

Trends & Outlook for the Offshore Wind Sector: An Opportunity for the Basque Country

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Market outlook

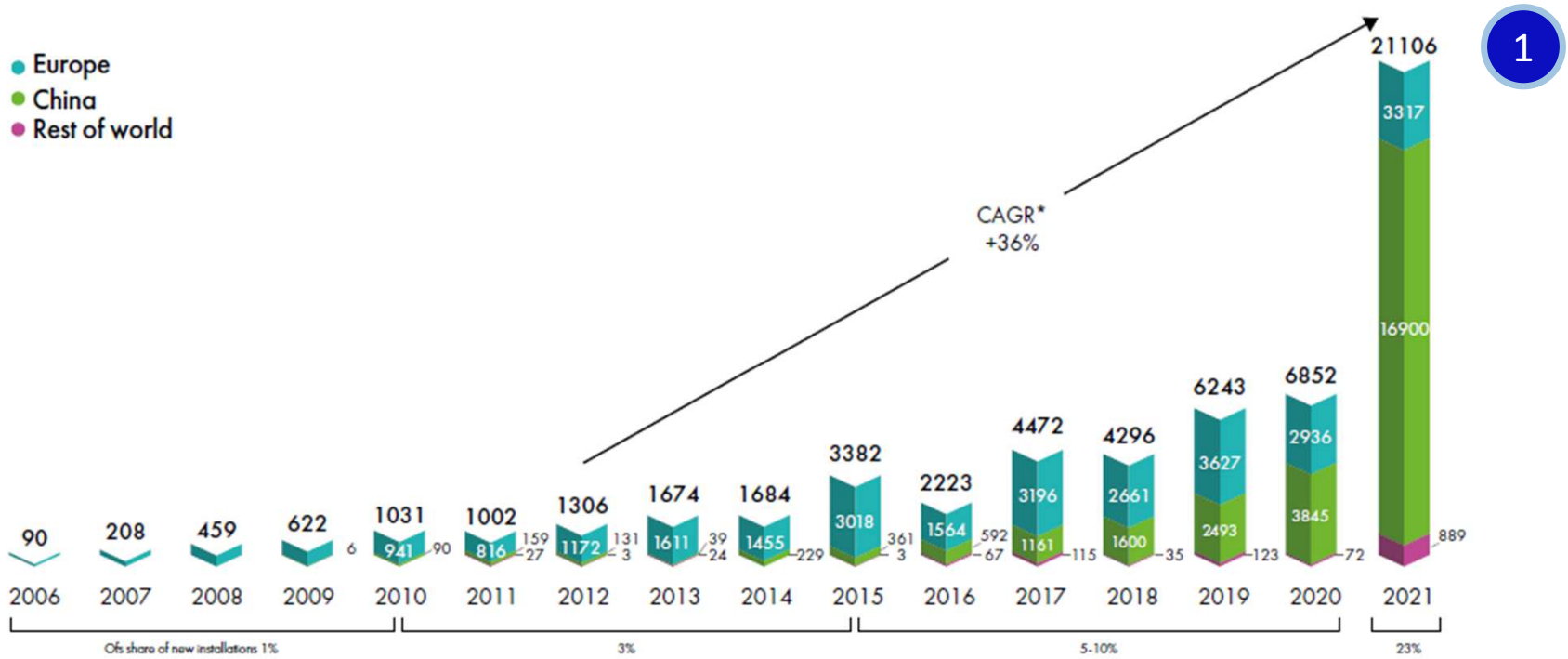
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Offshore wind is booming...



New offshore installations 2006-2021 (MW)



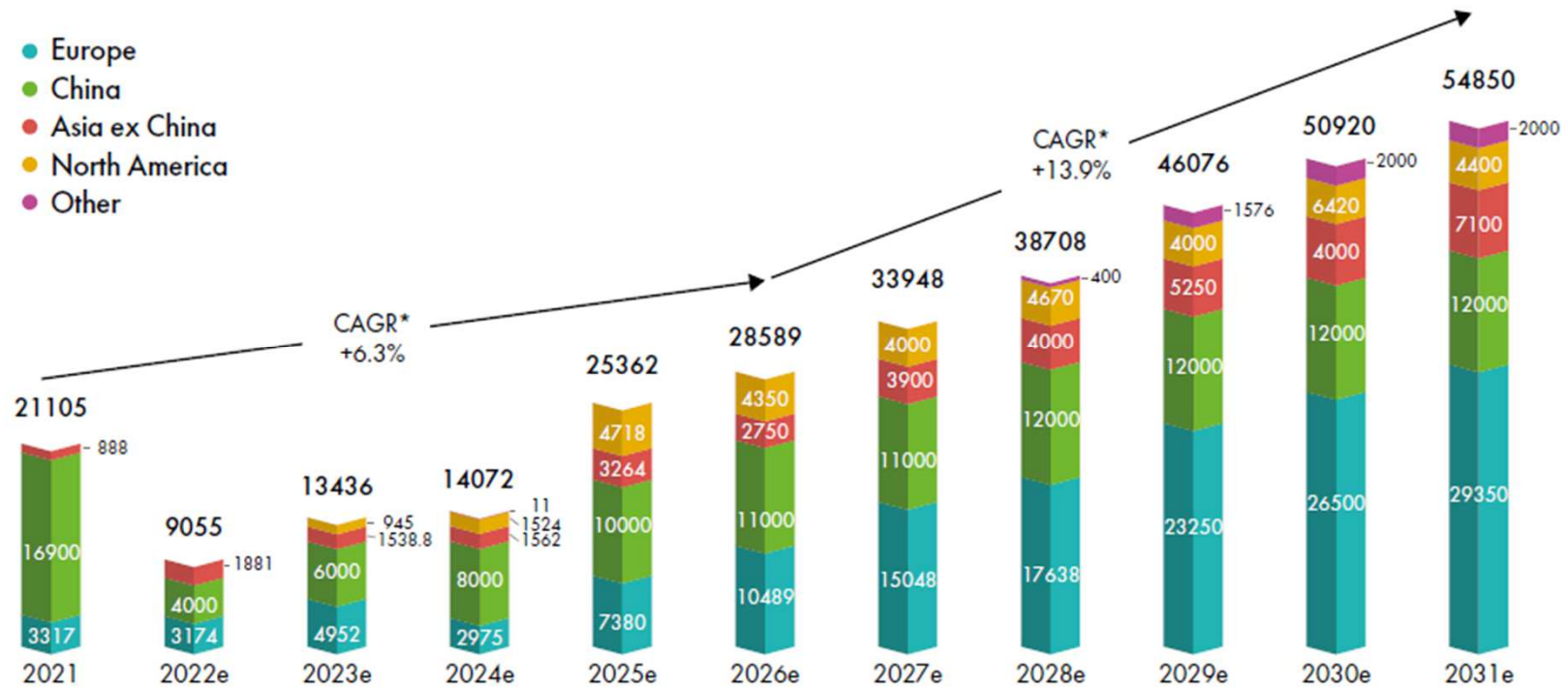
*Compound Annual Growth Rate.
Source: GWEC Market Intelligence, June 2022

1



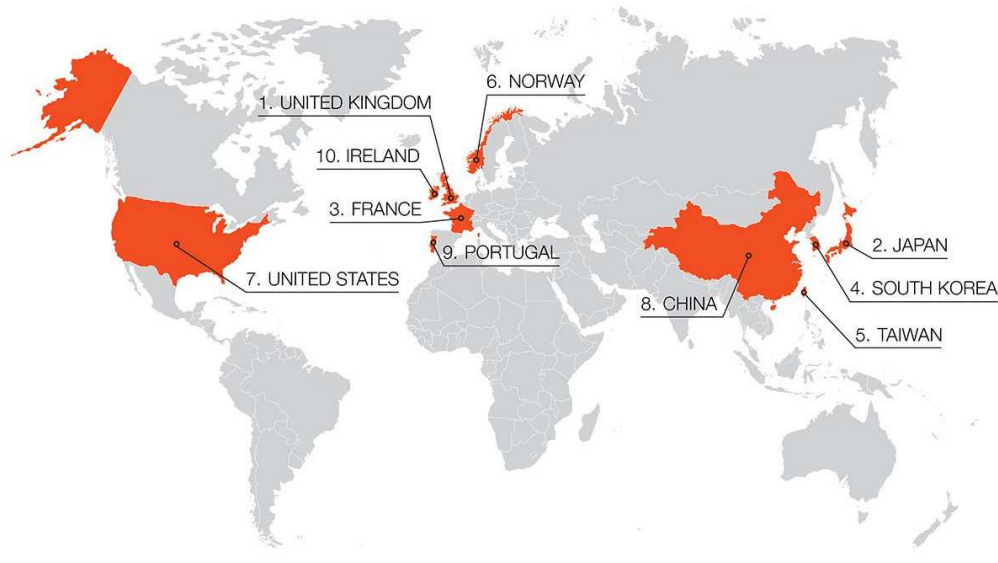
... will keep booming (more and more) for a while...

New offshore installations, global (MW)



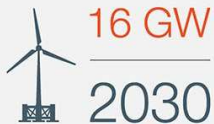
... and part of it will (hopefully) float

Floating wind outlook



A new report by the Floating Offshore Wind Centre of Excellence has identified the countries that are most ready to become major players in the FOW industry.

16 GW of FOW is forecast to be installed by 2030



Reaching 48 GW by 2035



The US and South Korea are leading the pack with targets of 10 GW each by 2035

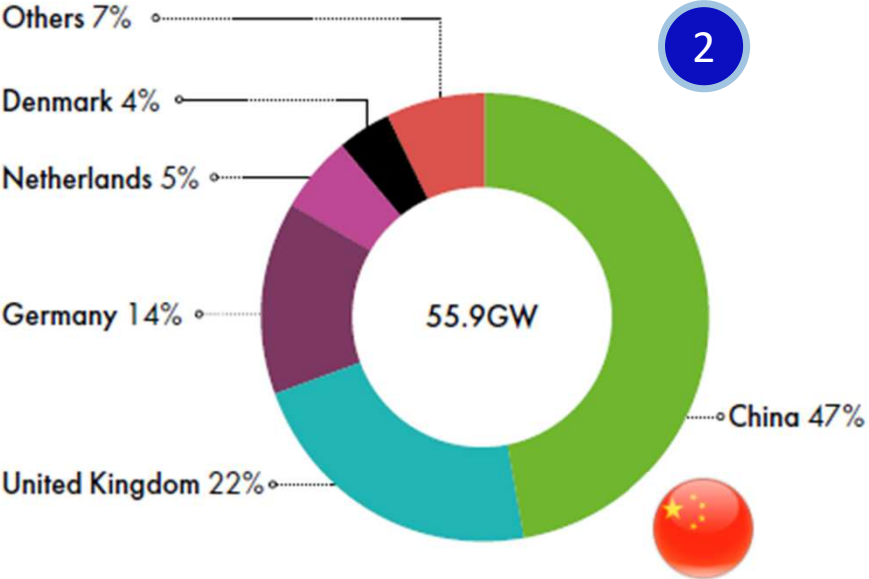


Europe is expected to have capacity of 18 GW by 2035



Currently there are two offshore wind global markets

Total offshore wind installations by market



Life is not as easy as it seems



Inflation and price increase



Public interventions in electricity markets

Turbine orders drop in Europe in 2022 compared to 2021

3



Difficulties in the supply chain

Competitive dynamics

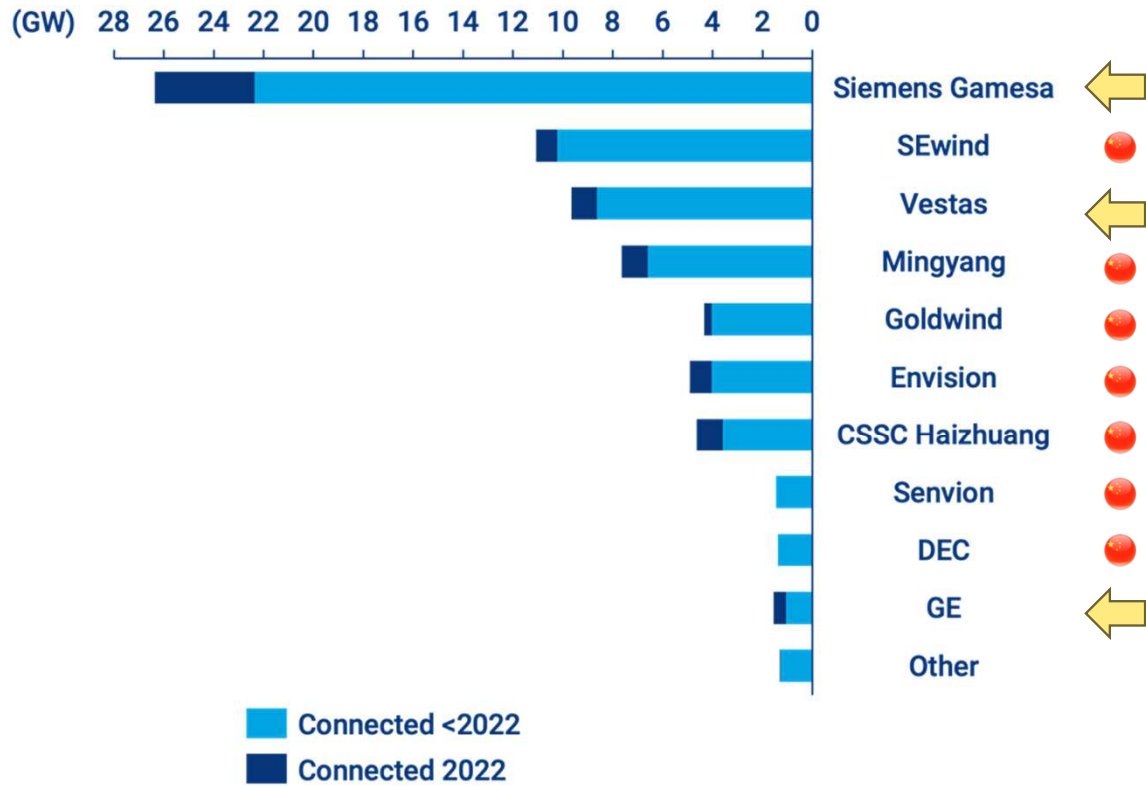
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Very few wind turbine manufacturers worldwide

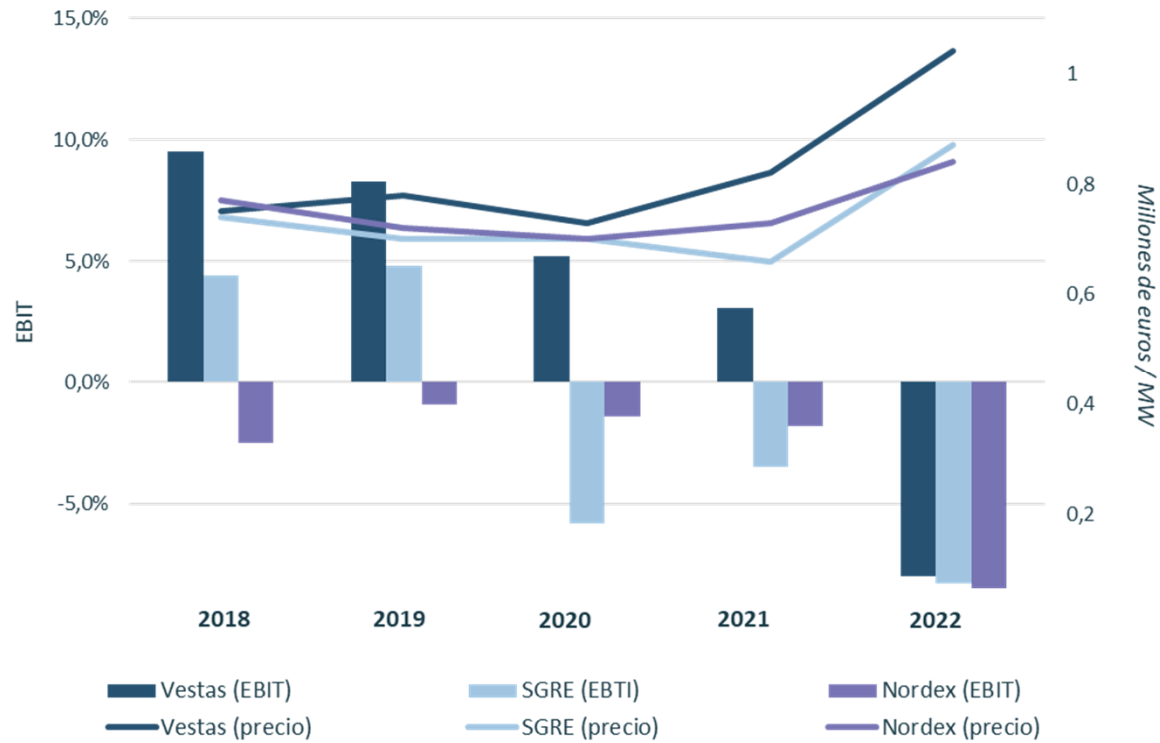
Offshore cumulative and newly added volumes (GW, 2022)

4



Though suffering in the short term...

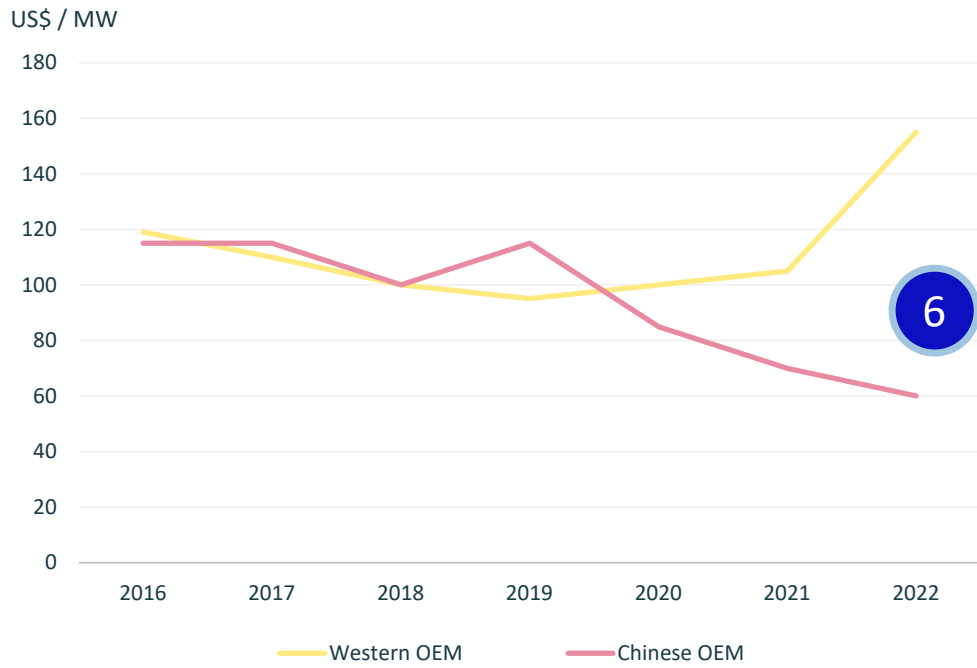
European OEM EBIT evolution



5

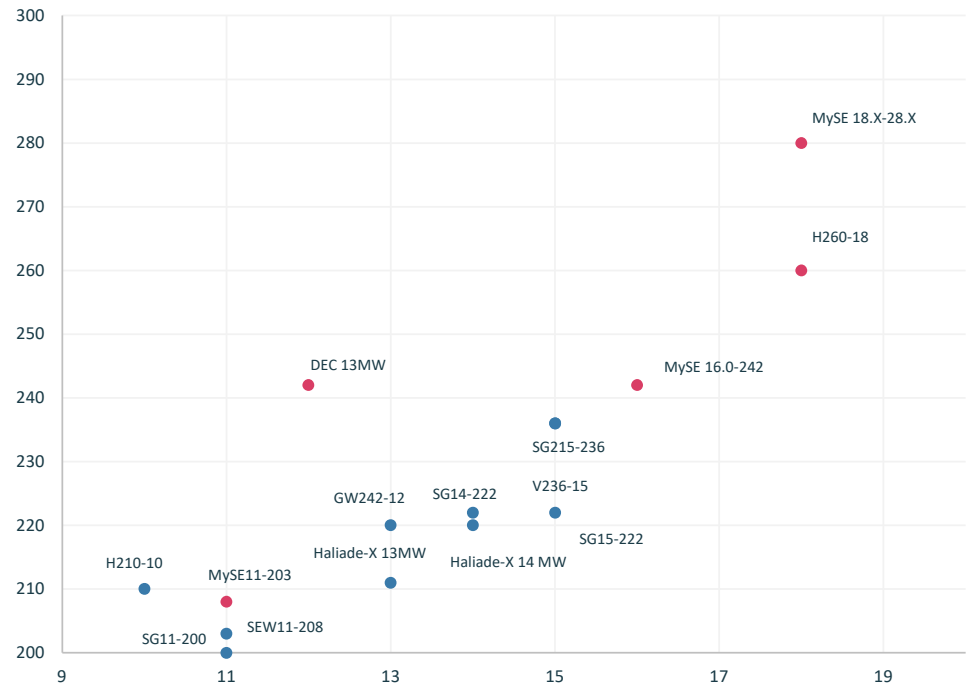
... and with the Chinese phantom menace in the horizon

Price of wind turbines (US\$ / MW)



6








Power of different offshore wind turbine models



7

And at the same time, not enough suppliers

Future supply chain risks:
Key findings summary, selected parts of the supply chain unique to the wind industry

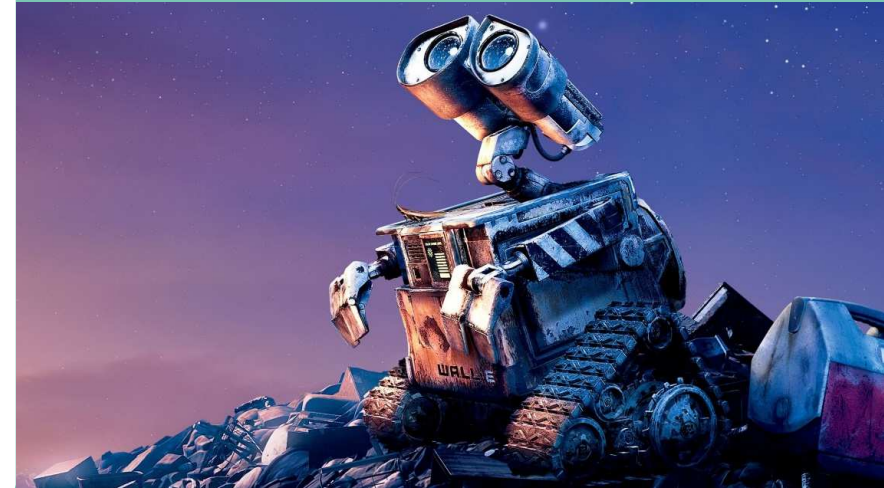
Segment	Industry	Sub-segment	2022-2030 demand growth*	Time to action*	Urgency assessment	Comment
Turbines	Onshore & Offshore wind	Total market	~3X Capacity (MW)	2024-2025		<ul style="list-style-type: none"> High inflation, low margins and an R&D race to supply the largest turbines on the market has put pressure on western OEM's ability to expand manufacturing capacities or repurpose facilities to accommodate a changing demand. While onshore wind turbine size demand is relatively more stable, expansion of manufacturing is needed to match growth in activity levels in the 2030 Targets Scenario.
	Offshore wind	>12 MW turbines	0-29 GW	2024		<ul style="list-style-type: none"> Offshore wind serves as the key challenge, with a large gap between current manufacturing capacity and projected demand for the largest models. Rotor blade manufacturing represents the current bottleneck for European turbine supply, but both need a rapid expansion to meet demand in this scenario.
Towers	Onshore & Offshore wind	All	~2.5X Metric tons	2025		<ul style="list-style-type: none"> Centralized tower supply for a larger range of turbines has enabled the supply chain to expand with growing activity. Tower demand will be driven by a relatively high number of onshore wind turbines (compared to offshore wind) and increasing offshore wind activity and sizes. Growth is expected to accelerate in the second half of the decade, creating an additional need for expansion.
Foundations	Offshore wind	Monopiles	~12X Metric tons	2024-2025		<ul style="list-style-type: none"> Monopiles will remain the most popular concept in Europe, and with rapid growth in activity and turbine sizes in offshore wind, manufacturing must be scaled up quickly within the largest monopile segments.
		Other grounded	~7X Metric tons	None		<ul style="list-style-type: none"> Jacket manufacturing capacity less constrained thanks to O&G industry.
		Floating	~23X Metric tons	2024		<ul style="list-style-type: none"> Floating foundation manufacturing must be industrialized. Today, it is characterized by pilots, demos and pre-commercial projects with one-off manufacturing and few units. From this small basis, manufacturing capacity must grow substantially towards the end of the decade.
WTIVs	Offshore wind	Total market	~7.5X Vessel years	2024-2025		<ul style="list-style-type: none"> Strong fleet additions in recent years have put supply in a strong position to cover demand in the next two to three years. Increased demand in the second half of the decade, primarily in the largest turbine size ranges will put pressure on supply.
		>12 MW turbines	0-25 vessel years			<ul style="list-style-type: none"> A global fleet and increasing demand outside Europe will likely pull supply out of Europe, worsening the supply-demand balance, with new units forecast to be needed. An increasing share of demand in the 15-20 MW range towards 2030 will also drive a need for new units, as the fleet of vessels capable of installing these units is currently limited.

*Estimated European demand based on 2030 Targets Scenario. Time to action refers to the estimated year when supply expansions need to be initiated to avoid a potential bottleneck.

Source: Rystad Energy research and analysis

Technology trends

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Size matters

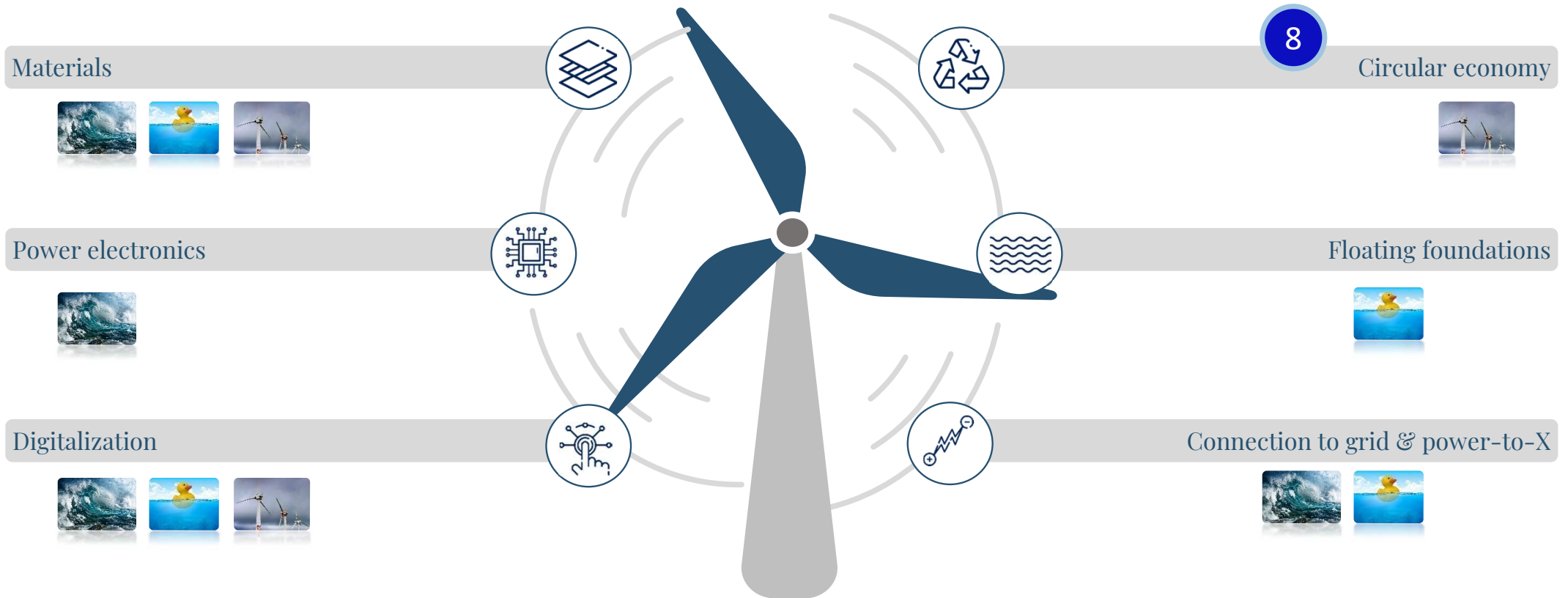
Rotor size and power rating continue to increase



Three technology-based opportunity areas...



... that need R&D in several technological fields



The wind energy sector in the Basque Country

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A global benchmark



Some figures

Global turnover (€M)



People working in the sector in the Basque Country

Annual investment in R&D carried out from the Basque Country (€M)



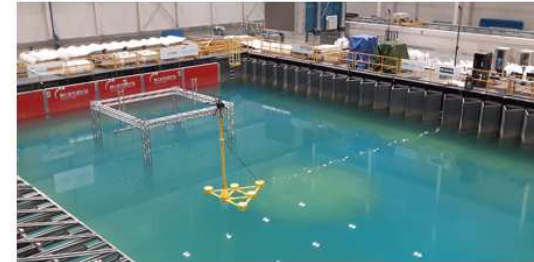
Floating Wind = The Next Big Thing for Euskadi



BiMEP
Open sea test site with grid connection for floating wind platforms



Hive Wind
Semi-submersible floating steel platform



SATH (Swinging Around Twin Hull)
Concrete floating platform



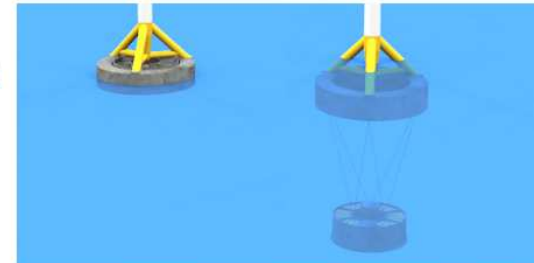
W2Power
Twin turbine floating wind platform



NAUTILUS Floating Solutions
Semi-submersible four-leg floating foundation

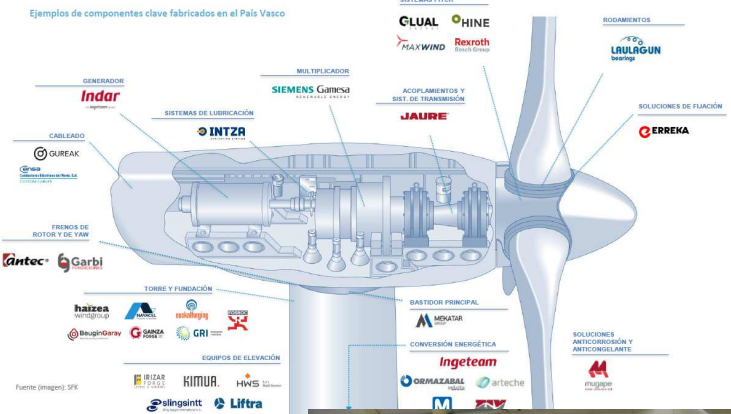


WHEEL
Hybrid Wind Floater Technology:
Compact lowdraft barge in harbour
Transparent spar in operation



Some singular facts

Ejemplos de componentes clave fabricados en el País Vasco





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