

Year
2013

Deutsche
WindGuard

STATUS OF OFFSHORE WIND ENERGY DEVELOPMENT IN GERMANY

On behalf of:



Power Systems

STATUS OF OFFSHORE WIND ENERGY DEVELOPMENT

In 2013, a total of 48 offshore wind turbines (OWT) with a combined capacity of 240 MW fed into the grid for the first time. Of those 48 turbines, 41 were erected in 2013. A total of 116 OWT's located in the North and Baltic Sea with a combined capacity of 520.3 MW fed into the German grid by 31 December 2013. Aside from the turbines already connected to the grid, another 103 OWT's (394.6 MW) in three offshore wind farms (OWF) were fully erected in 2013, but not yet connected to the grid. Another 266 OWT locations either received foundations or had partially erected turbines. Based on the data, a total of 282 foundations and partially erected OWT's were ready for further construction on 31 December 2013. Table 1 shows the status of new construction for 2013, as well as the cumulative status.

Table 1: Offshore Wind Energy Development Status 31 December 2013

	Status of Offshore Wind Energy Development	Capacity [MW]	Number [OWT]
New Construction 2013	OWT's with Grid Connection	240,0	48
	Erected OWT's w/o Grid Connection	394,6	103
	Foundations w/o OWT		266
Cumulative (31 December 2013)	OWT's with Grid Connection	520,3	116
	Erected OWT's w/o Grid Connection	394,6	103
	Foundations w/o OWT		282

The development of offshore wind energy for the past several years is illustrated in Figure 1. The classification of the new construction is dependent on the year the OWT was connected to the grid. Erected OWT's without grid connection are not included in Figure 1. Seven OWT's, with a total capacity of 35 MW, that received grid connectivity in 2013 had been erected in 2012. As of 31 December 2013, eight OWF's are under construction, another one had been erected but had no grid connection. The total capacity of OWF's either under construction or without grid connection is 2,432.4 MW. These OWF's are scheduled to be operational in 2014 or 2015.

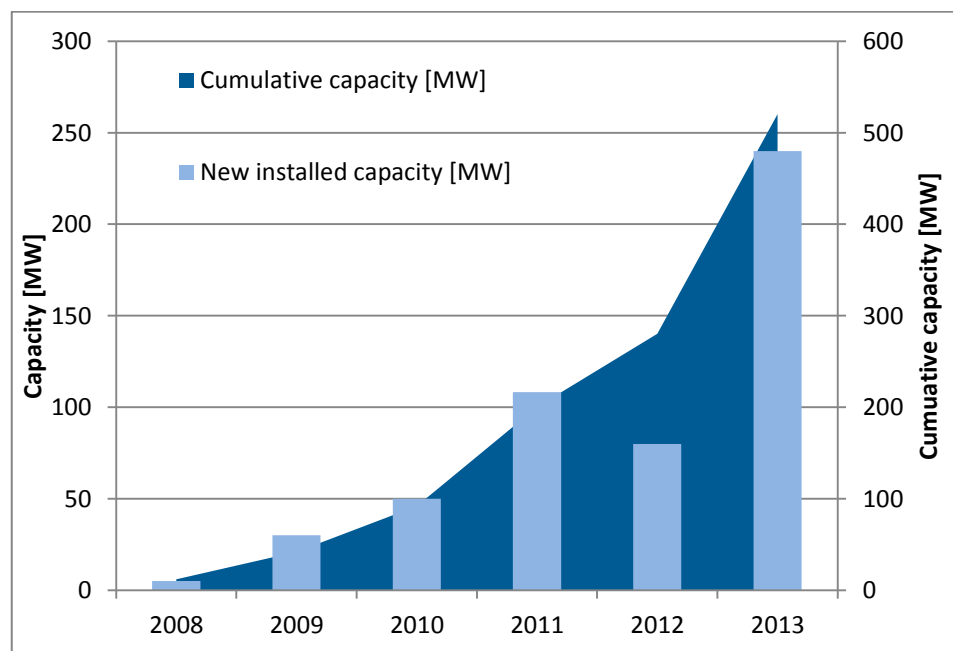


Figure 1: Development of Offshore Wind Energy in Germany (OWT's connected to the Grid), Status 31 December 2013

TURBINE LOCATIONS

The distribution of connected and erected OWT's in the North and Baltic Sea as of 31 December 2013 are depicted in Table 2. The data shows that the majority of the grid-connected capacity (two OWF's and two individual OWT's nearshore), as well as under-construction / non-grid-connected capacities (seven OWF's / one OWF, respectively) is located in the North Sea. The Baltic Sea has one OWF and one individual OWT (nearshore) connected to the grid. An additional OWF was still under construction at the end of 2013.

Table 2: Construction Distribution across the North and Baltic Seas

Regional Distribution		North Sea		Baltic Sea	
		Capacity [MW]	Number [OWT]	Capacity [MW]	Number [OWT]
New Construction 2013	Erected OWT with Grid Connection	240.0	48	0.0	0
	Erected OWT w/o Grid Connection	394.6	103	0.0	0
	Foundations w/o OWT		227		39
Cumulative (31 December 2013)	Erected OWT with Grid Connection	469.5	94	50.8	22
	Erected OWT w/o Grid Connection	394.6	103	0.0	0
	Foundations w/o OWT		243		39

TURBINE CONFIGURATION

The average offshore wind turbine connected to the grid in 2013 had a capacity of 5 MW, a rotor diameter of 126 meters and a hub height of 90 meters. Compared to the average configuration of the cumulatively grid-connected OWT, the capacity of OWT's erected in 2013 has increased. The rotor diameter and hub height on average is also larger and higher, respectively. The average turbine configuration is shown in Table 3.

Table 3: Average Turbine Configurations of OWT's

	Average Turbine Configuration of Grid-Connected OWT's	
New Construction 2013	Average Turbine Capacity	5,000 kW
	Average Rotor Diameter	126.0 m
	Average Hub Height	90.0 m
Cumulative (31 December 2013)	Average Turbine Capacity	4,485 kW
	Average Rotor Diameter	119.3 m
	Average Hub Height	88.4 m

OFFSHORE-WIND FARMS UNDER CONSTRUCTION

Figure 2 provides an overview of completed offshore wind farms in 2013 and those still under construction by 31 December 2013 in the North Sea. “Bard Offshore I” was put into operation in 2013, construction of “Borkum Riffgat” has been completed and is waiting for its connection to the grid. The first OWT’s have been erected in the OWF’s “Borkum West II” and “Meerwind Süd/Ost (South/East)”. The completion of the in-park transformer substation for “Borkum West II” has been confirmed. The foundation for the transformer substation for “Meerwind Süd/Ost” was placed by the end of 2013. “Global Tech I” completed its transformer substation and started with the erection of the OWT’s during 2013, having several turbines partially up (OWT’s without rotor). “DanTysk” completed all foundation installation work and has its transformer substation erected. By the end of 2013, the OWF “Nordsee Ost (North Sea East)” had the foundations for the transformer substation and a number of OWT’s installed. The transformer substation of “Riffgrund I” has also been erected, but further foundations have not been installed. Also by the end of 2013, preparatory work had commenced on the OWF “Amrumbank West”, but the efforts did not include any installation work. During 2013, construction work on the OWF “Baltic II,” located in the Baltic Sea and depicted in Figure 3, included the installation of the first OWT foundations.

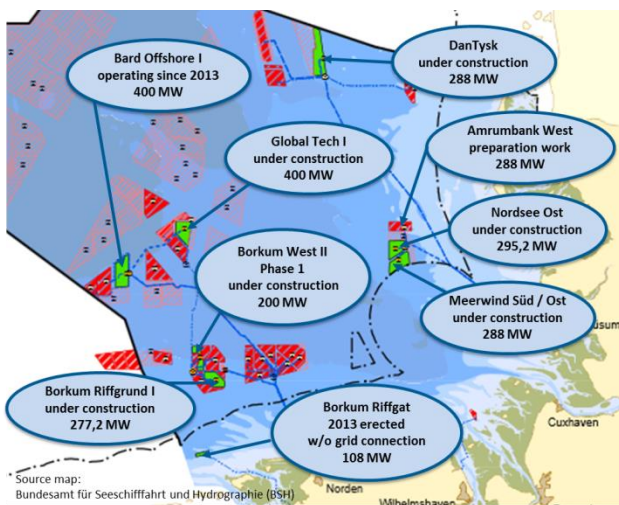


Figure 2: Offshore Wind Farms under Construction in the North Sea in 2013

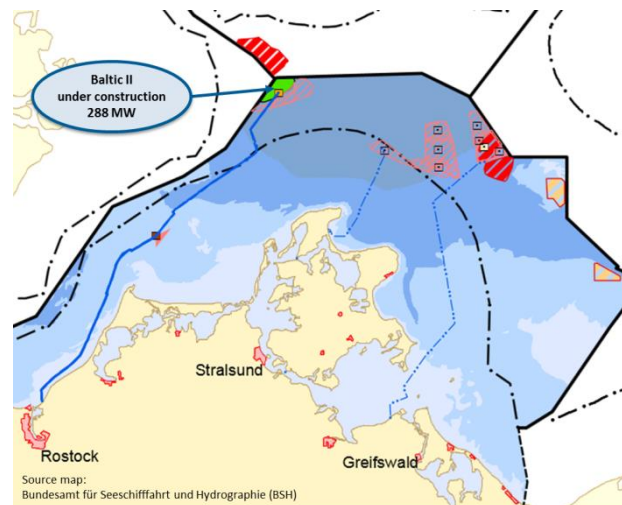


Figure 3: Offshore Wind Farms under Construction in the Baltic Sea in 2013

Data Collection, Adaptation and Translation:

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