

**First Half
2014**

Deutsche
WindGuard

STATUS OF LAND-BASED WIND ENERGY DEVELOPMENT IN GERMANY

On behalf of:



Power Systems

STATUS OF LAND-BASED WIND ENERGY DEVELOPMENT AS OF 30 JUNE 2014

This factsheet examines the status of land-based wind energy development in Germany, as well as the development of new construction for the first half of 2014. During this time, a total of 650 wind turbine generators (WTG) with a total capacity of 1,722.71 MW were erected on land. This gross addition includes at least 93 repowering turbines with a total capacity of 267.38 MW. In addition, it was determined that 102 WTGs with a total of 63.84 MW had been dismantled.

Table 1 provides an overview of the additions during the first half of 2014 and the installed cumulative capacity. This shows that by 30 June 2014 a total of 24,193 WTGs with a cumulative capacity of 35,388.70 MW was installed. The data collected for repowering and dismantling are non-binding and discussed further in the applicable section of this factsheet.

Table 1: Status of Land-Based Wind Energy Development in the first Half of 2014

Status of Land-based Wind Energy Development		Capacity [MW]	Number [WTG]
Development 2014	Gross additions during first Half of 2014	1,722.71	650
	Repowering share (non-binding)	267.38	93
	Dismantling in first Half of 2014 (non-binding)	63.84	102
Cumulative 2014	Cumulative WTG portfolio Status: 30 June 2014	35,388.70	24,193

This shows that by 30 June 2014 a total of 24,193 WTGs with a cumulative capacity of 35,388.70 MW was installed. The data collected for repowering and dismantling are non-binding and discussed further in the applicable section of this factsheet.

The development of the annual additions to wind energy and the cumulative capacity is depicted in Figure 1. The first half of 2014 showed a 66% increase in capacity additions compared to a total of 1,038.07 MW during the same timeframe in 2013.

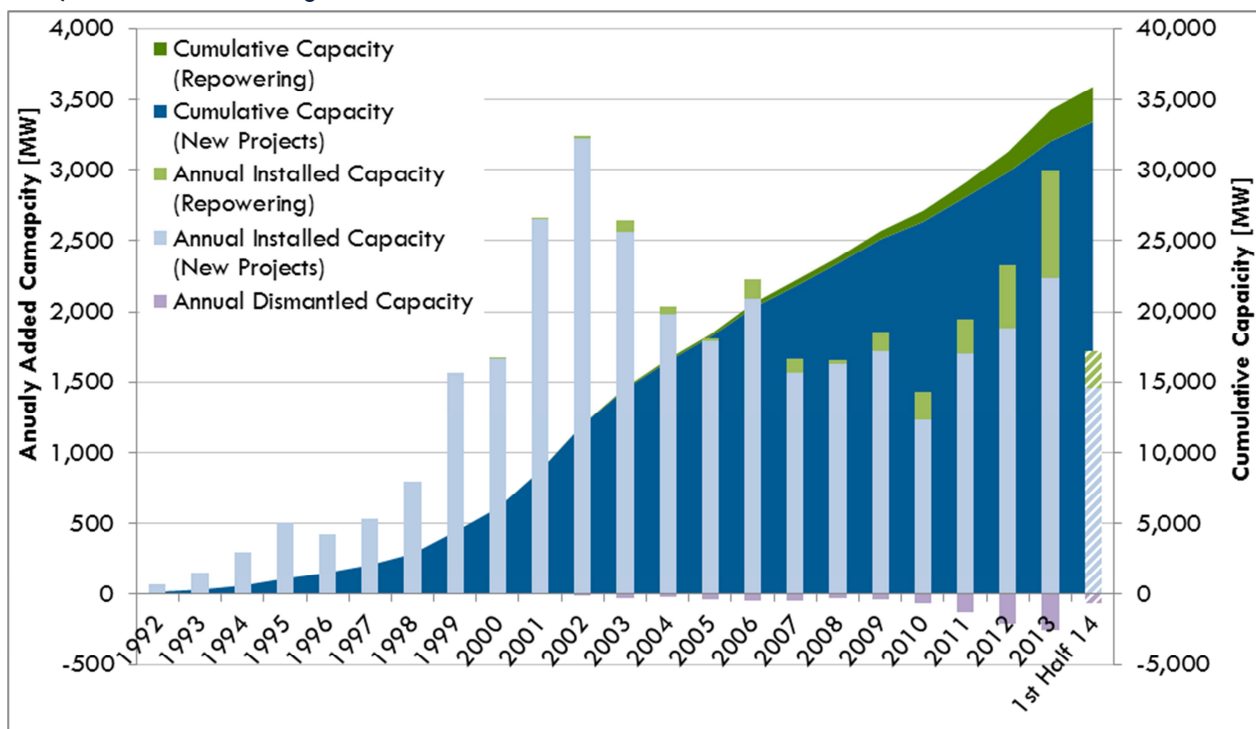


Figure 1: Development of the Annual Installed and Cumulative Capacity (MW) of Land-Based Wind Energy in Germany incl. Repowering and Dismantling, Status: 30 June 2014

The data since the end of 2012 were determined by inquiries with industry stakeholders as well as other research.

Basis of data 1992 – 2011: DEWI

REPOWERING AND DISMANTLING

The amendment to the Renewable Energy Law, which is coming into effect on 01 August 2014, stipulates the establishment of a central WTG register. A corresponding provision is currently under development. Newly installed WTGs will thence be recorded in a central register. Should the repowering characteristic of a WTG and the dismantling of WTGs be noted therein, a comprehensive statistic concerning repowering can evolve. Until then, the data regarding repowering and dismantling presented below remain non-binding and contain all information captured by means of a complex data collection – with the knowledge that the actual repowering and dismantling numbers are most likely above those captured.

Repowering

In the framework of the statistical data collection for the first half of 2014, 93 of the 650 newly installed WTGs have been identified as repowered ones (meaning that for a newly erected WTG an old WTG was dismantled in the same or adjacent administrative district/county). With an identified capacity of 267.38 MW, this equates to a repowering share of at least 15.5 % of the

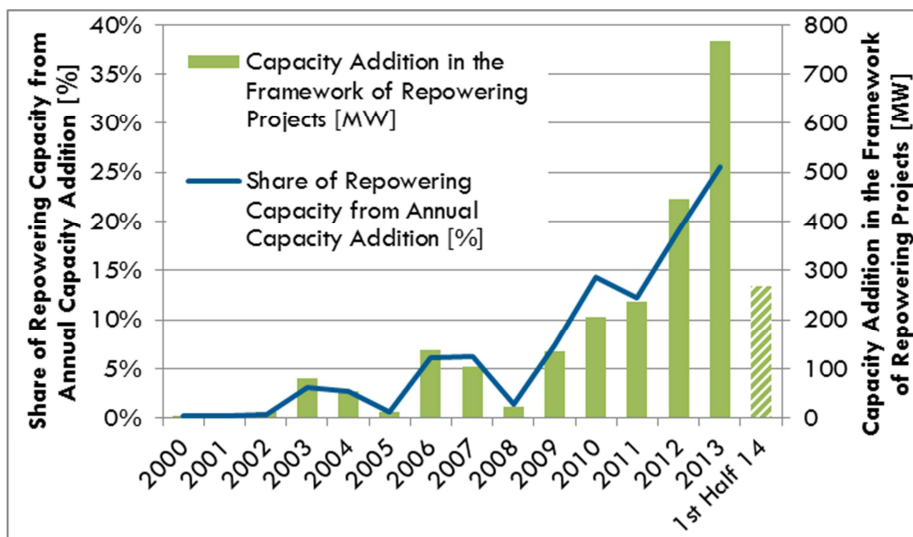


Figure 2: Development of Proportional and Absolute Installed Capacity in the Framework of Repowering Projects, Status 30 June 2014

Dismantling

In parallel, at least 102 WTGs with a capacity of 63.84 MW were dismantled.

The average capacity of dismantled WTGs was about 626 kW. This results in an average repowering factor of 4.2, meaning that the installed capacity was more than quadrupled in the framework of repowering.

The net development can be derived using the annual gross new construction and dismantling numbers of WTGs, coming to 1,658.87 MW for the first half of 2014. It should be assumed, however, that the underestimation of dismantled WTGs, which is probably the case here, results in an overestimation of the net new construction of wind energy.

gross new construction of the first half of 2014. The repowering WTGs possessed an average capacity of 2.875 kW.

Table 2 shows the annual installed capacity in the framework of repowering projects, as well as the repowering-share of the annual gross capacity addition in relation to elapsed time

AVERAGE TURBINE CONFIGURATION

This section deals with the average land-based turbine configuration. The results are shown in Table 2. In the first half of 2014, the average WTG capacity was 2,650 kW across Germany. The average WTG had a rotor diameter of 97 meters and a hub height of 113 meters. Regional differences with regard to average WTG configuration are discussed further in the next section (Regional Distribution of Wind Energy Development).

Table 2: Average Turbine Configuration of WTGs installed in the first half of 2014

Average Land-Based WTG Configuration, Installed in the First Half of 2014		
1 st Half of 2014	Average Turbine Capacity	2,650 kW
	Average Rotor Diameter	97 m
	Average Hub Height	113 m

Figure 3 shows the development of average turbine capacity over time with respect to the annual new installations and the cumulative land-based turbine portfolio. Compared to the average value determined for all of 2013, the average turbine capacity increased by about 2 % for the first half of 2014. By 30 June 2014, the average capacity per WTG within the entire portfolio came to 1,463 kW.

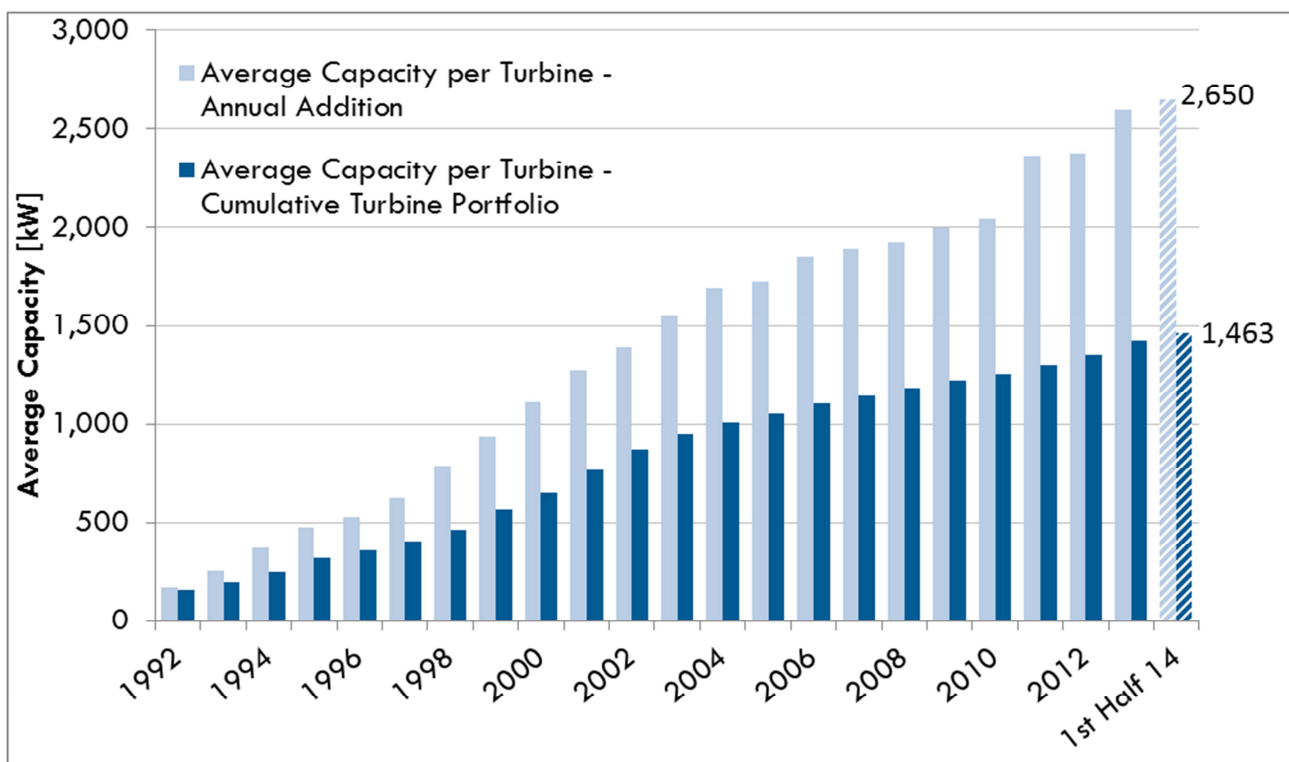


Figure 3: Development of the Average Capacity of Land-Based WTGs annual installed and cumulatively present in the Turbine Portfolio in Germany, Status: 30 June 2014

REGIONAL DISTRIBUTION OF WIND ENERGY DEVELOPMENT

This section deals with the regional distribution of wind energy development across the individual German states during the first half of 2014. The results are shown in Table 3. Compared to all other states, Schleswig-Holstein again leads with about 443 MW of new construction. Lower Saxony comes in second place with 190 MW of new construction slightly ahead of Brandenburg with 189 MW. New construction in these three states makes up nearly half (47.7 %) of all new construction within Germany.

The northern German states are clearly the leaders, since another 174 MW were installed in Mecklenburg-Western Pomerania. As mentioned, the most new construction in central Germany occurred in Brandenburg, as well as Saxony-Anhalt (122 MW). The southern states are headed up by Rhineland-Palatinate (161 MW), followed by Bavaria with about 141 MW.

Table 3: Addition to Wind Energy in the German States in the First Half of 2014

Rank	State	Gross Addition in first Half of 2014			Average Turbine Configuration		
		Added Capacity [MW]	Added Number [WEA]	Share of Added Capacity of Total Addition	Average Turbine Capacity [kW]	Average Rotor Diameter [m]	Average Hub Height [m]
1	Schleswig-Holstein	442.95	159	25.7%	2,786	94	84
2	Lower Saxony	189.96	71	11.0%	2,675	91	99
3	Brandenburg	188.90	77	11.0%	2,453	98	124
4	Mecklenburg-Western Pomerania	174.20	64	10.1%	2,722	100	127
5	Rhineland-Palatinate	160.70	57	9.3%	2,819	106	138
6	Bavaria	140.55	51	8.2%	2,756	109	133
7	Saxony-Anhalt	122.00	47	7.1%	2,596	93	121
8	North Rhine-Westphalia	109.20	45	6.3%	2,427	89	118
9	Hesse	88.25	33	5.1%	2,674	101	135
10	Thuringia	73.45	34	4.3%	2,160	90	117
11	Saarland	21.80	8	1.3%	2,725	108	135
12	Bremen	5.70	2	0.3%	2,850	93	118
13	Baden-Württemberg	3.05	1	0.2%	3,050	101	135
14	Hamburg	2.00	1	0.1%	2,000	90	105
15	Saxony	0.00	0	0.0%	-	-	-
16	Berlin	0.00	0	0.0%	-	-	-
	Total	1,722.71	650	100%	2,650	97	113

Also shown in Table 3 is the average turbine configuration of new additions for the first half of the year for each German state. The smallest and the largest average turbine capacity are attributable to two individual turbines. Aside from these two turbines, the average turbine capacity across all German states lies between 2,160 kW and 2,850 kW.

The average rotor diameters lie between 89 and 109 meters, average rotor diameters exceeding 100 meters were found to be in the southern German states. With the exception of Schleswig-Holstein (84 meters) and Lower Saxony (99 meters), the average hub height in all German states was at least 105 meters and up to 138 meters.

REGIONAL DISTRIBUTION OF THE CUMULATIVE PORTFOLIO OF WIND TURBINES

The cumulative capacity and number of turbines according to the German states can be ascertained from Table 4. It should be noted that the cumulative values may deviate from fact as the exact number of dismantled turbines is not known.

With 7,819 MW of installed capacity, Lower Saxony is at the top of the list of cumulative wind energy development. Brandenburg comes in second with 5,233 MW and Schleswig-Holstein is third with about 4,331 MW of cumulative capacity.

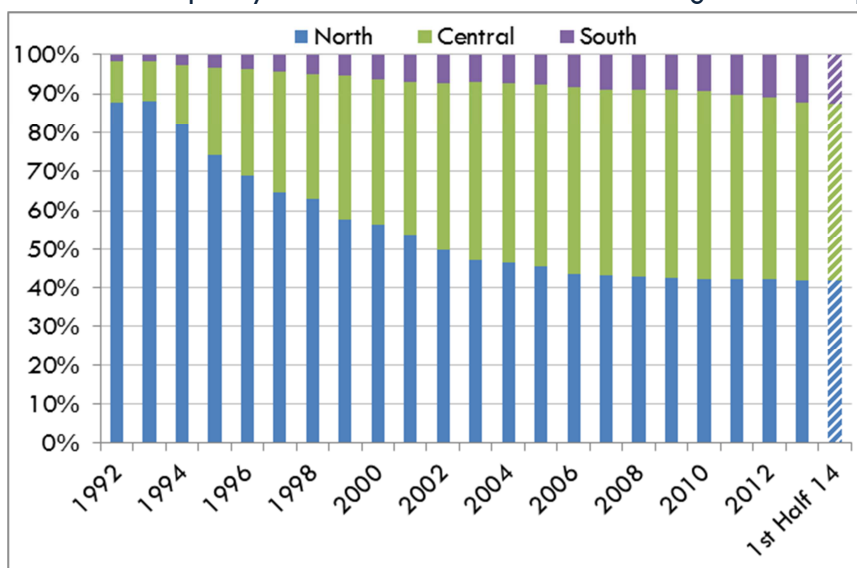
For several years now, the North makes up 42 % of the overall capacity installed in Germany. The central German states contribute with about 45 % of

Table 4: Cumulative Capacity and Number of Turbines in the German States, Status: 30 June 2014

	Region / State	Cumulative Capacity Status: 30 June 2014 [MW]	Cumulative Number Status: 30 June 2014 [WEA]
North	Lower Saxony	7,818.90	5,530
	Schleswig-Holstein	4,330.54	3,072
	Mecklenburg Western Pomerania	2,511.08	1,672
	Bremen	156.71	80
	Hamburg	57.12	59
Central	Brandenburg	5,233.29	3,275
	Saxony-Anhalt	4,170.19	2,548
	North Rhine-Westphalia	3,515.49	3,017
	Thuringia	1,065.59	708
	Hesse	1,057.99	777
	Saxony	1,038.04	856
	Berlin	2.00	1
South	Rhineland-Palatinate	2,446.09	1,395
	Bavaria	1,261.02	703
	Baden-Württemberg	536.10	392
	Saarland	188.55	108
	Total	35,388.70	24,193

the capacity and are hence slightly below the status of the end of 2013. The remaining 13 % cumulative capacity is installed in the Southern Region and represents a slight increase. The

development of the cumulative capacity distribution is depicted graphically in Figure 4.



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Figure 4: Distribution of the Germany-wide Installed Cumulative Capacity across the Regions, Status: 30 June 2014