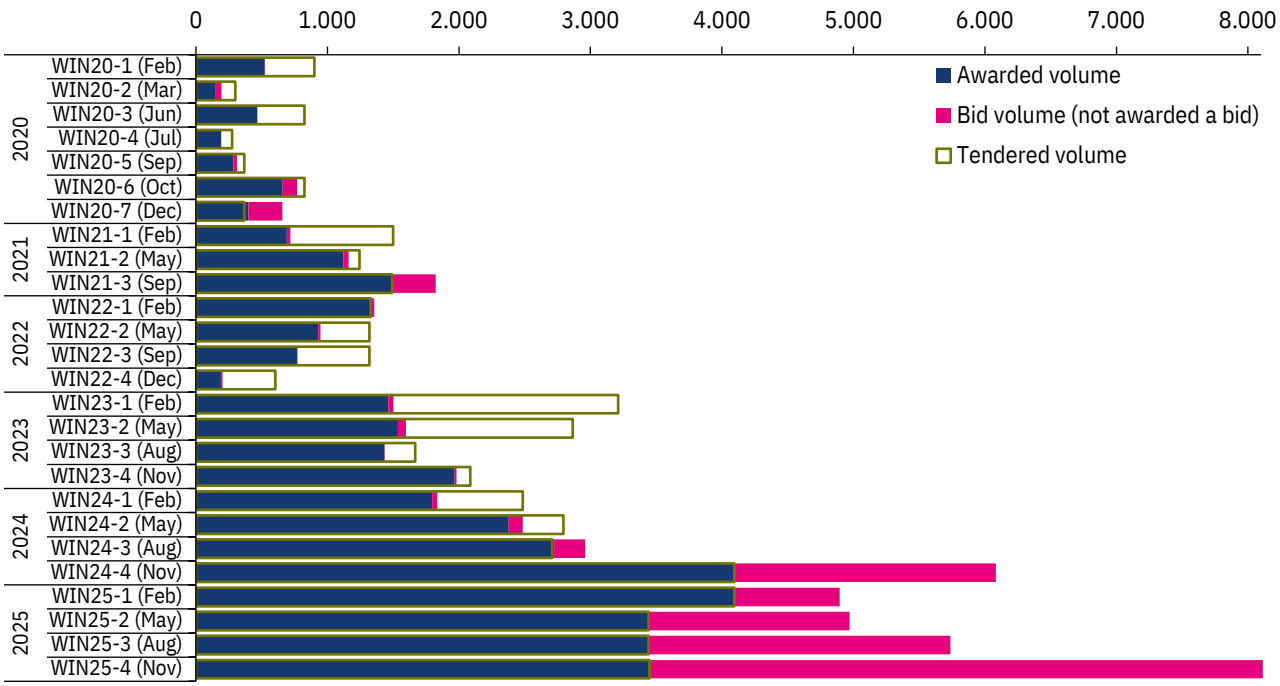

Figure 10: Tendered and awarded volumes of bidding rounds since 2020
Data: BNetzA

4.1 Regional distribution of bids in the bidding rounds

The largest shares of awarded volume from the bidding rounds in 2025 went to North Rhine-Westphalia (29%) and Lower Saxony (23%). Together, these two states received just over half of the volume awarded a bid this year. In most federal states, award volumes increased compared to 2024 – by a total of 31 percent or 3,449 MW. Award volumes increased above average in Baden-Wuerttemberg (+60%), Bavaria (+64%), Lower Saxony (+109%) and North Rhine-Westphalia (+34%). Saxony recorded the sharpest percentage decline compared to the previous year, at minus 71 percent.

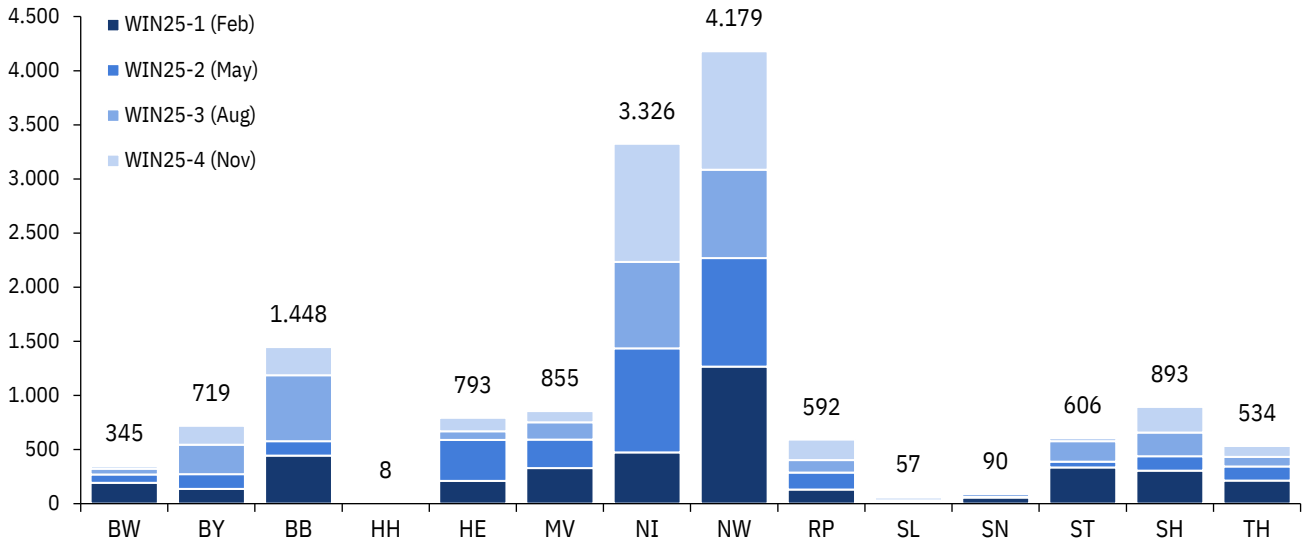

Figure 11: Distribution of awarded volumes across the federal states in the two tenders in 2025
Data: BNetzA; figures in megawatts

The area-specific award volume in 2025 is above the national average (40 kW/km²) in only four federal states (Brandenburg, Lower Saxony, North Rhine-Westphalia and Schleswig-Holstein). For both the absolute and area-specific awarded volumes, North Rhine-Westphalia leads the comparison between federal states by a wide margin in 2025 as in 2024.

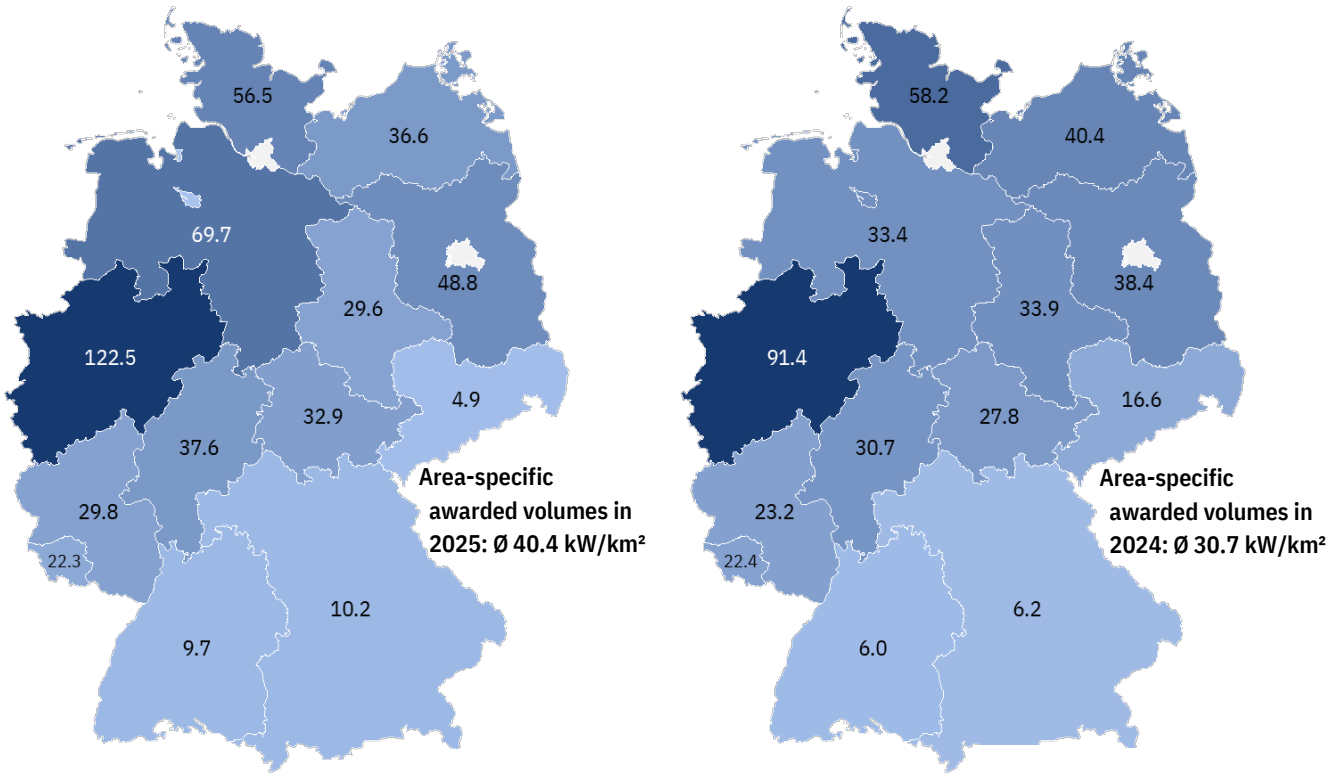

Figure 12: Area-specific awarded volumes from the 2025 and 2024 tenders
Data: BNetzA, Destatis; figures in kilowatts per square kilometre; map: FA Wind und Solar based on © GeoNames, Microsoft, TomTom

4.2 Realisation status of wind energy capacity awarded a bid

Of the 48,000 MW of wind energy capacity awarded a bid since the introduction of tenders, 18,960 MW has been realised to date. The realisation deadline for awards totalling 17,600 MW from the bid dates conducted up to February 2023 has since expired without the wind turbines having been built in that time.

In 2017 – a year marked by bid to non-permitted projects – the realisation rate was just 12 percent. This was due to initial uncertainty caused by the transition to the tender-based support system as well as the fact that, at the time, certain projects were allowed to bid before receiving a permit. However, awarded bids for this remained largely unused. Since then, rates have risen significantly. 81 percent of the awarded volumes awarded in 2018 were realised. The realisation rates for the 2019 and 2020 award years each exceeded 90 percent. Nearly 90 percent of the 2021 bids have been implemented. Of the volumes awarded in the bidding rounds of 2022, 84 percent have been realised. 80 percent of the capacity awarded a bid in 2023 has been realised to date. From the tender rounds in 2024, just under 15 percent of the capacity awarded a bid has been connected to the grid to date. And from last year's auction rounds, only 114 MW have been realised so far.

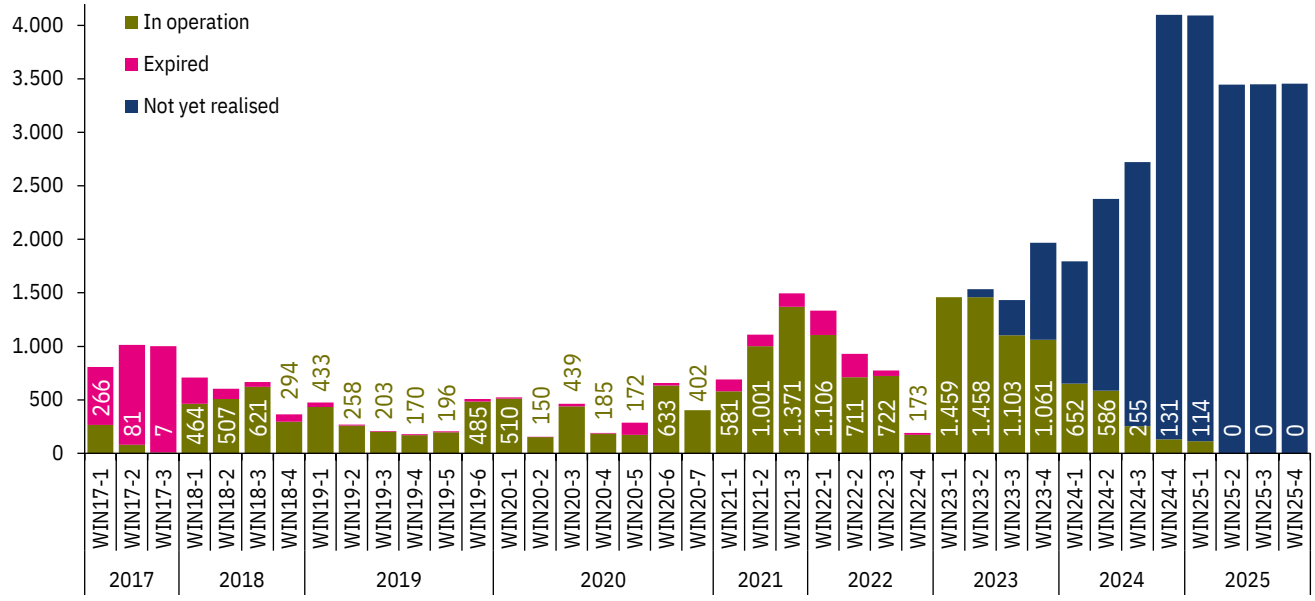

Figure 13: Wind energy capacity awarded a bid and realized by tender round
Data: BNetzA, MaStR, own research; figures in megawatts

Of the capacity volumes awarded a bid since 2018[13] (45,200 MW), 41 percent have been realised to date. 80 percent of the capacity awarded a bid in 2018 has been commissioned. The 2019 bids were implemented at a rate of 95 percent. 93 percent of the capacity awarded a bid in 2020 is currently online. Almost 90 percent of the wind energy capacity awarded in 2021 has been realised. The realisation rate for capacity awarded a bid in 2022 is 84 percent.

At least 3,500 MW of awarded wind energy capacity has so far been brought online in Lower Saxony, North Rhine-Westphalia and Schleswig-Holstein. In Brandenburg, nearly 2,700 MW of capacity awarded through the tender scheme has already been realised. In Saxony-Anhalt, one thousand megawatts of capacity awarded a bid are on the grid. More than 500 MW of capacity with a remuneration commitment from the tender have been commissioned to date in Baden-Wuerttemberg, Hesse, Mecklenburg-Vorpommern and Rhineland-Palatinate.

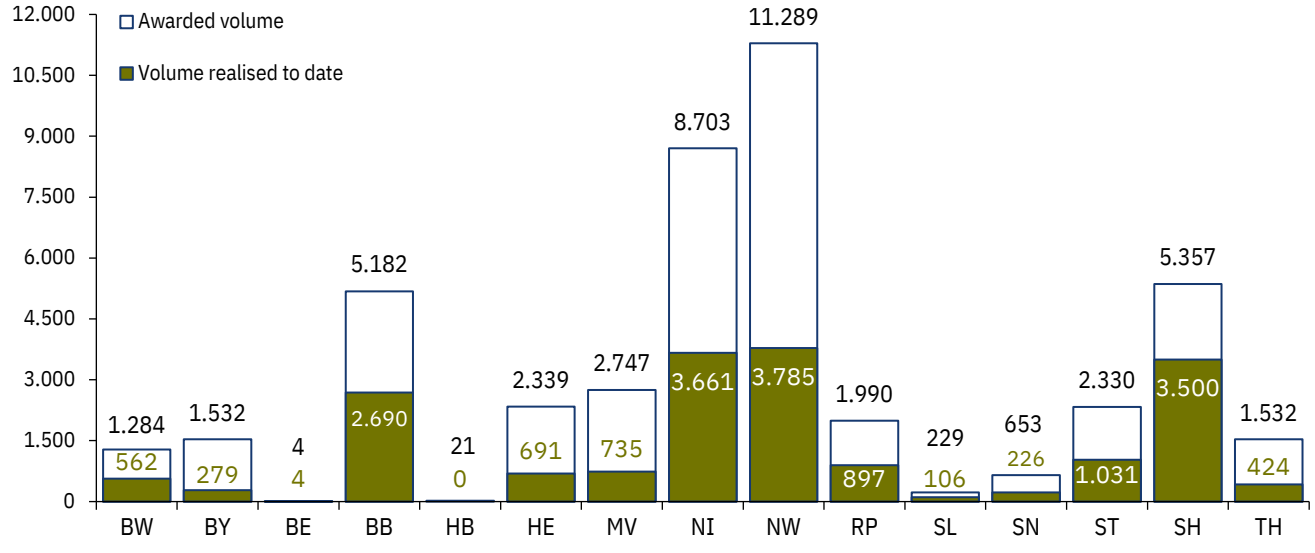

Figure 14: Wind energy capacity awarded a bid and realised shares by federal state – excluding 2017 tender year
Data: BNetzA, MaStR; figures in megawatts

[13] Of the awarded volumes in 2017, a year marked by non-permitted projects, only 13% were realised. Due to the low realisation rate, this tender year is not included here.

5 Permits for new wind turbines

In 2025, new permits[14] were issued for 3,310 wind turbines with a total capacity of 20,765 MW. This is by far the largest permit volume ever approved in Germany within a single year.

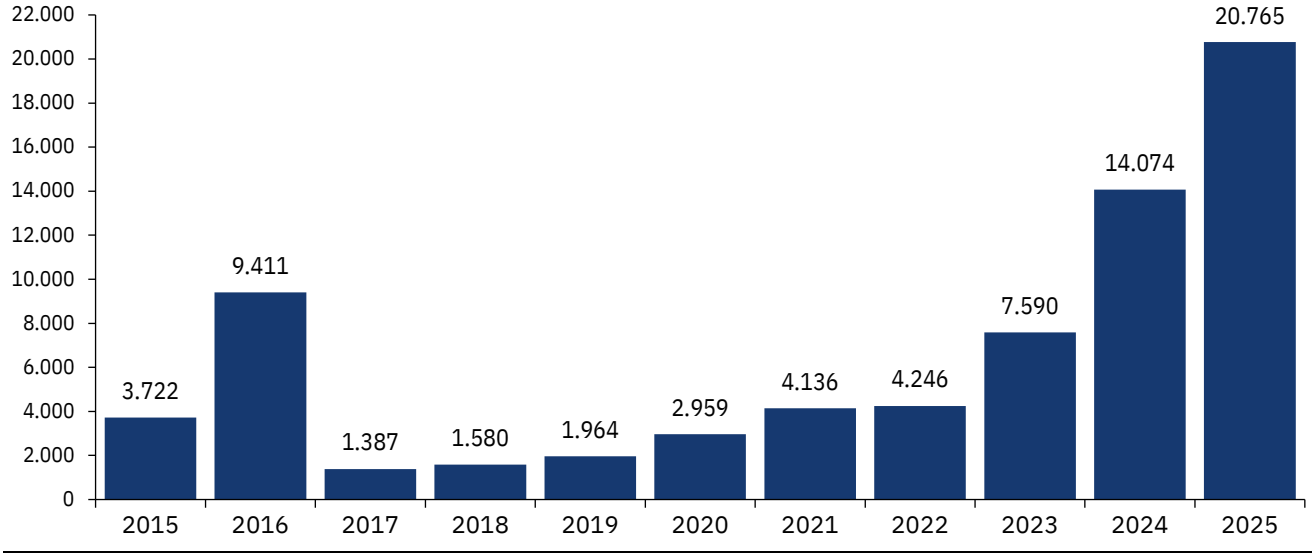

Figure 15: Newly permitted wind energy capacity in Germany by year
Data: MaStR, own research; figures in megawatts

As of the end of 2025, the Market Master Data Register listed around 6,630 wind turbines permitted under the Federal Immission Control Act and a combined capacity of 40,100 MW that had not yet been reported as commissioned. Of these, around 4,160 wind turbines (25,160 MW) held a valid bid from the tender. Over 80 percent of the wind turbines currently recorded as permitted in the register received their building permit in the past two years.

5.1 Regional distribution of permits

In the state comparison, North Rhine-Westphalia ranks first with 5,942 MW of newly permitted capacity and 959 wind turbines. Behind it stands Lower Saxony with 5,211 MW and 813 wind turbines respectively. Brandenburg follows in third place by a clear margin, where 1,510 MW of wind energy capacity was permitted. More than 1,000 MW of wind energy capacity each were newly permitted by the permitting authorities in Bavaria, Hesse, Mecklenburg-Vorpommern and Rhineland-Palatinate. There were no new permits in 2025 only in Berlin and Bremen.

The southern region accounts for 15 percent of newly approved wind energy capacity. In total, 477 wind turbines with a total capacity of 3,084 MW received official construction approval there. The largest shares come from districts in the Bavarian (1,118 MW) and Rhineland-Palatinate (1,172 MW) parts of the region.

[14] Only wind turbines that received an initial permit in 2025 are included in the count. Changes to existing permits issued during the year are not included in the 2025 statistics, as their (initial) permit had already been recorded at an earlier date.

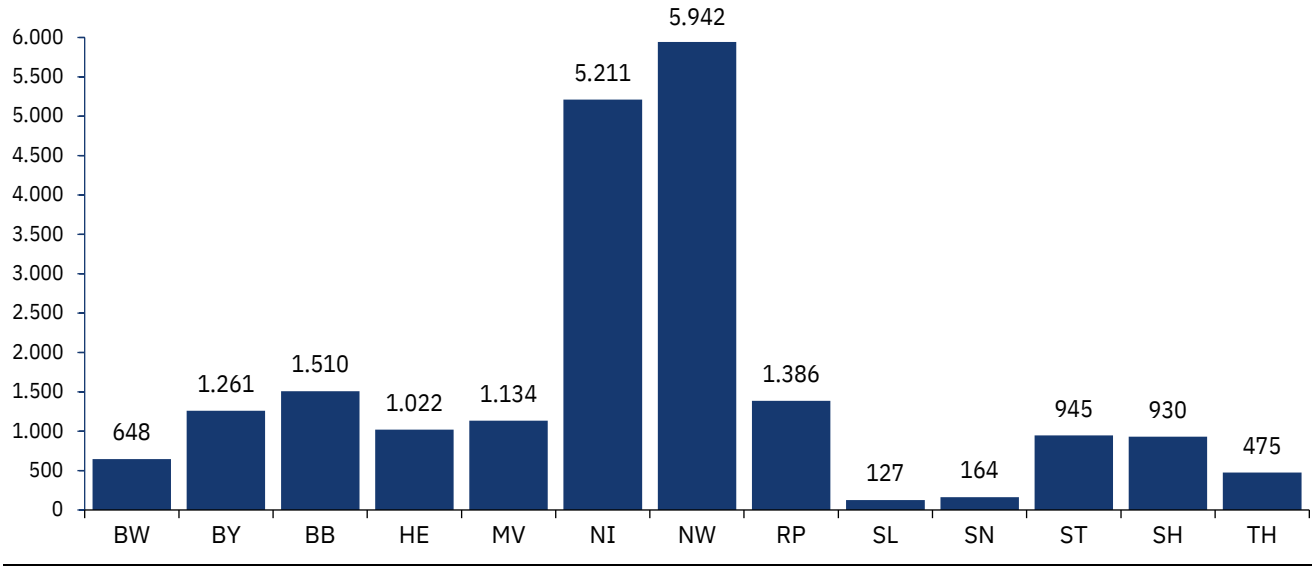

Figure 16: Newly permitted wind energy capacity in 2025 by federal state
Data: MaStR, own research; figures in megawatts

5.2 Permit period

Despite the unprecedented volume of new permits, the average processing time decreased significantly in nearly all federal states in 2025. On average across Germany, permit procedures completed this year took 16.8 months (median: 12.4 months), finishing 27 percent faster than in the previous year (Ø 23 months). Figure 17 shows the average procedure duration, based on the year in which the permit decisions (initial rulings) were issued. From this it becomes clear that procedure durations increased for years from 2017 onwards, with an upward trend. A trend reversal became apparent in 2024. In the current year, the procedure duration is at the level of the years 2015/2016.

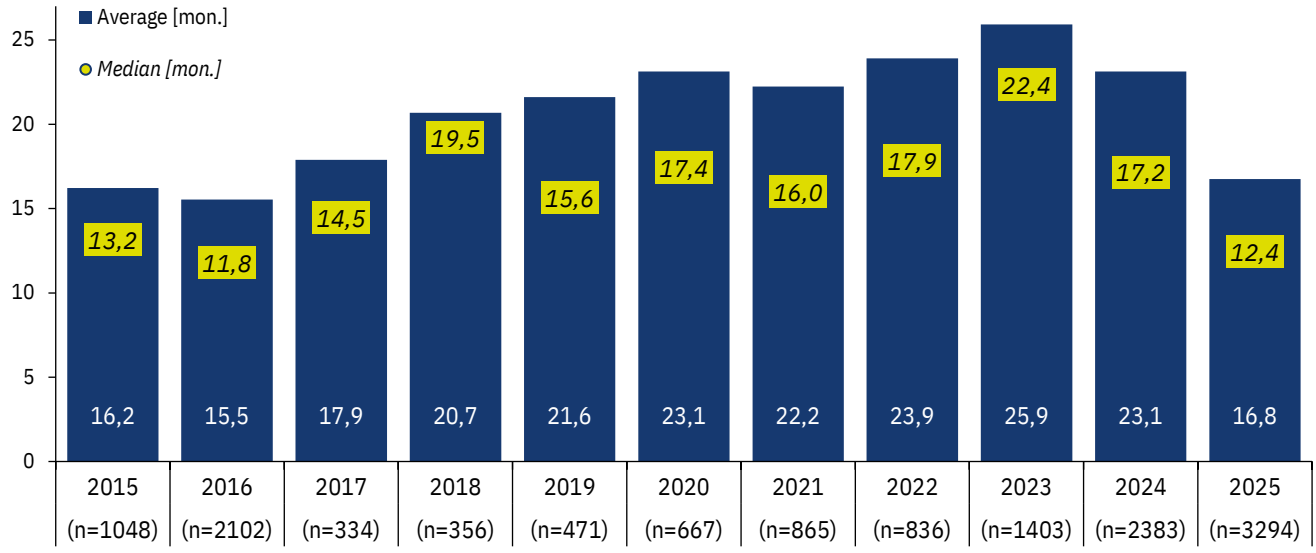

Figure 17: Duration of permit procedures by year
Data: MaStR, UVP-Portal, own research; figures in months

Significant differences in processing times were observed across federal states in 2025, ranging from nine months (Bavaria) to 42 months (Mecklenburg-Vorpommern). Long durations, as seen for example in Mecklenburg-Vorpommern, can also be attributed to the fact that numerous legislative changes in the previous legislative period are now leading to the completion of permit procedures that had previously stalled for years or were resumed after being rejected.

The change in processing duration compared to the 2024 permit year also varies greatly across states: Except for Thuringia, the average procedure duration decreased in all other states in 2025 – most significantly in Lower Saxony (-45%) and Saarland (-30%).

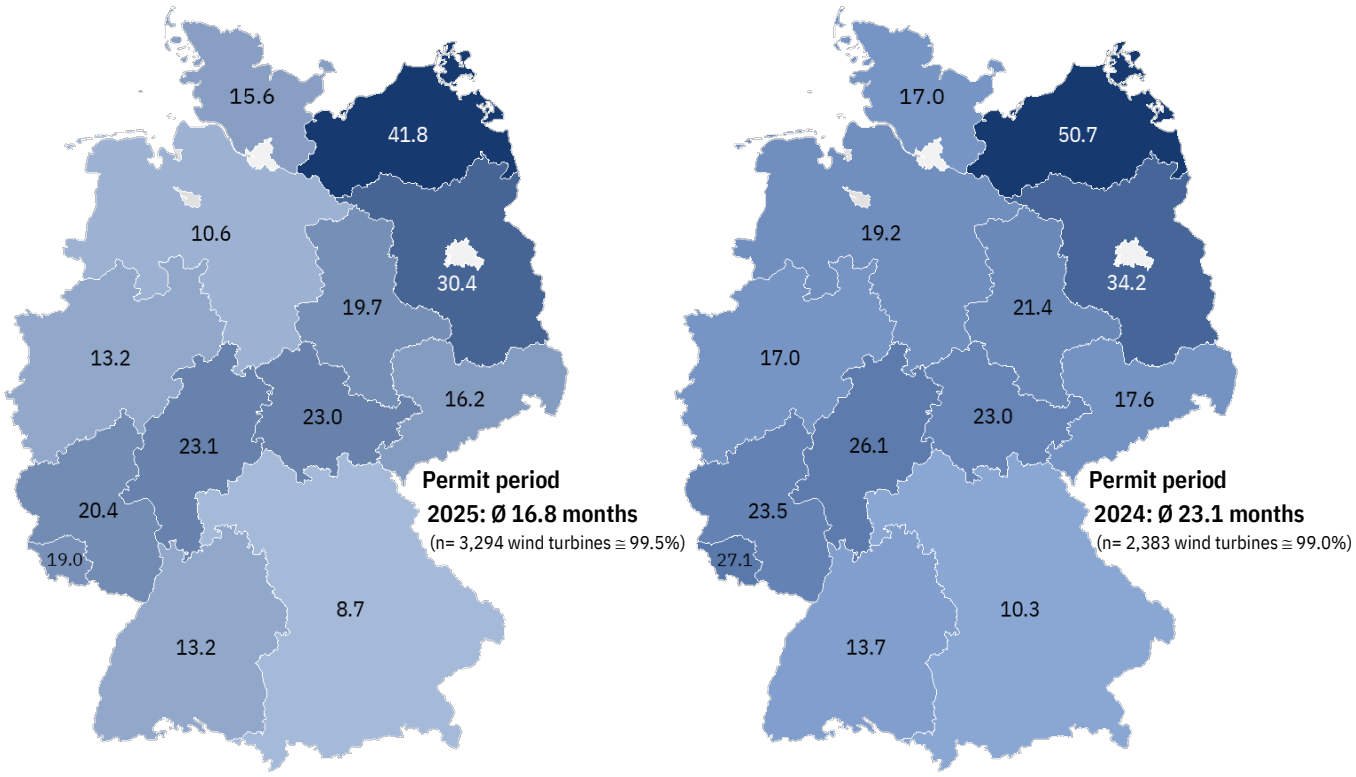

Figure 18: Duration of permit procedures completed in the federal states in 2025 and 2024
Data: MaStR, UVP-Portal, own research; figures in months; map: FA Wind und Solar based on © GeoNames, Microsoft, TomTom

5.3 Wind turbine configuration

In the past decade, the generator capacity of newly permitted wind turbines has shown steady annual growth rates of six to ten percent. The average approved capacity has now reached 6.3 MW. 88 percent of wind turbines permitted in 2025 have a generator capacity of at least 5.5 MW. Half of the wind turbines were even permitted with more than 6.5 MW. There is no end to this trend in sight, as all major manufacturers offer models in the 7 MW class.

Table 8: Capacity categories of wind turbines permitted in 2025; Data: MaStR

Capacity categories	Wind turbines	Capacity [MW]	Share [wind turbines]
P ≤ 3,500 kW	21	63	0.6%
3,500 < P ≤ 4,500 kW	234	983	7.1%
4,500 < P ≤ 5,500 kW	143	729	4.3%
5,500 < P ≤ 6,500 kW	1,266	7,422	38.2%
P > 6,500 kW	1,646	11,567	49.7%

6 Expected development of expansion and political targets

The Renewable Energy Sources Act (EEG 2023) sets out a capacity-based expansion pathway[15] for individual energy sources, including onshore wind. According to the law, "*69 gigawatts in 2024*" of onshore wind energy capacity should have been online. This political target was clearly missed at the end of 2024, with only 63.5 GW installed. For 2026, the law foresees 84 gigawatts of installed wind energy capacity. Starting from the current 68 GW of capacity on the grid, a net 16 GW would have to be installed in 2026. From today's perspective, this target will not be achievable.

The tendered volumes stipulated in the EEG form the basis for the annually required expansion and are also intended to compensate for the expected decommissionings. Experience shows that it takes nearly two years for capacity awarded a bid to be realised through the commissioning of wind turbines.[16] Therefore, most of the expansion in 2026 will derive from awarded volumes made in 2024 (11 GW). So far, 9.4 GW of that has yet to be realised. If the current pace of implementation continues and failure rates remain comparably low as in previous years, gross expansion in 2026 are likely to reach 8 to 8.5 GW of capacity.

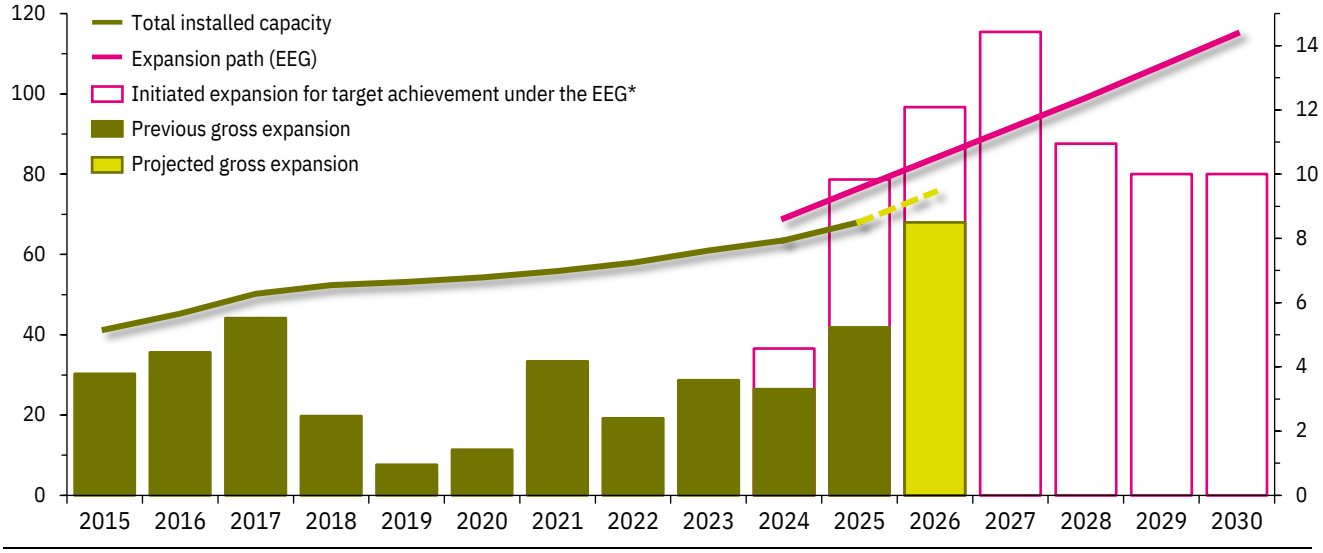

Figure 19: Past and projected expansion, cumulative fleet and expansion targets according to EEG
Data: MaStR, BNetzA, EEG; figures in gigawatts; *) based on the tender volumes (incl. catch-up volumes) of the respective year before last

7 Monthly electricity generation and market values

In 2025, the nationwide fleet of onshore wind turbines generated 106.5 terawatt-hours [TWh] of electricity. Compared to the previous year (112.6 TWh), the feed-in decreased by five percent, which was mainly due to the fact that the months of February to May saw historically low wind levels.[17]

Despite the decline in generation, onshore wind remained the most important energy source for electricity generation in Germany in 2025, with a 24 percent share. The share of renewable energies in national electricity generation fell by only one percentage point to just under 59 percent compared to 2024, despite the weak wind conditions, as the share of solar power increased significantly in 2025.[18]

[15] See Section 4 No. 1 EEG.
[16] For the approximately 4,130 wind turbines implemented so far with a successful bid, it took on average 20 months from the award announcement to turbine commissioning.
[17] Up to September, 2025 ranked among the lowest-wind years of the last 25 years; see QUADRA, energy-meteorological annual review 2025.
[18] Renewable energy shares in total electricity generation in 2025: 58.9%, in 2024: 60.3%; see SMARD.de, "Actual Generation" dashboard.

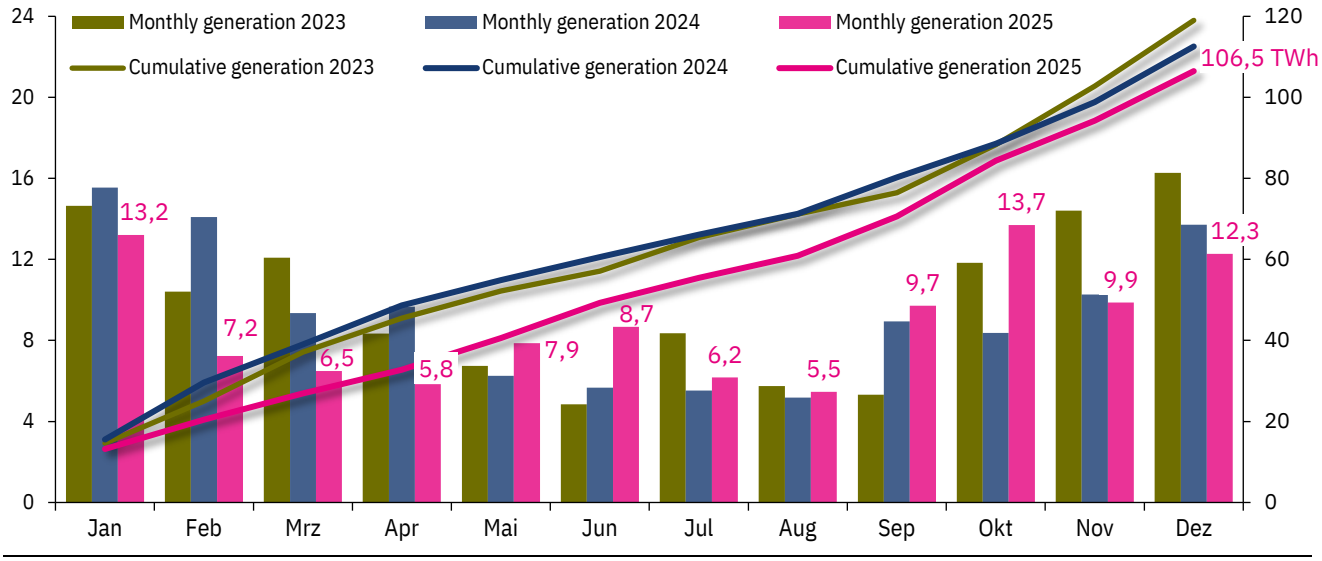

Figure 20: Electricity generation from onshore wind turbines
Data: BNetzA | SMARD.de; figures in terawatt-hours [TWh]

In February 2025, the monthly market values[19] for electricity from onshore wind energy reached their highest value since the end of 2022, at 11.59 ct/kWh. Following the record values in 2022 – when the annual market value for onshore wind electricity amounted to 19.32 ct/kWh – market values fell continuously from the beginning of 2023. In 2023, the annual market value for onshore wind fell to 7.62 ct/kWh, representing a drop of more than 50 percent compared to 2022. The downward trend continued in 2024. At that time, the annual market value for onshore wind stood at 6.29 ct/kWh – the lowest value of the last four years. In 2025, the value initially rose significantly due to the very low-wind spring, levelling off at 7.44 ct/kWh over the year as a whole – representing an increase of 18 percent compared to 2024.

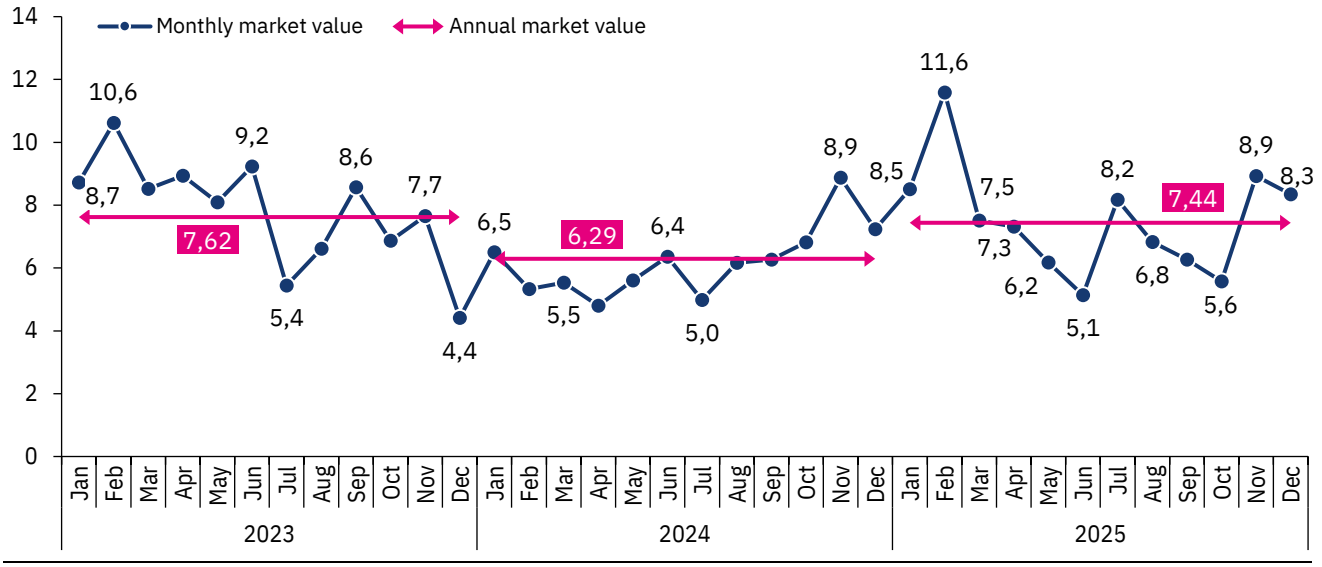

Figure 21: Monthly and annual market values for electricity from onshore wind turbines
Data: Transmission system operators | Netztransparenz.de; figures in Euro cents per kilowatt-hour (ct/kWh)

[19] Netztransparenz.de, monthly market values in accordance with Annex 1 (to Section 23a EEG) No. 5.2.

About the German Wind Energy Association (BWE)
As the interest group of the German wind power industry, the German Wind Energy Association (BWE) represents the entire wind energy sector with around 17,000 members. In collaboration with supplier and manufacturing companies rooted in German mechanical engineering, project developers, specialised lawyers, the finance sector, and companies in logistics, construction, service/maintenance, storage technologies, electricity trading, grid operation and energy supply, the BWE serves as the primary point of contact for policymakers, industry, academia and the media on all questions related to wind energy.

About VDMA Power Systems
VDMA Power Systems is the industry association for energy plant engineering. It represents the interests of manufacturers and suppliers of electricity and heat generation plants in Germany and abroad. This includes wind, solar and hydro-power installations, engines, thermal power plants and storage and sector coupling technologies. VDMA Power Systems serves as a cross-technology information and communication platform focusing on energy and industrial policy, innovation and technology, markets and trade fairs, as well as press and public relations. VDMA Power Systems is a trade association within VDMA, Europe's largest machinery industry association.

About the Wind and Solar Energy Agency
The Wind and Solar Energy Agency is a non-profit association. Its members include the federal government, the federal states, the leading municipal associations, business and environmental organisations, as well as companies. The association supports the environmentally and ecologically compatible use of onshore wind energy and solar energy in Germany. It prepares analyses, information resources and expert reports, among other things. Its work is based on the climate and energy policy goals of the European Union. The association operates on a basis of facts, legal precedent and scientific evidence.

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