

OFFSHORE WIND IN EUROPE

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Offshore wind in Europe

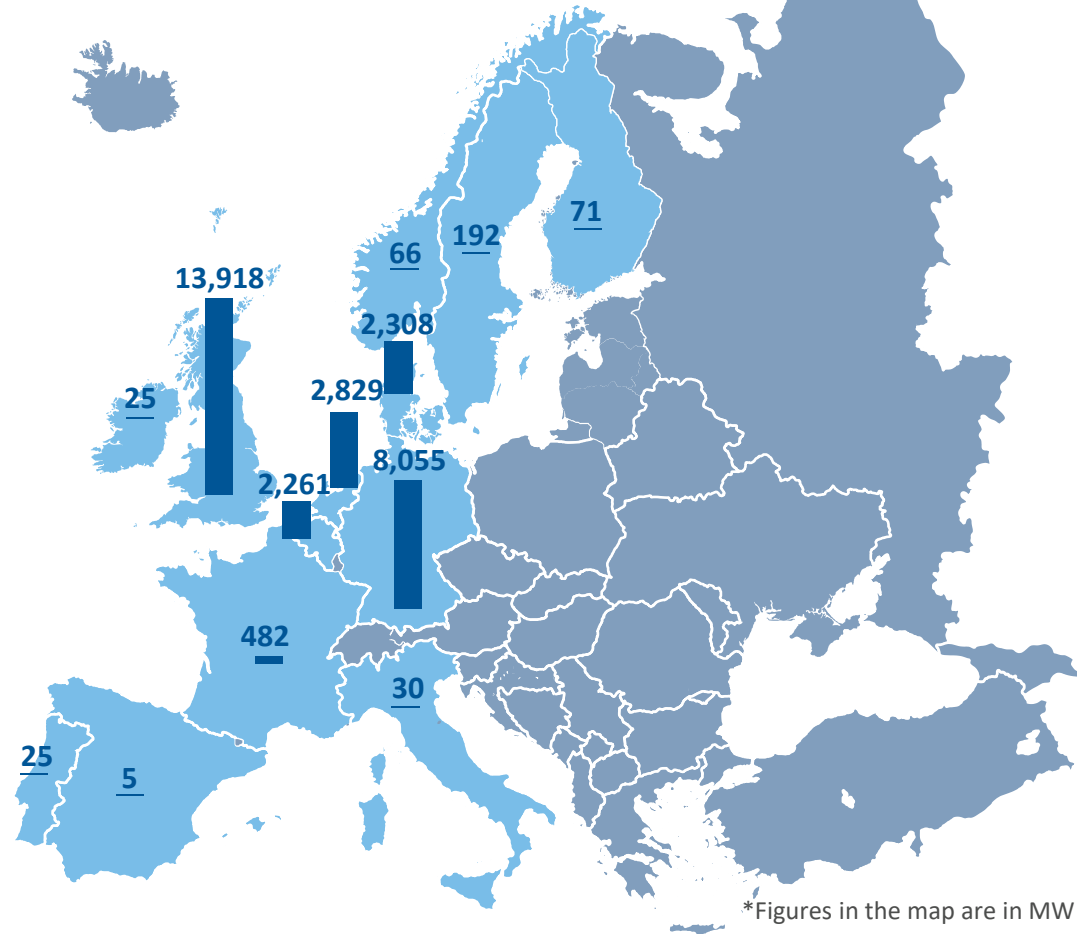
Cumulative

30,267 MW
connected to the grid

13 countries

5,954 turbines

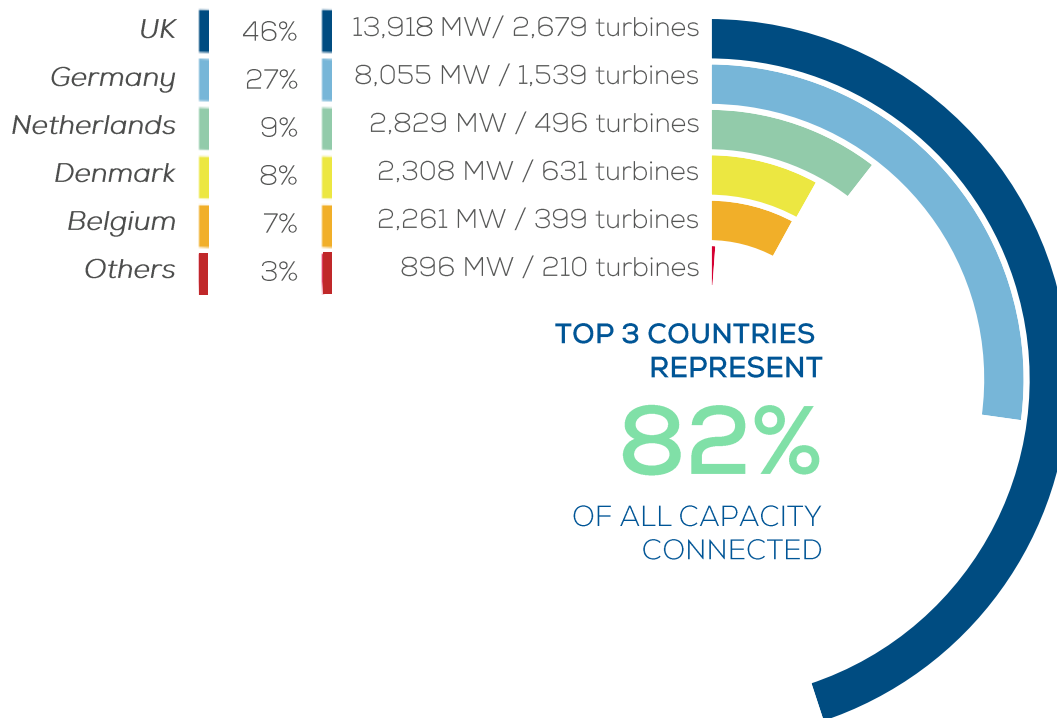
126 wind farms
connected to the grid



Europe's installed capacity is concentrated in five countries

Cumulative

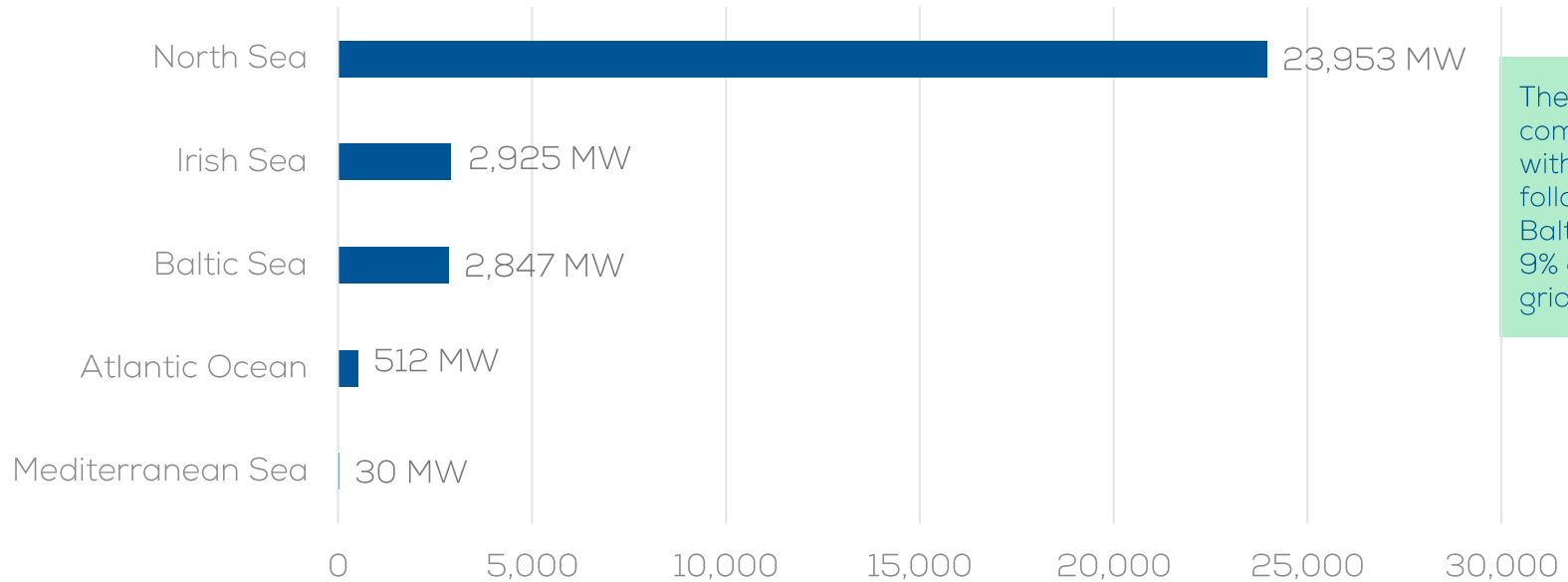
Cumulative capacity and grid-connected turbines by country



79% of all turbines connected to the grid are in the North Sea

Cumulative

Cumulative grid-connected capacity by sea basin

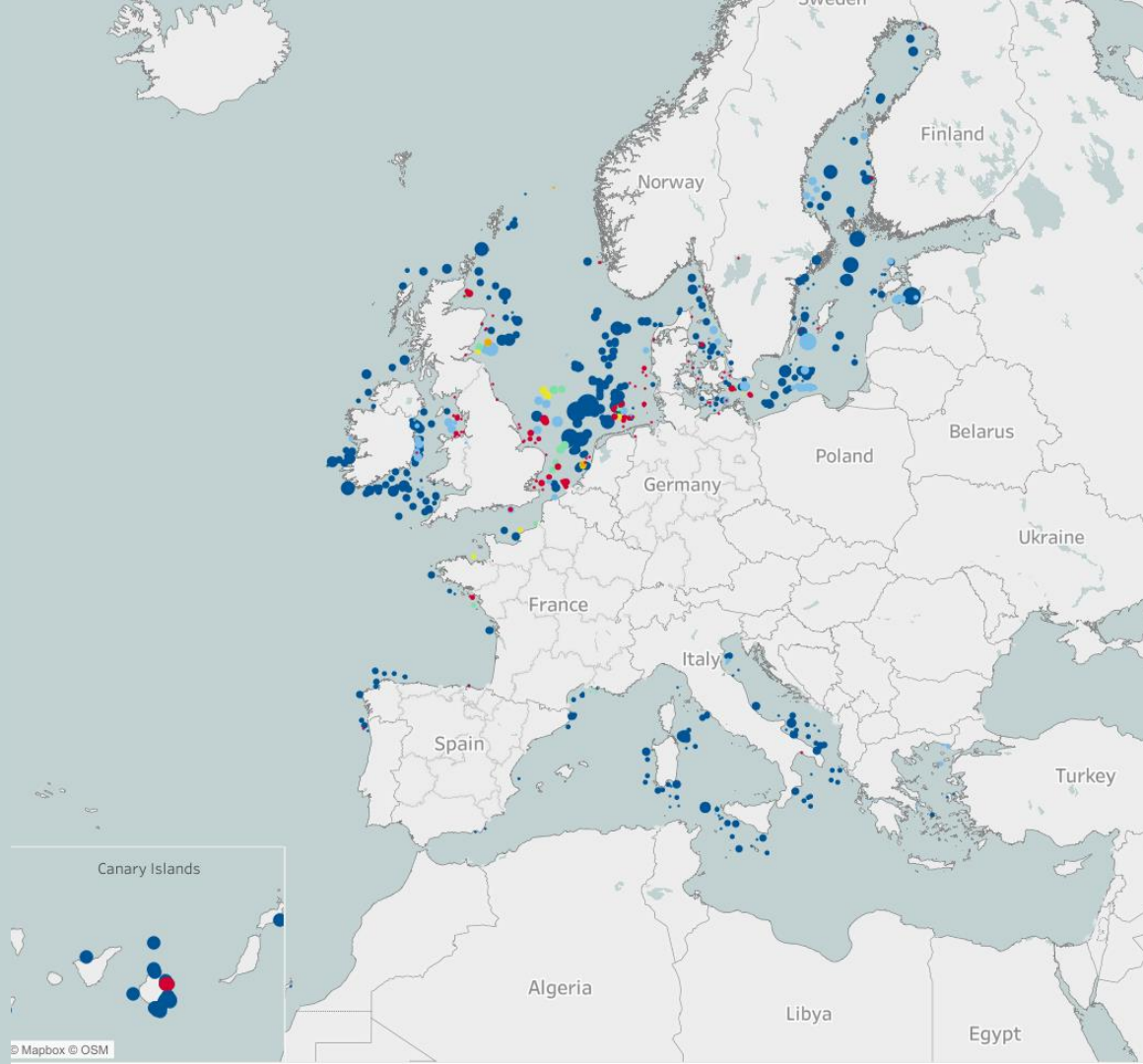


The Irish Sea comes second with 10% followed by the Baltic Sea with 9% of capacity grid-connected.

Europe's offshore wind farms

Status of Offshore Wind Projects

- Online
- Partially online
- Under construction
- With permits
- Under permitting procedure
- Planned



Governments want more offshore wind

Baltic Sea



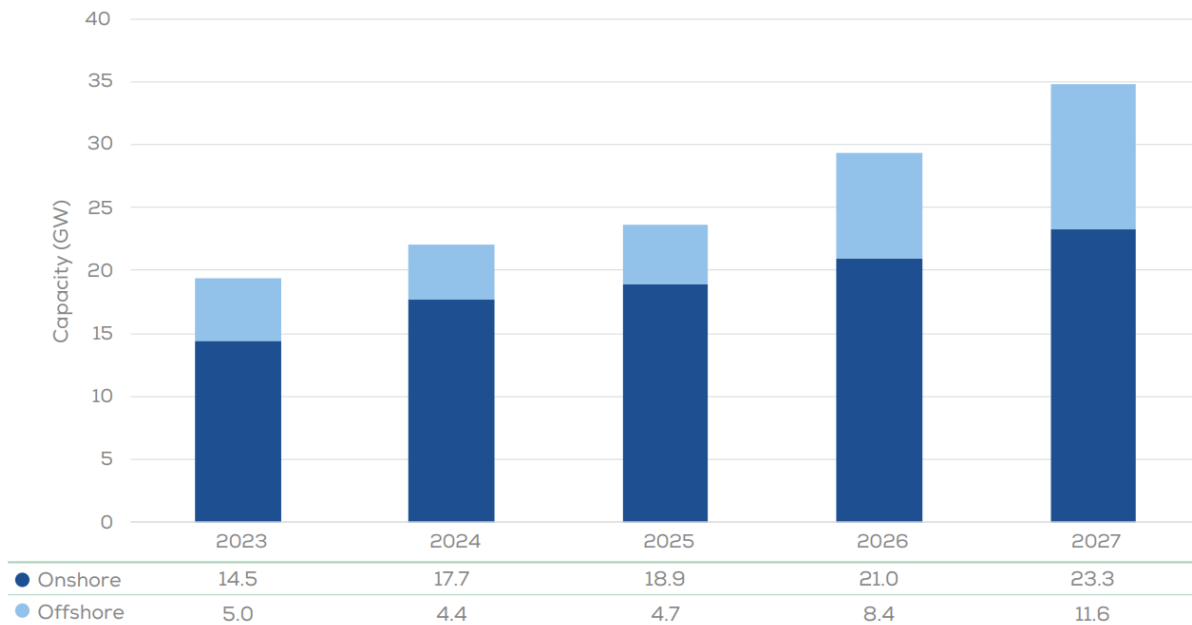
19.6 GW by 2030

North Sea



120 GW by 2030

34 GW of new offshore will be added in Europe in the next five years



New Energy Strategy
12.7 GW in 2023-2027



The new WindSeeG
6.4 GW in 2023-2027



Offshore Wind Energy Roadmap
4.3 GW in 2023-2027



New offshore sector deal
3.6 GW in 2023-2027



Danish Climate Agreement
2.4 GW in 2023-2027



UK

Offshore wind capacity

13.9 GW TODAY

50 GW BY 2030*

Market
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12.7 GW

to be installed
from 2023-2027

Next
Tenders
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Round 5 (AR5)
Opening: March 2023

Round 6 (AR6)
Opening: March 2024

UK raises 2030 offshore wind target from 40 to 50 GW

In its new Energy Strategy, the UK Government raised its 2030 offshore wind target from 40 to 50 GW and its floating wind target within that from 1 to 5 GW. To deliver this they plan to cut consenting time for new offshore wind farms from 4 years to 1. And to take a new approach to nature protection with a new Offshore Wind Environmental Improvement Package. They are hoping to run yearly CfD auctions of 4 GW starting in March 2023.

Floating wins more than bottom-fixed in Scottish seabed leasing auction

Crown Estate Scotland awarded seabed space in their “ScotWind” auction to 15 GW of floating offshore wind - and 10 GW of bottom-fixed offshore wind. They got 74 bids in total and awarded seabed space to 17 of them. Iberdrola / Scottish Power (3 GW) and BP (2.9 GW) won the largest projects. The winning developers will pay a one-off fee of up to £100,000/km2. This is much less than in England. In the last seabed lease in England developers could pay up to 50 times the amount paid for seabed leases in Scotland for similarly-sized projects.

UK awards 7 GW of new offshore wind CfDs

In what became the world’s largest ever renewable energy auction, the UK awarded 7 GW of Contracts for Difference (CfDs) to offshore wind. This is spread between five different wind farms. And the average price was £37.35/MWh in 2012 prices. These amounts are index-linked: a crucial factor given the current situation. A 32 MW floating wind farm also won a CfD at £87.30/MWh.



Germany

Offshore wind capacity

8.1 GW TODAY

30 GW BY 2030*

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6.4 GW

to be installed
from 2023-2027

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N-3.5, N-3.6, N-6.6,
N-6.7 & O-2.2 (central)
Status: opening in 2023
Commissioning: 2028-2030

N-11.1, N-12.1 & N-12.2
(non-central)
Status: opening in 2023
Commissioning: 2030

Germany signs up to non-binding targets for North and Baltic Seas

At the annual North Seas Energy Cooperation (NSEC) Summit the Energy Ministers of eight NSEC countries pledged to build 76 GW of offshore wind between them by 2030. They've also committed to 193 GW by 2040 and 260 GW by 2050. Meanwhile Heads of Government from the eight Baltic Sea countries met in Copenhagen and agreed to expand offshore wind in the Baltic from 3 GW today to 20 GW by 2030. Both declarations call for signatories to collaborate on cross-border (hybrid) projects.

Future auctions set conditions for uncapped negative bidding

Germany's new offshore wind law (passed by the Bundestag on 7 July) sets rules for possible uncapped negative bidding for future offshore wind auctions. Some auctions will combine zero bidding and non-price criteria, and others negative bidding. This is not good. Negative bidding, where developers pay to build an offshore farm, brings costs that have to be passed on to consumers and the supply chain.

Germany launches 7 GW of offshore wind tenders

The German Federal Network Agency launched four tenders in the North and Baltic Seas as part of its programme to deliver the new 30 GW target. In the North Sea three areas N-11.1, N-12.1 and N-12.2 offer 2 GW each and in the Baltic Sea the area O-2.2 will offer 1 GW. These areas are non-centrally developed and will be assessed using non-price criteria. The agency will run four other auctions this year for a total of 1.8 GW in the North Sea through the central system.



Offshore wind capacity
2.8 GW TODAY*
21.5 GW BY 2030**

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4.3 GW
to be installed
from 2023-2027

Next
Tenders
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IJmuiden Ver I & II
Status: opening in 2023
Commissioning: 2028

IJmuiden Ver III & IV
Status: opening in 2023
Commissioning: 2028

Dutch show that non-price criteria work

The Netherlands held Europe's first successful renewable energy auctions based on non-price criteria: for two 700 MW offshore wind farms at the Hollandse Kust West site. Both auctions were 90%-based on non-price criteria. The first focused on system integration criteria and the other on biodiversity protection. RWE won the former, offering 600 MW of onshore electrolyzers and 225 MW of e-boilers, batteries and floating solar. Shell and Eneco won the latter with innovative commitments, e.g., on artificial seabed reefs.

Four North Sea countries commit to huge expansions of offshore wind

The Heads of Government of Germany, Belgium, the Netherlands and Denmark met with the President of the EU Commission in Esbjerg and pledged to build 65 GW of offshore wind between them in the North Sea by 2030, and 150 GW by 2050. They currently have 13 GW. They also committed to deploying 20 GW of renewable hydrogen by 2030 and agreed to collaborate on joint offshore wind projects, energy islands and grid infrastructure.

New designated areas for offshore wind

The Dutch Government issued a newly updated Offshore Wind Energy Roadmap that will deliver about 21 GW by 2030. It includes the areas of Hollandse Kust West VIII (0.7 GW), Nederwiek (6 GW), Doordewind (4 GW), IJmuiden Ver (6 GW) and Ten noorden van de Waddeneilanden (0.7 GW). The tenders will be carried out in the next five years starting with IJmuiden Ver sites I to IV, possibly in pots of two tenders worth 2 GW each to benefit from economies of scale. The Government is currently reviewing its auction rules – mostly which non-price criteria it plans to use.



France

Offshore wind capacity

0.5 GW TODAY

6.8 GW BY 2030*

Market
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3.6 GW

to be installed
from 2023-2027

Next
Tenders
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Normandy
Status: ongoing
Results: 2023

South Brittany (floating)
Status: ongoing
Results 2023

France makes new long term commitments

The Government has announced new targets for France's 2050 energy mix. This includes 40 GW of offshore wind. The Government will consult with stakeholders to ensure careful mapping of sea areas. President Macron also announced €1bn of new funding for emerging technologies, including floating wind. France is determined to achieve industrial leadership in floating wind.

First French wind farm up and running

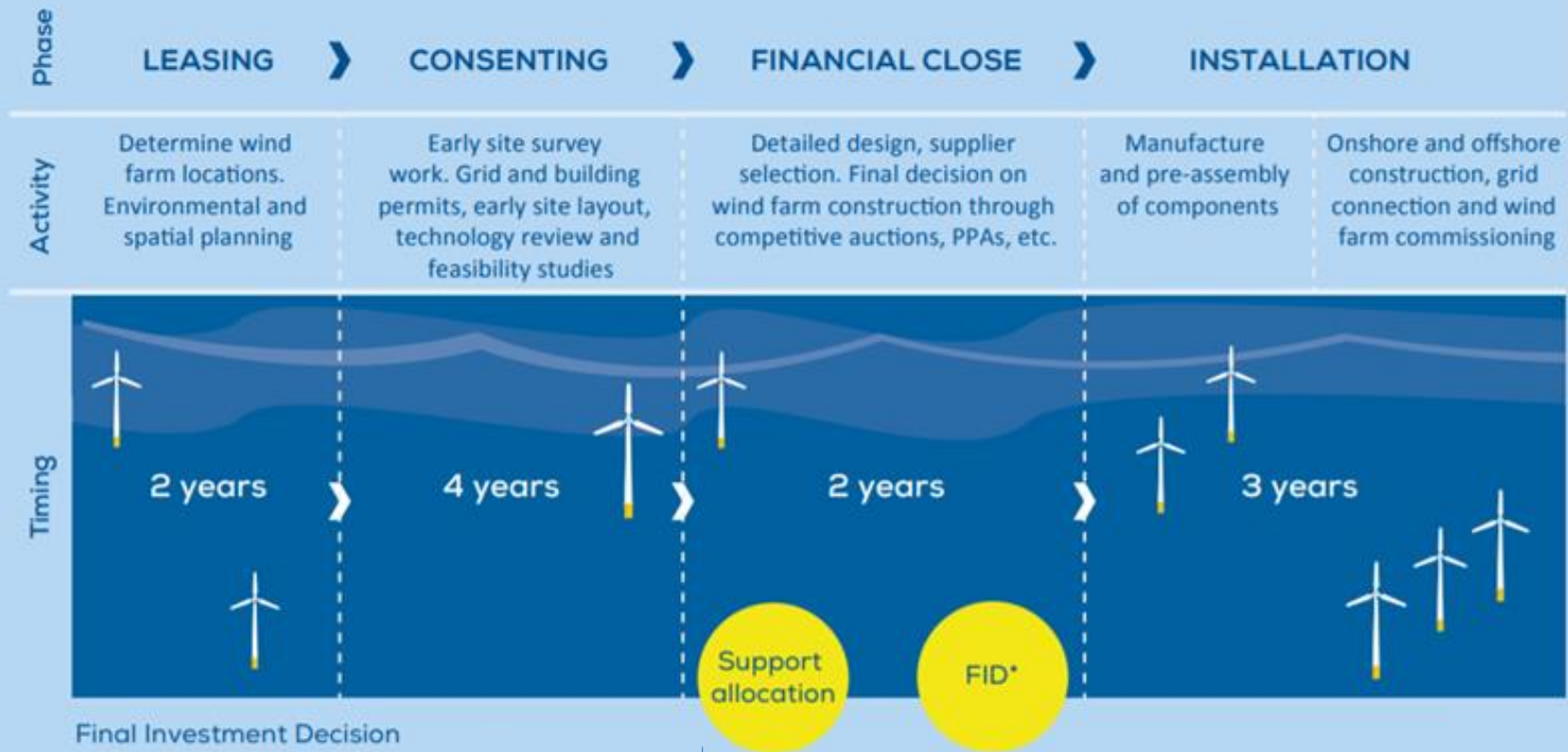
France has commissioned its first offshore wind farm. Saint Nazaire is 480 MW (80 turbines) and will cover 20% of the Loire-Atlantique department's electricity consumption. The project was awarded in an auction back in 2012, but the permitting has been slow. The other winners of that auction are all under construction and expected to come online in 2023 and 2024: Fécamp (498 MW), Saint Brieu (496 MW) and Courseulles-sur-Mer (450 MW).

Several tenders still open and some delays

France currently has six tenders open for a total of 4.25 GW – fixed and floating. Three bottom-fixed areas include Centre Manche (1 GW), Centre Manche 2 (1.5 GW) off the Normandy coast, and Sud-Atlantique (1 GW) off La Rochelle. Three floating areas include Sud Bretagne (250 MW) off the coast of Brittany, and Mediterranean I and II (250 MW each). Some of the tender results have been delayed due to lack of data from the State and approval of the tender conditions to be compliant with EU State Aid rules.

OTHER TRENDS IN EUROPEAN MARKETS

Offshore wind farm development phases



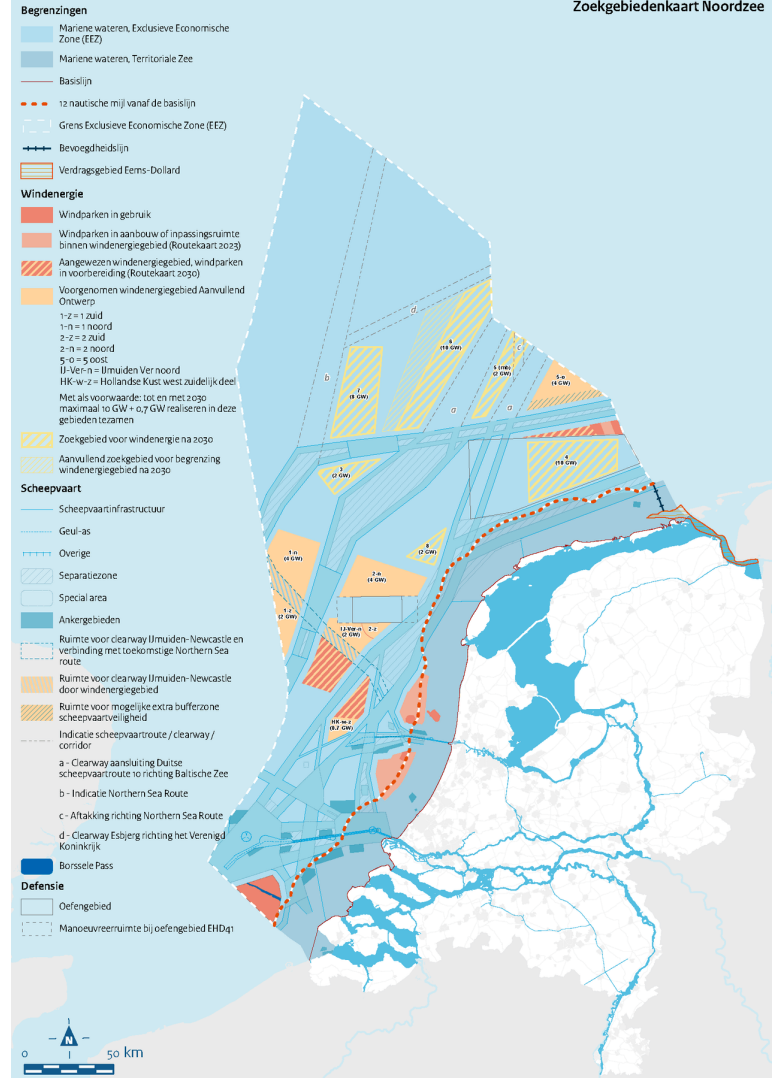
MSPs in EU

Country	Area available for OW (sq. km)	Equivalent Capacity (GW)	Estimated Energy Density (MW/km ²)	% of sea	Expected to 2030 (GW)
Belgium	519	5.7	11	15	5.8
Denmark	11,000	42.3	3.8	10	12
Estonia	1,850	9	5.0	5	0.5 0.07 (4 GW estimated)
Finland	3,500	15.7	4.5	4.3	
France*	8,000	40	5.0	2.3	6.8
Germany	8,400	60	7.1	15	30
Ireland	1,000	5	5.0	0.2	7
Latvia	800	4	5.0	1.1 - 2.8	0.5
Lithuania	644	2.4 - 3.3	5.0	9.4	0.7
Netherlands	3,400	26.8	7.9	5.9	22.2
Poland	3,600	17.2	5.0	12	5.9
Sweden	1,400	7	5.0	4.5	0.2 (expected to be raised to 7 GW)
Spain*	8,000	24	3.0	1.4	3
TOTAL	52,000 sq. km	220 GW		2.9%	±100 GW

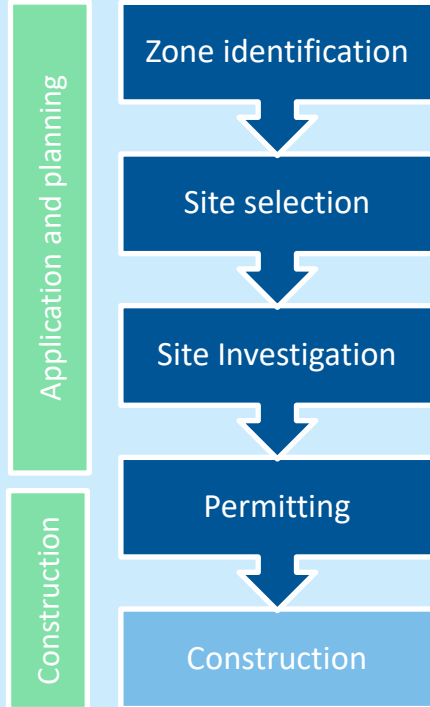
-  Well above
-  Just enough
-  Not applicable
-  Expected to raise targets

The Netherlands

MSP submitted on:	2022 (currently under discussion)
Valid until:	2027
Authority	Ministry of Infrastructure and Water Management
Area available for OW:	3,400 km² by 2030: 26.8 GW (target of 22.2 GW) + 3,400 km ² for extra 34 GW after 2030 at 10 MW/km ²
Equivalent capacity:	26.8 GW (target of 22.2 GW) + 34 GW – Search areas after 2030
% of sea space for OW:	5.9% for 26.8 GW (target of 22.2 GW) + 5.9% for extra 34 GW after 2030 at 10 MW/km ²
OW and nature	Low - Nature conservation areas have been avoided.
OW and fishing	Low - A socio-economic assessment has been performed to assess the amount of the compensation measures (for the 16 GW new search areas estimated around 2.5 m€/year – source)
OW and Defence	Low - Options for relocating and multiple use of military exercise areas (EHD-41, EHD-42) will be explored.
Industry feedback:	Positive



22.2 GW by 2030: Centralised efficient model



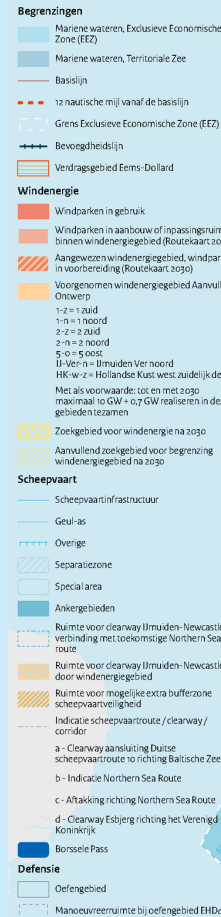
Government

Developer

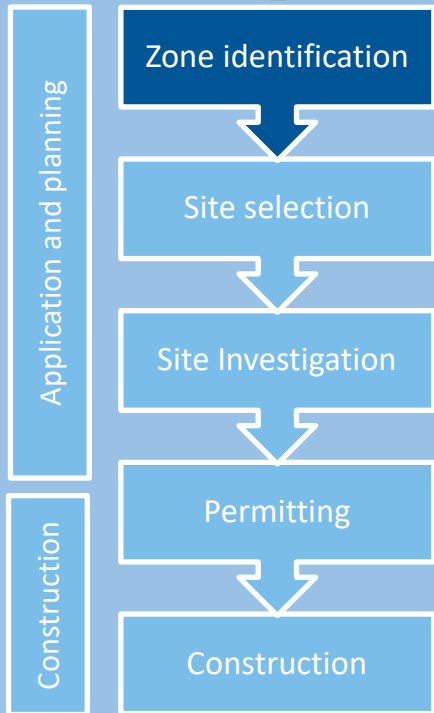
TSO

Good practices

- Central model
- One-stop-shop
- Designated areas in Maritime Spatial Plan
- Grid connection planned and constructed by TSO
- Process deadlines and principle of positive silence
- Monitoring of environmental effects
- Online platform



50 GW by 2030: Most decentralised model



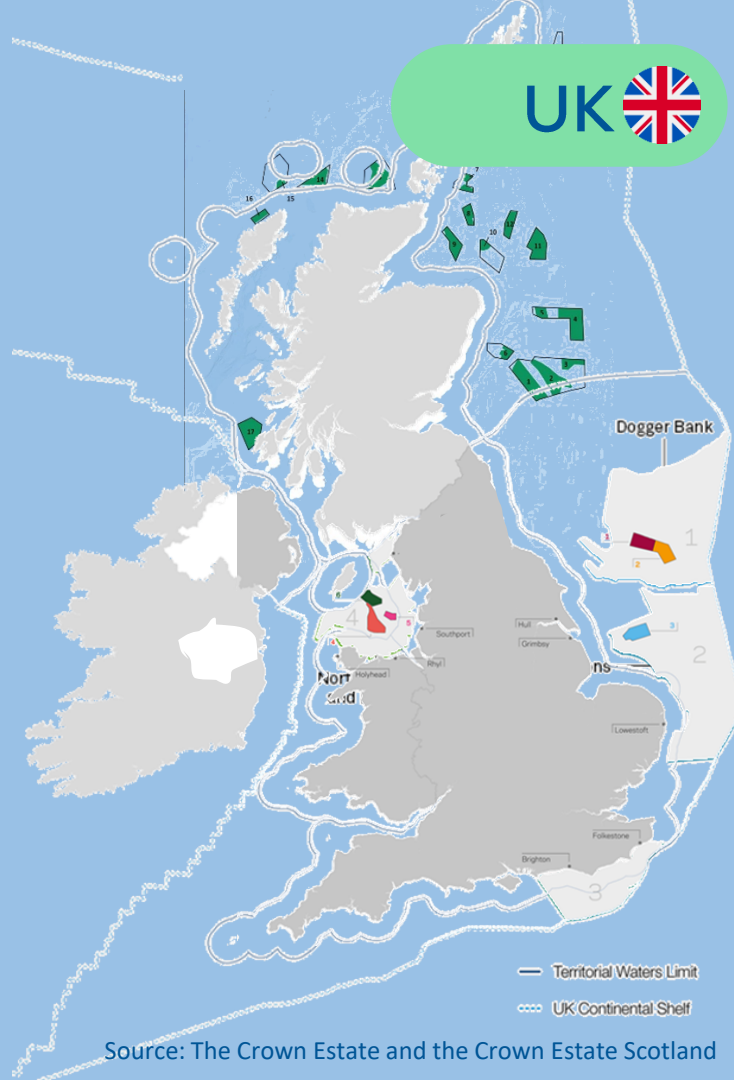
Government

Developer

TSO

Good practices

- Clear timeline of future auctions
- Recurrent seabed leases in line with targets
- Annual rounds for support
- Large capacity offered in both
- 2 sided Contracts-for-Difference



Source: The Crown Estate and the Crown Estate Scotland

How other countries speed up offshore wind

One stop shop
permitting

Auctions

Centralised grid
development

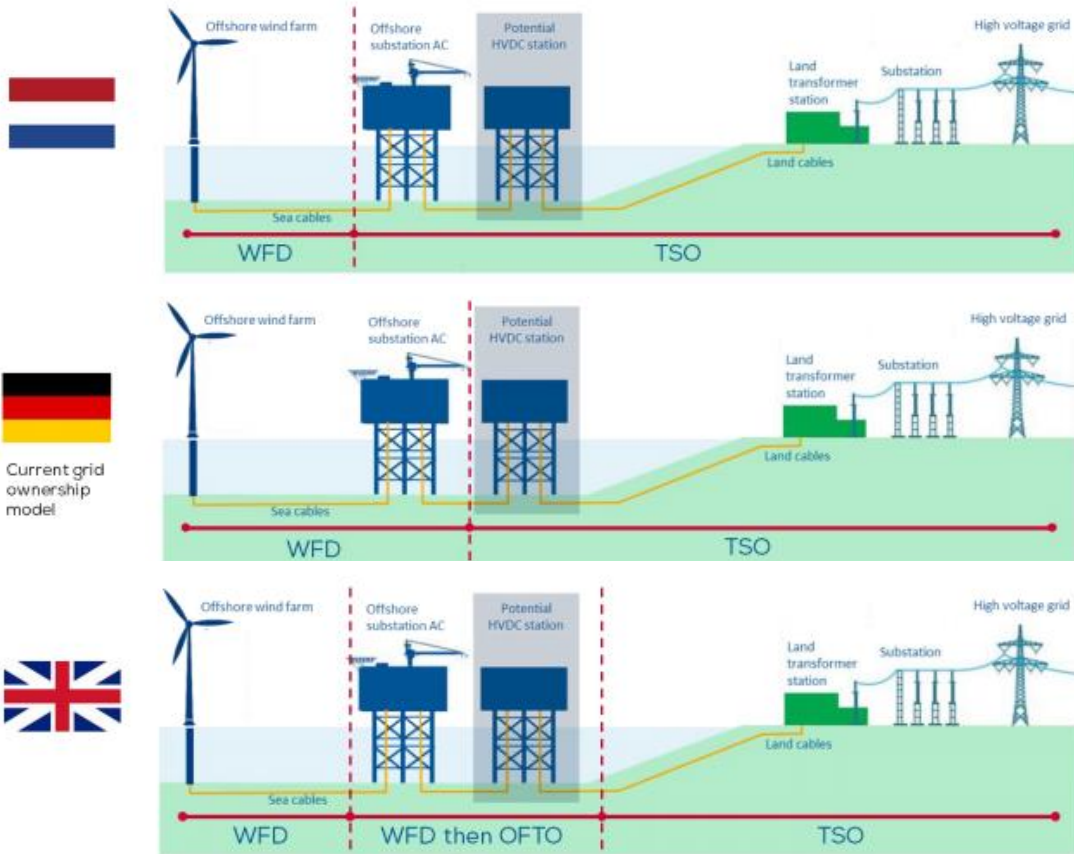


Legal requirement

Approved, and CfDs
encouraged

Coordination across
sea basins

Offshore grid connections: different configurations



Centralised

Decentralised

THANK YOU

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EUROPE

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