DEUTSCHE WINDGUARD

Status of Onshore Wind Energy Development in Germany

First Half of 2026

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Notes

The analysis within the scope of the Status of Onshore Wind Energy Development is based on the data of the core energy market data register (German: Marktstammdatenregister or MaStR) of the Federal Network Agency (German: Bundesnetzagentur or BNetzA) as well as on the announcements of the BNetzA regarding the tenders for onshore wind energy. The data was partially validated and corrected with regard to various details and supplemented with unrecorded dismantling and repowering properties of projects. Only wind turbines with an installed capacity of over 100 kW are included in the analysis.

The publication of the Status of Onshore Wind Energy Development takes place before the reporting deadline for commissioning in the first half of 2026. Further reports increasing the quantity added and decommissioned as well as permits are possible. Furthermore, changes or subsequent reporting of existing turbines to the MaStR may result in deviations from the cumulative portfolio shown.

Some of the figures in the text and illustrations are rounded values. Their addition may therefore result in slight deviations from the total values.

Photo on Title Page

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Publication Date

July 21, 2026

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Wind Energy Development and Status

In the first half of 2026, 423 onshore wind turbines (WT) with a total capacity of 2,365 MW were installed in Germany. Compared with the first half of the previous year, the capacity addition increased by around 6%.

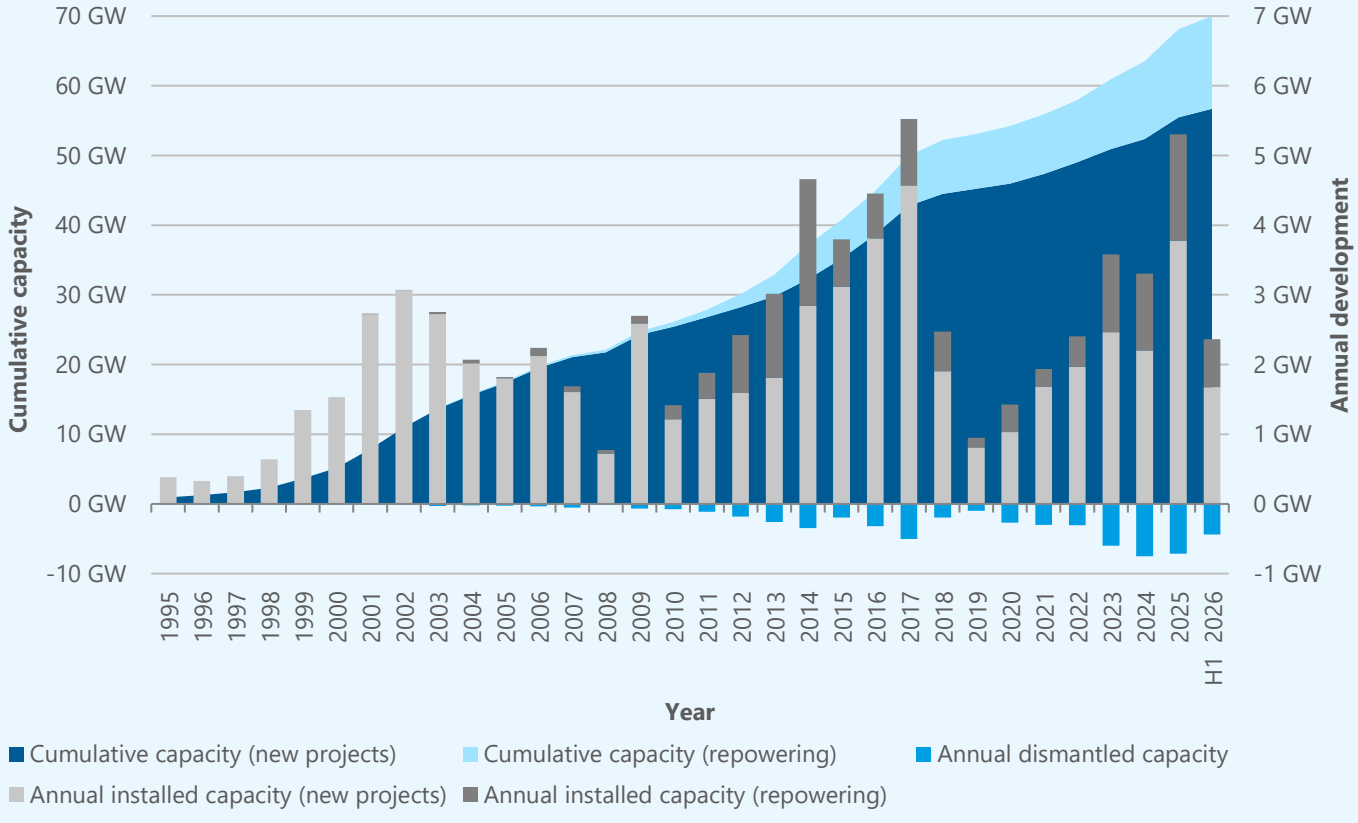
These new installations were offset by the decommissioning of 307 wind turbines with a combined capacity of 437 MW. In the first half of 2026, therefore, more capacity was decommissioned than ever before in a half-year period.

Net capacity additions amounted to 1,928 MW, around 3% higher than in the first half of the previous year. Overall, the net increase in the number of onshore wind turbines was 116 in the first half of 2026.

As of 30 June 2026, Germany had a cumulative total of 29,216 onshore wind turbines with a combined installed capacity of 70,018 MW, surpassing the 70 GW mark for onshore installed capacity for the first time.

Status of onshore wind energy development

		Capacity	Turbines
Cumulative 2025-12-31	Cumulative 2025	68,090 MW	29,100 WT
Development H1 2026	Gross installations	2,365 MW	423 WT
	Repowering share	689 MW	119 WT
	Decommissioning	437 MW	307 WT
	Net installations	1,928 MW	116 WT
Cumulative 2026-06-30	Cumulative H1 2026	70,018 MW	29,216 WT



Annual development onshore wind energy capacity in Germany

Decommissioning, Continued Operation and Repowering

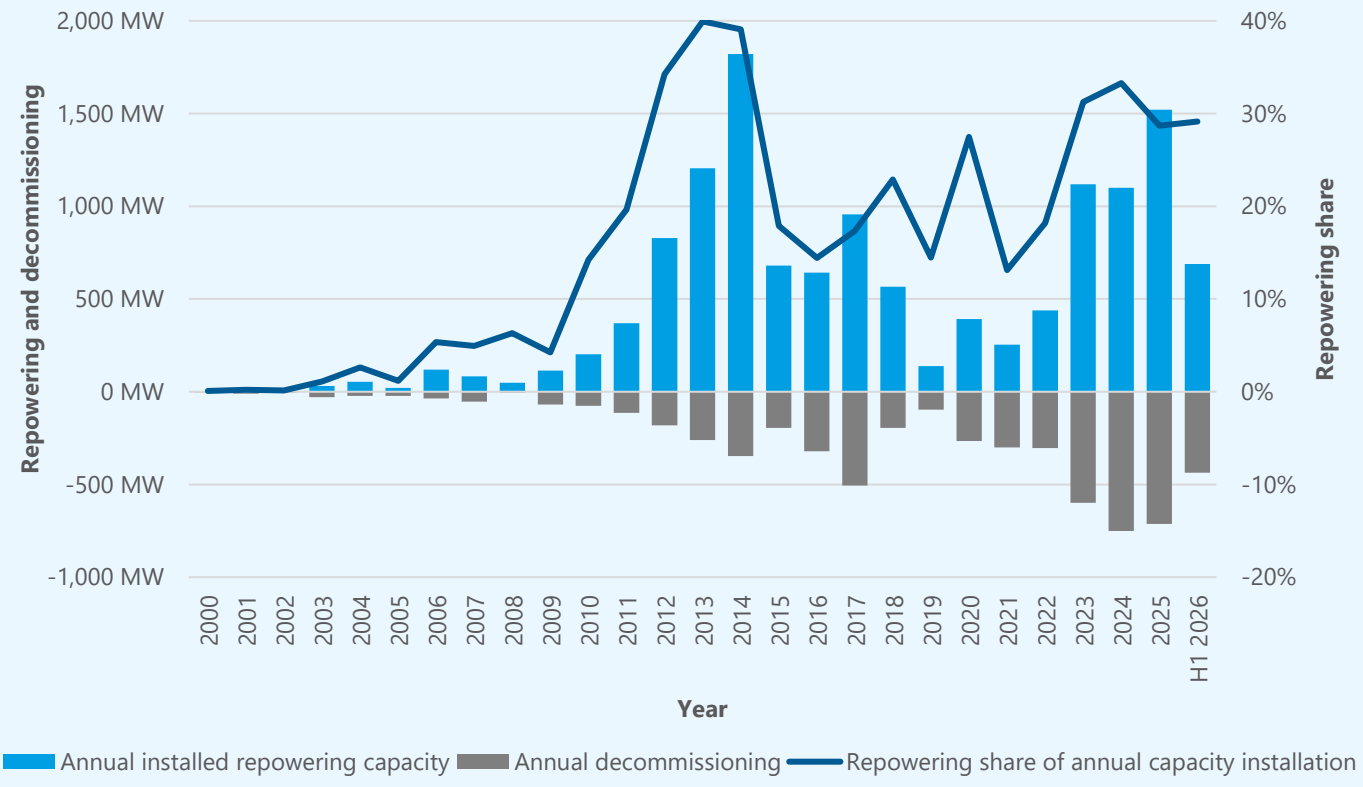
During the first half of 2026, 307 wind turbines with a total capacity of 437 MW were decommissioned in Germany. The average operational lifespan of the decommissioned turbines was 24 years. The vast majority of decommissionings took place as part of repowering projects, in which older turbines are replaced by modern, more powerful ones.

Repowering projects accounted for around 29% of newly installed capacity in the first half of 2026, corresponding to approximately 689 MW of new installed capacity. The repowering share is thus comparable to that of the previous year.

After 20 years of operation, existing wind turbines lose their entitlement to EEG support at the end of the following year. In the first half of 2026, 9,977 wind turbines with a total capacity of around 12.2 GW continued to operate without EEG support. Over the next five years, a further 8.4 GW of installed capacity will gradually lose eligibility for EEG support unless the turbines are decommissioned beforehand.

Age of dismantled and operating wind turbines

	Decommissioning H1 2026		Cumulative 2026-06-30	
Age	**Capacity**	**Turbines**	**Capacity**	**Turbines**
>20 Years, no funding claim (COD ≤ 2005)	381 MW	272 WT	12,218 MW	9,977 WT
15 - 20 Years (COD 2006 - 2010)	50 MW	31 WT	8,441 MW	4,423 WT
10 - 15 Years (COD 2011 - 2015)	6 MW	4 WT	15,659 MW	6,110 WT
5 - 10 Years (COD 2016 - 2020)	0 MW	0 WT	14,811 MW	4,879 WT
0 - 5 Years (COD 2021 - 2026)	0 MW	0 WT	18,890 MW	3,827 WT
Total	**437 MW**	**307 WT**	**70,018 MW**	**29,216 WT**



Development of annual decommissioning, annual installed repowering capacity and repowering share

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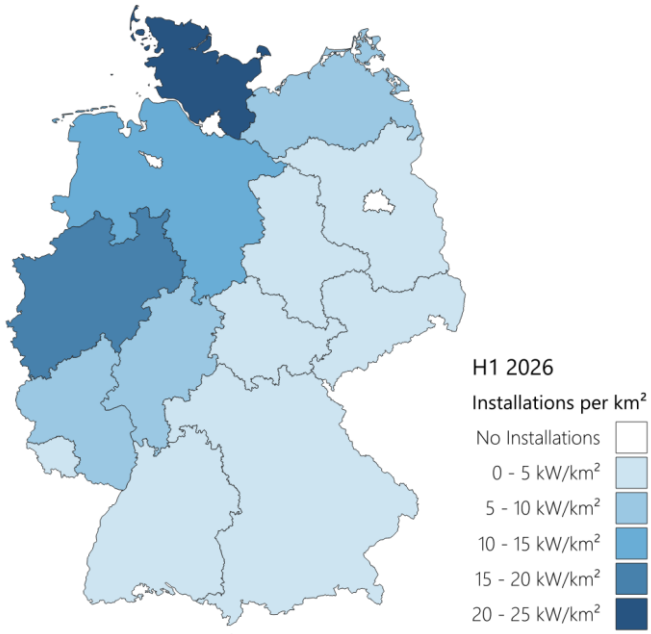
Regional Distribution of Wind Energy Installation

Among the federal states, North Rhine-Westphalia recorded the highest gross capacity additions in the first half of 2026 with 541 MW, maintaining the leading position it has held for the past two years. Lower Saxony followed closely in second place with 516 MW. Schleswig-Holstein ranked third with 361 MW of new capacity. Together, these three federal states accounted for 60% of gross capacity additions.

Thuringia and Saarland each contributed with only one newly installed wind turbine, while the city states recorded no new installations. Saxony-Anhalt and Bremen recorded negative net capacity additions due to decommissionings.

In terms of newly installed capacity per km², however, Schleswig-Holstein remained in the lead. Overall, capacity additions per km² were most pronounced in north-western Germany.

Lower Saxony stands out in terms of repowering: One in every two newly installed turbines was part of a repowering project. Moreover, 40% of the repowering capacity installed nationwide in the first half of 2026 was located in Lower Saxony.



Base map: © GeoBasis-DE / BKG 2022 | Database: MaStR with own modifications
Source: Deutsche WindGuard

Regional distribution of gross capacity installation

Gross installation, dismantling, net installation and repowering in German federal states

H1 2026		Gross installations			Dismantling and net installation			Repowering		
Position	Federal state	Capacity Instal-lation	Number of new turbines	Share*	Capacity Dis-mantling	Number of dismantled turbines	Net Instal-lation	Capacity Repo-wering	Number of repo-wering turbines	Repo-wering-share**
1	North Rhine-Westphalia	541 MW	99 WT	23%	37 MW	33 WT	503 MW	109 MW	22 WT	20%
2	Lower Saxony	516 MW	89 WT	22%	137 MW	86 WT	379 MW	279 MW	44 WT	54%
3	Schleswig-Holstein	361 MW	66 WT	15%	20 MW	23 WT	341 MW	79 MW	16 WT	22%
4	Mecklenburg-Western Pomerania	208 MW	37 WT	9%	7 MW	4 WT	201 MW	56 MW	9 WT	27%
5	Baden-Württemberg	169 MW	33 WT	7%	0 MW	0 WT	169 MW	39 MW	7 WT	23%
6	Brandenburg	140 MW	22 WT	6%	33 MW	22 WT	107 MW	31 MW	5 WT	22%
7	Hesse	130 MW	23 WT	5%	9 MW	10 WT	121 MW	6 MW	1 WT	4%
8	Rhineland-Palatinate	118 MW	22 WT	5%	31 MW	18 WT	88 MW	44 MW	7 WT	37%
9	Saxony-Anhalt	77 MW	13 WT	3%	128 MW	84 WT	-51 MW	36 MW	6 WT	47%
10	Bavaria	60 MW	11 WT	3%	1 MW	1 WT	59 MW	0 MW	0 WT	0%
11	Saxony	36 MW	6 WT	2%	25 MW	21 WT	11 MW	0 MW	0 WT	0%
12	Thuringia	6 MW	1 WT	0%	0 MW	0 WT	6 MW	6 MW	1 WT	100%
13	Saarland	4 MW	1 WT	0%	2 MW	1 WT	2 MW	4 MW	1 WT	100%
	Berlin	0 MW	0 WT	0%	0 MW	0 WT	0 MW	0 MW	0 WT	-
	Hamburg	0 MW	0 WT	0%	0 MW	0 WT	0 MW	0 MW	0 WT	-
	Bremen	0 MW	0 WT	0%	8 MW	4 WT	-8 MW	0 MW	0 WT	-
	Germany	**2,365 MW**	**423 WT**		**437 MW**	**307 WT**	**1,928 MW**	**689 MW**	**119 WT**	**29%**

* Share of gross capacity Installations per federal state in total gross capacity installation
** Share of repowering capacity per federal state in gross capacity installation per federal state

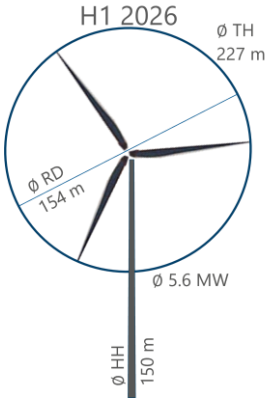
Average Turbine Configuration and Regional Differences

The average wind turbine installed in the first half of 2026 has a rated capacity of 5.6 MW and a total height of 227 m. This total height combines an average hub height of 150 m with an average rotor diameter of 154 m. Compared with the average turbine configuration of the previous year, the rotor diameter has increased by 2%, while turbine capacity, hub height and total height have each risen by 3%. The trend towards more powerful and larger wind turbines is continuing. The average specific power is 301 W/m², a decrease of around 1% compared with the previous year.

The average turbine configurations vary significantly between the federal states. Wind turbines with the highest average rated capacity of 6.3 MW were installed in Brandenburg. There, the turbines also had the greatest average total height of 252 m. In Schleswig-Holstein, the average total height of wind turbines increased by 10 m compared with the previous year. Nevertheless, the smallest turbines were installed there, with an average total height of 193 m.

Average wind turbine configuration

Installations H1 2026	Change compared to prior year
Rated power	+3%
Rotor Diameter	+2%
Hub Height	+3%
Tip Height	+3%
Specific Power	-1%



Average turbine configuration of newly installed wind turbines in German federal states

Installations H1 2026		Average configuration of newly installed turbines				
State	Number of turbines	Rated power	Rotor diameter	Hub height	Tip height	Specific Power
North Rhine-Westphalia	99 WT	5.5 MW	155 m	152 m	229 m	290 W/m²
Lower Saxony	89 WT	5.8 MW	157 m	156 m	235 m	296 W/m²
Schleswig-Holstein	66 WT	5.5 MW	145 m	120 m	193 m	329 W/m²
Mecklenburg-Western Pomerania	37 WT	5.6 MW	148 m	144 m	218 m	326 W/m²
Baden-Württemberg	33 WT	5.1 MW	150 m	156 m	231 m	291 W/m²
Brandenburg	22 WT	6.3 MW	164 m	170 m	252 m	300 W/m²
Hesse	23 WT	5.6 MW	157 m	165 m	244 m	292 W/m²
Rhineland-Palatinate	22 WT	5.4 MW	155 m	158 m	235 m	284 W/m²
Saxony-Anhalt	13 WT	5.9 MW	160 m	167 m	247 m	297 W/m²
Bavaria	11 WT	5.4 MW	156 m	161 m	239 m	278 W/m²
Saxony	6 WT	6.0 MW	160 m	168 m	248 m	299 W/m²
Thuringia	1 WT	6.0 MW	162 m	169 m	250 m	291 W/m²
Saarland	1 WT	4.0 MW	150 m	169 m	244 m	226 W/m²
Hamburg	0 WT	-	-	-	-	-
Bremen	0 WT	-	-	-	-	-
Berlin	0 WT	-	-	-	-	-
Germany	**423 WT**	**5.6 MW**	**154 m**	**150 m**	**227 m**	**301 W/m²**

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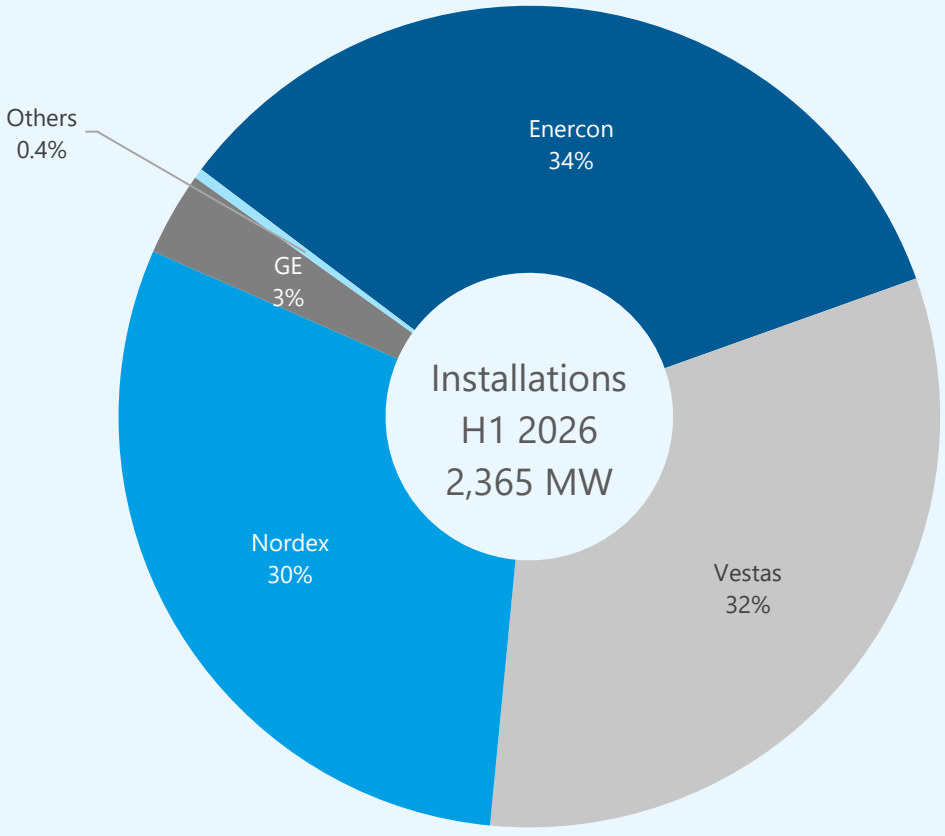
Turbine Manufacturers and Types

In the first half of 2026, the manufacturers Enercon, Vestas and Nordex accounted for 96% of the market for newly installed onshore wind capacity in Germany. Enercon increased its market share by five percentage points compared with the previous year and led the market with a share of 34%. Vestas followed with a share of 32% and Nordex with 30%, leaving only a narrow gap between the three manufacturers. GE ranked fourth with a market share of 3%. Vensys and windwise together accounted for less than 1% of the market and were grouped under 'Others'.

The dominance of the three market leaders is also reflected in the ranking of the most popular turbine types. The Enercon E-160 EP5 E3 retained its top position from the previous year, with a clear lead and 74 installations in the first half of 2026. It was followed by the Vestas V162-6.2 MW and Nordex N149/5.X models, with 39 installations each. All other turbine types in the top ten were also produced by the three leading manufacturers.

Most popular turbine types

Rank	Manufacturer	Type
1	Enercon	E-160 EP5 E3
2	Vestas	V162-6.2 MW
2	Nordex	N149/5.X
4	Nordex	N163/6.X - 6,8 MW
4	Enercon	E-138 EP3 E2 4,2 MW
6	Enercon	E-175 EP5
7	Enercon	E-138 EP3 E3 4,26 MW
8	Nordex	N133/4.8
9	Nordex	N163/6.X - 7 MW
10	Vestas	V172-7.2 MW

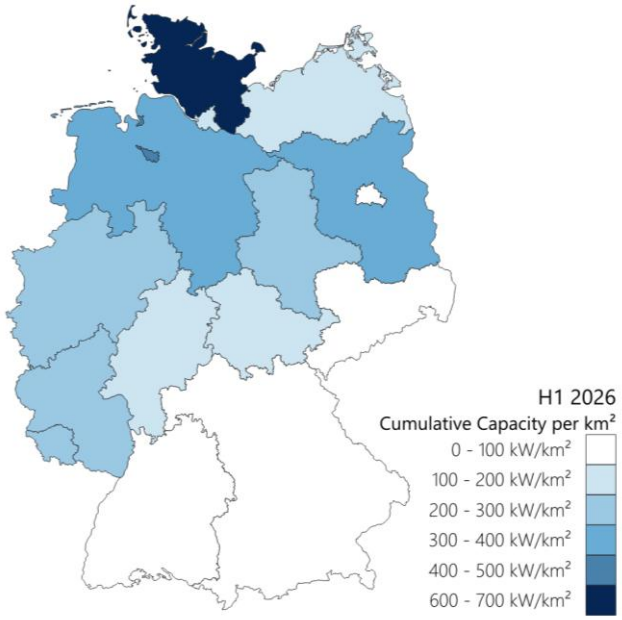


Manufacturers' market share of onshore capacity development in Germany

Regional Distribution of the Cumulative Portfolio

As of 30 June 2026, Germany had a cumulative total of 29,216 wind turbines with a total installed capacity of 70.0 GW. Lower Saxony accounted for the largest share of the total capacity, at 20%. It was followed by Schleswig-Holstein, Brandenburg and North Rhine-Westphalia, each with 14% of the total installed capacity. All other federal states each account for less than 10% of the total installed capacity.

Schleswig-Holstein remained the leading federal state in terms of installed capacity per km², reaching 631 kW/km². Bremen followed with 456 kW/km² and Brandenburg with 325 kW/km². The distribution of cumulative capacity density clearly reflects the existing north–south divide in wind energy deployment in Germany. The federal states of Saxony, Baden-Württemberg, Bavaria and Berlin each had a capacity density of less than 100 kW/km².



Base map: © GeoBasis-DE / BKG 2022 | Database: MaStR with own modifications
Source: Deutsche WindGuard

Regional distribution of cumulative capacity

Cumulative capacity and number of wind turbines in the German federal states

Cumulative portfolio* (2026-06-30)				
Federal state	**Cumulative capacity**	**Cumulative number**	**Share**	**Capacity per area**
Lower Saxony	14,319 MW	6,217 WT	20%	300 kW/km²
Schleswig-Holstein	9,968 MW	3,343 WT	14%	631 kW/km²
Brandenburg	9,649 MW	4,134 WT	14%	325 kW/km²
North Rhine-Westphalia	9,592 MW	3,906 WT	14%	281 kW/km²
Saxony-Anhalt	5,710 MW	2,639 WT	8%	279 kW/km²
Rhineland-Palatinate	4,416 MW	1,794 WT	6%	222 kW/km²
Mecklenburg-Western Pomerania	4,137 MW	1,861 WT	6%	178 kW/km²
Hesse	2,918 MW	1,213 WT	4%	138 kW/km²
Bavaria	2,818 MW	1,178 WT	4%	40 kW/km²
Baden-Württemberg	2,250 MW	856 WT	3%	63 kW/km²
Thuringia	1,908 MW	862 WT	3%	118 kW/km²
Saxony	1,441 MW	847 WT	2%	78 kW/km²
Saarland	567 MW	218 WT	1%	220 kW/km²
Bremen	191 MW	81 WT	0%	456 kW/km²
Hamburg	122 MW	61 WT	0%	161 kW/km²
Berlin	17 MW	6 WT	0%	19 kW/km²
Germany	**70,018 MW**	**29,216 WT**	**100%**	**196 kW/km²**

* with a minimum turbine capacity of > 100 kW

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Results of Tender Rounds

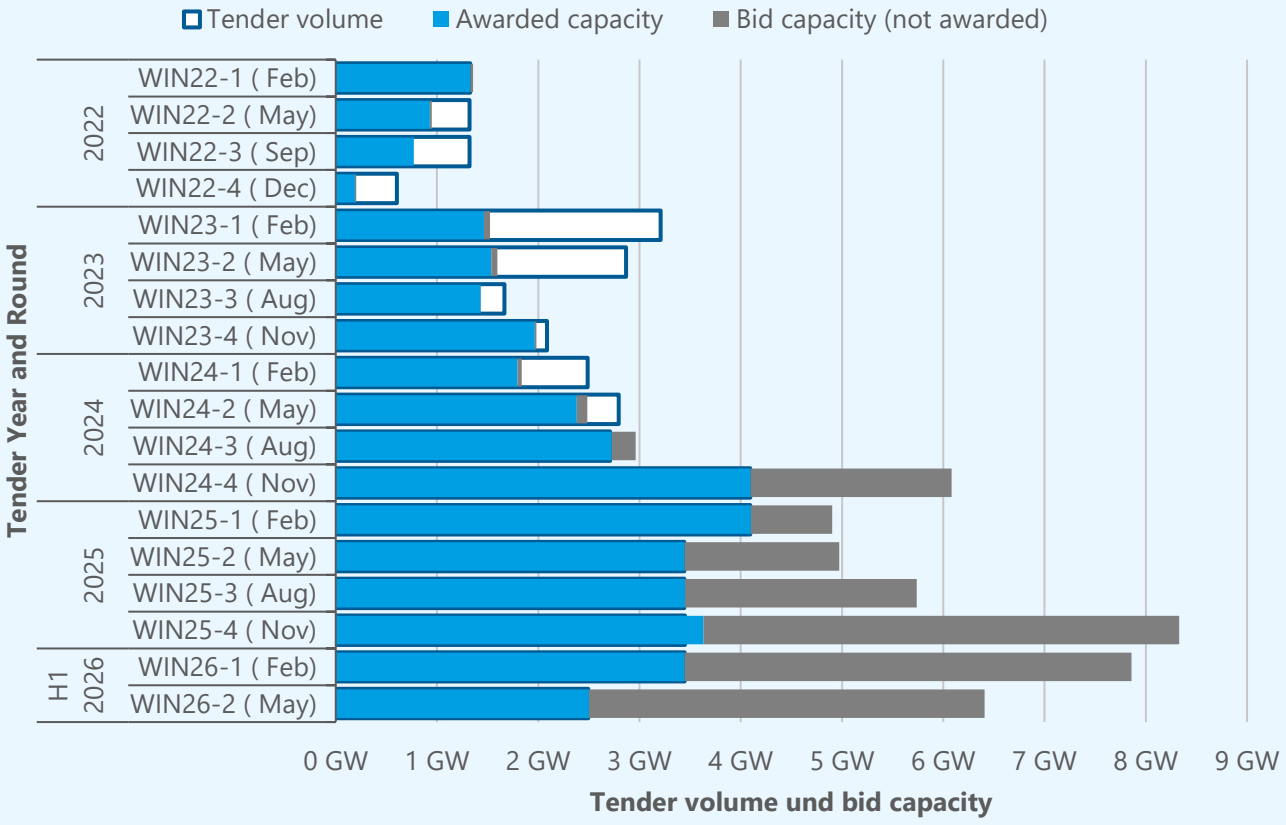
In the first half of 2026, the Federal Network Agency (German: Bundesnetzagentur or BNetzA) conducted two tender rounds to allocate EEG support entitlements for onshore wind turbines. With a volume of around 3.4 GW, the first tender round in February was larger than the second round in May due to additional volumes carried over from previous years. The volume of the second round was, as planned, around 2.5 GW.

As in the previous year, both tender rounds were oversubscribed. The unsuccessful bid volume stood at around 4.4 GW in February and amounted to 3.9 GW in the second tender round in May. Consequently, in both tender rounds, more than half of the submitted bid volume was not awarded.

Due to high competition, award prices fell further. The average volume-weighted award price was 5.54 ct/kWh in February and 5.06 ct/kWh in May. Consequently, the average award price for the two tender rounds in the first half of the year (5.34 ct/kWh) is more than one cent below the average award price for the whole year of 2025 and significantly below the maximum price of 7.25 ct/kWh set for 2026.

Development of awarded bids of tender rounds for onshore wind energy in Germany (Database: BNetzA)

Year of tender	Permissible maximum value	Average capacity-weighted award value
2022	5.88 ct/kWh	5.81 ct/kWh
2023	7.35 ct/kWh	7.33 ct/kWh
2024	7.35 ct/kWh	7.26 ct/kWh
2025	7.35 ct/kWh	6.63 ct/kWh
H1 2026	7.25 ct/kWh	5.34 ct/kWh

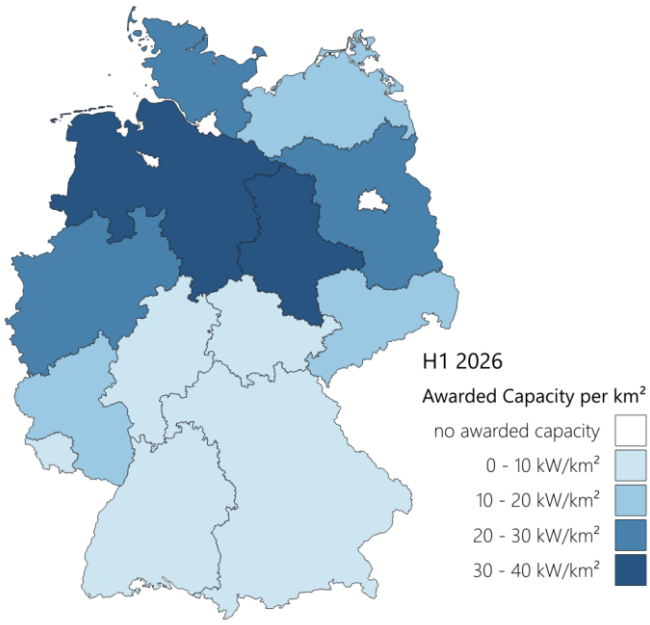


Competitive situation in tender system for onshore wind energy (Database: BNetzA)

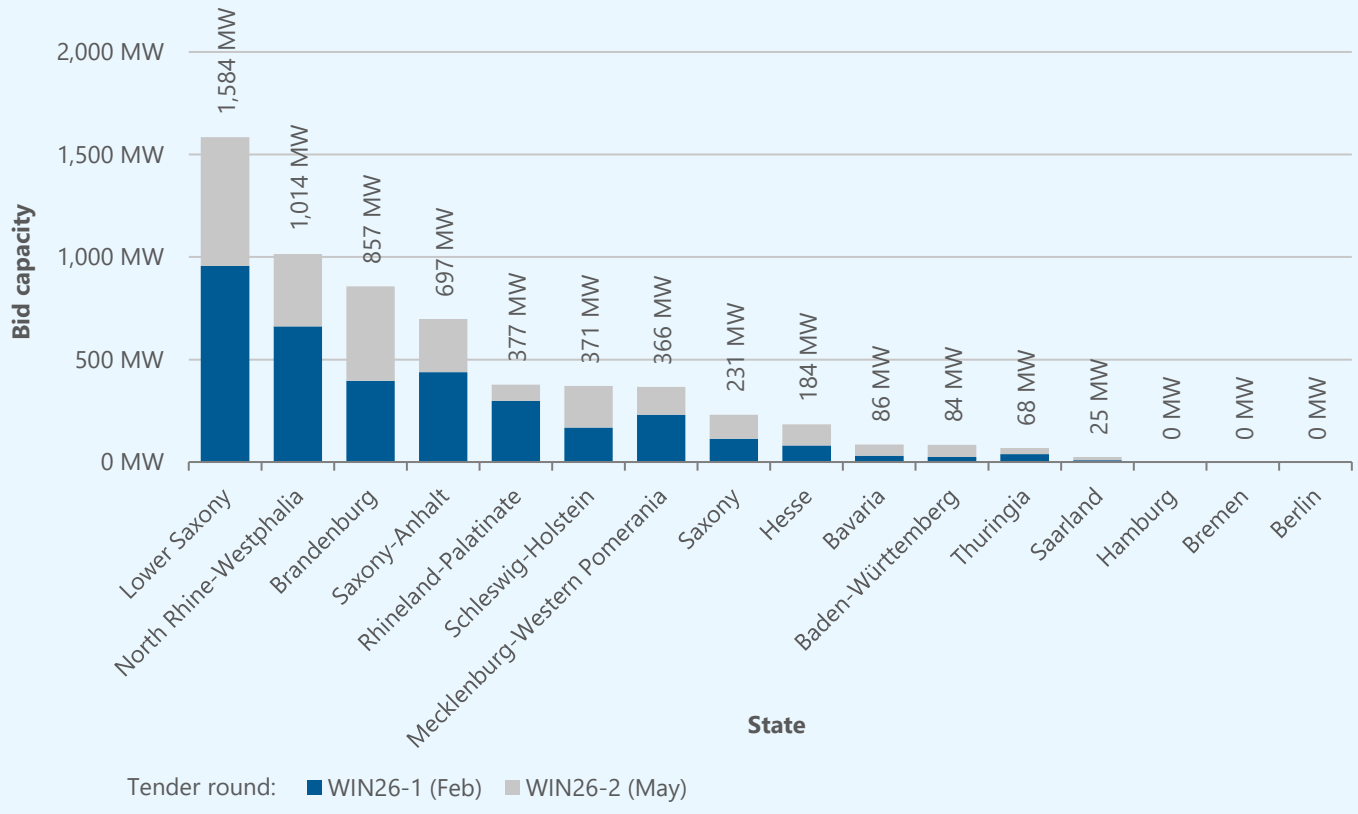
Regional Distribution of Awarded Bids

In the first half of 2026, wind turbines from all federal states except the three city states received awards in the two tender rounds held to date. Lower Saxony accounted for the largest share of awarded capacity nationally, at 27% of the overall total. It was followed by North Rhine-Westphalia (17%), Brandenburg (14%) and Saxony-Anhalt (12%).

In Saxony-Anhalt and Saxony, more capacity was awarded in the first half of 2026 than in the entire previous year 2025. Furthermore, Saxony-Anhalt has the highest awarded capacity per unit of land area, at 34 kW/km², closely followed by Lower Saxony at 33 kW/km². As in recent years, only a small proportion of both the absolute and relative awarded capacity is accounted for by the southern federal states.



Regional distribution of awarded capacity across the federal states (Database: BNetzA)



Regional distribution of awarded capacity across the German federal states (Database: BNetzA)

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Development Status of Awarded Turbines

Since 2022, a total of 41.2 GW of wind power capacity has been awarded, of which approximately 11.9 GW had been installed by 30 June 2026. The realization deadline for unused awards totalling around 0.5 GW has already expired. Unless the deadline is extended, these awards will expire. The relevant projects may participate in the tenders again or may already have secured a new award.

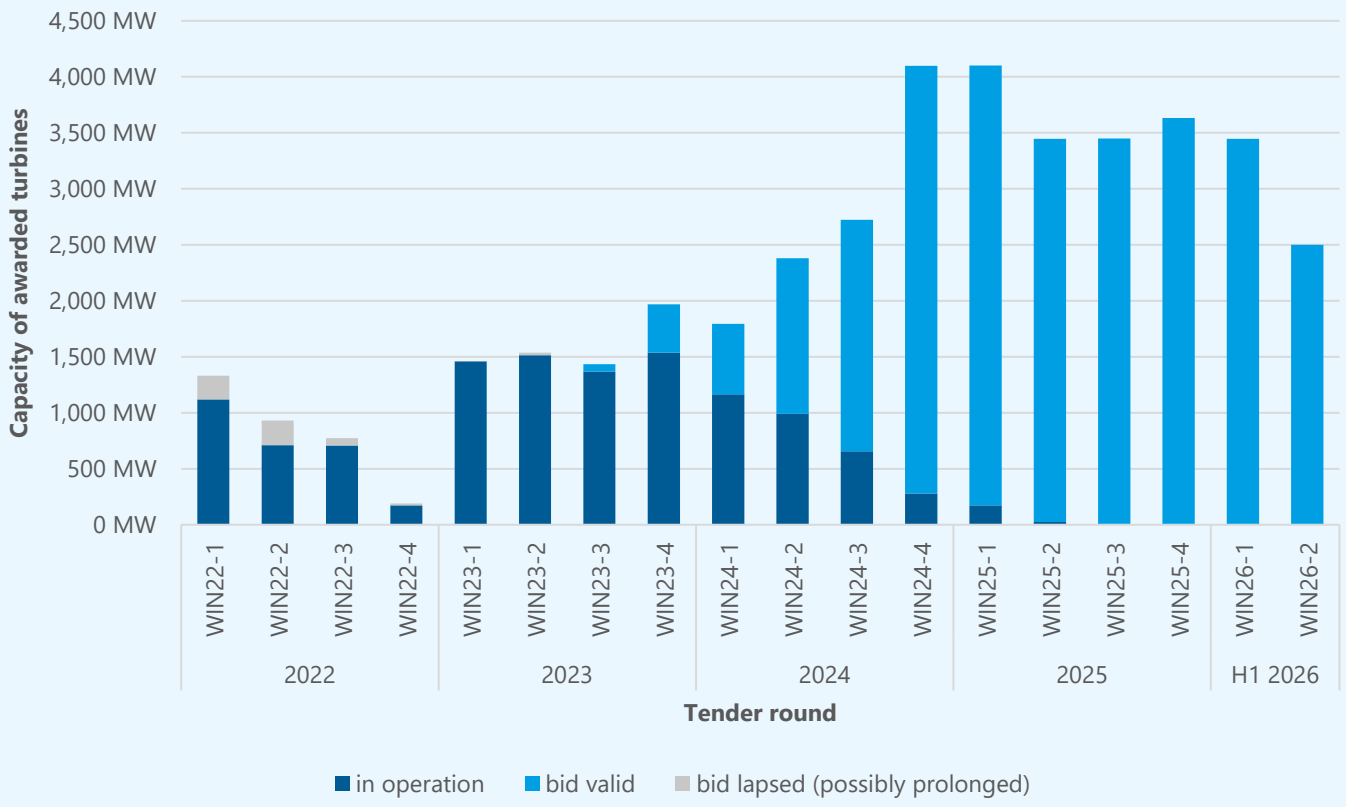
The regular realization deadline for the awards from 2022 has expired. Only 84% of the awarded capacity has been realized. The realization rate to date for the 2023 awards is already significantly higher at 92%. The outstanding awards from 2023 must be implemented during 2026 to avoid expiry. Awards from 2024 have already been realized to the extent of 28%. The awards from 2025 and 2026 are still in the early stages of the realization period.

Accordingly, only a small proportion of these turbines have been commissioned. On average, it took 25 months between the award and the commissioning of the turbines commissioned in 2026.

Realized capacity* of tenders for onshore wind energy in Germany

Year of tender	Realized capacity*	Realization rate
2022	2,713 MW	84%
2023	5,876 MW	92%
2024	3,089 MW	28%
2025	197 MW	1%
H1 2026	0 MW	0%

* The evaluations represent an assessment of the development status based on an analysis of the MaStR and the awards issued by BNetzA. Deviations from actually allocated awards are possible. It was assumed that the award volume corresponds to the permitted/installed capacity.



Development status* of awarded capacity (Database: BNetzA, MaStR, own research and assumptions)

Permitted Capacity and Development Status

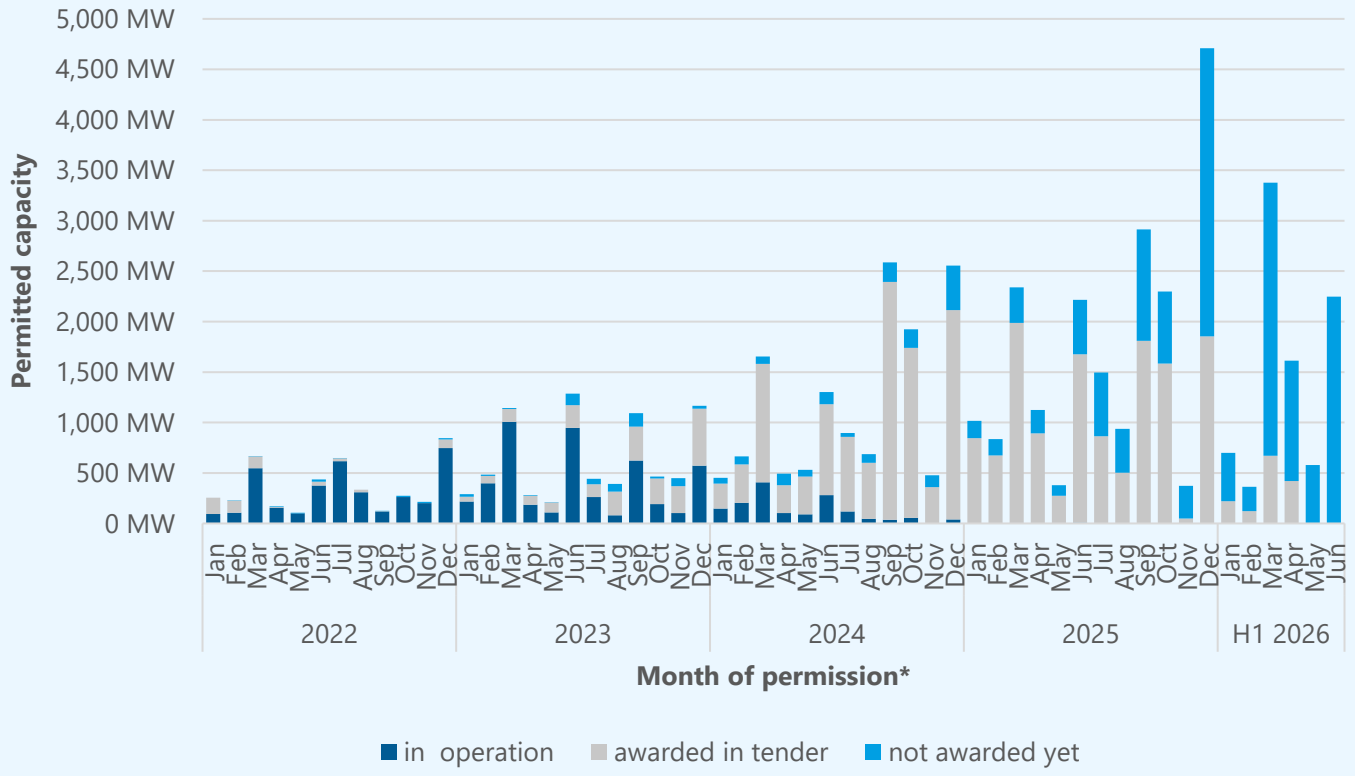
In the first half of 2026, 1,371 wind turbines with a total capacity of around 8.9 GW were granted permits. Compared with the first half of 2025, the permitted capacity increased by 12%. This makes the first half of 2026 the strongest first half-year for permits granted to date. Furthermore, the capacity permitted in the first six months already exceeds the total capacity permitted in both 2022 and 2023.

Only 16% of the wind turbines that were permitted in the first half of 2026 have already received an award under the EEG support scheme. Projects granted permits after 7 April 2026 have not yet been able to participate in any tender round. Furthermore, other turbines with permits issued in 2025 and earlier years have not yet received an award either. This means that around 17 GW of permitted capacity is available for further tenders in 2026.

Of the wind turbines with permits issued in 2022 and 2023, 84% and 61%, respectively, were in operation by the end of the first half of 2026. Among the projects with permits issued in 2024, commissioning has so far been recorded for 11% of the permitted capacity. Of the capacity permitted in 2025, only a few MW are currently connected to the grid. No commissioning has yet been recorded for the turbines permitted in 2026.

Annual permitted capacity

Year of permission	Permitted capacity	Permitted wind turbines
2022	4,306 MW	819 WT
2023	7,701 MW	1,372 WT
2024	14,218 MW	2,391 WT
2025	20,640 MW	3,288 WT
H1 2026	8,880 MW	1,371 WT



* Permits with an updated permit date have been dated back to the date of the first registration in MaStR.

Monthly permitted capacity including status

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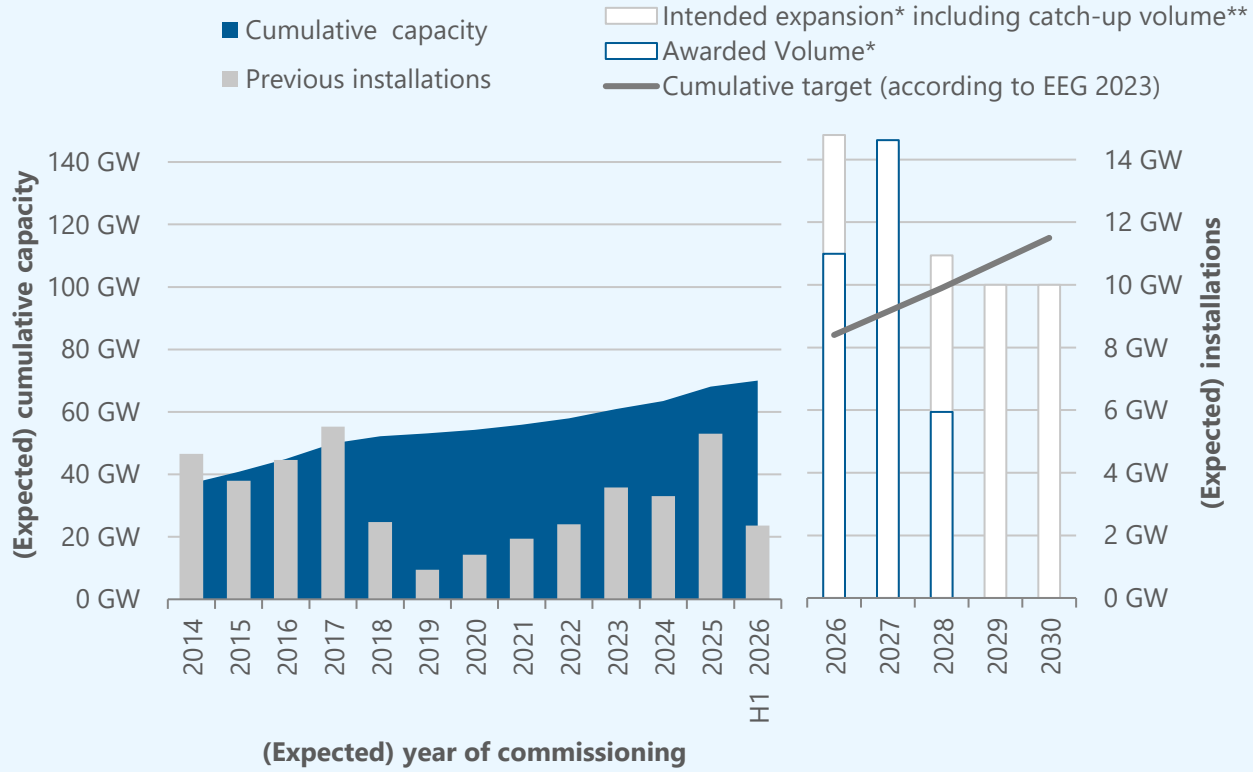
Political Target and Future Tender Rounds

The German Renewable Energy Sources Act (German: Erneuerbare-Energien-Gesetz or EEG) sets out the expansion targets for onshore wind energy in Germany. To meet the legal expansion targets in 2026, a cumulative installed capacity of 84 GW is envisaged. By the end of the first half of 2026, the cumulative installed capacity amounts to 70.0 GW. To achieve the expansion target, a net increase of around 14 GW is therefore required in the second half of 2026. However, this is not realistic. In the long term, the total installed capacity is initially set to rise to 115 GW by 2030 and then be maintained at a level of 160 GW from 2040 onwards.

The tender volumes specified in the EEG form the basis for the gross annual expansion required to meet the target, taking into account the expected decommissioning of existing turbines. Tender volumes from previous years that were not allocated may be put out to tender again in subsequent years as catch-up volumes. For this reason, the first tender round of 2026 (WIN26-1) was supplemented by the last remaining catch-up volumes from 2024. The second tender round (WIN26-2) was conducted as planned with a tender volume of 2.5 GW and without any additional catch-up volumes, as all tender volumes had been fully allocated by mid-2024.

The two remaining rounds in 2026 will each have a tender volume of 2.5 GW. The EEG 2023 also provides for an annual tender volume of 10 GW (across four rounds) for the following years. However, the EEG is being revised for 2027, so there may be differences from the version valid at the end of the first half of 2026.



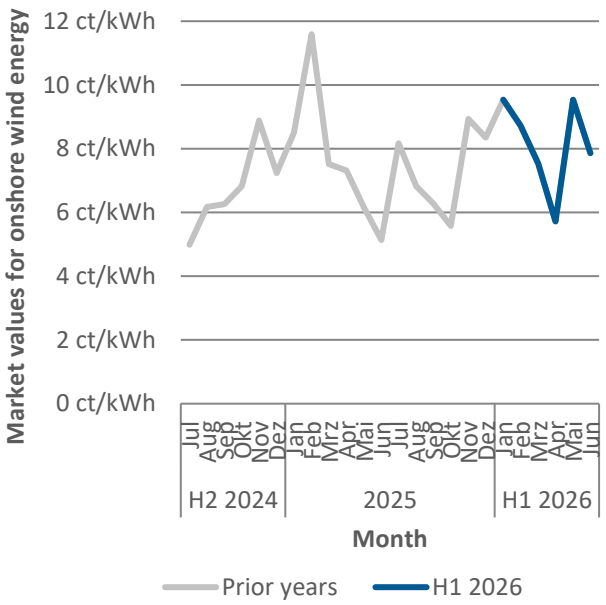
*derived from the (planned) tender quantities in the year before the previous year
**Tender volume corrected in accordance with § 28 EEG

Expected installations and political targets according to EEG 2023

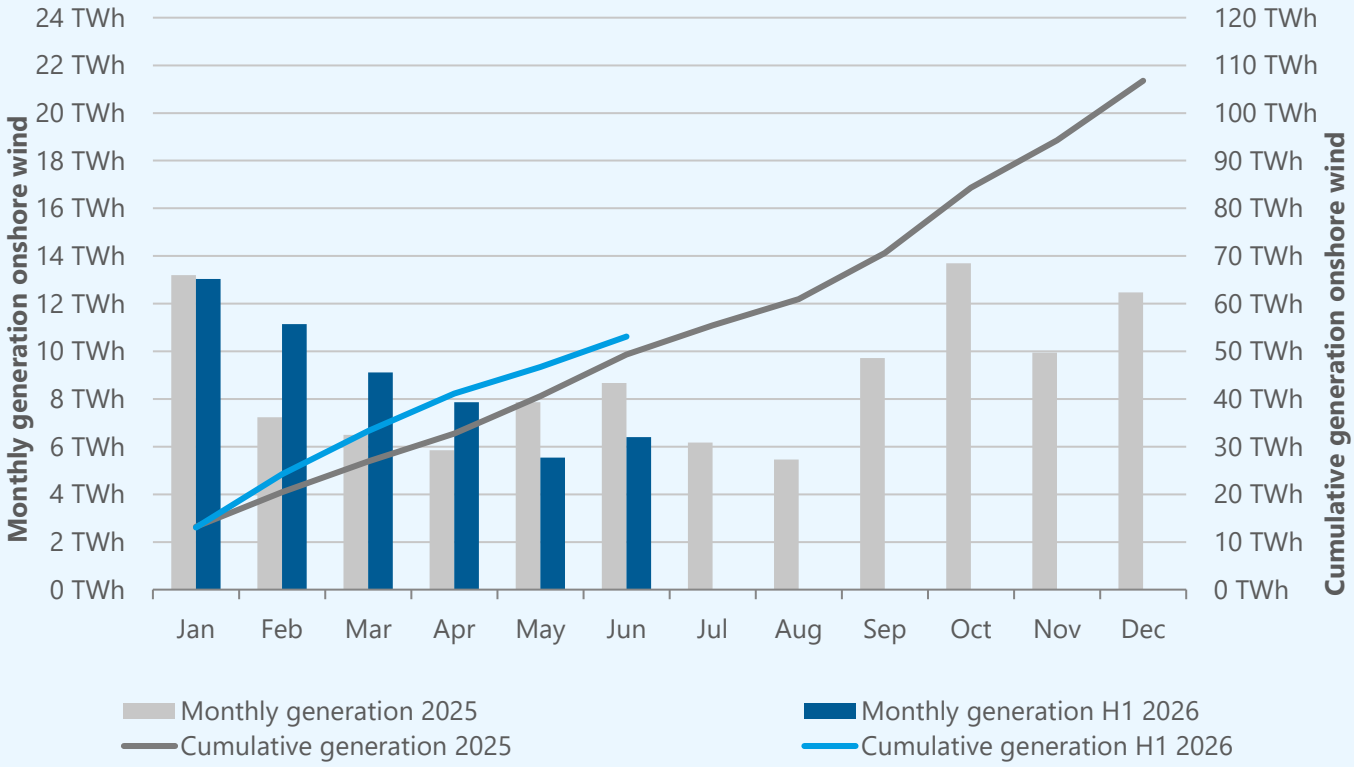
Power Generation and Market Values

During the first half of 2026, onshore wind turbines installed in Germany generated 53.1 TWh of electricity. Compared with the first half of the previous year, electricity generation from onshore wind power was around 8% higher. Accounting for 23% of total generation, onshore wind power remains the most important energy source for electricity generation in Germany.

In the first half of 2026, the monthly market values for onshore wind power ranged from 5.7 ct/kWh (in March) to 9.5 ct/kWh (in January and May). The average volume-weighted market value in the first half of 2026 was 8.21 ct/kWh. Compared with the previous year (2025), the market value for electricity from onshore wind power increased by around 10%.



Monthly market values for onshore wind energy (Database: Netztransparenz)



Power generation onshore wind (Database: Bundesnetzagentur | SMARD.de)

Deutsche WindGuard – The Wind Professionals

Deutsche WindGuard is one of the leading independent service providers in the wind energy industry worldwide. It offers comprehensive services and consulting along the entire value chain of a wind energy project. One key area of activity is advising federal and state governments on issues relating to onshore and offshore wind energy as well as preparing market, cost and value creation analyses for various associations and other stakeholders in the wind energy sector and politics. Further business activities include technical inspections and management, site assessment, measurements on wind turbines, wind tunnel measurements, offshore consulting and training.

In the complex energy market, Deutsche WindGuard is committed to providing unbiased, manufacturer-independent consulting and comprehensive scientific, technical, and operational services.

Deutsche WindGuard was founded in 2000. With the headquarters in Varel and subsidiaries in Germany, the United States, China and India, it employs more than 220 experienced experts.