Global Offshore Wind Report

2021

February 2022

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

75 + global
member
organisations

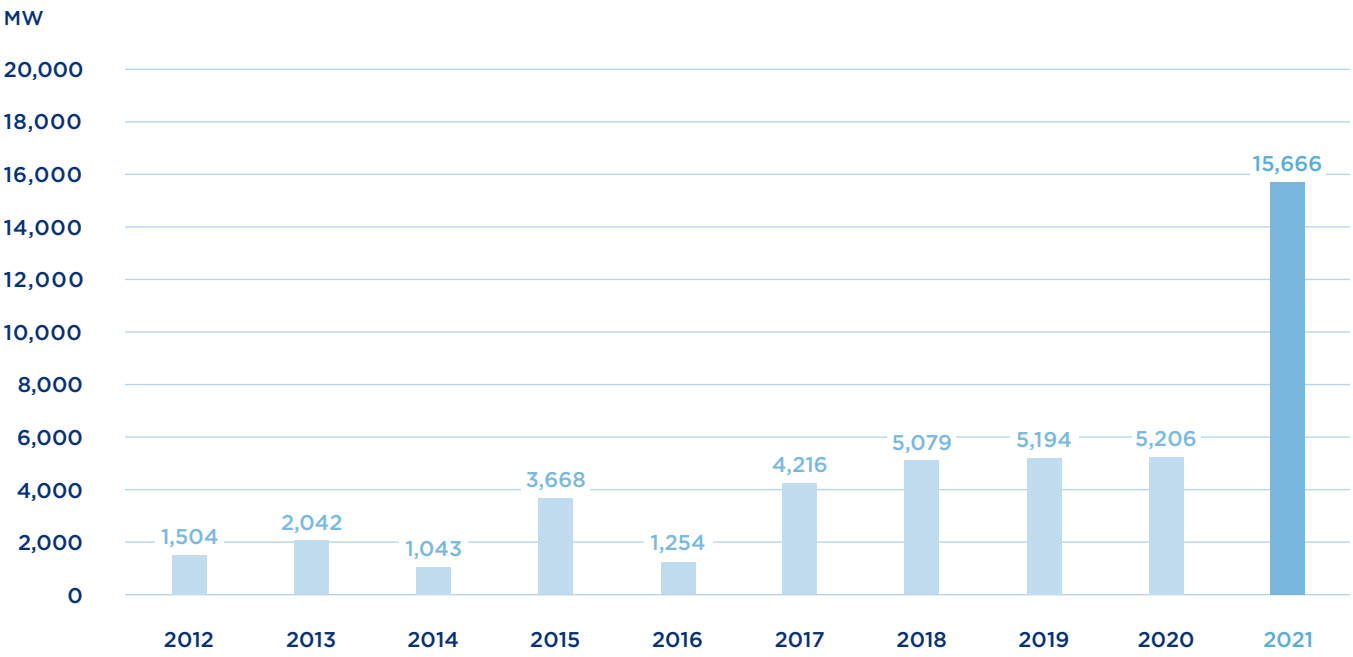
Global setup
with offices in
Hamburg, New York,
Tokyo, and Taipei

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.

Phenomenal growth in China makes 2021 a new record year for offshore wind installations

Annually added offshore wind capacity



- **15.7 GW** of global offshore wind capacity were added in 2021, driven by China due to the expiration of the Chinese feed-in tariff by the end of 2021
- Globally, **53** new offshore wind farms went into operation[1] in China (45), the UK (3), the Netherlands (2), Denmark (1), Taiwan (1), and Norway (1)
- The **average size** of a newly added offshore wind farm during 2021 was **296 MW** compared to 347 MW in 2020, due to many 200–300 MW projects in China

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

15.7 GW

Globally added offshore wind capacity in 2021

In detail: offshore wind farms put into operation in 2021

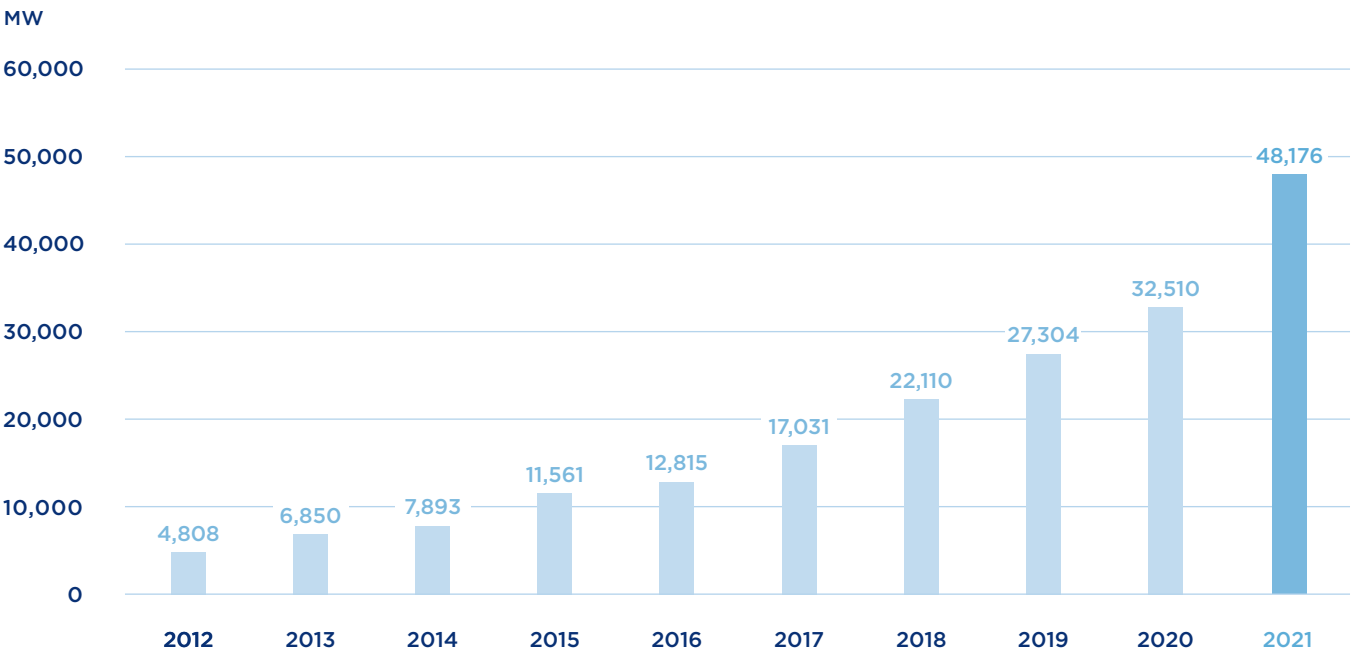
No	Wind Farm	MW	Units	MW/Unit	Turbine	Location
1	TetraSpar demo (floating)	4	1	3.6	Siemens Gamesa SG 3.6	NO
2	CTGNE Yangjiang Shapa III – demo (floating)	6	1	5.5	MySE5.5-155	CN
3	Borssele 5	19	2	9.5	MHI-Vestas V164-9.5	NL
4	Kincardine (floating)	50	6	9.5	Vestas V164-9.5 MW, Vestas V80-2 MW	UK
5	CTGNE Yangjiang Shapa III - A2	100	47	6.5	MySE6.45-180	CN
6	Sheyang H2-1	104	23	4.5	EN-148/4.5	CN
7	Changhua Phase 1	109	21	5.2	Hitachi 5.2 MW	TW
8	Zhuhai Guishan Hai Demonstration 1	120	37	3.0/6.45	MySE3.0-112, UP3000-108, MySE6.45-180	CN
9	Fujian Putian City Flat Bay (Zone F)	200	29	7.0/6.0	SWT-7.0-154, SWT-6.0-154	CN
10	Shicheng Fishing Port	200	29	7.0	SWT-7.0-154	CN
11	Zhanjiang Wailuo 200MW 2	200	32	6.3	SWT-6.25-172	CN
12	Zhugensha H1 – Dongtai V	200	50	4.0	–	CN
13	Fengxian 1	206	32	6.5	MySE6.45-180, GW184-6.45MW0	CN
14	Datang International Shantou Lemen I	245	35	7.0	SWT-7.0-154	CN
15	Fujian Putian City Flat Bay Two (Zone B)	246	41	6.0	SWT-6.0-154	CN
16	Qidong H1	250	42	6.25/5.2	SWT-6.25-172, EN-161/5.2	CN
17	Qidong H2	250	42	6.25/5.2	SWT-6.25-172, EN-161/5.2	CN
18	Guodian Zhoushan Putuo District 6-2	252	63	4.0	SWT-4.0-130	CN
19	Shengsi 5+6	282	45	6.3	SWT-6.25-172	CN
20	CECEP Yangjiang Nanpeng Island	300	55	5.5	MySE5.5-155	CN
21	CSIC Jiangsu Rudong H3-1	300	60	5.0	H151-5MW, H171-5.0MW	CN
22	CTGNE Jiangsu Dafeng H8-2	300	58	4.5/6.45	GW 155-4.5MW, GW171-6.45MW	CN
23	CTGNE Yangjiang Shapa I	300	55	5.5	MySE5.5-155	CN
24	CTGNE Yangjiang Shapa III - A1	300	47	6.5	GW171-6.45MW, MySE6.45-180	CN
25	CTGNE Yangjiang Shapa V	300	47	6.5	MySE6.45-180	CN
26	Huadian Fujian Fuqing Haitan Strait	300	46	7.0/6.2	MySE7.0-158, H171-6.2MW	CN
27	Huaneng Dalian Zhuanghe II	300	60	5.0	H171-5.0MW	CN
28	Huaneng Guanyun 1	300	48	6.5	GW184-6.45MW, GW171-6.45MW	CN
29	Huaneng Shandong Peninsula South 4	300	58	5.2	EN-161/5.2	CN
30	Rudong H8	300	67	5.0/4.0	H171-5.0MW, SWT-4.0-146	CN
31	SPIC Binhai South H3	300	75	4.0	SWT-4.0-146	CN
32	Zhanjiang Xuwen-North	300	47	6.5	MySE6.45-180	CN
33	Zhuhai Jinwan	300	55	5.5	MySE5.5-155	CN
34	CTGNE Yangjiang Shapa IV	300	43	7.0	DEW-D7000-186	CN
35	Zhejiang Jiaxing 1	301	74	4.0	XE148-4000, SWT-4.0-146	CN
36	Sheyang H1	302	67	4.5	EN-148/4.5	CN
37	Sheyang H2	302	67	4.5	EN-148/4.5	CN
38	SPIC Shandong Peninsula South 3	302	58	5.2	EN-161/5.2	CN
39	Zhugensha H2	302	67	4.0/6.0	SWT-4.0-146, SWT-6.0-172	CN
40	Qidong H3	305	50	6.25/5.2	SWT-6.25-172, EN-161/5.2	CN
41	Shenquan 1	316	53	5.5/7.0	MySE5.5-155, SWT-7.0-154	CN
42	Huaneng Dalian Zhuanghe IV 1	350	51	7.5/6.2	DEW-7.5MW-186, H171-6.2MW	CN
43	Rudong H2	350	70	5.0	H171-5.0MW	CN
44	Windpark Fryslan	383	89	4.3	Siemens Gamesa SWT-4.3-130	NL
45	CTGNE Yangjiang Shapa II	400	62	6.5	MySE6.45-180, GW171-6.45MW	CN
46	Rudong H10	400	100	4.0	SWT-4.0-146	CN
47	Rudong H6	400	100	4.0	SWT-4.0-146	CN
48	Shengsi 2	400	67	6.45/6.25	MySE6.45-180, SWT-6.25-172	CN
49	SPIC Rudong H4	400	100	4.0	SWT-4.0-146	CN
50	CGN Shanwei Houhu	500	91	5.5	MySE5.5-155	CN
51	Kriegers Flak	605	72	8.0	Siemens Gamesa SG 8.0-167 DD	DK
52	Triton Knoll	857	90	9.5	Vestas V164-9.5 MW	UK
53	Moray East	950	100	9.5	Vestas V164-9.5 MW	UK
	Total	15,666				

Global growth

Offshore wind capacity jumps to almost 50 GW

Global offshore wind capacity in operation[2] – cumulative

IN OPERATION



- Globally, installed offshore wind capacity reached **48.2 GW** by the end of the year 2021, 40 % of which (19.7 GW) is now installed in China
- During the 2nd half of 2021, new offshore wind installations exceeded the first six months by far with **14,045 MW** due to China's vast buildout
- Worldwide, **215** offshore wind farms[3] are currently in operation of which 110 are located in Europe, 103 in Asia 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

48.2 GW

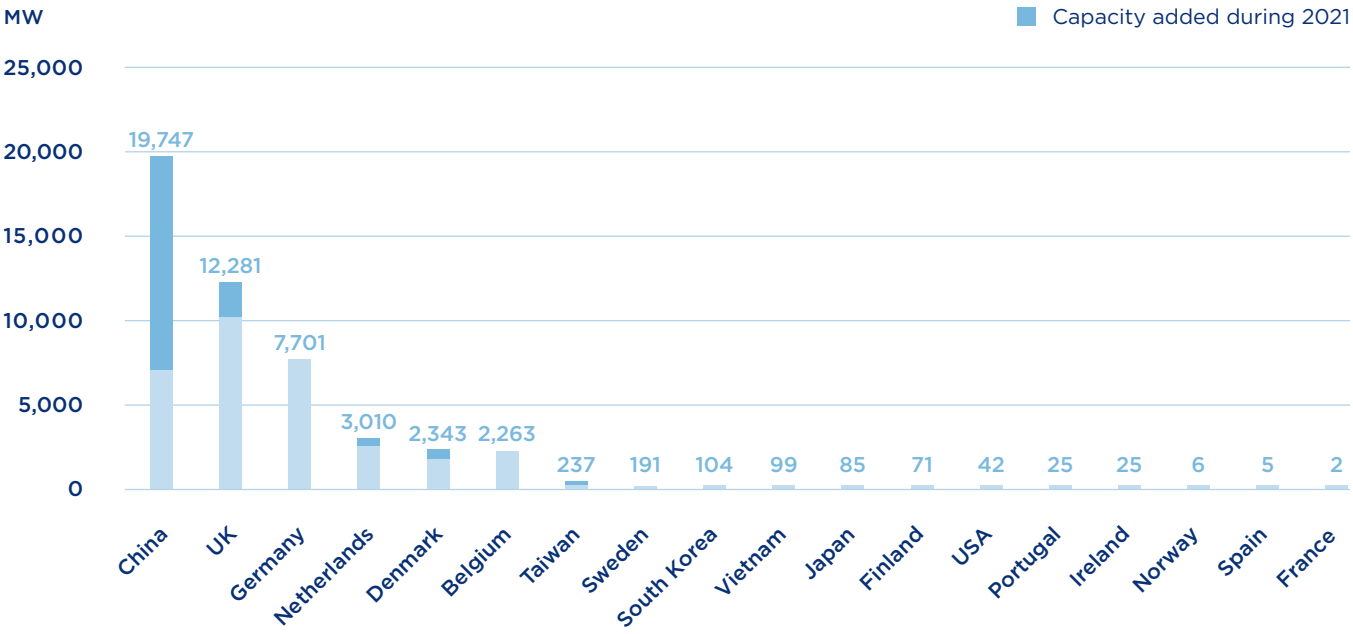
Global offshore wind capacity in operation

Top markets

China becomes the largest offshore wind market by far ahead of the UK and Germany

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

IN OPERATION



- **China** grew phenomenally with **12.689 MW**[5] of newly installed capacity during 2021, increasing its total installed capacity to **19.7 GW**
- **China** is now the world's largest offshore wind market by far with almost as much installed capacity as the UK and Germany combined
- **Germany** falls behind China and the UK with a stagnant total of 7.7 GW and no new capacity added or under construction during 2021

[4] In operation: all turbines installed and first power
[5] Difference between figures of China's National Energy Administration (16.9 GW) is due to definition of operational capacity

12.7 GW

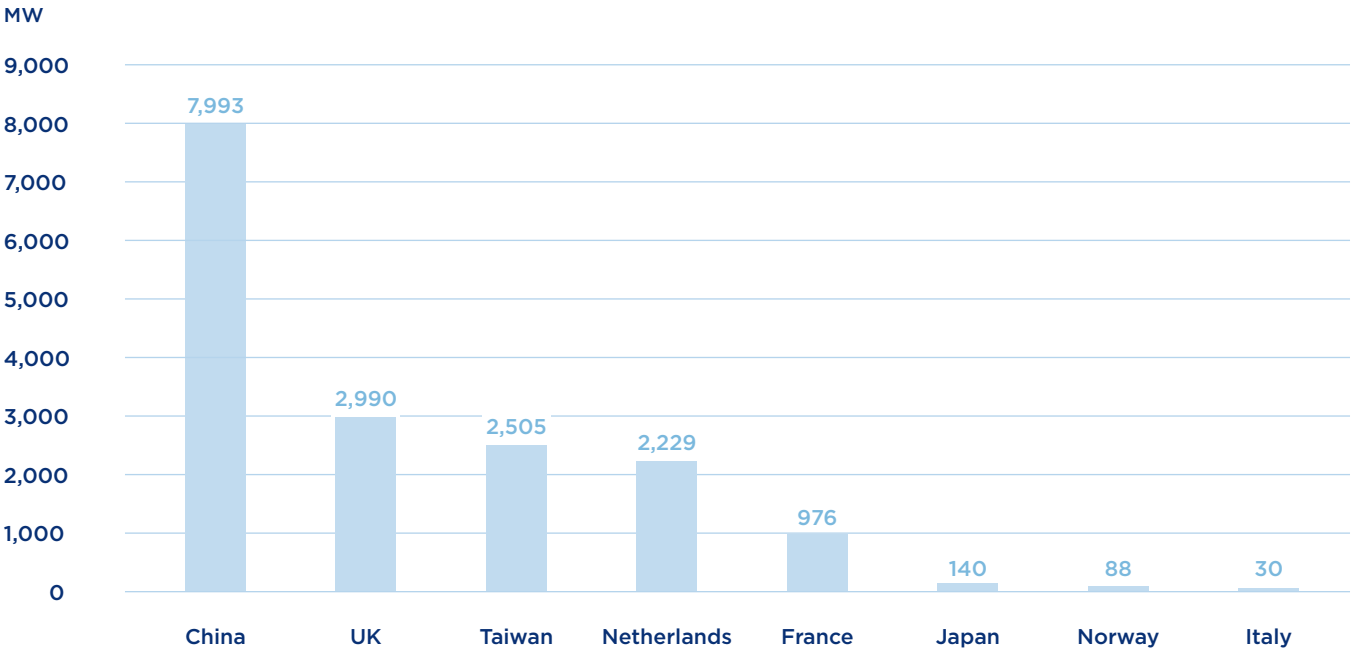
Offshore wind capacity added in China in 2021

Construction

Strong growth in China and in new markets around the world

Global offshore wind capacity under construction[6] until end of 2021

UNDER CONSTRUCTION



- **China's** offshore wind sector continues to grow rapidly with a total capacity of **8 GW** currently under construction
- In **France**, **Japan** and **Italy** the first **commercial-scale** offshore wind farms went into construction
- In **Norway** the world's largest **floating** offshore wind farm (88 MW) is currently under construction

[6] Under construction: first offshore wind foundation installed

17 GW

Global offshore wind capacity under construction

In detail: offshore wind farms under construction[7] worldwide

No	Wind Farm	MW	Units	MW/Unit	Turbine	Location
1	Taranto	30	10	3.0	MySE 3.0-135	IT
2	Pingtan Strait Gongtie Bridge Lighting Project	34	5	6.7	GW154-6.7MW	CN
3	Pudong New District Donghai Bridge Project	46	7	6.5	W6.5F-185	CN
4	Jiangjiasha	50	15	3.3	GW 155-3.3MW	CN
5	Akita Port	56	13	4.2	V117 – 4.2 MW	JP
6	Zhuhai Guishan Hai Demonstration 2	83	12	7.0	DEW-D7000-186, MySE6.45-180	CN
7	Noshiro Port	84	20	4.2	V117 – 4.2 MW	JP
8	Hywind Tampen (floating)	88	11	8.0	SG 8.0-167 DD	NO
9	CSIC Jiangsu Rudong H3-2	100	20	5.0	H151-5MW	CN
10	Huadian Yuhuan 1 South	146	20	7.0	DEW-D7000-186	CN
11	Rudong H13	150	30	5.0	H171-5.0MW	CN
12	Huadian Yuhuan 1 North	154	22	7.0	DEW-D7000-186	CN
13	Longyuan Putian Nanri Island I 2	180	45	4.0	SWT-4.0-130	CN
14	Fujian Pingtan Datang Changjiangao	185	37	5.0	MySE5.0-133	CN
15	Changle Area C 1	200	20	10.0	DEW-D10000-185	CN
16	Rudong H15	200	40	5.0	H171-5.0MW	CN
17	Longyuan Putian Nanri Island I 1	204	51	4.0	SWT-4.0-130	CN
18	Dafeng H5	206	32	6.45	GW184-6.45MW	CN
19	Xinliao	206	32	6.45	MySE6.45-180	CN
20	CGN Pingtan Island	240	60	4.0	SWT-4.0-130, MySE5.5-155	CN
21	CGN Huizhou I	250	40	6.5	MySE6.45-180	CN
22	Guodian Xiangshan 1 1	254	41	6.2	H171-6.2MW	CN
23	Fuqing Xinghua Bay 2	288	46	6.7	GW154-6.7MW, DEW-G5000-140	CN
24	Changle Area A	300	36	10.0	DEW-D10000-185, GW175-8.0MW	CN
25	Changle Area C 2	300	37	10.0	DEW-D10000-185, SG 10.0-193 DD	CN
26	Dafeng H6	300	47	6.5	GW184-6.45MW	CN
27	Rudong H5	300	75	4.0	SWT-4.0-146	CN
28	Zhejiang Jiaxing 2	300	50	6.0	SWT-6.0-154	CN
29	Yuedian Yangjiang Shapa	300	47	6.45	MySE6.45-180	CN
30	Zhanjiang Xuwen-South	300	47	6.45	GW171-6.45MW	CN
31	Mingyang Yangjiang Shapa	300	46	6.5	MySE6.45-180	CN
32	Longyuan Jiangsu Dafeng H4	302	47	6.5	GW184-6.45MW	CN
33	Fujian Putian City Flat Bay Three Zone C	308	44	7.0	SWT-7.0-154	CN
34	Formosa 2*	376	47	8.0	SG 8.0-167 DD	TW
35	SPIC Rudong H7	400	100	4.0	SWT-4.0-146	CN
36	CGN Shanwei Jiazi II	403	62	6.5	MySE6.45-180	CN
37	Neart na Gaoithe	450	54	8.4	SG 8.0-167 DD	UK
38	Saint-Nazaire	480	80	6.0	GE Haliade 160-6MW	FR
39	Saint-Brieuc*	496	62	8.0	SG 8.0-167 DD	FR
40	Guodian Xiangshan 1 2	500	41	12.0	–	CN
41	CGN Shanwei Jiazi I	503	78	6.5	MySE6.45-180	CN
42	Changfang and Xidao	589	62	9.5	V174-9.5 MW	TW
43	Yunlin	640	80	8.0	SG 8.0-167 DD	TW
44	Hollandse Kust Noord	759	69	11.0	SG 11.0-200 DD	NL
45	Greater Changhua 1&2a	900	111	8.0	SG 8.0-167 DD	TW
46	Seagreen	1,140	114	10.0	V164-10 MW	UK
47	Hornsea 2	1,400	165	8.4	SG 8.0-167 DD	UK
48	Hollandse Kust Zuid	1,540	140	11.0	SG 11.0-193 DD	NL
	Total	17,021				

[7] Under construction: first offshore wind foundation installed

* Only pin-piles were installed by the end of 2021

JOIN US!

World Forum Offshore Wind e.V.
Gunnar Herzig | Managing Director

Mobile +49 162 639 67 14
E-Mail gunnar.herzig@wfo-global.org
Twitter @WFO_global
LinkedIn World Forum Offshore Wind (WFO)

www.wfo-global.org