



NORWEP

Global Offshore Wind Market Report 2021

Bergen 07 September 2021





Agenda



Time	Topic	Speaker
09:00	Registration and Coffee	Sandra IN og JBT
09:30	Welcome – GCE and MB	Kai Stoltz og Siv Remøy
09:35	NORWEP Annual Global Offshore Wind Market Report	Jørgen B. Theodorsen
10:20	Pause	
10:30	Odfjell Oceanwind	Stig Waage
10:40	DOF	Jan Kristian Haukeland
10:50	IN	Ivar Singstad
11:00	Hva tenker politikerne?	Marte Mjøs Persen (Ap) og Liv Kari Eskeland (H)
11:20	Avslutning	Kai Stoltz og Siv Remøy



Norwegian Energy Partners

is an independent non-profit foundation established to strengthen the long-term basis for value creation and employment in the Norwegian energy industry through facilitation of the industry's international business activities.

We have 300 partners/company members from the Norwegian offshore, energy and maritime industries!

Founders

Organisations

- Energy Norway
- Federation of Norwegian Industries
- Norwegian Oil and Gas Association
- Norwegian Shipowners' Association
- The Norwegian Confederation of Trade Unions

Norwegian Government

- Ministry of Petroleum and Energy
- Ministry of Trade and Industry
- Ministry of Foreign Affairs

Industry

- Equinor
- Statkraft



NORWEP - what we do



Provide market and project information to NORWEP partners and Norwegian industry at large

Map Norwegian competence and technology to fit needs in the energy industry

Create relevant dialogues between Norwegian industry and international partners and clients



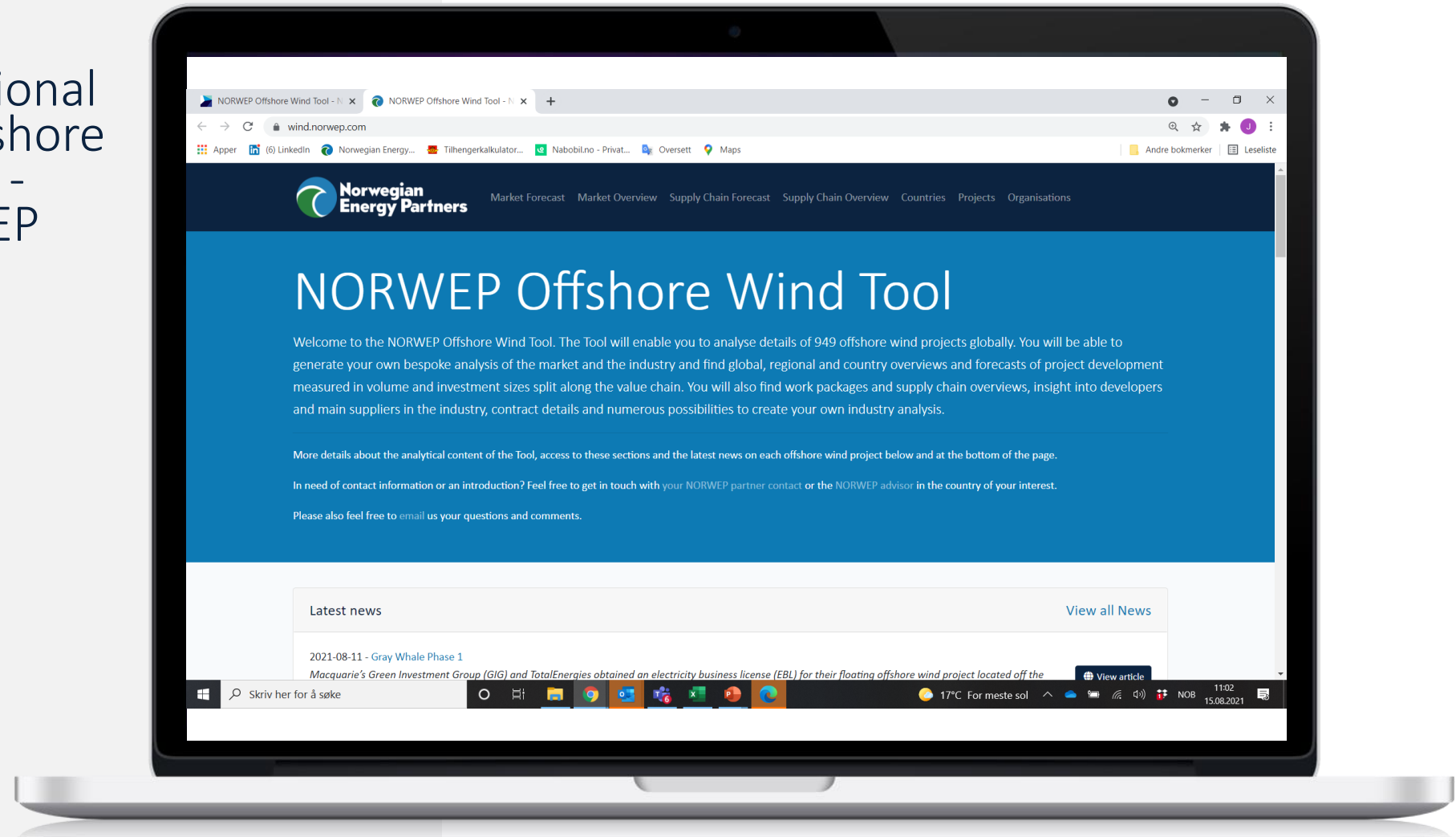
United Arab Emirates

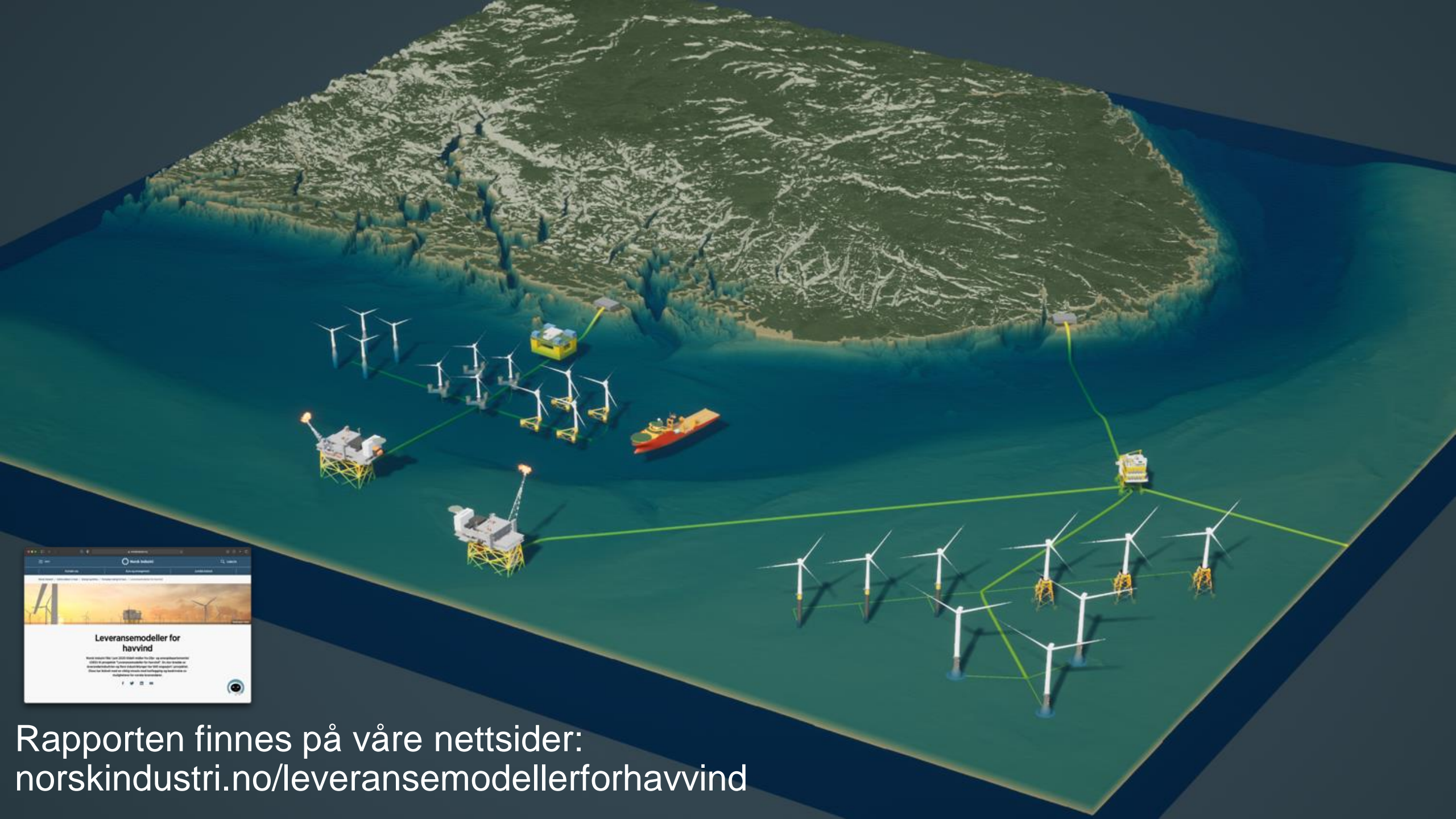
Brunei



Market Report 2021 and Offshore Wind Tool

A digital base of information on all regional markets and 900+ offshore wind projects globally - exclusively for NORWEP partners!





Rapporten finnes på våre nettsider:
norskindustri.no/leveransemodellerforhavvind

Country	Type of market	Ease of doing business	Size of the opportunity (at 2030)
China	Established	Difficult	Large
Denmark	Established	Easy	Medium
France	Established	Moderate	Medium
Germany	Established	Easy	Large
Netherlands	Established	Easy	Medium
Taiwan	Established	Moderate	Large
UK	Established	Easy	Large
Ireland	Emerging	Easy	Medium
Japan	Emerging	Moderate	Medium
Poland	Emerging	Moderate	Medium
South Korea	Emerging	Moderate	Medium
US	Emerging	Moderate	Large
Vietnam	Emerging	Difficult	Medium
Australia	Potential	Easy	Small
Baltic States	Potential	Moderate	Small
Brazil	Potential	Difficult	Small
India	Potential	Moderate	Medium
Italy	Potential	Easy	Small
Spain	Potential	Easy	Small
Sweden	Potential	Easy	Small

Det globale havvindmarkedet

- Det globale marked – vurdering som er gjort i prosjektet
- Europa som «hjemmemarked»
- Omstilling må starte nå – det tar tid før det blir aktivitet på norsk sokkel

Floating wind will piggyback on previous innovations and cost reduction, while innovate and open new markets and application areas



Resources

Deeper, farther from shore
Site flexibility
Space availability

Jobs

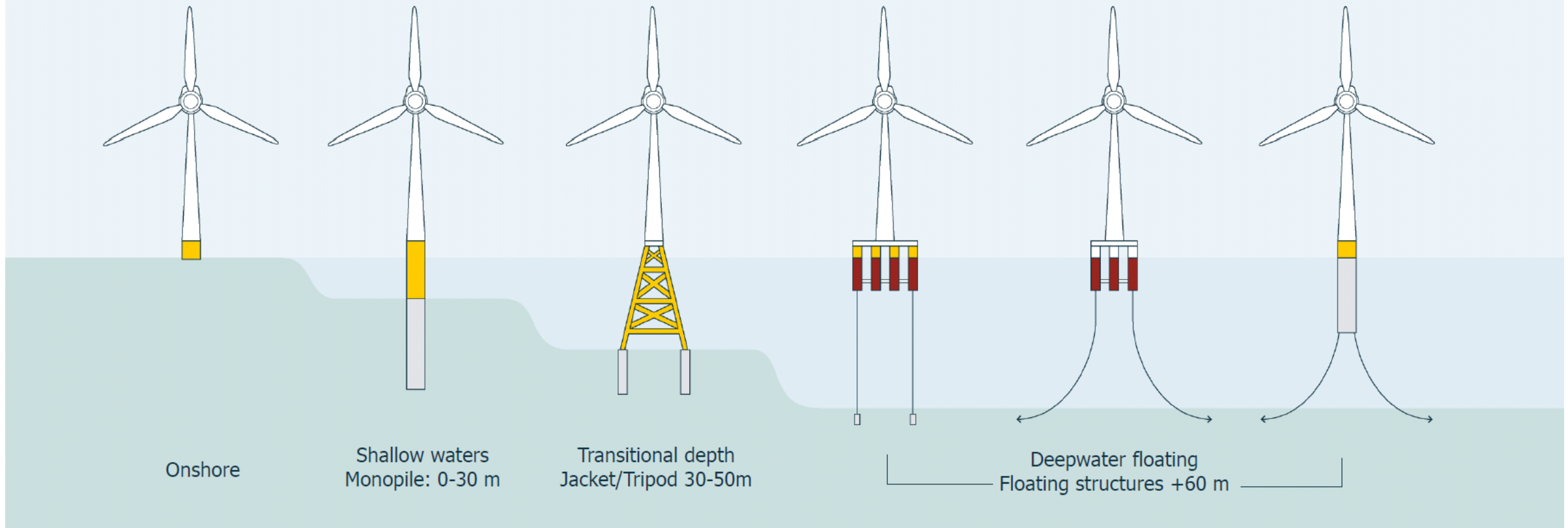
Domestic and export industrial opportunities
Regional developments
Build on O&G

Economics

High capacity factor
Higher scalability?
Standardisation potential

New application areas

Electricity to population centers
Power industry and O&G
Recycle marine spaces



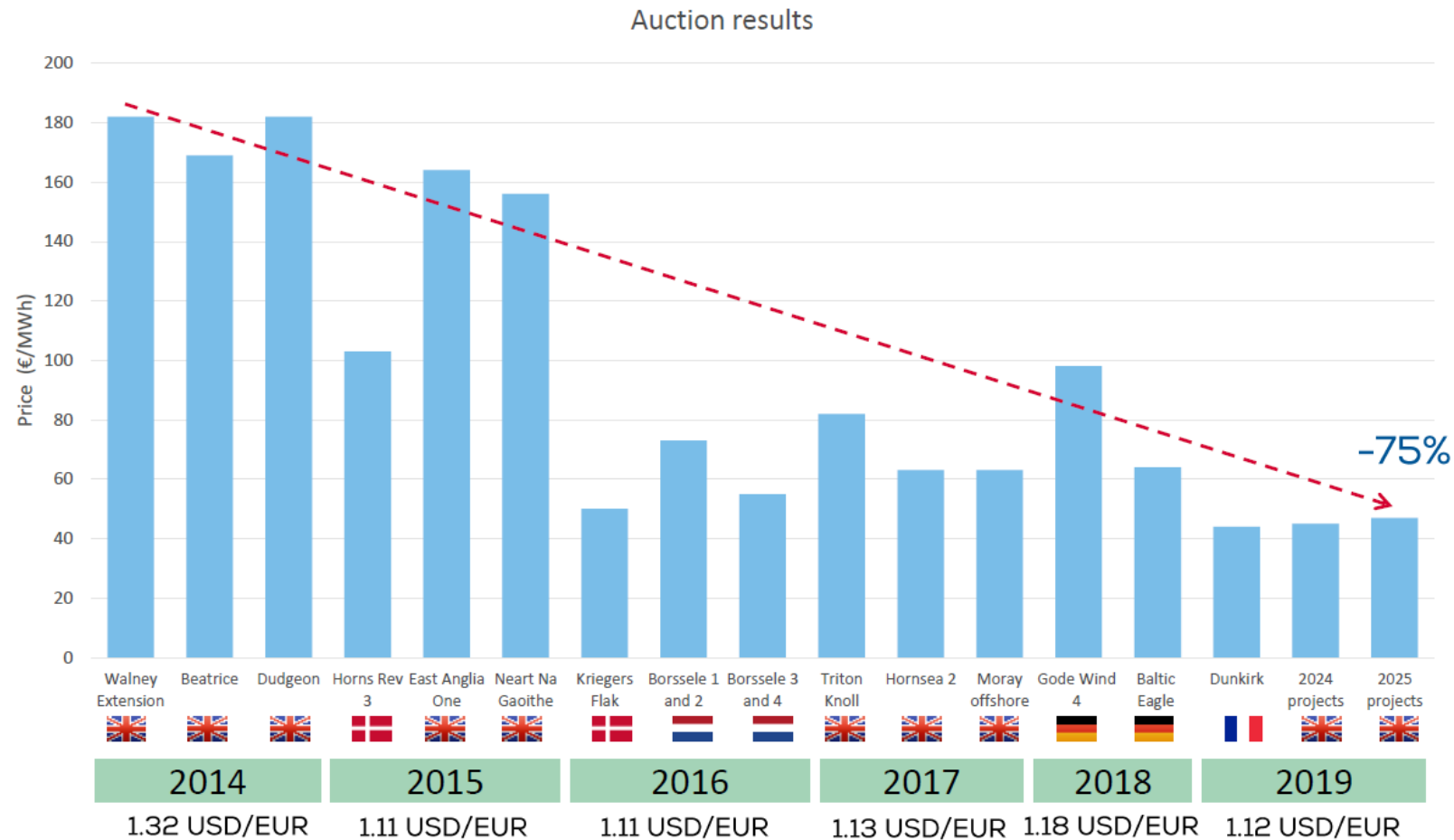


NORWEP Global Offshore Wind Market Report - Highlights

- Cost and politics driving the industry in Europe, the US and in the APAC region
- Emerging countries developing road maps for offshore wind
- Announced capacity almost doubled in 2020/21
- Announced floating capacity more than doubled
- Key power utilities are joined by oil majors in new alliances worldwide
- Globalisation and local content as key trends to watch
- Scalability of supply chain a major limiting factor

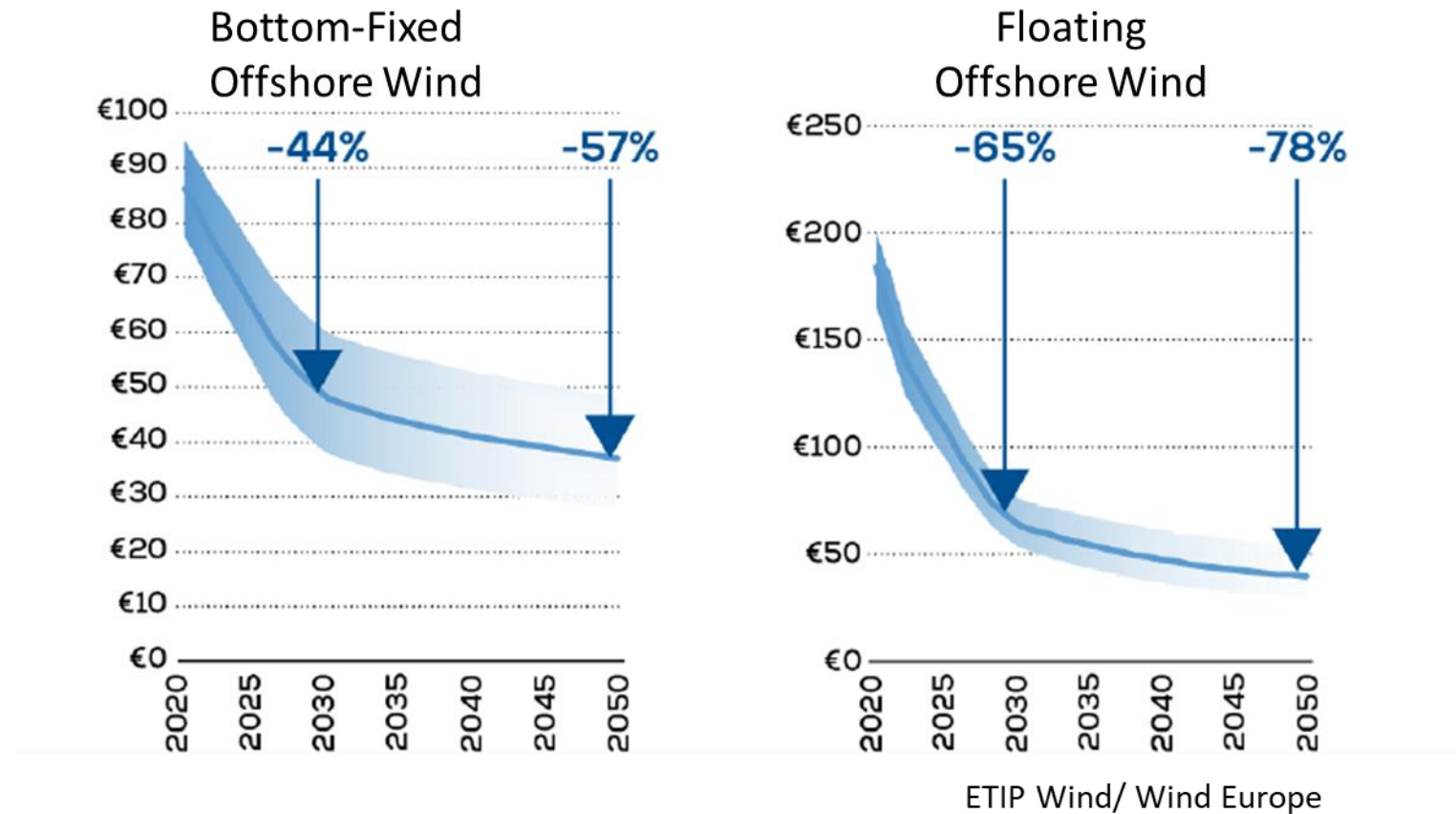


Offshore wind cost reduction so far





Further cost reductions expected





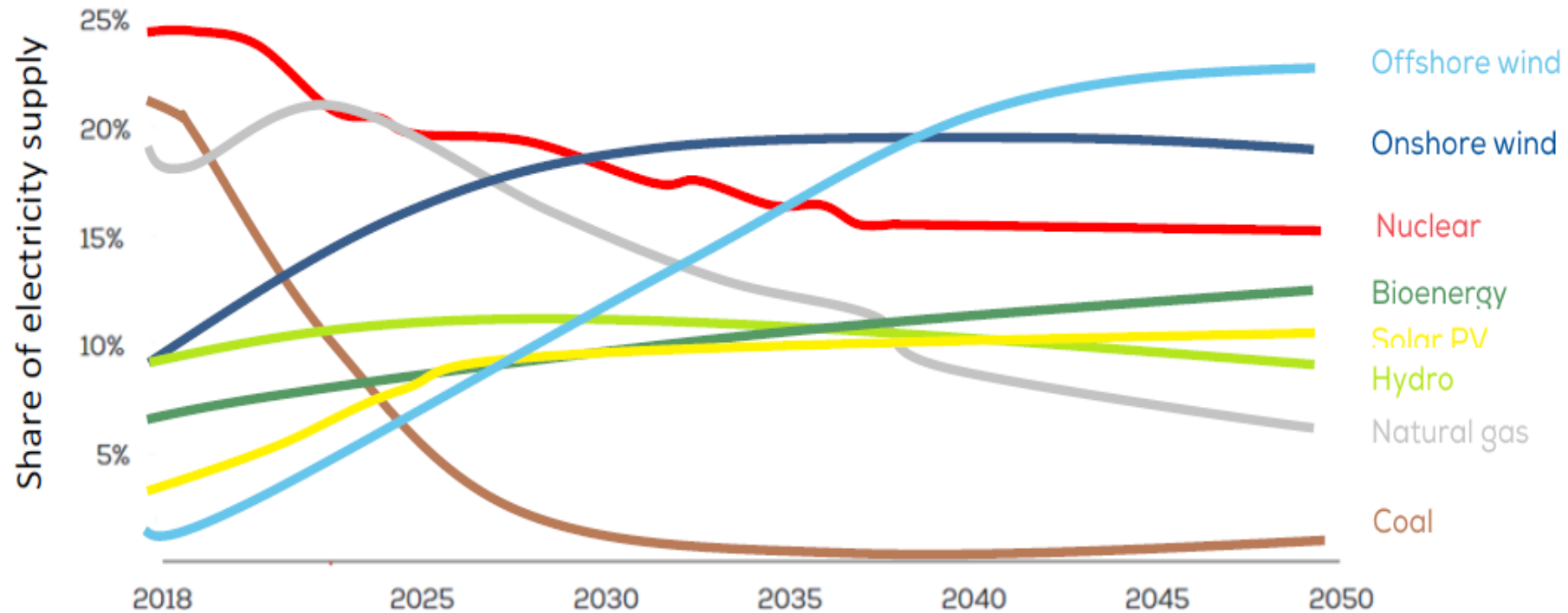
**Offshore wind -
driven by
governments and
institutions**

[Back to overview](#)

US Jumpstarts Offshore Wind, Targets 30 GW by 2030

March 30, 2021, by Adrijana Buljan

Shares of electricity generation by technology in the European Union. Sustainable Development Scenario





Headlines every day!

7050 milliarder ventes investert i havvind de neste ti år: Antall prosjekter doblet i 2020

Antallet havvindprosjekter i verden ble doblet i 2020. Norske bedrifter kaprer markedsandeler.

TU 17082021



Ørsted går sammen med Fred. Olsen Renewables og Hafslund Eco i norsk havvindkonsortium

09.06.2021 11:55



Ørsted tilslutter sig konsortiet med Fred. Olsen Renewables og Hafslund Eco og etablerer et langsiktig partnerskap om at utvikle havvind i Norge og om at delta i Norges forestående ansøgningsrunde for havvindområder.

Wind turbines could be coming to California's coast

New bill would set state target to build hundreds of tall turbines in the Pacific Ocean by 2030



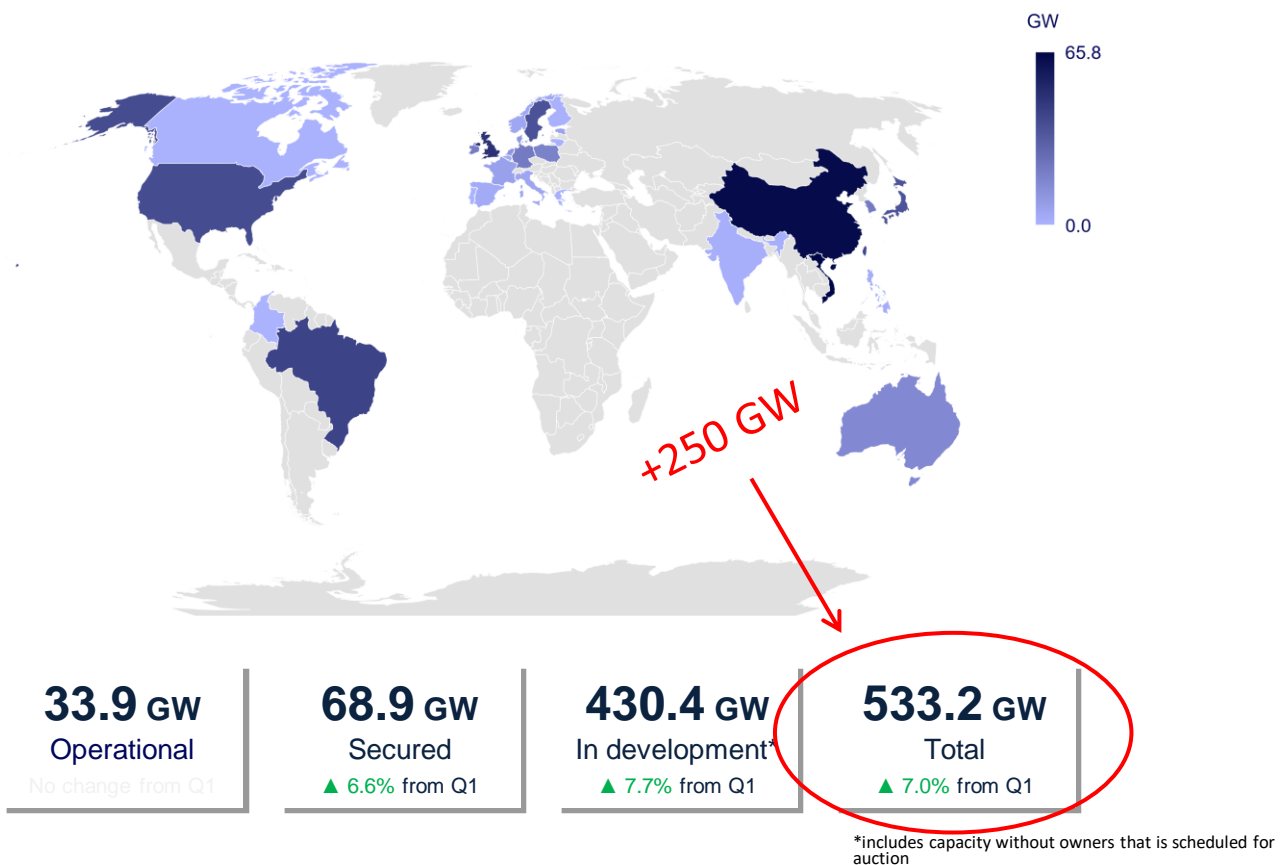


amazon

Orsted



Capacity of announced projects almost doubled in 2020

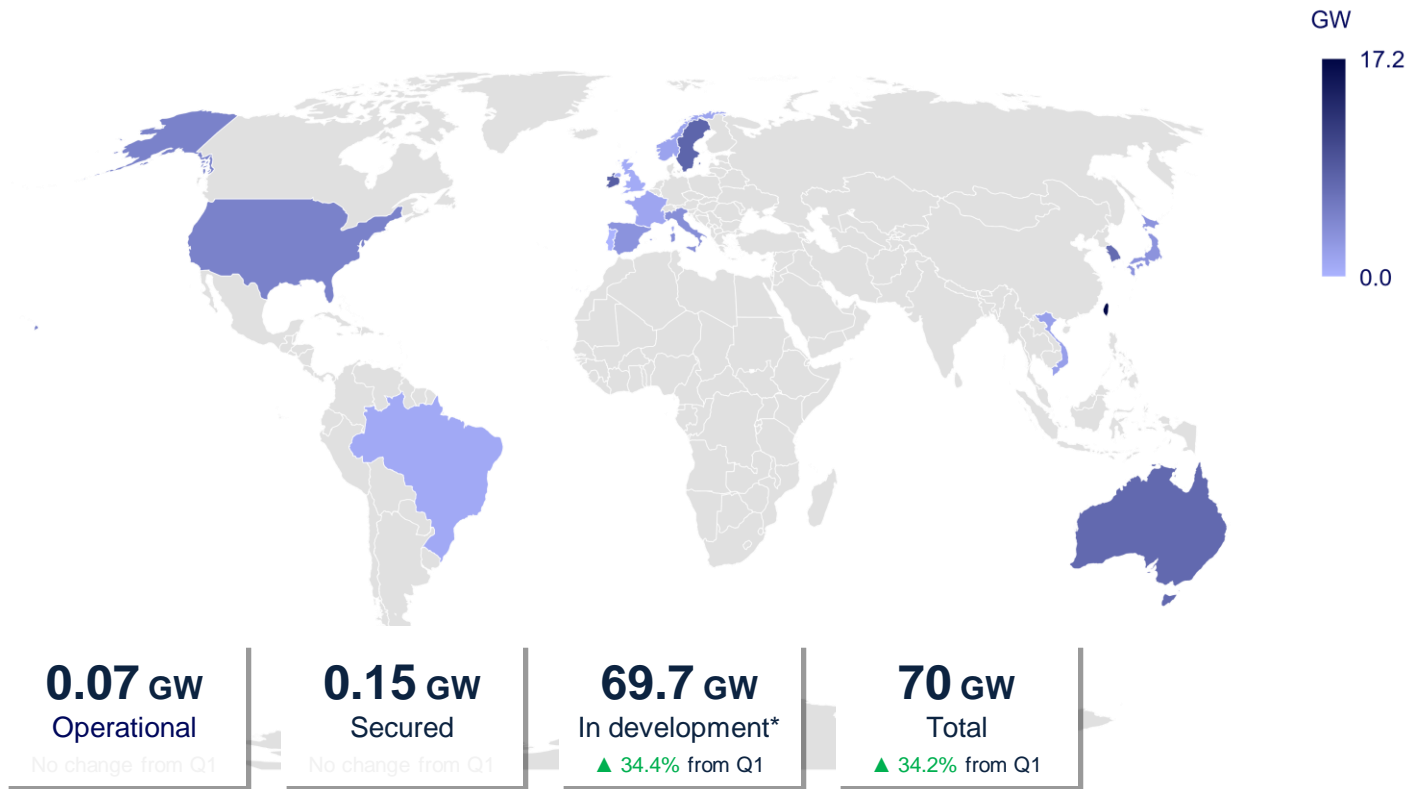


Top 16 (Q2 2021)

#	Country	Operational	Secured	Development*	Total
1	Vietnam	99	783	64,919	65,801
2	China	8,524	24,824	30,237	63,586
3	United Kingdom	10,424	9,927	28,978	49,329
4	Brazil			42,537	42,537
5	Taiwan	128	5,167	36,229	41,524
6	USA	42	11,586	27,538	39,166
7	Sweden	191		36,766	36,957
8	Japan	61	146	36,162	36,369
9	Germany	7,653	3,125	10,552	21,330
10	South Korea	95	95	21,121	21,311
11	Ireland	25		21,023	21,048
12	Poland		5,933	12,804	18,737
13	Australia			15,887	15,887
14	The Netherlands	2,620	2,682	6,100	11,402
15	Denmark	1,701	949	7,768	10,418
16	France	2	3,513	3,384	6,899

Ranking based on total size of portfolio

Utility scale floating wind emerge



Powered by Bing
© Australian Bureau of Statistics, GeoNames, Microsoft, Navinfo, TomTom, Wikipedia

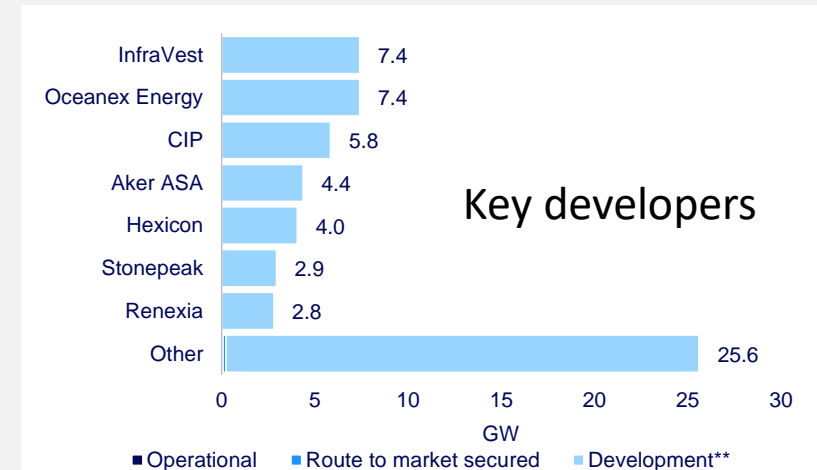
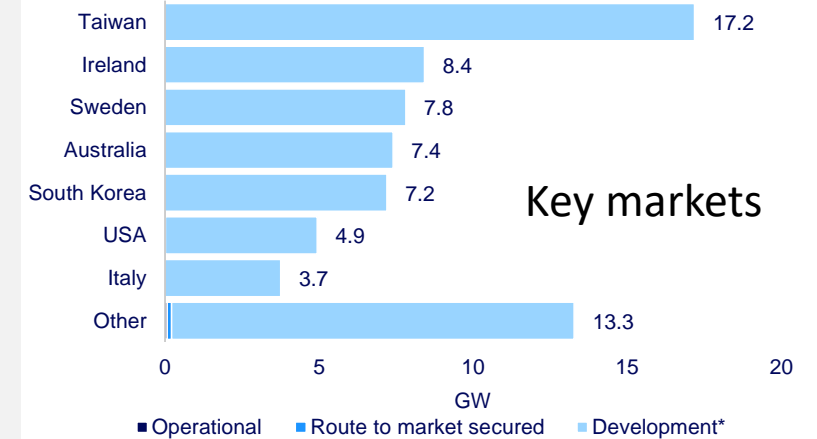
Shell and CoensHexicon to Jointly Build 1.4 GW Floating Wind Farm Offshore Korea



WIND FARM UPDATE

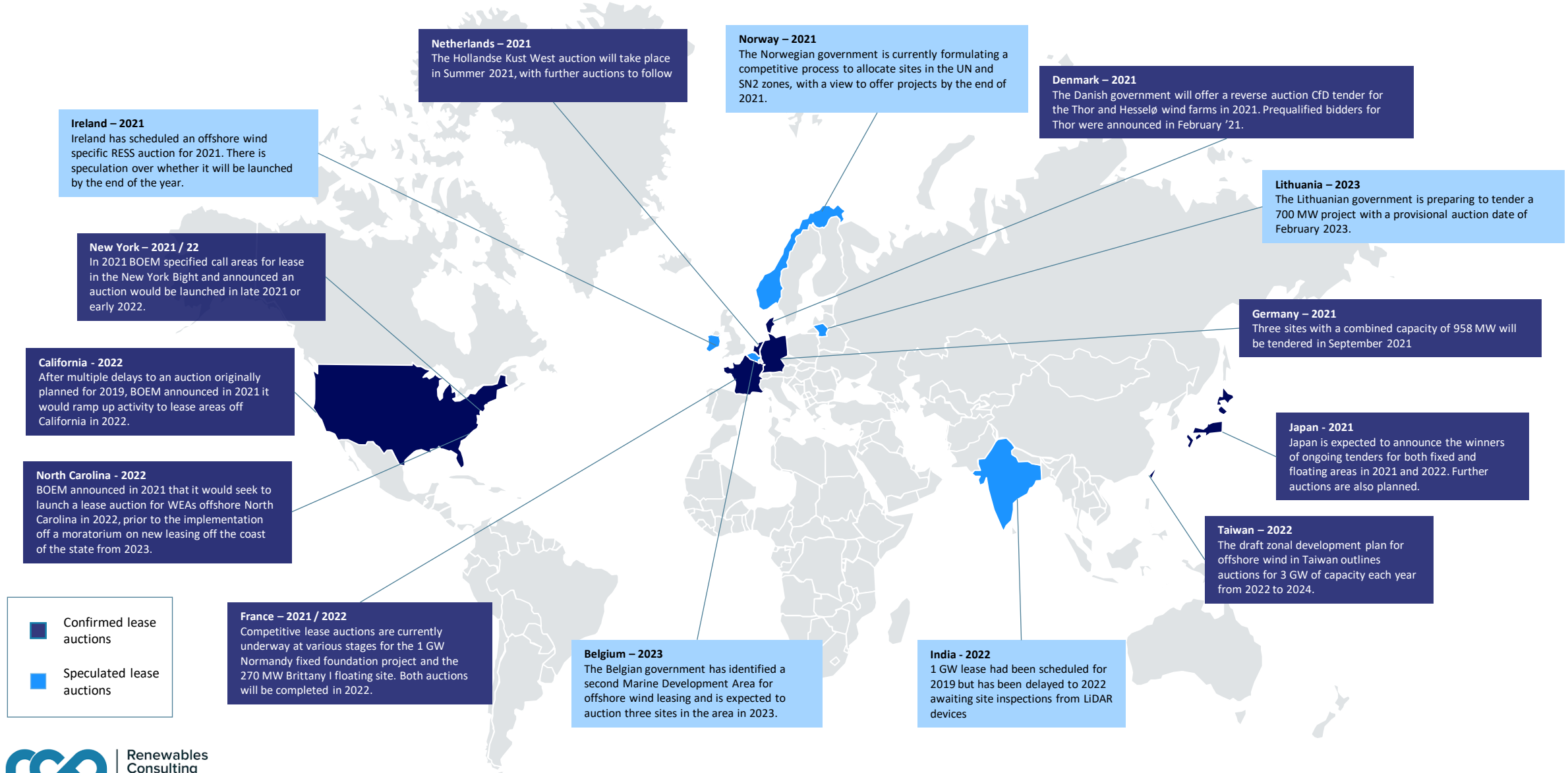
September 1, 2021, by Adnan Durakovic

Shell Overseas Investment B.V. and CoensHexicon Co., LTD have established a joint venture to develop and operate a 1.4 GW floating wind project off the south-east coast of South Korea.



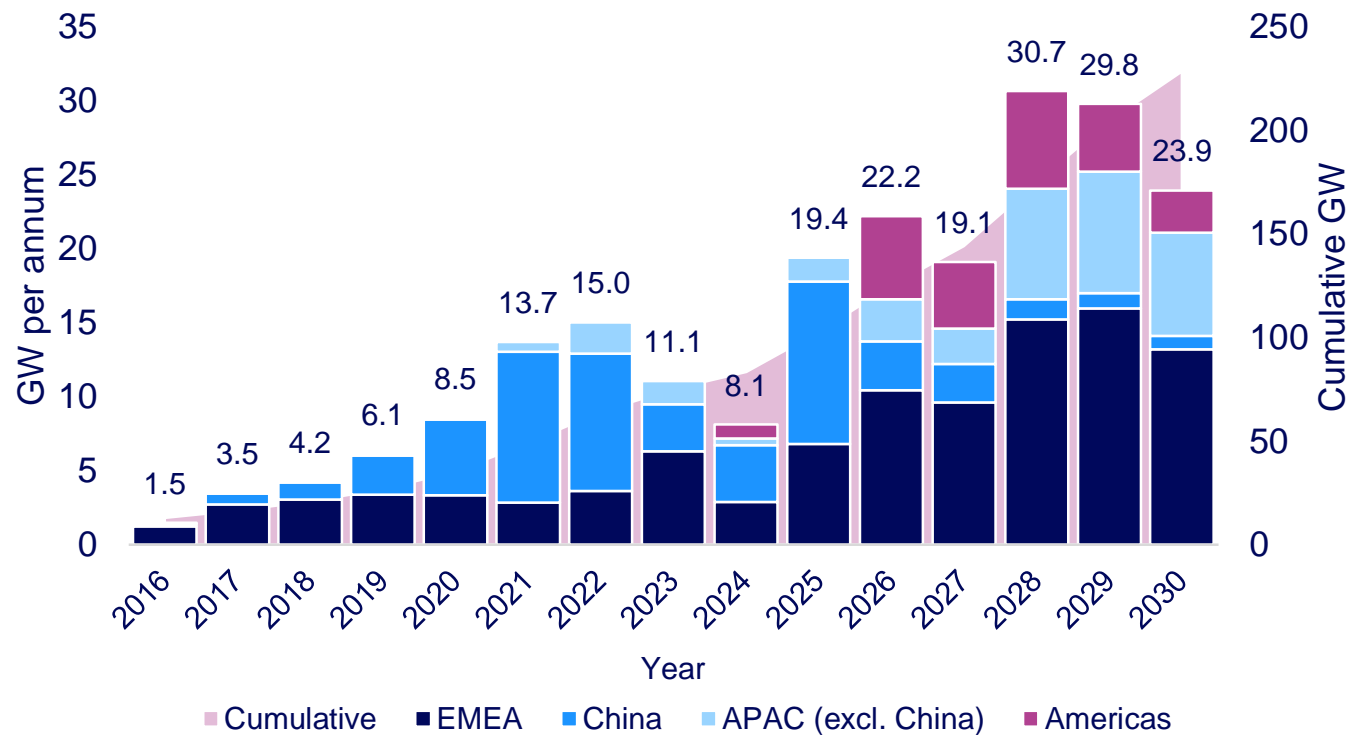


Upcoming lease auctions*





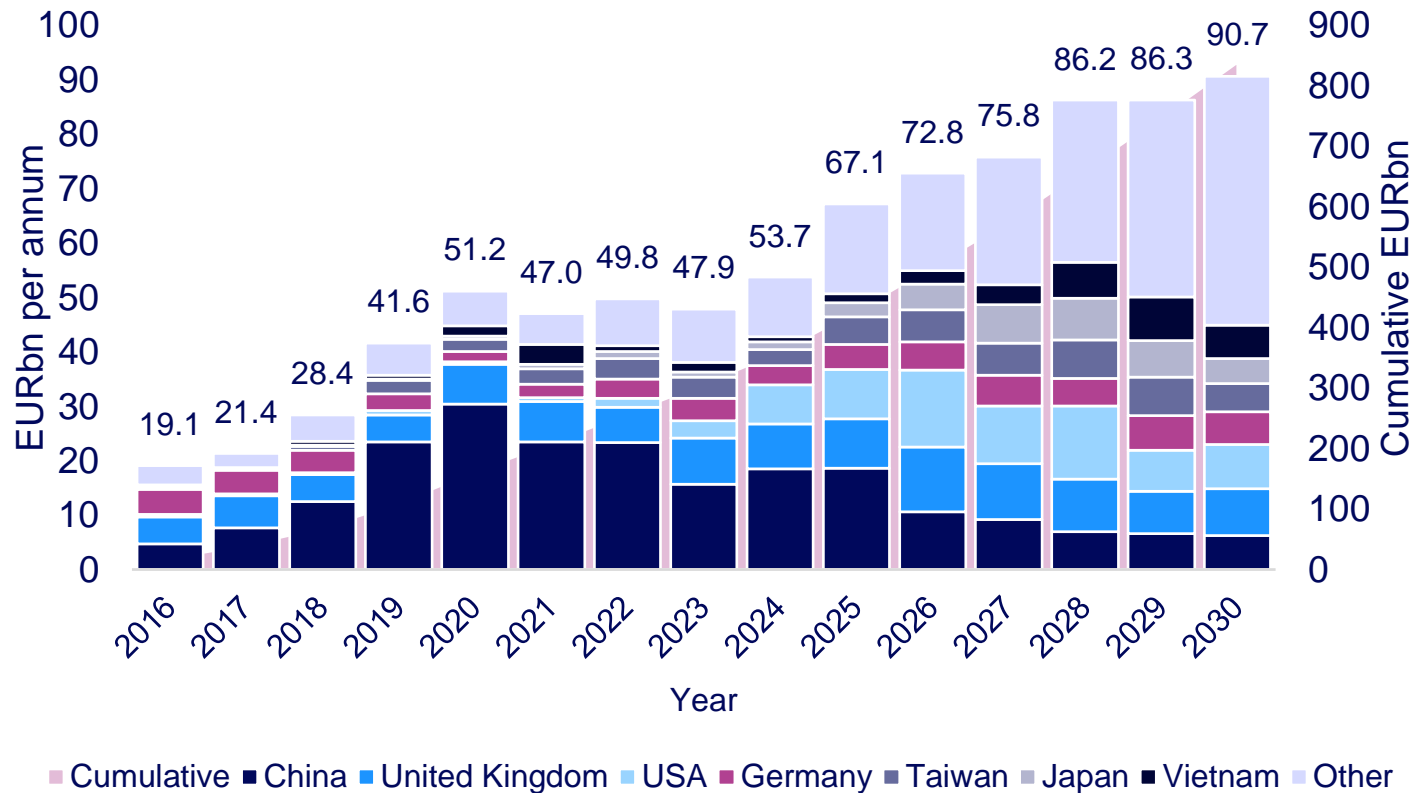
Boom!



- Capacity commissioned to close in on 230 GW in 2030.
- A consistent stream of tenders and capacity auctions will ensure more projects secure a route to market through to 2030 in the EMEA.
- China project commissioning at unprecedented rates as central support is due to expire in 2022.
- In the Americas a strong route to market pipeline has been secured by state-level authorities in the US.
- Ambitious government targets will be missed due to supply chain constraints and administrative delays.



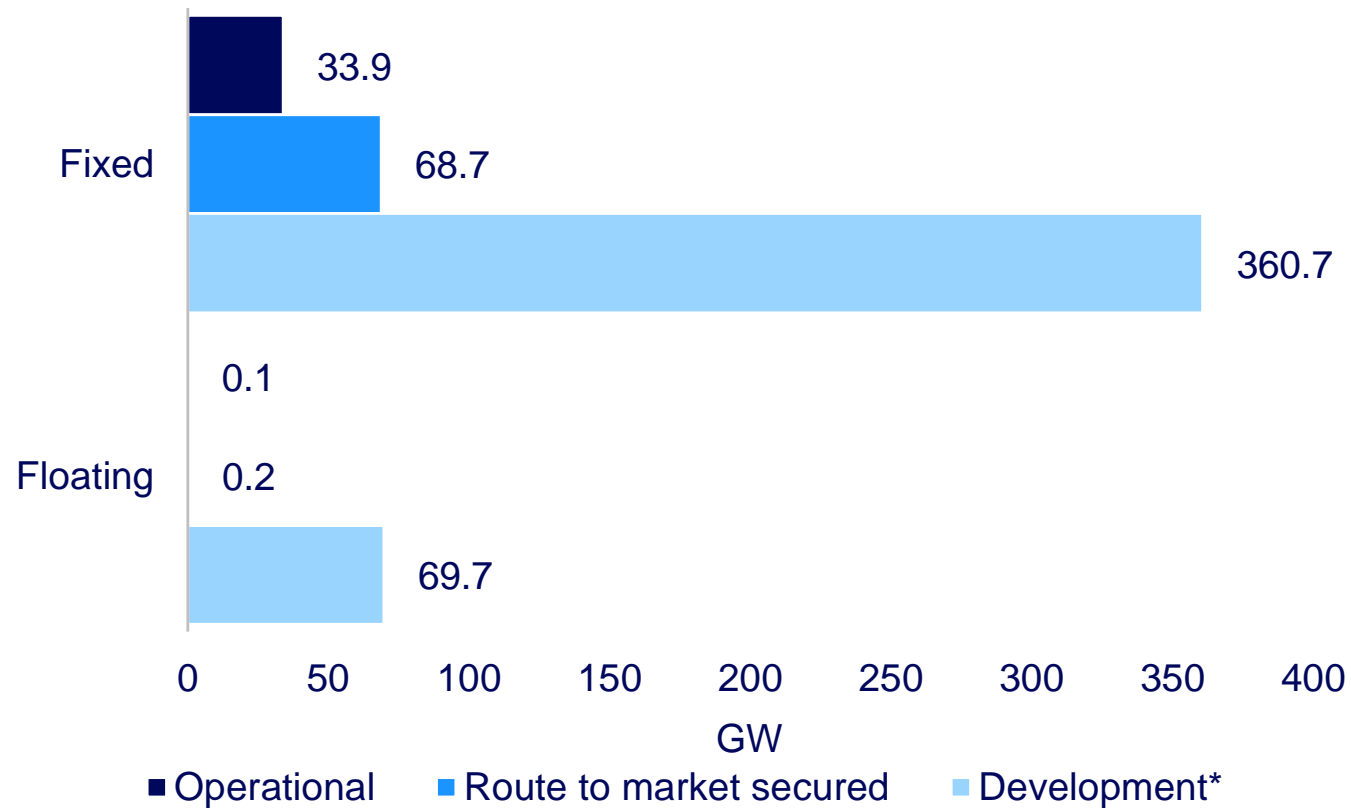
Overall expenditure is set to rise



- An average global annual market of 50 bn EUR in the early 2020s will be worth 80-90 bn EUR annually towards 2030.
- TotEx is forecast to fall in China based on the current project pipeline. The expected increase in new development activity following adjustment to updated route to market mechanisms from 2022 is however likely to increase expenditure in line with trends in other regions.
- Supply chain bottlenecks and localisation requirements may limit cost reductions.



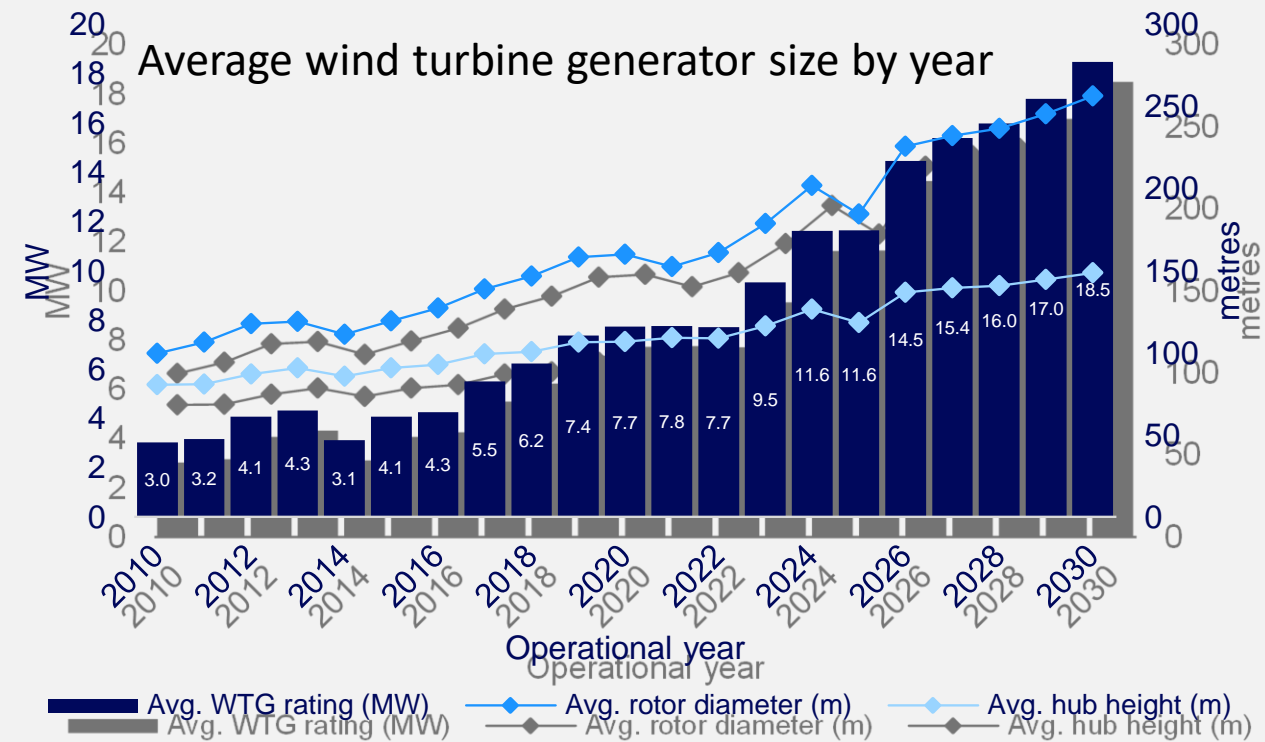
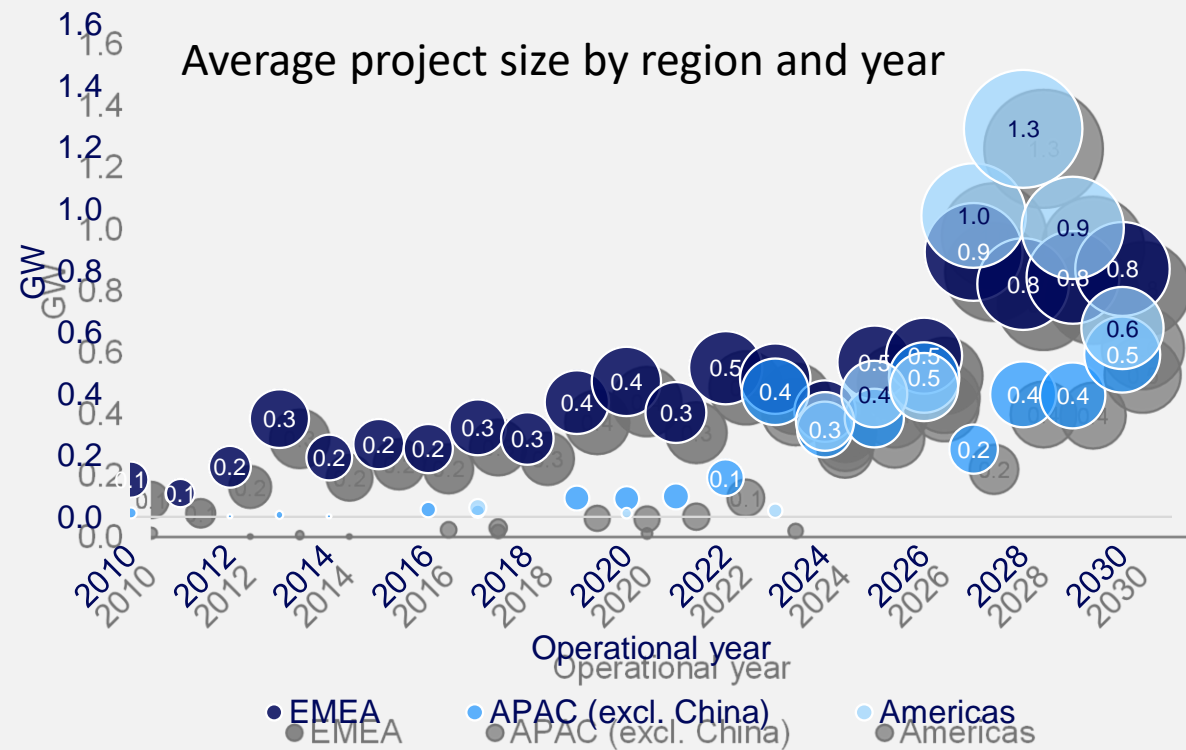
Technologies



- Fixed-foundation project development continues to be the industry focus.
- The first tenders to allocate a route to market for utility-scale floating foundation projects are due to take place from 2021.
- Consistent deployment of floating-foundation projects from 2025 is expected to encourage further development.

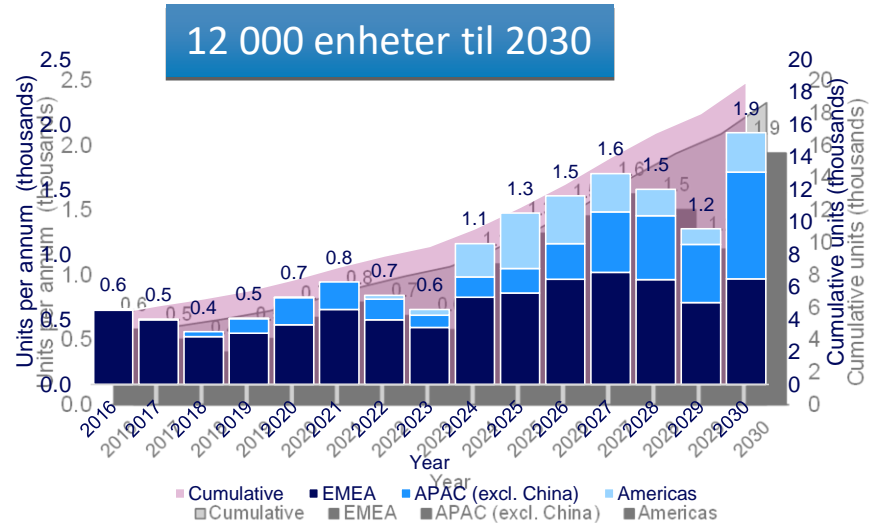


Projects and turbines are getting bigger





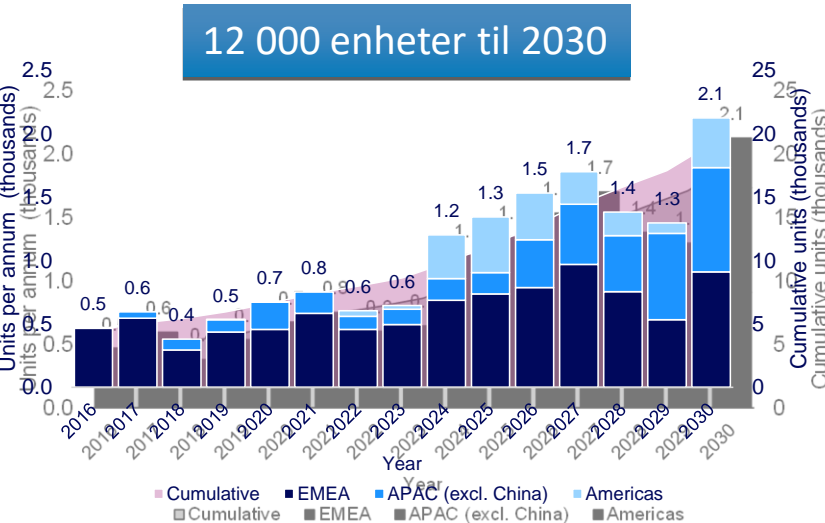
WTG Supplies



- Wind turbine manufacturing demand is set to increase significantly from 2024 as new markets in all regions progress towards construction.

WTG Foundation Supplies

Manufacturing forecast by region



- Whilst there is some fluctuation in the total number of WTG foundations forecast to be manufactured per year, the overall trend shows demand increasing greatly from 2024. Approximately 1,500 foundations will be manufactured annually from 2024 to 2030.

Array cable Supplies



- While there is some fluctuation in the total kilometres of array cable manufacturing demand annually, the overall trend shows demand increasing significantly from 2024, requiring an average of more than 3,700 km of cable to be manufactured per year.

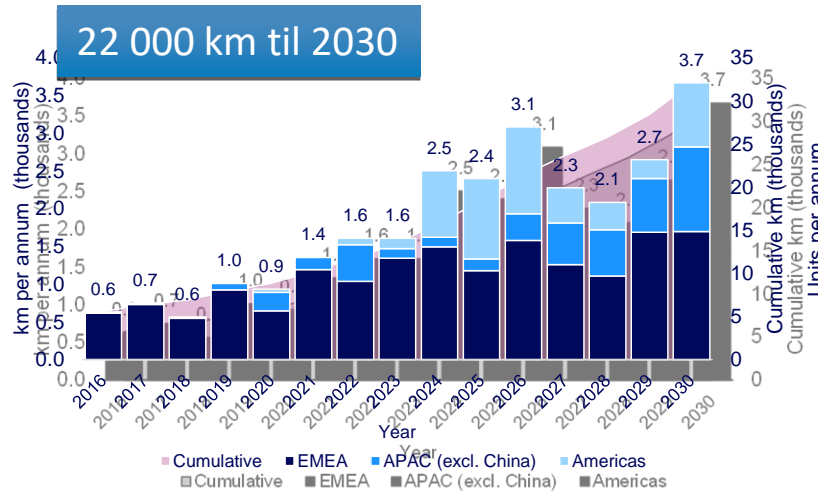
Export Cable supply

Sub Station Supply

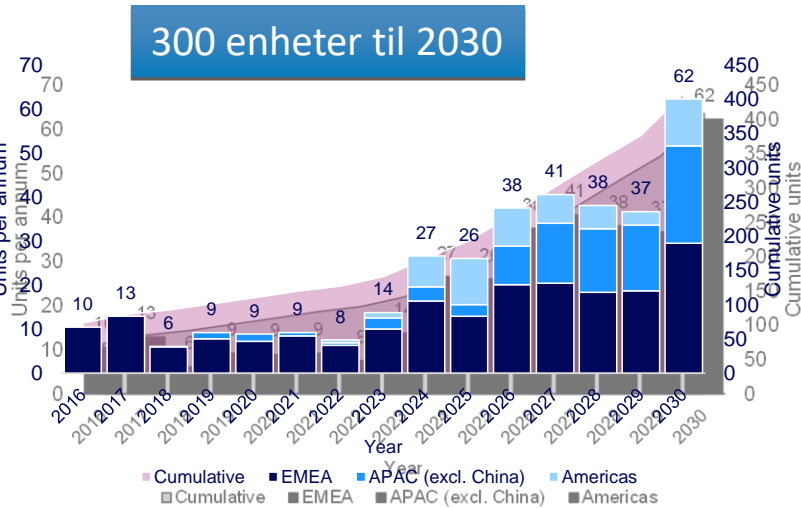
Sub Station Distance to shore



Manufacturing forecast by region

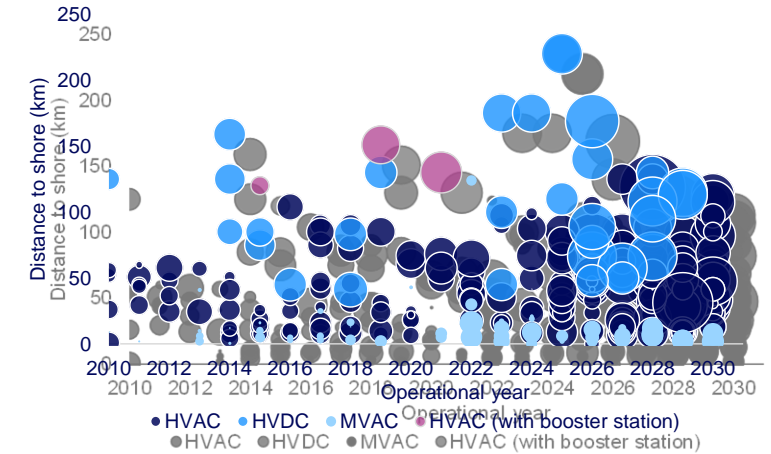


- There is a consistent increase in the forecasted demand for subsea export cables across all regions, as more projects are installed further from shore in mature and emerging markets.



- Demand for OSS foundation manufacturing will increase almost two-fold between 2023 and 2024, from 14 to 26. The current trend indicates limited fluctuation of the forecasted annually required OSS foundations post-2025.

Distance and type



- To date, high voltage alternating current (HVAC) has been the preferred technology for export cables, owing to the low cost and ease of installation relative to HVDC systems. Some offshore wind farms in Europe have deployed HVAC cables beyond 100 km by using offshore reactive compensation stations.



HVDC Converter Station – The heart of the wind farm



BorWin 3
(2019)
900MW,
20.000tons,
22tons/MW



Dogger Bank
1200MW, 7.500tons,
6,3tons/MW



DolWin 3
(2017)
900MW,
18.500tons,
21tons/MW

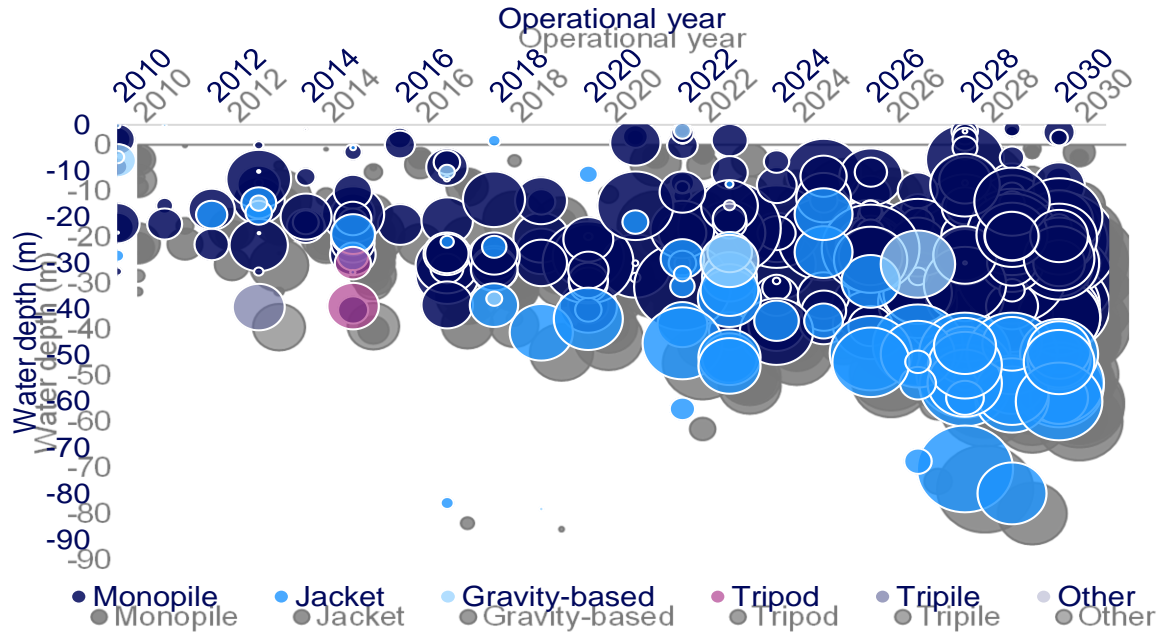
DOGGER BANK
WIND FARM
BY



Vanndyp, fast og flytende

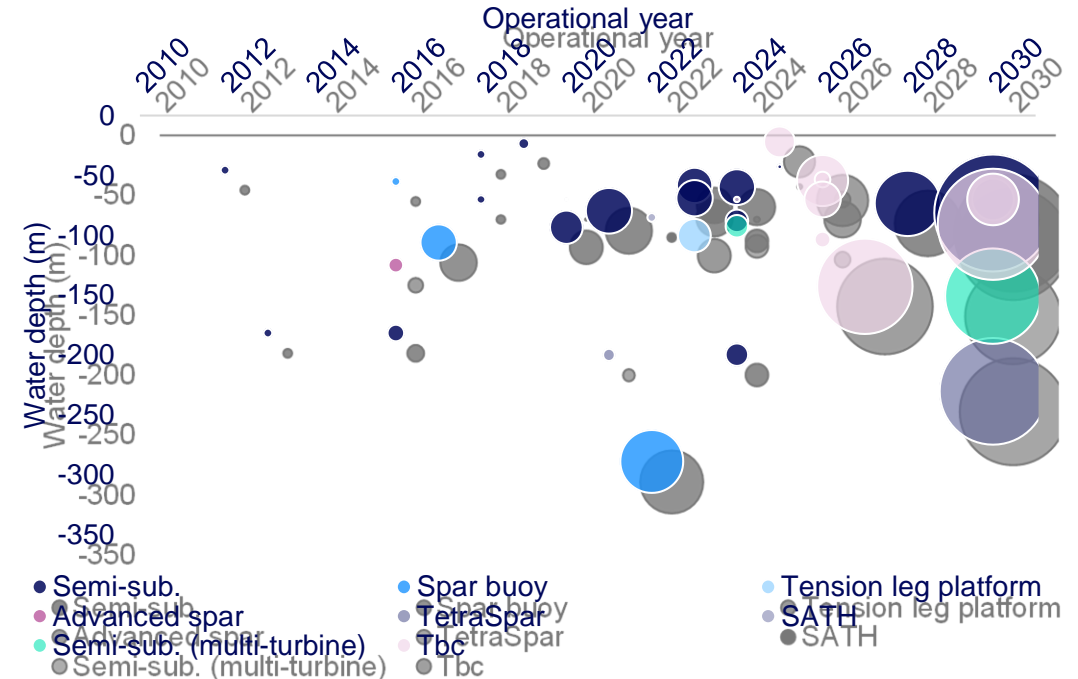


- Avg. water depth by year & foundation type
Fixed



- Due to the low cost and relative ease of production, monopile foundations continue to be used in water depths of up to 50 metres, where soil conditions facilitate installation. In the US, gravity base foundations can provide a locally produced foundation design alternative to monopiles shipped from Europe.

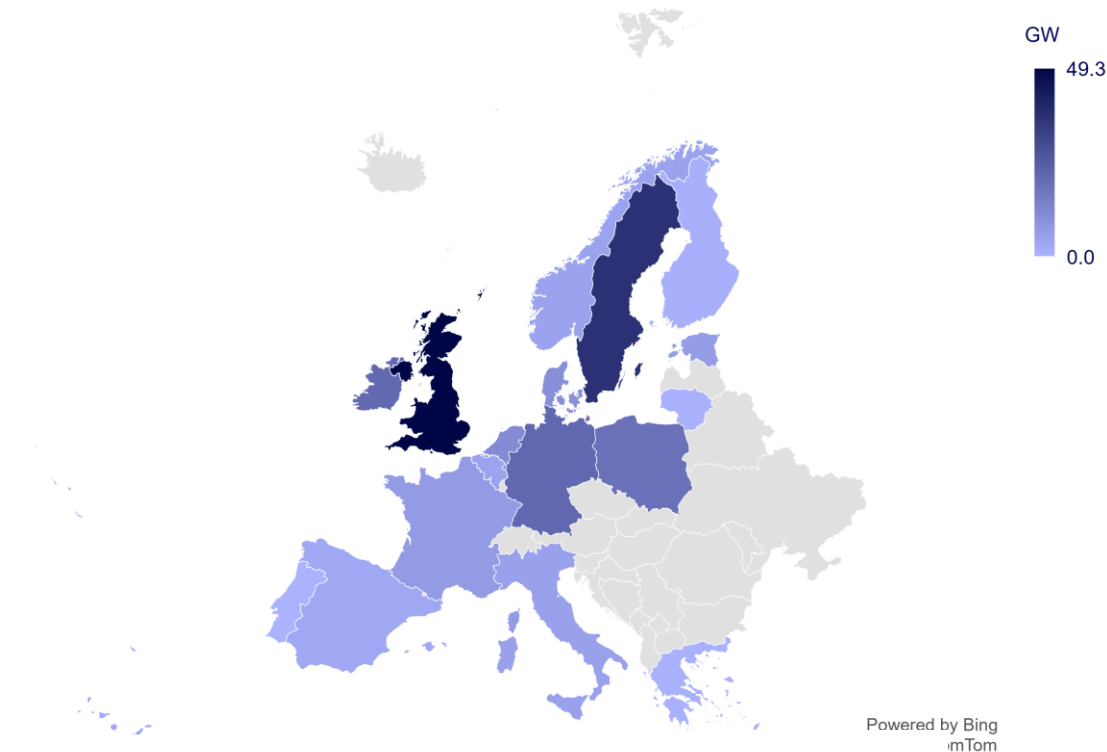
- Avg. water depth by year & foundation type
Floating



- Water depths for projects in the near-term floating pipeline are expected to remain under 200 metres, allowing for the use of conventional fixed foundation offshore substations on deep-water jackets, as well as avoiding cable and mooring constraints that may otherwise require additional technological innovation.



Europe maintaining pole position



25.0 GW Operational <small>No change from Q1</small>	26.3 GW Secured <small>▲ 6.6% from Q1</small>	151.4 GW In development* <small>▲ 8.0% from Q1</small>	202.6 GW Total <small>▲ 6.7% from Q1</small>
---	--	---	---

*includes capacity without owners that is scheduled for auction

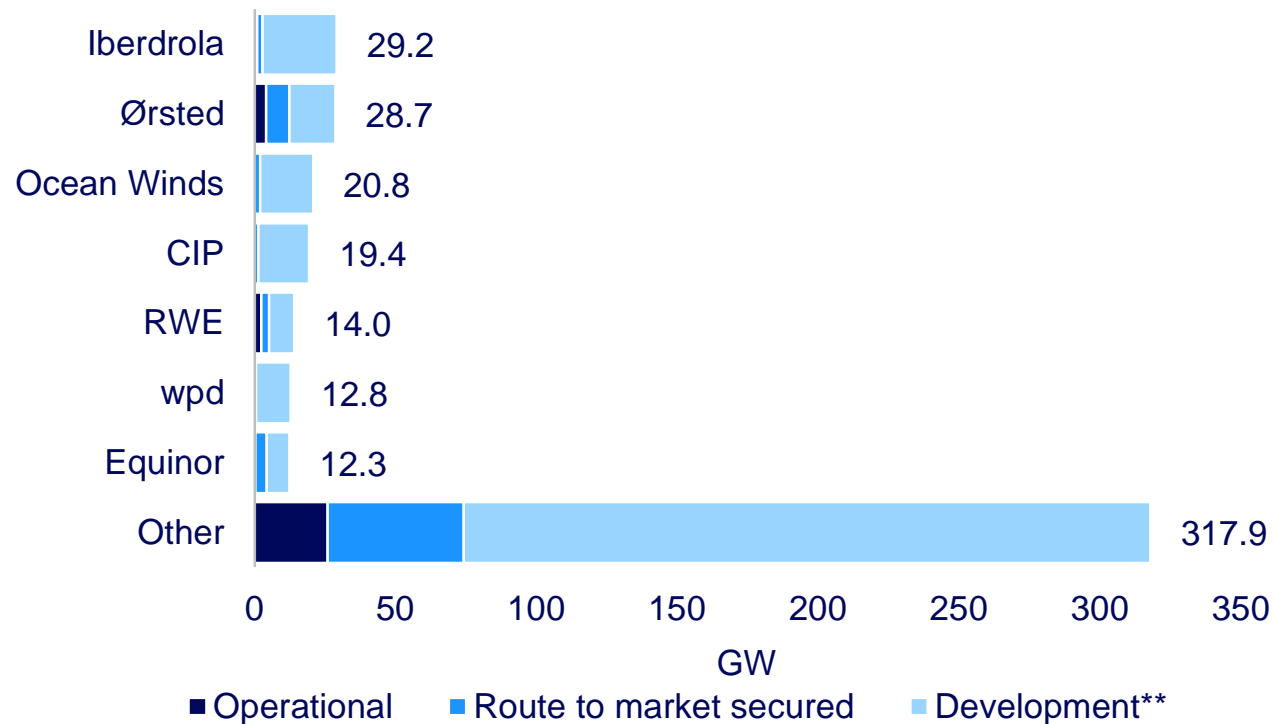
Top 16 (Q2 2021)

#	Country	Operational	Secured	Development*	Total
1	United Kingdom	10,424	9,927	28,978	49,329
2	Sweden	191		36,766	36,957
3	Germany	7,853	3,125	10,552	21,330
4	Ireland	25		21,023	21,048
5	Poland		5,933	12,804	18,737
6	The Netherlands	2,620	2,682	6,100	11,402
7	Denmark	1,701	949	7,768	10,418
8	France	2	3,513	3,384	6,899
9	Estonia			6,264	6,264
10	Italy		30	5,097	5,127
11	Norway	2	92	4,519	4,613
12	Belgium	2,261		2,040	4,301
13	Spain	5	2	3,197	3,204
14	Finland	68		740	808
15	Greece			714	714
16	Lithuania			700	700

Ranking based on total size of portfolio

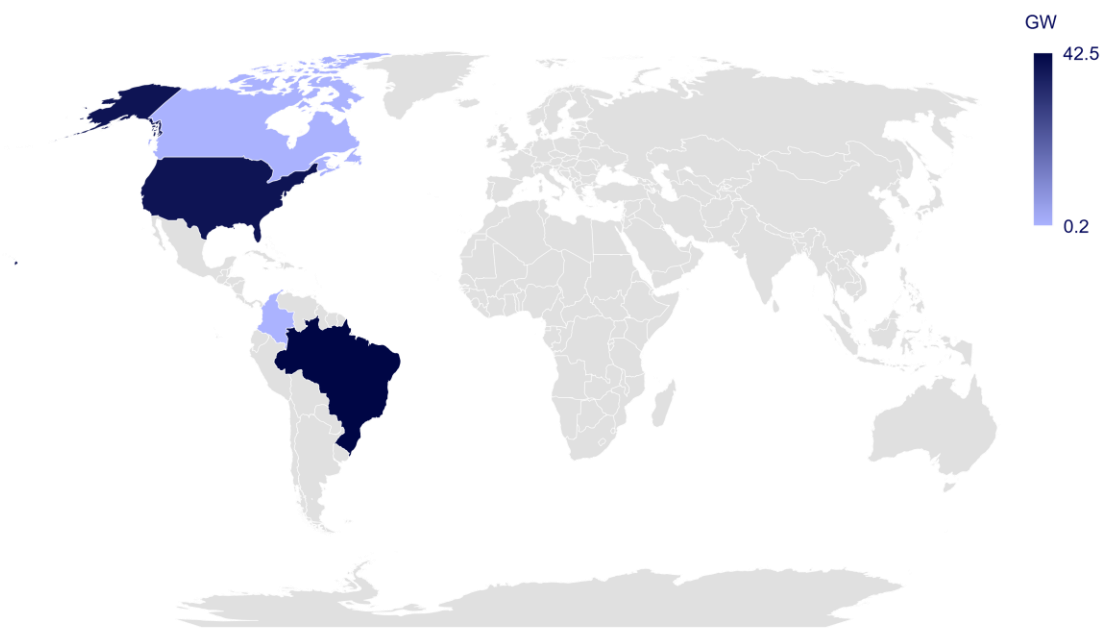


Key developers



- As early movers in the offshore wind sector, European utilities lead the global portfolio ranking.
- Increased competition from oil majors and regional developers.
- EPCI and institutional investors are investing in early stage projects in line with inherent developers.
- Alliances are evolving – across the world.

Americas



0.04 GW
Operational

No change from Q1

11.6 GW
Secured

▲ 29.8% from Q1

70.7 GW
In development*

▲ 6.5% from Q1

82.3 GW
Total

▲ 9.3% from Q1

*includes capacity without owners that is scheduled for auction

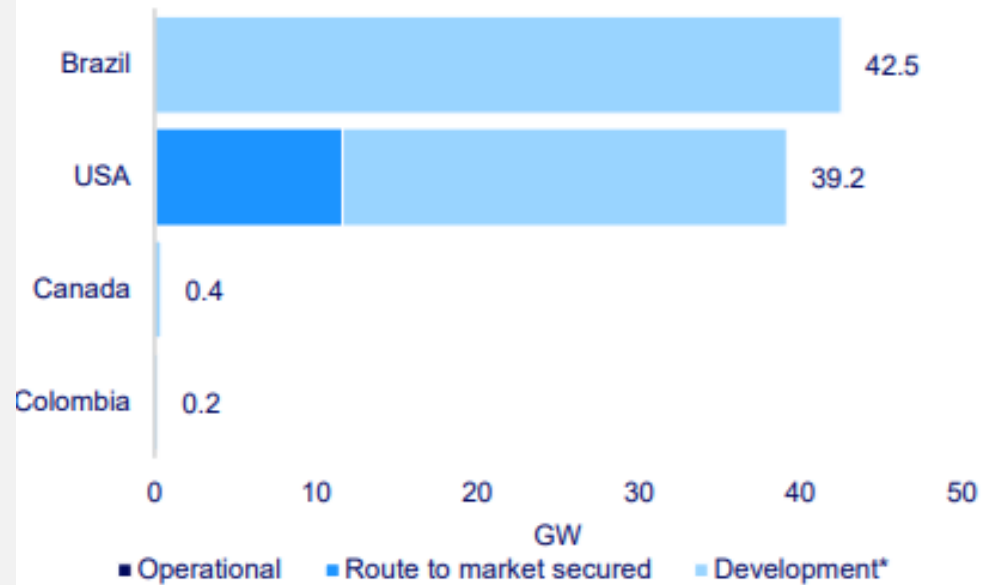
- Brazilian early stage development portfolio expanded rapidly in 2020.
- US market remained focused on offtake solicitations and permitting for late-stage development projects.
- First offshore wind farm in Colombia was unveiled.



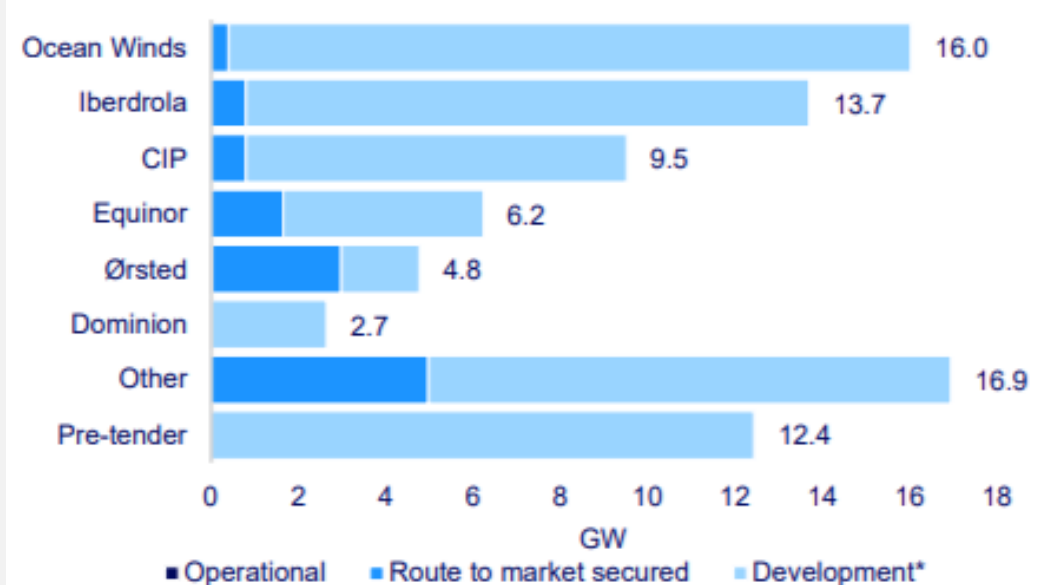


Americas

Key markets



Key owners





338 millioner kroner

First US Wind Turbine Installation Vessel to Feature Kongsberg Tech

March 17, 2021, by [Nadja Skopljak](#)

Keppel AmFELS has awarded Kongsberg Maritime with a contract to provide its technology for the first Jones Act compliant wind turbine installation vessel (WTIV) for the U.S. offshore wind sector.

The agreement will see Kongsberg supply a comprehensive technology package for the new WTIV which is [being constructed](#) at Keppel AmFELS' Brownsville shipyard in Texas.

The company will provide its integrated solution for WTIVs, which combines motion control, propulsion and dynamic positioning functionalities, as well as thrusters with power supplied by six Bergen diesel engines.

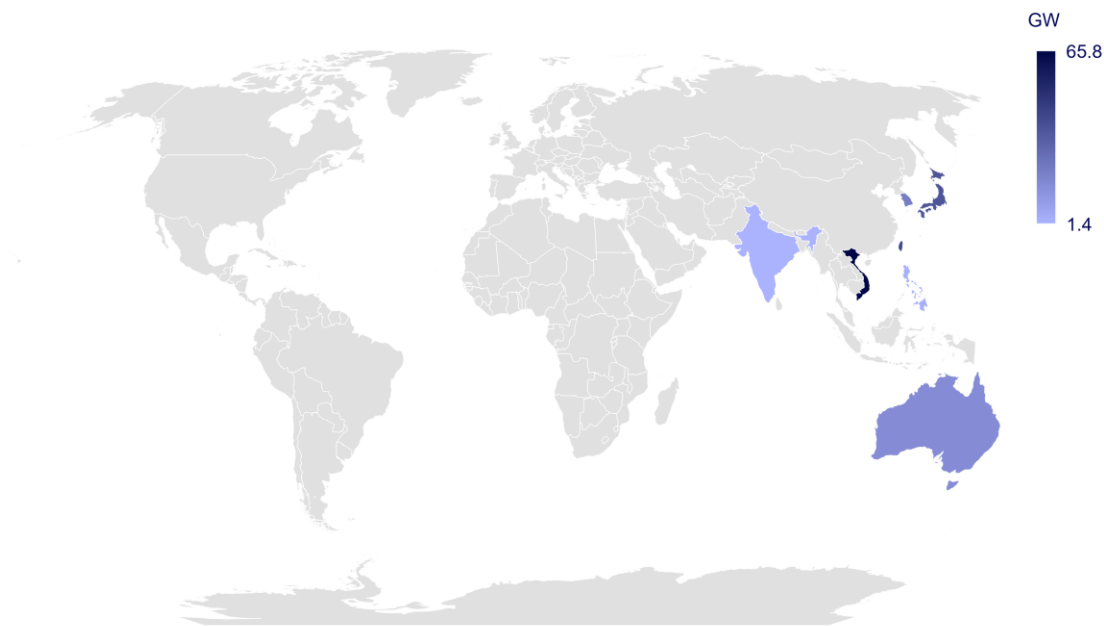
Mooring and line handling will be facilitated by a comprehensive Kongsberg deck machinery package.

Related news



Cadeler's Mega Jack-Ups to Feature Kongsberg Maritime Tech
about 1 month ago

APAC ex. China



1	Vietnam	99	783	64,919	65,801
2	Taiwan	128	5,167	36,229	41,524
3	Japan	61	146	36,162	36,369
4	South Korea	95	95	21,121	21,311
5	Australia			15,887	15,887
6	Philippines			2,450	2,450
7	India			1,400	1,400

0.38 GW Operational <small>No change from Q1</small>	6.2 GW Secured <small>No change from Q1</small>	178.2 GW In development* <small>▲ 9.3% from Q1</small>	184.7 GW Total <small>▲ 9.0% from Q1</small>
---	--	---	---

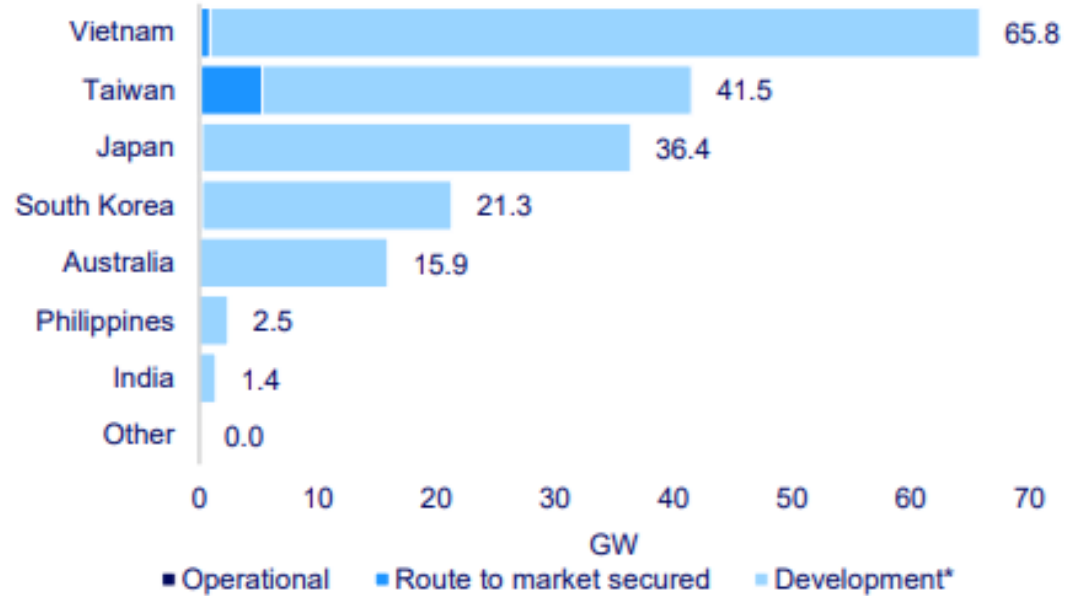
• *includes capacity without owners that is scheduled for auction or where owner info is absent



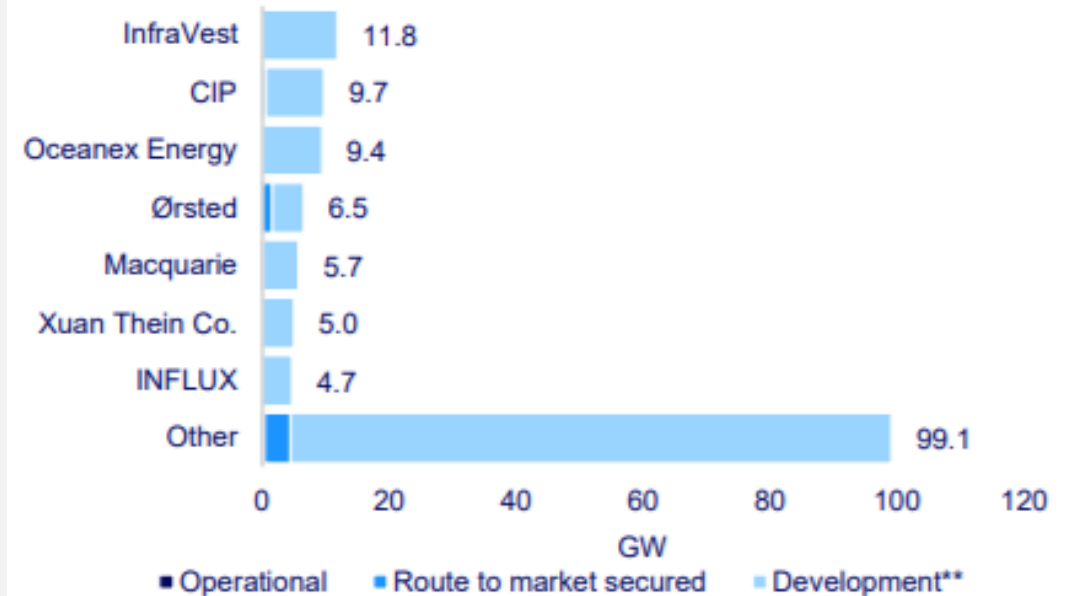


APAC ex. China

Key markets

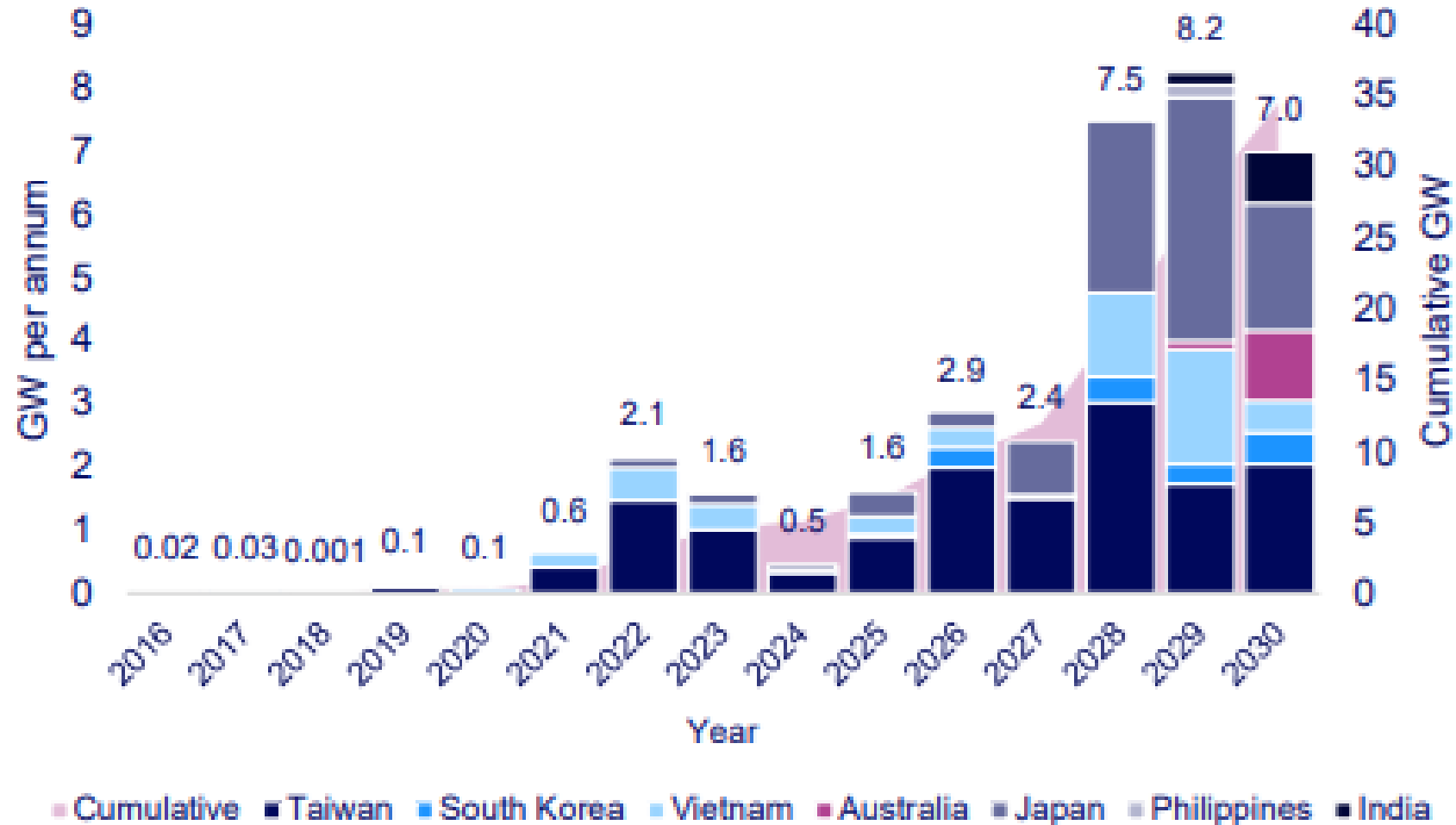


Key owners

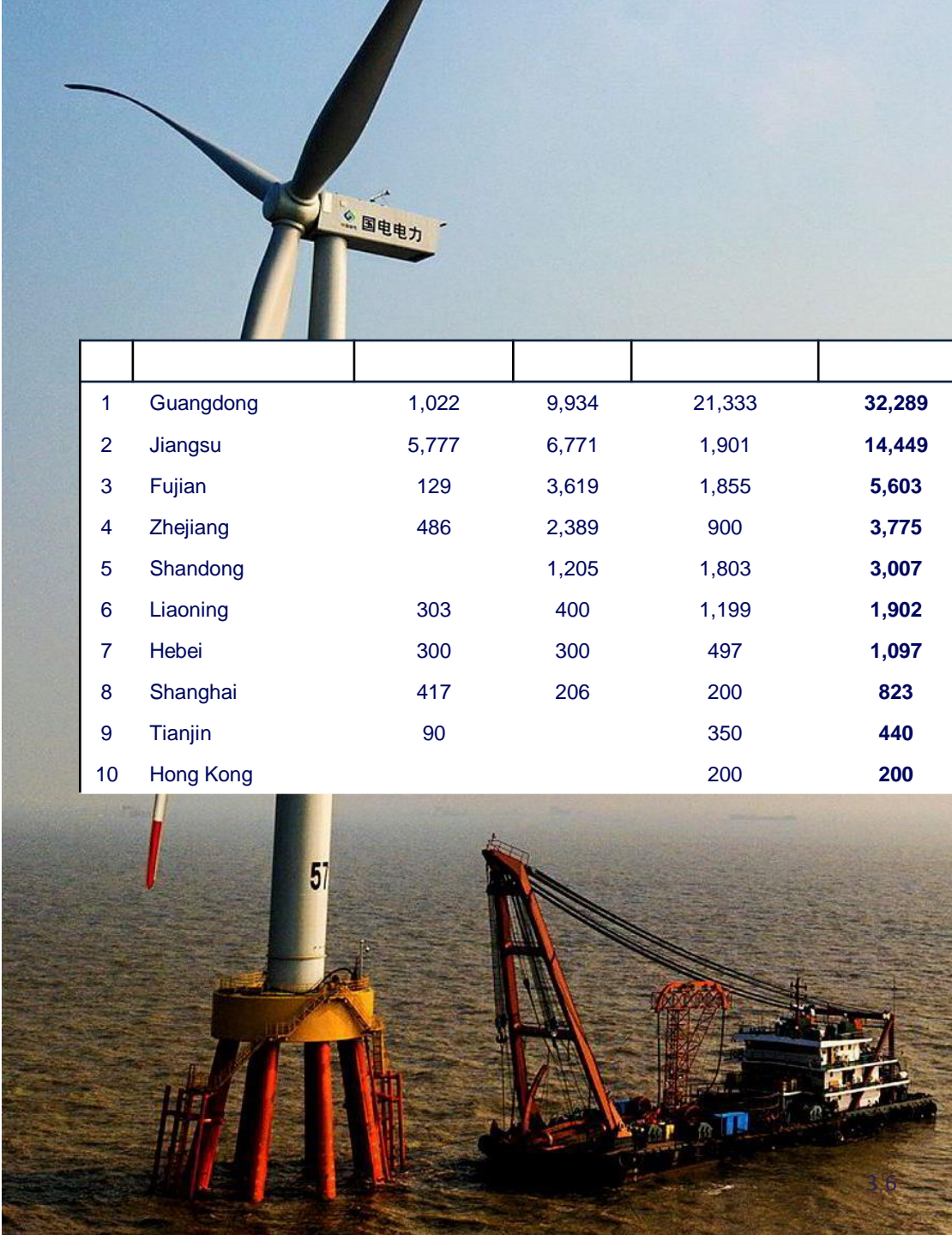
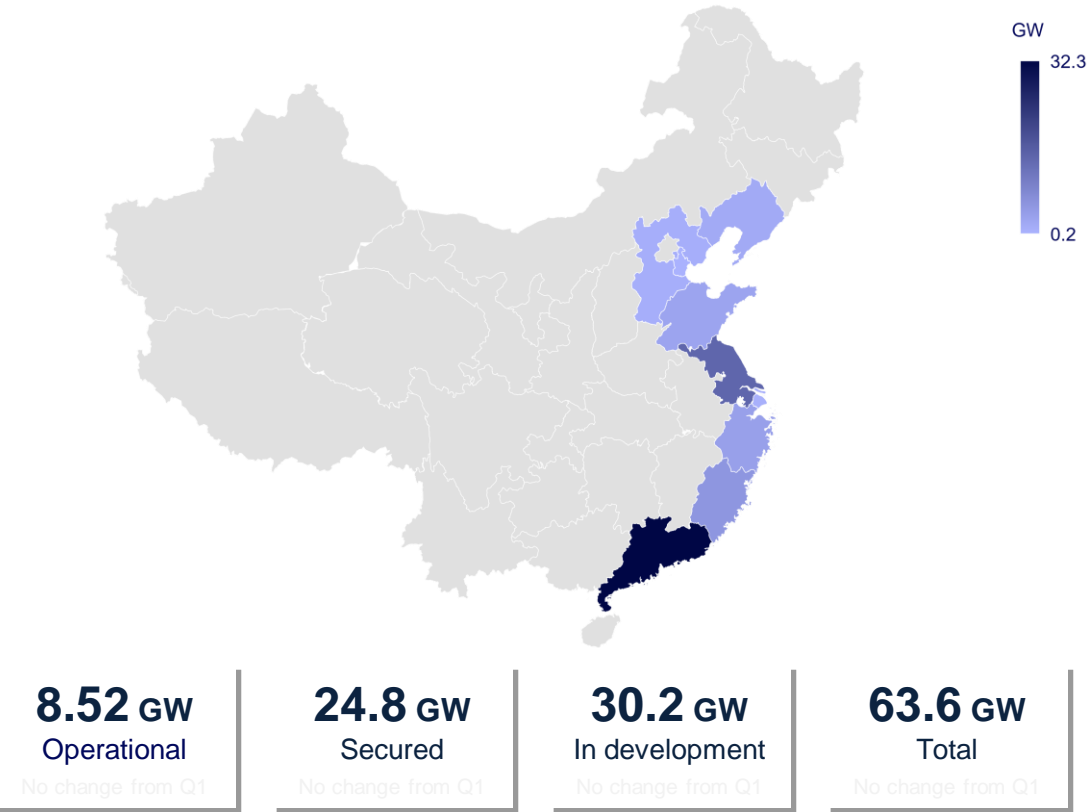




Commissioning activity and forecast by country



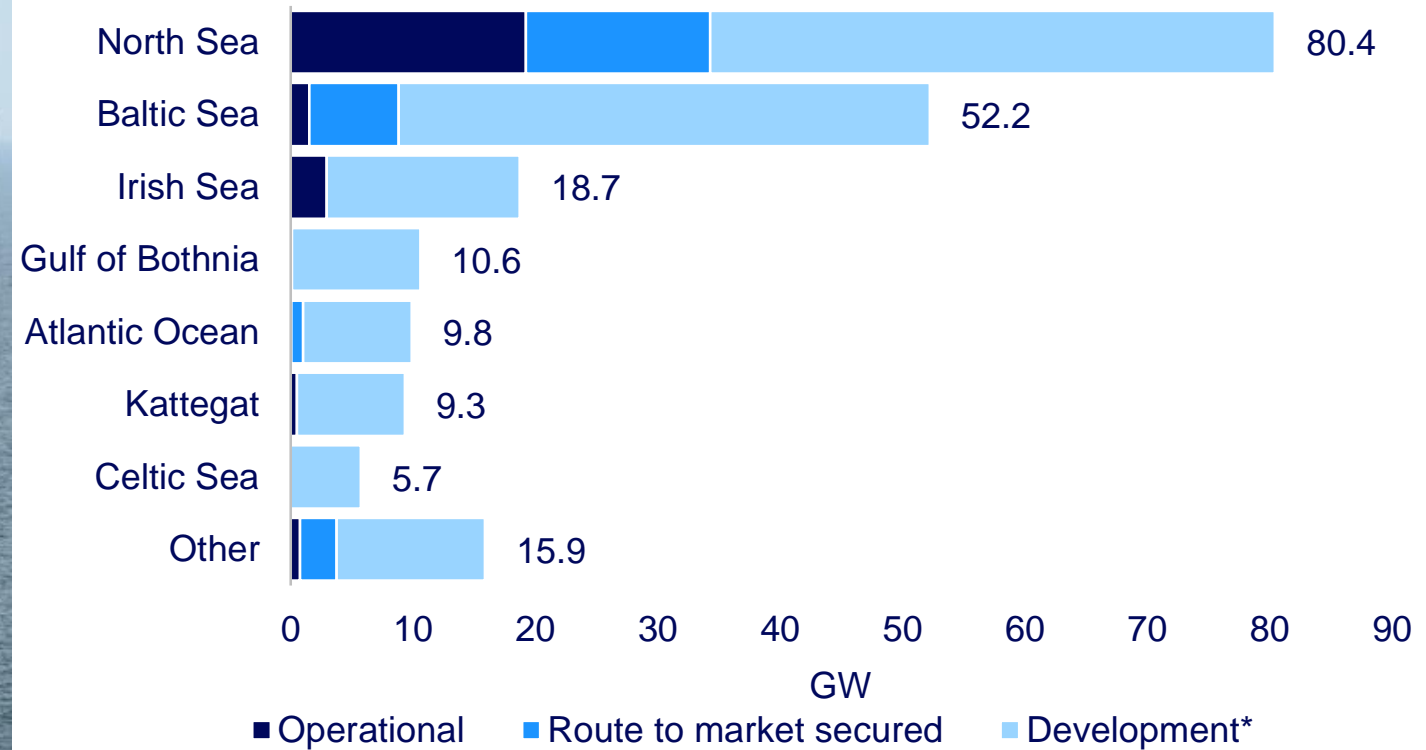
The chinese dragon



1	Guangdong	1,022	9,934	21,333	32,289
2	Jiangsu	5,777	6,771	1,901	14,449
3	Fujian	129	3,619	1,855	5,603
4	Zhejiang	486	2,389	900	3,775
5	Shandong		1,205	1,803	3,007
6	Liaoning	303	400	1,199	1,902
7	Hebei	300	300	497	1,097
8	Shanghai	417	206	200	823
9	Tianjin	90		350	440
10	Hong Kong			200	200



A short journey from Norway





Competition is heating up

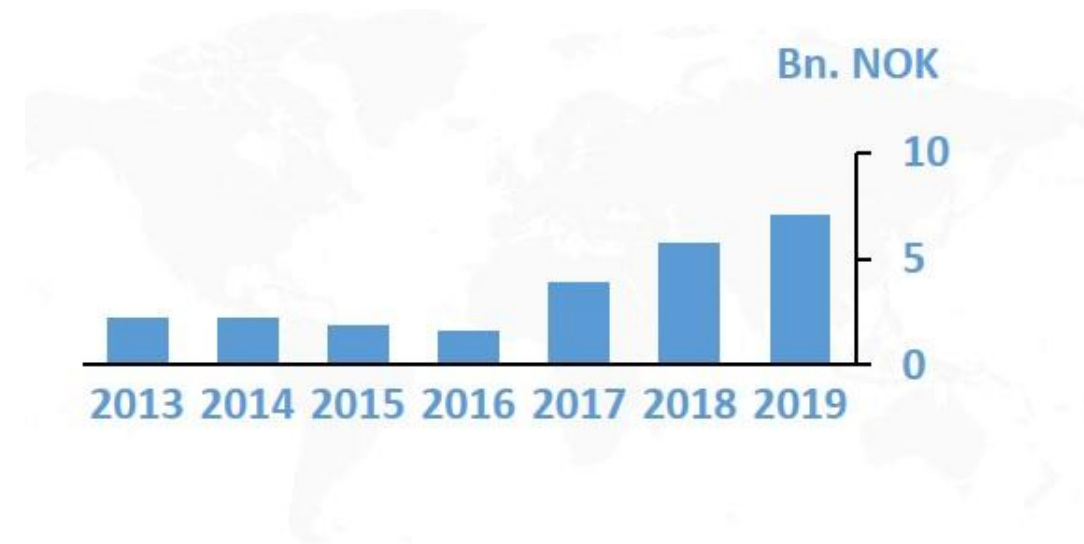
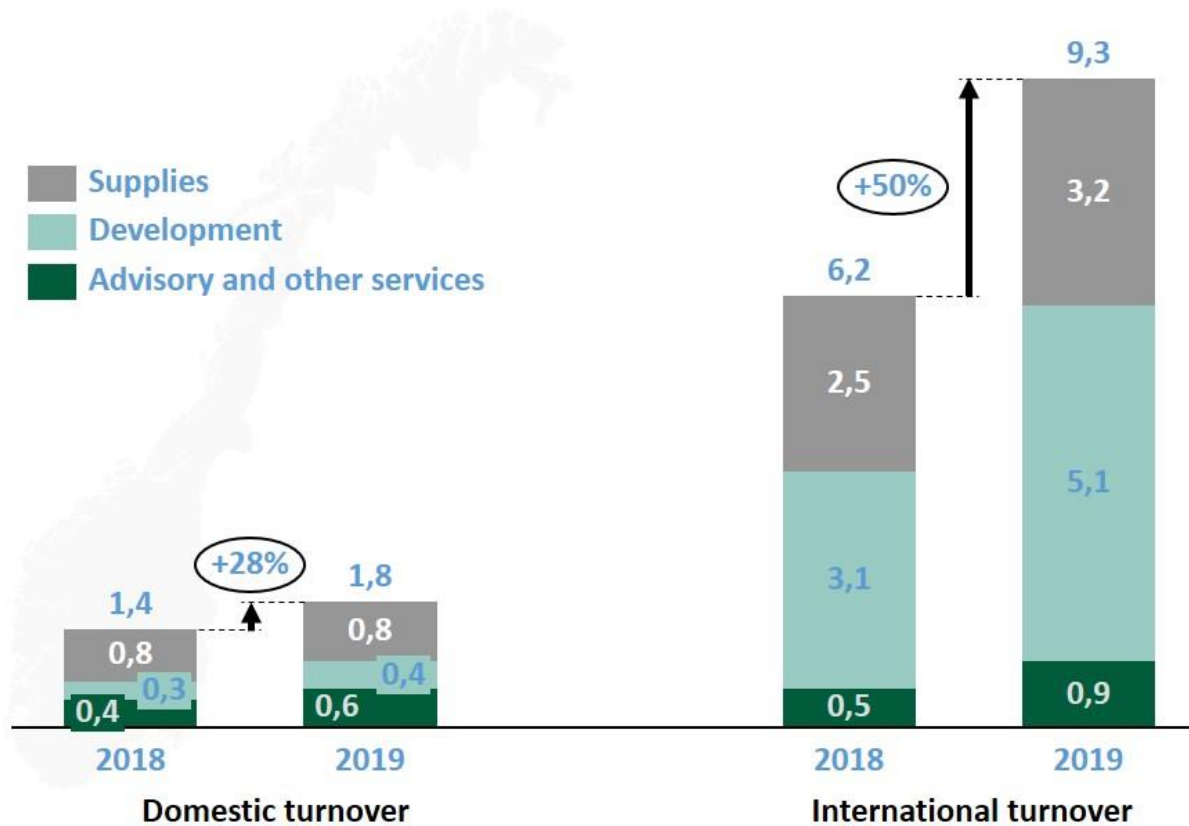
- Norwegian contenders

Utvikler	Partner 1	Partner 2	Forventet interesse	Internasjonalt
Equinor	VårGrønn	ENI	Utsira Nord	International
Equinor	Hydro REN	RWE	Sørlige Nordsjø	International
VårGrønn	Agder Energi	ENI	Sørlige Nordsjø	Nordic/Baltics
Norseman	Norgesgruppen	EnBW	Sørlige Nordsjø	International
Magnora	TechnipFMC		??	ScotWind
DeepWind Offshore	Knutsen		??	International
Arendals Fossekompagni	FERD		Begge	International
NorSea	Wilhelmsen	Parkwind	Begge	International
AOW	Statkraft	BP	Begge	International
Cloudberry			??	Sweden
Fred Olsen Renewables	Hafslund Eco	Ørsted	Begge	International

- EDF, RWE, TotalEnergies, Shell/Eolfi, Ørsted, Ocean Winds, EnBW, CIP, Iberdrola, BP, CTG, ++
- BW Offshore, AOW, DEME, Van Oord, Saipem..



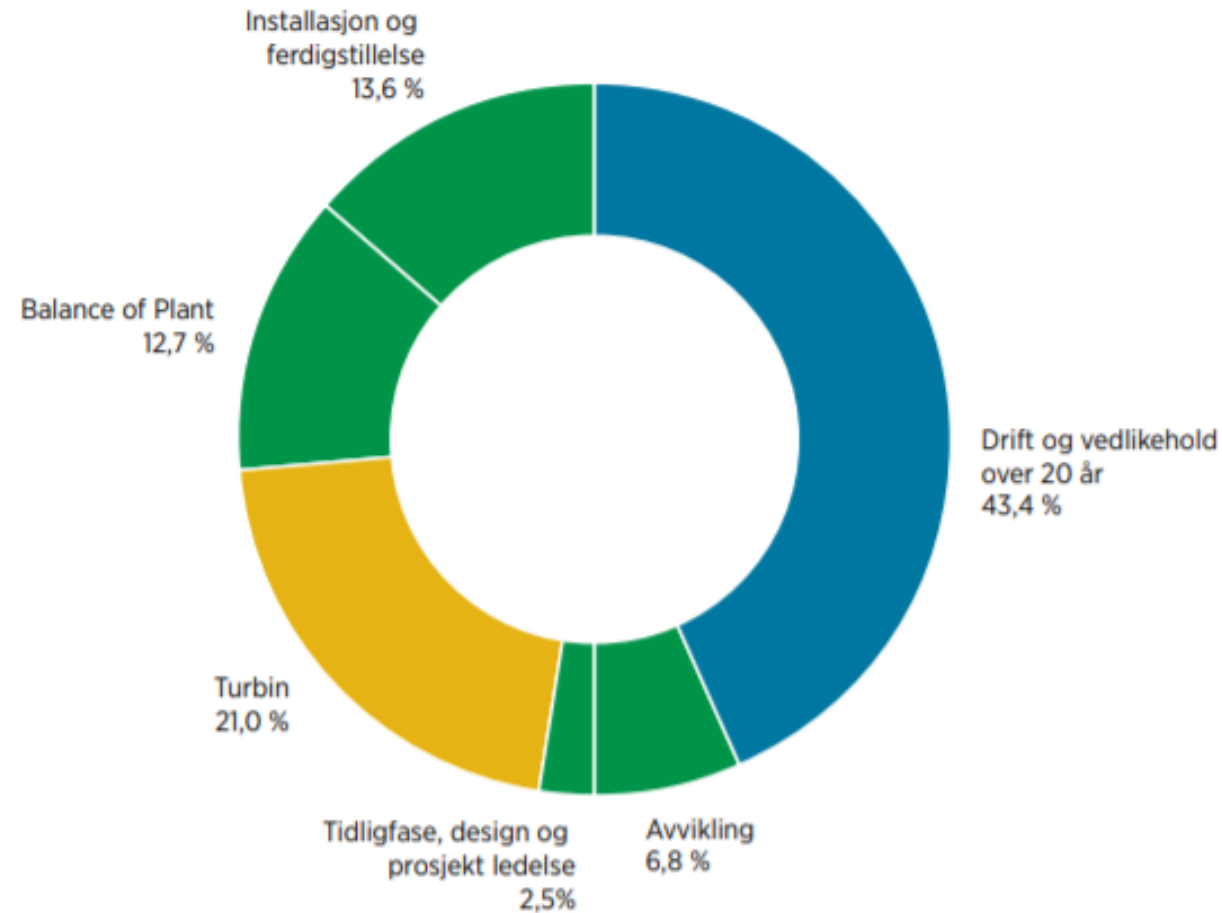
An emerging Norwegian offshore wind industry



Source: Multiconsult: Statusrapport Norges energinæring (2020)

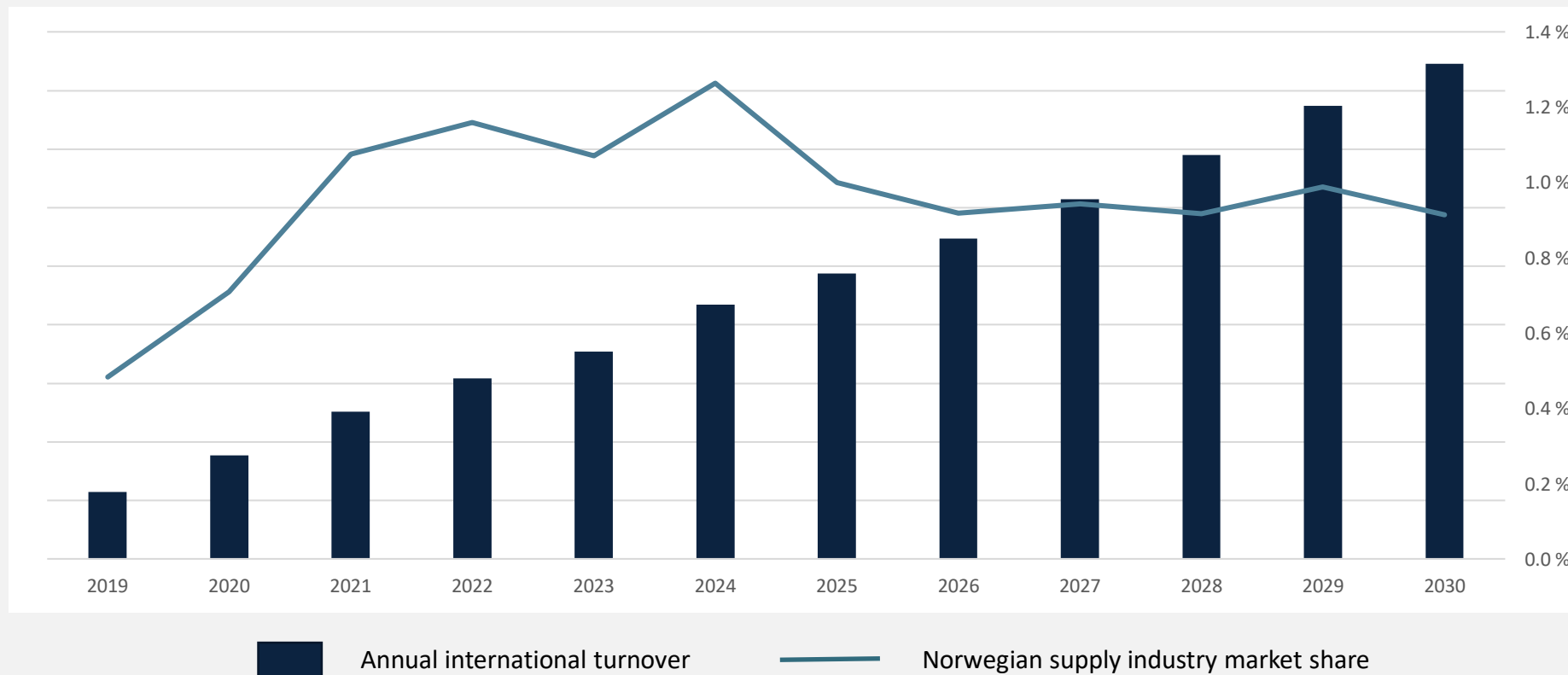


Hva investeres det i?





An estimated 80-100 bn NOK worth of Norwegian deliveries



..with a 10% market share and more than 500 bn NOK deliveries in the period to 2030.



What does it take?

- Central Norwegian suppliers need to engage and succeed globally in developing offshore wind projects
 - Norwegian players will:
 - Develop competence on markets, industry and commercial risk
 - Increase ambitions
 - Build volume production and get used to less tailored solutions
 - Strengthen and develop scale in more international markets and regions in competition with globally leading suppliers
- Norwegian developers are active on both the Norwegian and international markets
- Norwegian and international developers of the Norwegian projects bring Norwegian solutions into projects world wide.



Upcoming events

- Norway Wind Roadshow Offshore Wind market report 6 - 17 Sep
- Floating Offshore Wind 2021 15-16 Sep Aberdeen
- Seaenergy 21-23 Sep Nantes
- Taiwan Market & Industrial Webinar 24 Sep Virtual
- Netherlands Wind Market Update 27 Sep
- Japan Offshore Wind Tour 28-30 Sep Webinar
- Global Offshore Wind 2021 29-30 Sep London
- Hackaton Danish/Norwegian supply chain challenged by key stakeholders 4 - 5 Oct Aalborg
- ACPA Offshore Wind Conference 13 - 15 Oct Boston
- China Wind Power Exhibition and Conference 18 - 21 Oct Beijing
- OTD Energy 2021 (Offshore Technology Days) 20 - 21 Oct Stavanger
- Wind Energy Taiwan 2021 Oct 2021 Kaohsiung
- Offshore Energy 2021 26-27 Oct Amsterdam
- Norwegian offshore wind capabilities TBC Webinar
- International Energy Forum Summit 02.nov Oslo
- International Energy Forum OW 03. Nov, Oslo
- FOWT 16-18 Nov France
- Electric City 23-25 Nov Copenhagen
- WorkBoat 21 01 - 03 Dec New Orleans
- Offshore Wind at NorShipping 10-13 jan Oslo

JOIN US FOR THE MOST IMPORTANT ENERGY EVENT OF THE YEAR

INTERNATIONAL
ENERGY
FORUM
2021

NOVEMBER 2-3, 2021
OSLO, NORWAY



Contact



Jon Dugstad
Jon.dugstad@norwep.com
+47 957 28 580



Vidar Eiken
Vidar.eiken@norwep.com
+47 915 91 677



David S. Ottesen
David.ottesen@norwep.com
+47 954 95 040



Jørgen Brandt Theodorsen
Jorgen.theodorsen@norwep.com
+47 414 00 680

Offices Norwegian Energy Partners

Oslo

Hoffsveien 23
N-0275 Oslo

Stavanger

Professor Olav Hanssensvei 7 A
N-4021 Stavanger



Want to know more?

www.norwep.com/wind



solutions for global energy needs

