Global Offshore Wind Report

2022

February 2023

WORLD FORUM OFFSHORE WIND

Top 5 facts about WFO

WFO: 100% Offshore Wind

Non-profit
organisation
founded in 2018

Initiatives
Floating Offshore Wind Committee
Offshore Dispute Resolution Committee
Offshore Wind to Hydrogen Committee

110 + global
member
organisations

Global setup
with offices in
Hamburg, New York,
Tokyo, and Taipei

Core activities
1. Information
2. Events
3. Government Advisory

World Forum Offshore Wind (WFO) is the world's only organisation 100% dedicated to fostering the global growth of offshore wind energy. WFO's international members represent the complete offshore wind value chain including utilities, manufacturers, service firms and non-profit organisations.

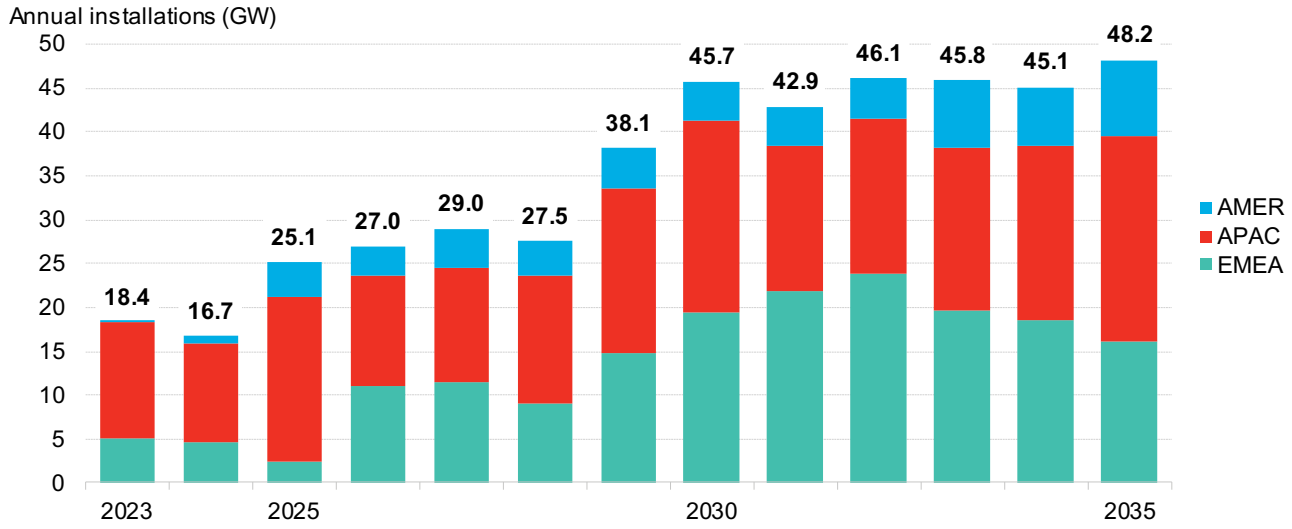
BloombergNEF

BloombergNEF Offshore Wind Forecast
February 20, 2023

BloombergNEF Content: Global Offshore Wind Forecast

- **Global offshore wind installations are on track to grow 10-fold by 2035, reaching 519 gigawatts (GW)**. Countries increasingly see the offshore wind sector as a key facilitator of their long-term climate goals, as they set new targets and increase existing ones. BloombergNEF's forecast for offshore capacity continues to rise as mature markets in Europe plan more projects via auctions and new markets in Asia and the Americas establish regulatory frameworks for offshore wind. As floating wind matures and hydrogen provides another potential source of demand, the opportunity for offshore wind is only growing.

Global offshore wind installations, by region



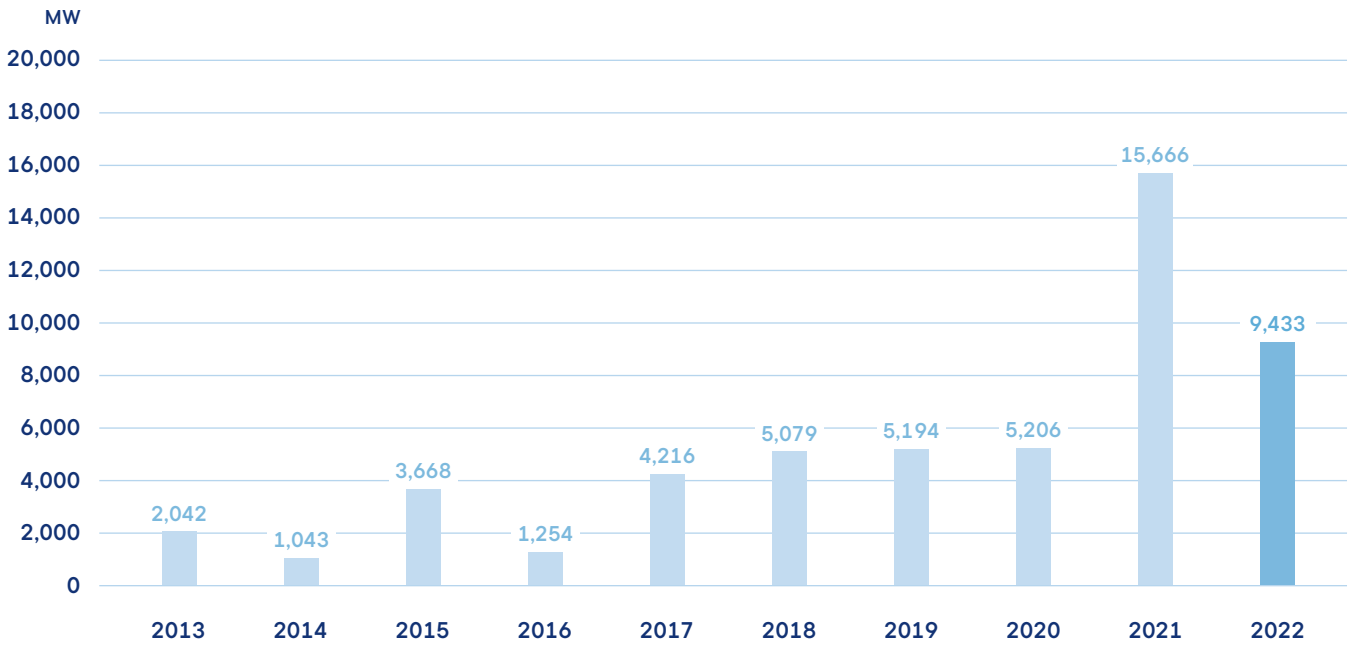
Source: BloombergNEF. Note: AMER = Americas, APAC = Asia Pacific, EMEA = Europe, the Middle East and Africa.

- **Offshore wind installations are set to reach 18.4GW in 2023**, a record. Mainland China will account for over half of this total. **Six markets will add over 1GW in 2023**, including Taiwan, which will install over 2GW of new capacity for the first time.
- **BNEF expects annual offshore wind build to climb to 45.7GW in 2030**, underpinned by the mature markets of China, the UK, Germany and the Netherlands. Emerging markets like the US, Taiwan, France, South Korea, Poland and Japan will make significant contributions, and Norway, India, Spain and Greece will install their first projects later in the decade.
- Post-2030, more new markets will contribute to build, including Colombia, Brazil and Sweden. **From 2031 to 2035, BNEF expects installations to average 45.6GW per year**, peaking at 48.2GW in 2035. By 2035, annual offshore wind additions will be over four times the 2022 total. Reaching these annual volumes will mean expanding the supply chain – including manufacturing capacity, installation vessels and equipment – and addressing skills shortages among workers. Distributing supply chain resources effectively between regions will be integral to the globalization of the industry. The offshore wind sector must strike a balance between satisfying local content requirements while maintaining supply chain resilience and keeping costs down.
- **By 2035, 22 markets are set to reach cumulative installations exceeding 1GW**, up from just six today. Mainland China will maintain its lead as the top offshore wind market, followed by the UK and then the US, which has installed just 42MW today.

Global offshore wind growth

More than 70 % of new global offshore wind capacity added in China

Annually added offshore wind capacity



- A total of **9.4 GW** of global offshore wind capacity was added[1] during 2022, again mainly driven by strong growth in China (6.8 GW)
- **New capacity** in 2022 was **lower** than 2021 (due to expiration of Chinese feed-in tariff) but higher than 2020
- The average size of a newly added offshore wind farm during 2022 was **225 MW** compared to 296 MW during 2021

[1] In operation: all turbines installed and first power

9.4 GW

Globally added offshore wind capacity in 2022

In detail: Global offshore wind farms put into operation in 2022

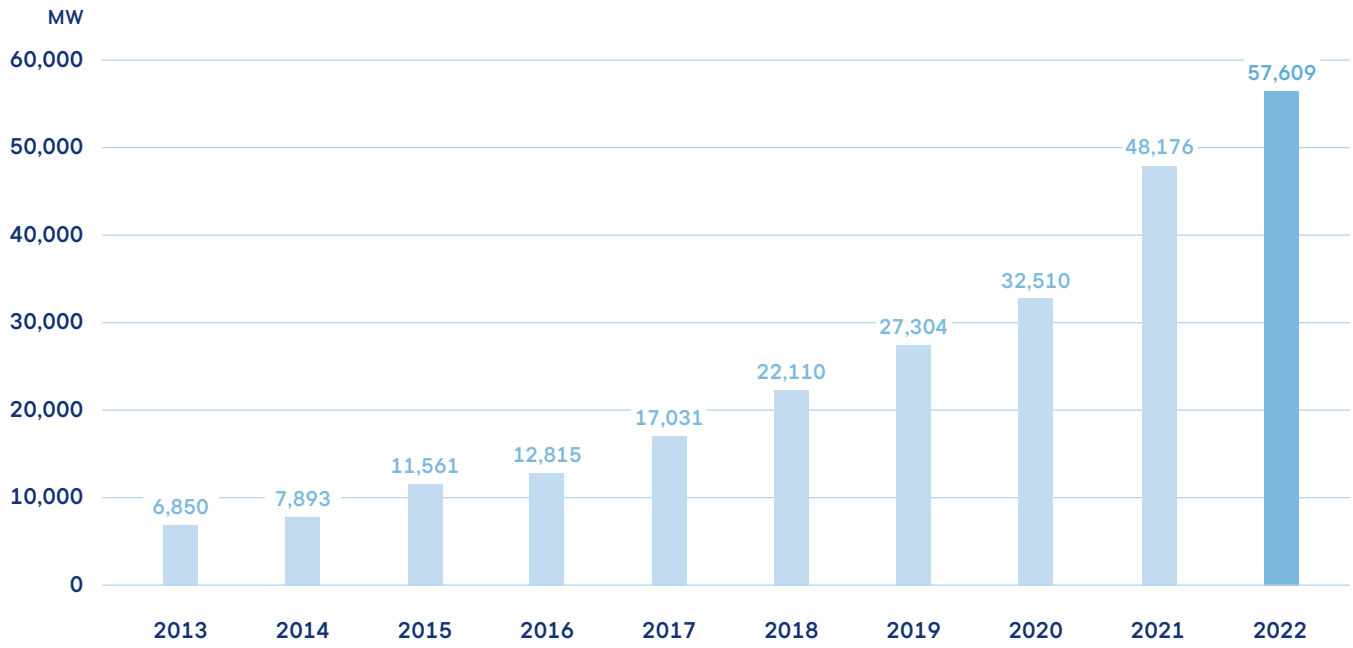
No	Wind Farm	MW	Units	MW/Unit	Turbine	Location
1	PivotBuoy PLOCAN (floating)	0.2	1	0.2	Vestas V29	ES
2	CSSC Fuyao demo (floating)	6	1	6.2	-	CN
3	Yeonggwang Baeksu	8	1	8	DS205-8 MW	SK
4	Taranto	30	10	3	MySE 3.0-135	IT
5	Pingtan Strait Gongtie Bridge Lighting Project	34	5	6.7	GW154-6.7 MW	CN
6	Pudong New District Donghai Bridge Project	46	7	6.5	W6.5F-185	CN
7	Tra Vinh V1-1	48	12	4	GW155-4.5 MW	VT
8	Tra Vinh V1-2	48	12	4	GW155-4.5 MW	VT
9	Tra Vinh V1-3	48	12	4	GW155-4.5 MW	VT
10	Jiangjiasha	50	15	3.3	GW 155-3.3 MW	CN
11	Akita Port	56	13	4.2	V117 - 4.2 MW	JP
12	Tan Thuan	75	18	4.2	SG 5.0-145	VT
13	Hiep Thanh	78	18	4.3	SG 5.0-145	VT
14	Zhuhai Guishan Hai Demonstration 2	83	12	7	DEW-D7000-186, MySE6.45-180	CN
15	Noshiro Port	84	20	4.2	V117 - 4.2 MW	JP
16	CSIC Jiangsu Rudong H3-2	100	20	5	H151-5 MW	CN
17	Huadian Yuhuan 1 South	146	20	7	DEW-D7000-186	CN
18	Huadian Yuhuan 1 North	154	22	7	DEW-D7000-186	CN
19	Fujian Pingtan Datang Changjiangao	185	37	5	MySE5.0-133	CN
20	Rudong H15	200	40	5	H171-5.0 MW	CN
21	Changle Area C 1	200	20	10	DEW-D10000-185	CN
22	Longyuan Putian Nanri Island I 1	204	51	4	SWT-4.0-130	CN
23	Xinliao	206	32	6.45	MySE6.45-180	CN
24	Dafeng H5	206	32	6.45	GW184-6.45 MW	CN
25	CGN Pingtan Island	240	60	4	SWT-4.0-130, MySE5.5-155	CN
26	Guodian Xiangshan 1 1	254	41	6.2	H171-6.2 MW	CN
27	Fuqing Xinghua Bay 2	288	46	6.7	GW154-6.7 MW, DEW-G5000-140	CN
28	Mingyang Yangjiang Shapa	300	46	6.45	MySE6.45-180	CN
29	Zhanjiang Xuwen-South	300	47	6.45	GW171-6.45 MW	CN
30	Yuedian Yangjiang Shapa	300	47	6.45	MySE6.45-180	CN
31	Zhejiang Jiaxing 2	300	50	6	SWT-6.0-154	CN
32	Rudong H5	300	75	4	SWT-4.0-146	CN
33	Dafeng H6	300	47	6.45	GW184-6.45 MW	CN
34	Longyuan Jiangsu Dafeng H4	302	47	6.45	GW184-6.45 MW	CN
35	CTG Laizhou demo (aquaculture)	304	38	8	H220-8000	CN
36	Kaskasi	342	38	9	SG 8.0-167 DD	DE
37	SPIC Rudong H7	400	100	4	SWT-4.0-146	CN
38	CGN Shanwei Jiazi II	403	62	6.45	MySE6.45-180	CN
39	Saint-Nazaire	480	80	6	GE Haliade 160-6 MW	FR
40	Shenquan Phase 2	502	50	11.0/8.0	SEW11.0-208	CN
41	CGN Shanwei Jiazi I	503	78	6.45	MySE6.45-180	CN
42	Hornsea 2	1,320	165	8.4	SG 8.0-167 DD	UK
	Total	**9,433**				

Global growth

Offshore wind capacity getting closer to 60 GW

Global offshore wind capacity in operation[2] – cumulative

IN OPERATION



- Globally, installed offshore wind capacity reached **57.6 GW** by the end of 2022, 44 % of which (25.6 GW) is now installed in China
- Globally, **42** new offshore wind farms went into operation in China, Vietnam, Japan, France, UK, South Korea, Germany, Spain and Italy
- Worldwide, **257** offshore wind farms[3] are currently in operation of which 140 are located in Asia, 115 in Europe and 2 in the USA

[2] In operation: all turbines installed and first power
[3] Wind farm: project consisting of at least two offshore wind turbines

57.6 GW

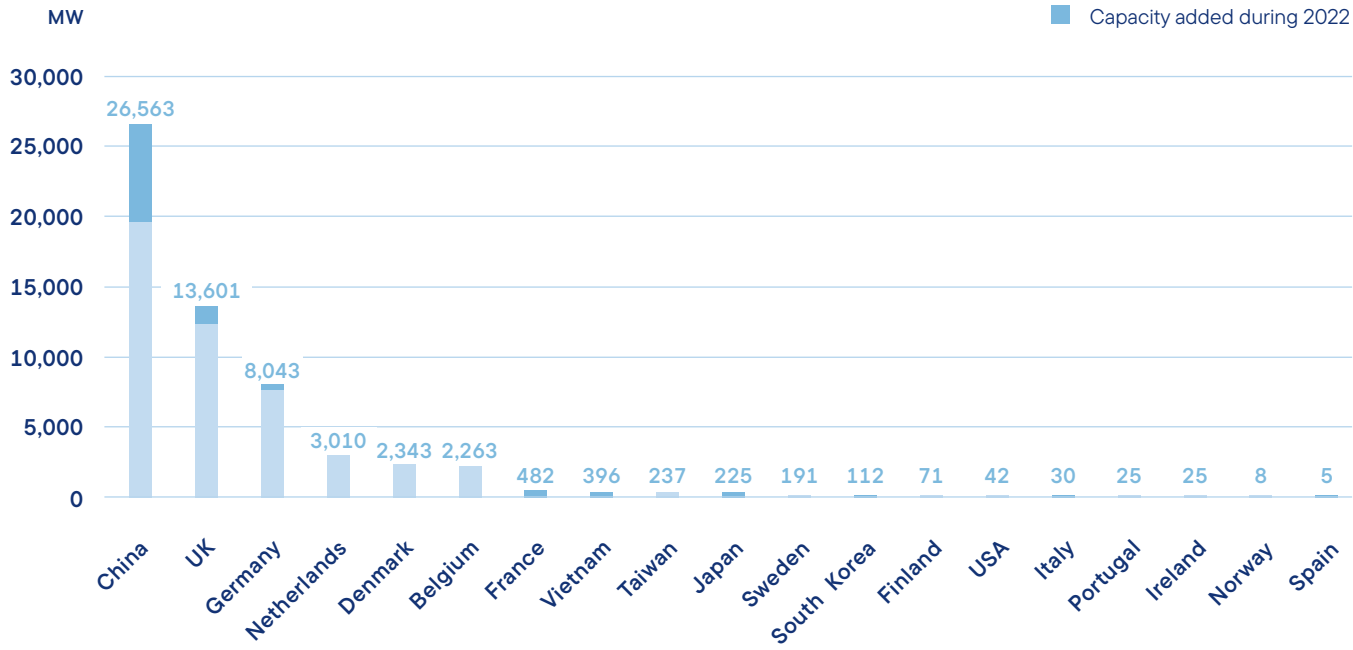
Global offshore wind capacity in operation

Top markets

France and Japan installed their first commercial-scale offshore wind farms in 2022

Global offshore wind capacity in operation[4] – by country

IN OPERATION



- **China's** growth continues with 6.8 GW of newly installed capacity during 2022, increasing its total installed capacity to **26.6 GW**
- **France** and **Japan** installed their first large-scale offshore wind farms: Saint Nazaire (480 MW), Akita/Noshiro Port (140 MW)
- After zero growth in 2021, **Germany** added the 342 MW Kaskasi project, increasing installed capacity to more than 8 GW

[4] In operation: all turbines installed and first power

6.8 GW

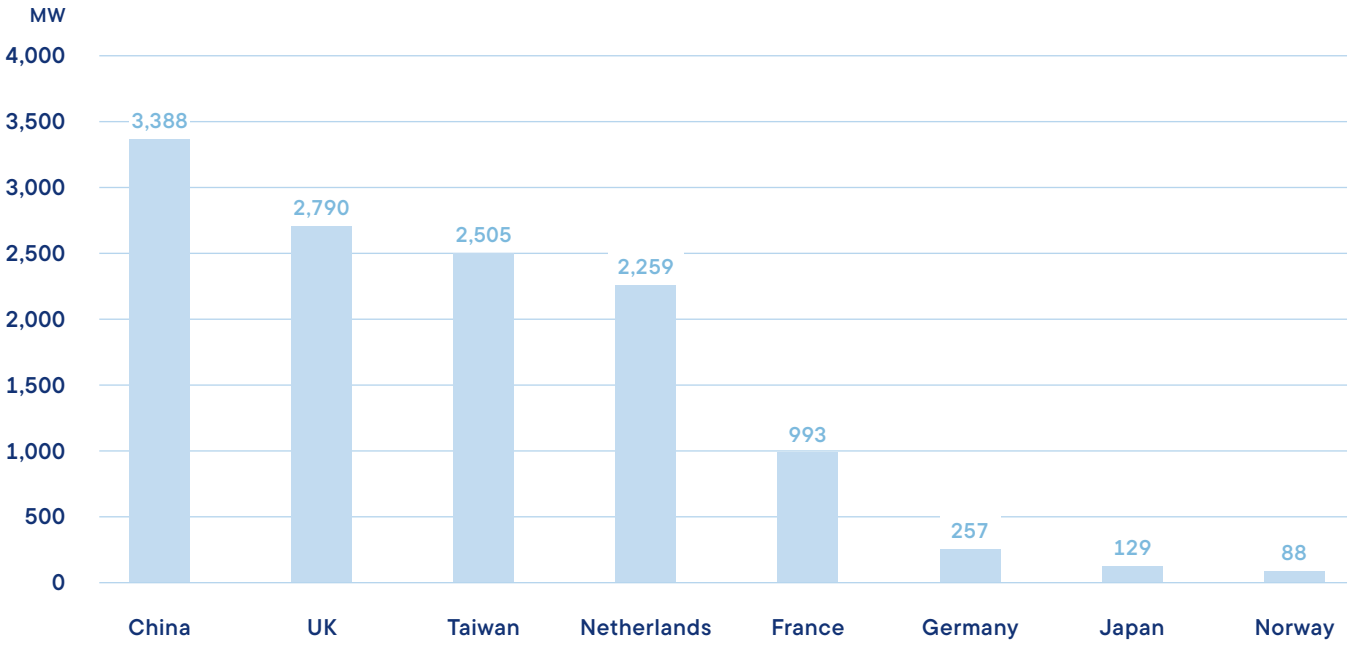
Offshore wind capacity added in China

Construction

China leads the way ahead of the UK, Taiwan and the Netherlands

Global offshore wind capacity under construction[5] by the end of 2022

UNDER CONSTRUCTION



- **China's** offshore wind sector continues to grow with a total capacity of **3.4 GW** currently under construction in Chinese waters
- The **UK** is in second place with **2.8 GW** including two GW-scale projects Dogger Bank A (1.2 GW) and Seagreen (1.1 GW)
- The **Netherlands** continue to grow with Hollandse Kust Noord (759 MW) and Hollandse Kust Zuid (1.5 GW) currently under construction

[5] Under construction: first offshore wind foundation installed

12.4 GW

Global offshore wind capacity under construction

In detail: Offshore wind farms under construction

No	Wind Farm	MW	Units	MW/Unit	Turbine	Location
1	DemoSATH (floating)	2	1	2.0	-	ES
2	Goto	17	8	2.1	Hitachi 2.1 MW	JP
3	Hywind Tampen (floating)	88	11	8.0	SG 8.0-167 DD	NO
4	Ishikari	112	14	8.0	SG 8.0-167 DD	JP
5	Rudong H13	150	30	5.0	H171-5.0MW	CN
6	Longyuan Putian Nanri Island I 2	180	45	4.0	SWT-4.0-130	CN
7	CGN Huizhou I	250	40	6.5	MySE6.45-180	CN
8	Arcadis Ost 1	257	27	9.5	V174-9.5 MW	DE
9	Changle Area A	300	36	10.0	DEW-D10000-185, GW175-8.0MW	CN
10	Changle Area C 2	300	37	10.0	DEW-D10000-185, SG 10.0-193 DD	CN
11	Fujian Putian City Flat Bay Three Zone C	308	44	7.0	SWT-7.0-154	CN
12	Formosa 2	376	47	8.0	SG 8.0-167 DD	TW
13	Cangnan #1 - Phase 1	400	49	6.25/10	-	CN
14	Neart na Gaoithe	450	54	8.4	SG 8.0-167 DD	UK
15	Saint-Brieuc	496	62	8.0	SG 8.0-167 DD	FR
16	Fécamp	497	71	7.0	SWT-7.0-154	FR
17	Guodian Xiangshan 1 2	500	41	12.0	-	CN
18	Mingyang Yangjiang Qingzhou IV	500	43	11/12	MySE 11-230, MySE 12-242	CN
19	Huadian Yangjiang Qingzhou III	500	67	6.8/8.3	MySE6.8-158, MySE8.3-180	CN
20	Changfang and Xidao	589	62	9.5	V174-9.5 MW	TW
21	Yunlin	640	80	8.0	SG 8.0-167 DD	TW
22	Hollandse Kust Noord	759	69	11.0	SG 11.0-200 DD	NL
23	Greater Changhua 1 & 2a	900	111	8.0	SG 8.0-167 DD	TW
24	Seagreen	1,140	114	10.0	V164-10 MW	UK
25	Dogger Bank A	1,200	95	13.0	Haliade-X 13 MW	UK
26	Hollandse Kust Zuid	1,500	140	11.0	SG 11.0-200 DD	NL
	Total	**12,411**				

1.5 GW

World's largest offshore wind farm under construction

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