

Portugal and Spain

Transmission System Operators

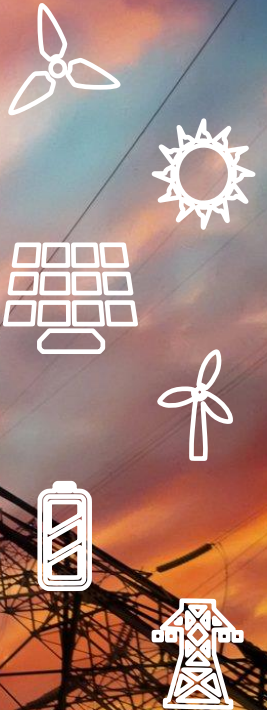
REN vs REE

Grid Connection Permits

20th March 2023



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Introduction

- The purpose of this document is to compare the Spanish and Portuguese TSOs (REE and REN) Grid Connection Permits grants, studied and with Connection Costs issued, and Connection requests waiting for Studies and respective TRC (Titulo de Reserva de Capacidade) in PT and (Acceso y Conexion) in ES.

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01

REE vs REN
TSOs
Grid
Connection
Permits

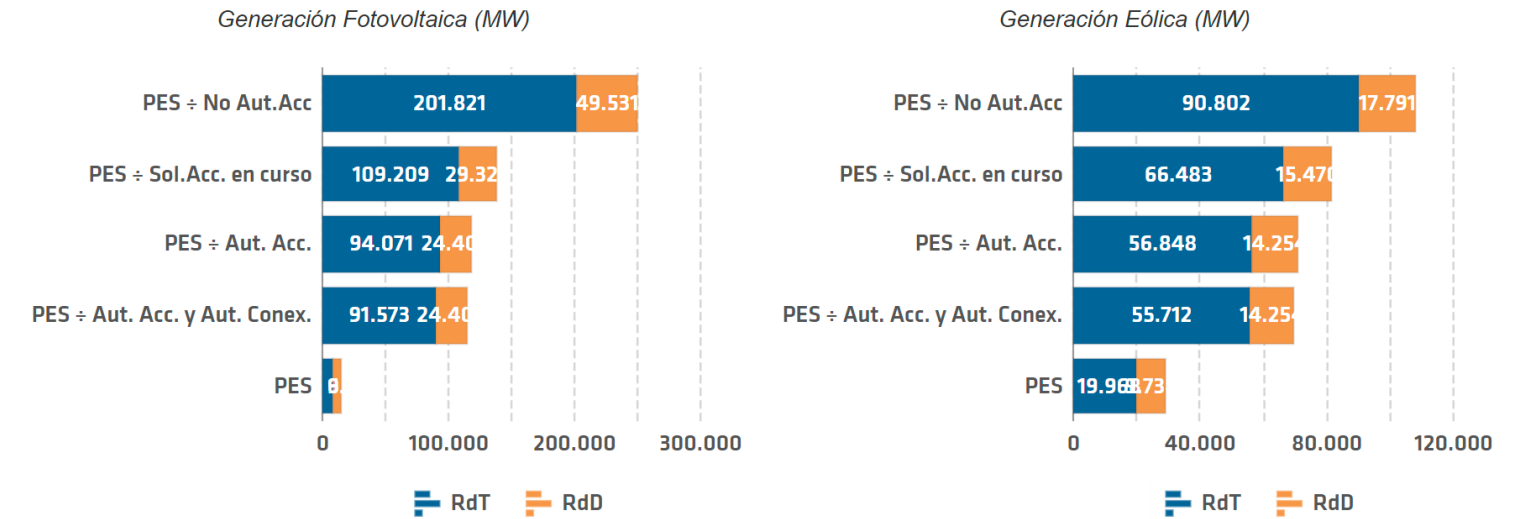


After the last EIA Permits with Positive DIA in Spain and its analysis, there is a need to accelerate the Development of Renewable Energy Projects in Portugal, as a critical factor for success and to capture and ensure investment for Portugal.

As an observation of the REE data on Connection Capacity in Spain, we have:

☒ Eólica ☒ Photovoltaic ☐ Thermosolar ☐ Others

NACIONAL



[MW]	PES	Aut.Acc. y Aut.Conex. Pte. PES		Total Aut. Pte. PES	PES ÷ Aut.Acc. Pte. PES	Sol.Acc. en curso	No Aut.Acc.	[MW]	PES	Aut.Acc. y Aut.Conex. Pte. PES		Total Aut. Pte. PES	PES ÷ Aut.Acc. Pte. PES	Sol.Acc. en curso	No Aut.Acc.
RdT	6.753	17.647		17.647	24.400	4.921	20.211	RdT	9.738	4.516		4.516	14.254	1.216	2.321
RdT	9.179	82.394		84.892	94.071	15.138	92.613	RdT	19.968	35.744		36.880	56.848	9.635	24.319
total	15.932	100.041		102.539	118.471	20.059	112.824	total	29.706	40.260		41.396	71.102	10.851	26.640

RdT: Red de transporte

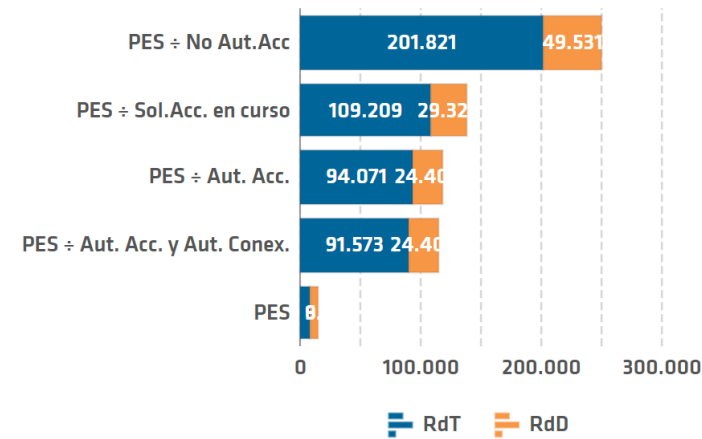
RdD: Red de distribución

red eléctrica
Departamento de Acceso a Red

☒ Eólica ☒ Photovoltaic ☐ Thermosolar ☐

NACIC

Generación Fotovoltaica (MW)



[MW]	PES	Aut.Acc. y Aut.Conex. Pte. PES	Aut.Acc. sin Aut.Conex. Pte. PES	Total Aut. Pte. PES	PES + Aut.Acc. Pte. PES	Sol.Acc. en curso	No Aut.Acc.
RdD	6.753	17.647		17.647	24.400	4.921	20.211
RdT	9.179	82.394	2.498	84.892	94.071	15.138	92.613
total	15.932	100.041	2.498	102.539	118.471	20.059	112.824

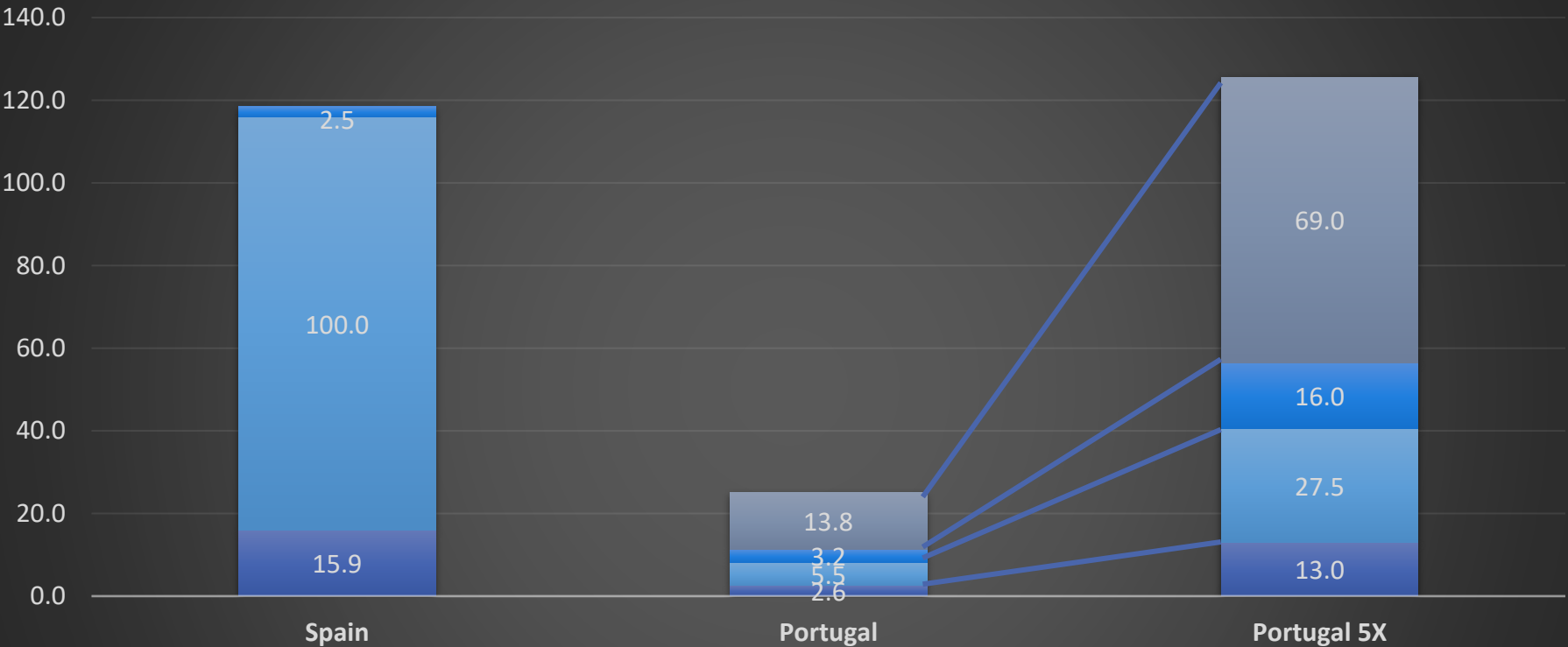
- 15,9 GW of projects already connected to the Grid
- 100 GW with Grid Access and Connection Permit, with Technical conditions and infrastructure upgrade prices already sent to the Developers and accepted by them.
- 2,5 GW with Grid Access Permit, waiting for Technical conditions and infrastructure upgrade prices,

➤ **A Total of 102,5 GW of Solar PV projects.** If we think about the dimension of PT vs ES, being 1/5 of the dimension, **Portugal should have in these conditions 20,5 GW** (being somewhat equivalent to the shortlist of the **78 projects and 17 GW** of the Portuguese TSO Direct Agreement (TERMOS DE REFERENCIA).

•CONCLUSION: it is extremely urgent to proceed with all of the studies of the TSO REN Direct Agreements within the shortest time possible

➤ As a next level, around **63-80 GW of Solar and Wind projects have the Environmental Permit (DIA) obtained**, as per the latest news in Spain and are **going to have in the next months the AAP, which is the Permit before the Ready to Build Permit**

Solar PV Connection Permits Portugal vs Spain (GW)



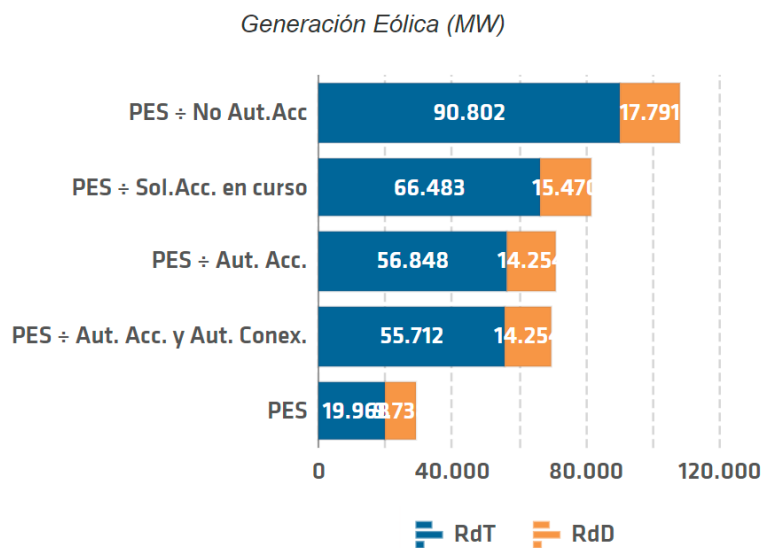
- TSO Direct Agreements remaining
- Grid Access Permit (PT 3,2 GW - first 11 Projects of TR)
- Grid Access and Connection Permit (PT Auctions and 3,5 GW TSO Agreements out of TR)
- Grid Connected

•CONCLUSION: it is extremely urgent to proceed with all of the studies of the TSO REN Direct Agreements within the shortest time possible

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GW	Grid Connected	Grid Access and Connection Permit (PT Auctions and 3,5 GW TSO Agreements out of TR)	Grid Access Permit (PT 3,2 GW - first 11 Projects of TR)	TSO Direct Agreements remaining
Spain	15.9	100.0	2.5	
Portugal	2.6	5.5	3.2	13.8
Portugal 5X	13.0	27.5	16.0	69.0

ANAL



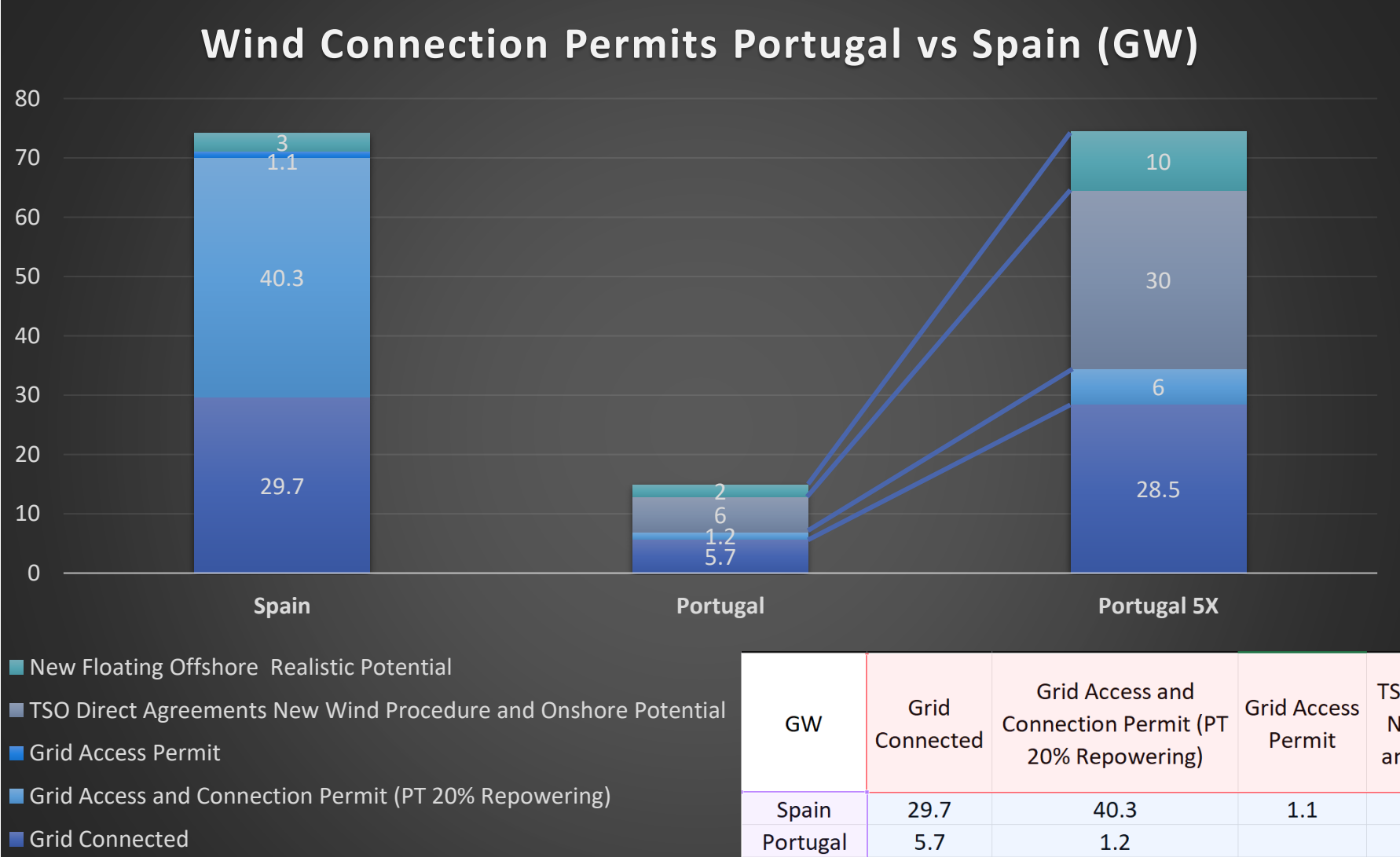
	PES	Aut.Acc. y Aut.Conex. Pte. PES	Aut.Acc. sin Aut.Conex. Pte. PES	Total Aut. Pte. PES	PES ÷ Aut.Acc. Pte. PES	Sol.Acc. en curso	No Aut.Acc.
RdD	9.738	4.516		4.516	14.254	1.216	2.321
RdT	19.968	35.744	1.136	36.880	56.848	9.635	24.319
Total	29.706	40.260	1.136	41.396	71.102	10.851	26.640

- 29,7 GW of projects already connected to the Grid
- 40,3 GW with Grid Access and Connection Permit, with Technical conditions and infrastructure upgrade prices already sent to the Developers and accepted by them.
- 1,1 GW with Grid Access Permit, waiting for Technical conditions and infrastructure upgrade prices,

➤ **A Total of 41,4 GW of Wind projects.** If we think about the dimension of PT vs ES, being 1/5 of the dimension, **Portugal should have in these conditions 10,4 GW.**

•CONCLUSION: it is urgent to proceed with a Termos de Reference process, only for Wind, in the shortest time possible

➤ As a next level, around **63-80 GW of Solar and Wind projects have the Environmental Permit (DIA) obtained**, as per the latest news in Spain and are **going to have in the next months the AAP, which is the Permit before the Ready to Build Permit**



•CONCLUSION: it is urgent to proceed with a Termos de Reference process, only for Wind, in the shortest time possible

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02

Future
Cheap RE
Electricity
Excess
Production



Future Cheap RE Electricity Excess Production

Electric Vehicles
massification

Industry
Electrification
Processes
replacing Fossil
Fuels

Domestic Electric
Heating

Heat Pumps

Green H2 local
production for
local use in New
Electro-Intensive
Industries

BESS Peak Shaving
and Capacity
Availability

A photograph of several offshore wind turbines in a dark, stormy sea under a heavy, grey sky. The turbines are white with red and yellow accents. The water is dark and choppy. The sky is filled with dark, heavy clouds.

03

2030 Floating Offshore in Europe

Europe can expect to have 10 GW of floating wind by 2030 (2 June 2022) © 2022 WindEurope asbl/vzw



<https://windeurope.org/newsroom/news/europe-can-expect-to-have-10-gw-of-floating-wind-by-2030/>

The world's largest floating wind energy event, FOWT 2022, took place on 16 May in Montpellier. WindEurope CEO Giles Dickson moderated the Ministerial panel comprising: Elisabeth Sæther, Norwegian State Secretary for Energy; Sophie Murlon, Director for Energy at the French Ministry for the Ecological Transition; and Ivan McKee, Minister for Business, Trade, Tourism and Enterprise in the Scottish Government.

Floating offshore wind offers unique opportunities for Europe. Floating turbines can produce electricity further offshore and in deeper waters than bottom-fixed turbines. So it opens up offshore wind for countries that don't have shallow waters – meaning offshore wind can be developed in deeper sea basins such as the Mediterranean and Atlantic.

Floating offshore wind is developing rapidly. Europe today has 113 MW of floating wind turbines in operation and is in the process of developing many more and larger floating wind farms.

Norway is now building the world's biggest floating wind farm, Hywind Tampen (88 MW). France will have four small projects of around 30 MW each up and running within 2 years. By 2024 Europe will have 330 MW of floating wind in operation.

Then things will start to scale up big time. France is now running its first of 3 auctions in 2 years for large floating wind farms, each 250 MW. Spain, Greece, Portugal and Norway all plan to start large-scale auctions in the coming year. Several large floating projects are being developed in Italy, off Sardinia, Apulia and Sicily. And Scotland have this year awarded seabed development rights for a massive 15 GW of floating projects.

All this activity and ambition is reflected in floating wind targets for 2030 that various countries have recently announced. Greece wants 2 GW by then, Spain 1-3 GW and the UK 5 GW. Italy is considering a 2030 target of 3.5 GW. Portugal is looking to auction 3 sites which could each host up to 2 GW. And Ireland has huge plans for floating wind, though mainly for after 2030.

It is not unreasonable to expect that Europe will have over 10 GW of floating wind in operation by 2030. But targets don't automatically translate into new capacity. Governments need the right policies and measures, and they have to implement them in good time.

First they need to give clarity to developers on where and how much they can build. The locations of floating wind farms should be reflected in national Maritime Spatial Plans. Then Governments need a clear auction schedule saying how much they will auction when. These auctions should be technology-specific. And they should provide revenue stabilisation, ideally via index-linked 2-sided Contracts for Difference (CfDs).

CfDs are cheap for Governments because they get paid back as well as paying out. And they're cheap for society because they minimise financing costs – banks are happy the upfront capital requires because with the prospect of stable revenues they see they'll get paid back.

Floating wind will have its own distinctive supply chain. The turbines are the same as for conventional (bottom-fixed) offshore wind farms. What's different are the floating structures on which the turbines stand. These are big structures which need to be assembled in port and coastal areas. This requires major investments in manufacturing sites and the related infrastructure. Governments need to facilitate and incentivise these investments. And they need to ensure the grid connections are developed on time, with the right technology to connect floating structures to the grid.

WindEurope CEO Giles Dickson says: "Floating wind energy is about to take off big time in Europe. Over 100 MW is already in operation. Governments see it's working well and that it means they can do offshore wind in deeper waters. So they're announcing big targets and planning big auctions. Provided they put the right policies in place it is not unreasonable to expect that Europe will have over 10 GW of floating wind in operation by 2030."

Where we are



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