



Offshore Wind - Warm up

Presenter



Ellinor Morrison

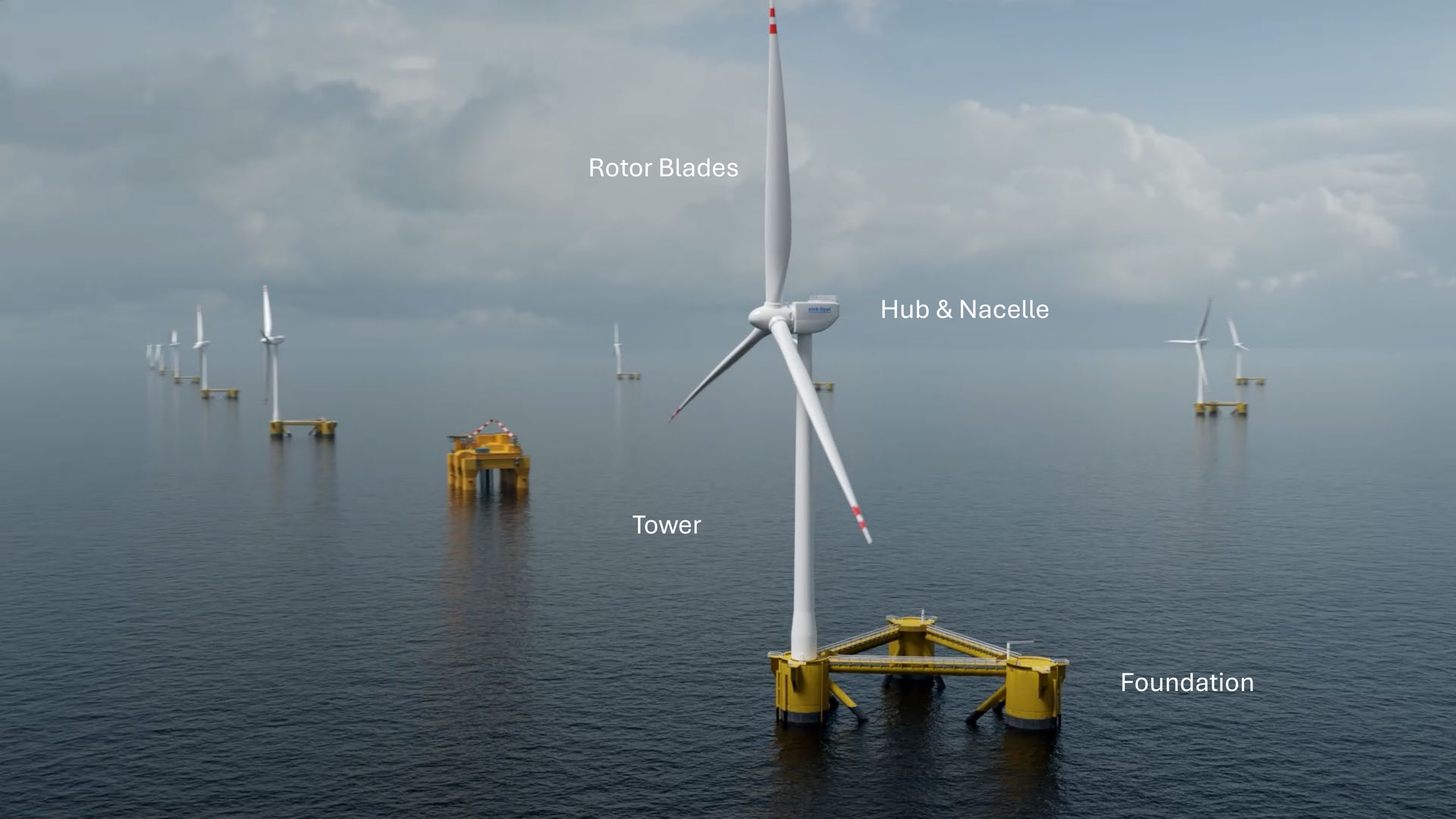
Assistant Underwriter, NIORD

The Turbines

Diameter:
260 m

Bestas B260 wind turbine





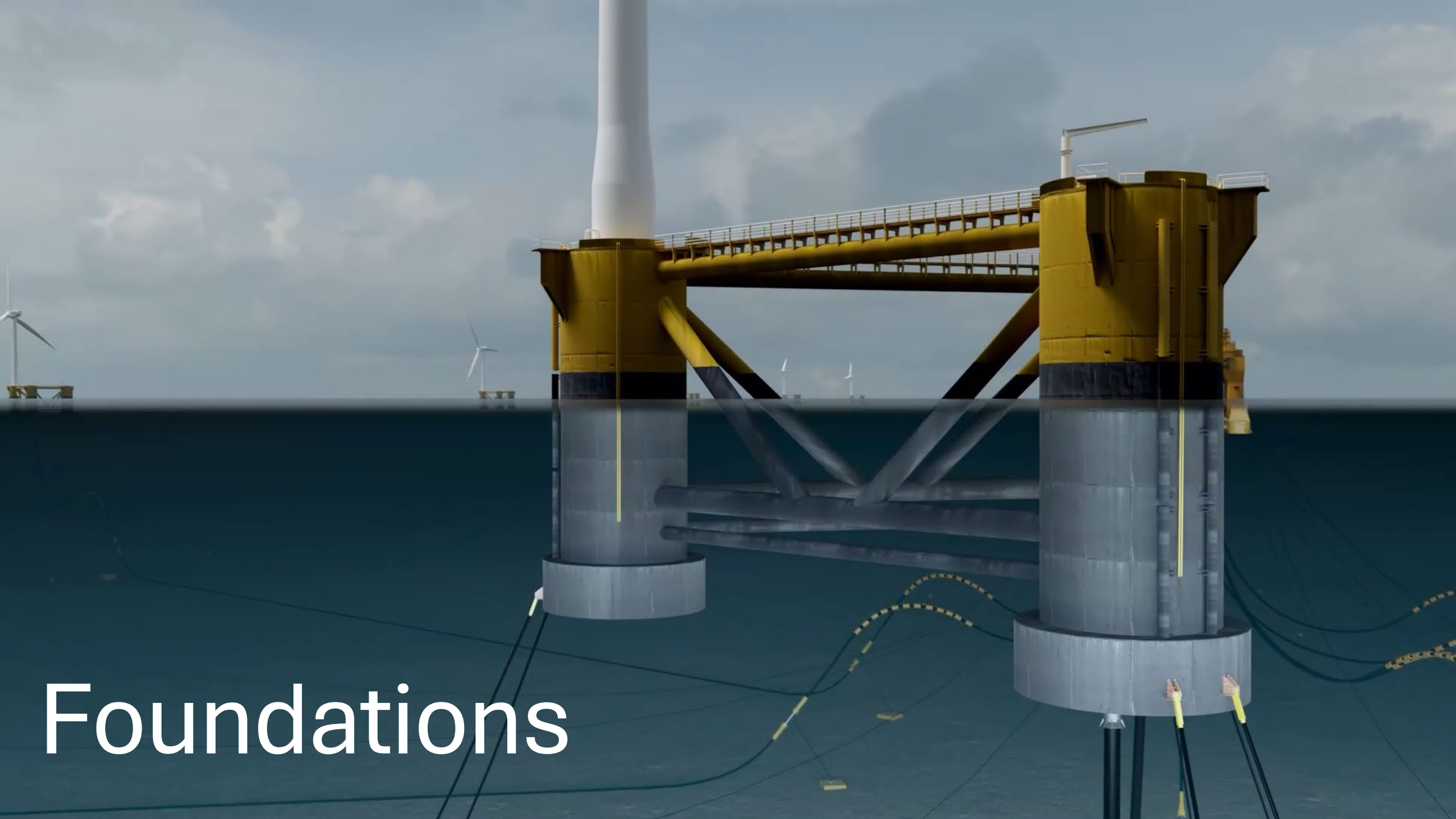
Rotor Blades

Hub & Nacelle

Tower

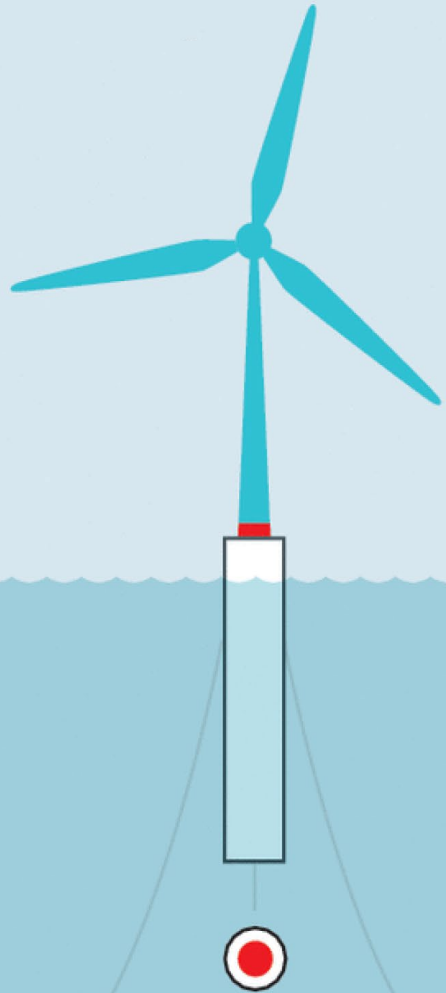
Foundation





Foundations

Spar



Source: Encyclopedia MDPI

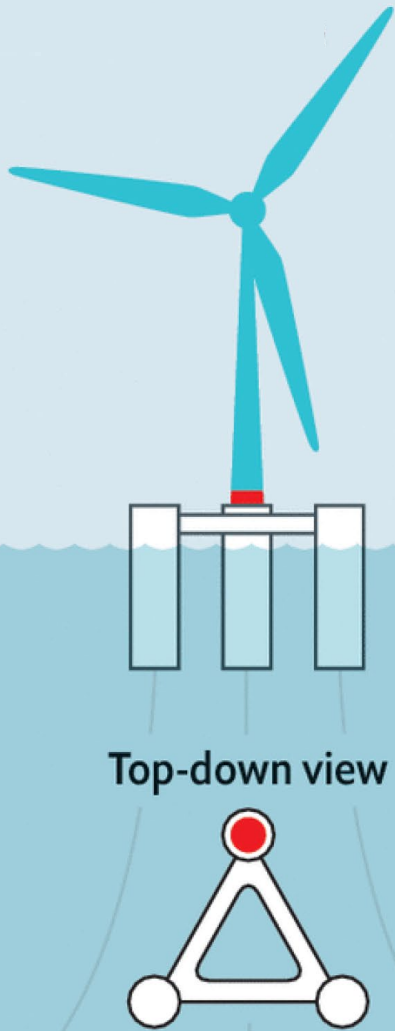


Hywind
Source: Equinor



TetraSpar
Source: RWE

Semisubmersible



Source: Encyclopedia MDPI



Twin Wind
Source: Hexicon



Wind Semi
Source: Equinor



Source: Kincardine



WindFloat
Source: Principle Power/Ocean Winds

Barge

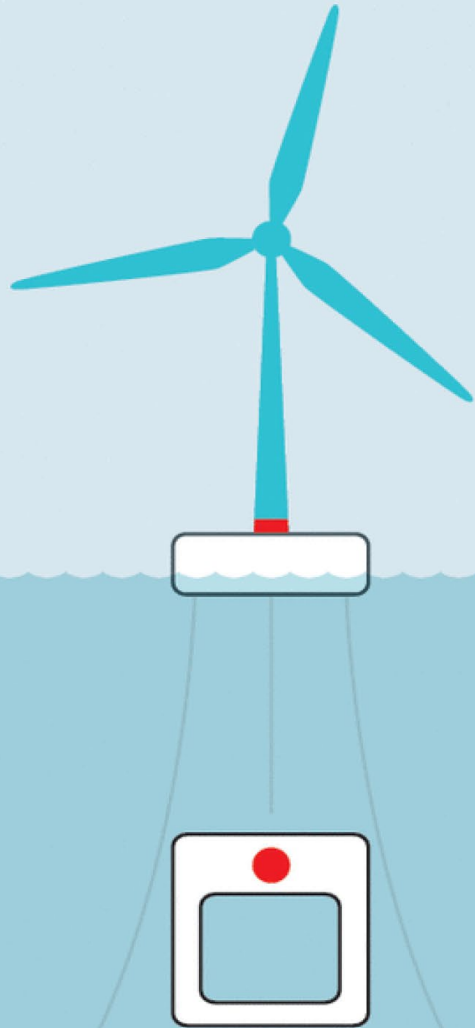


Damping Pool
Source: BW Ideol



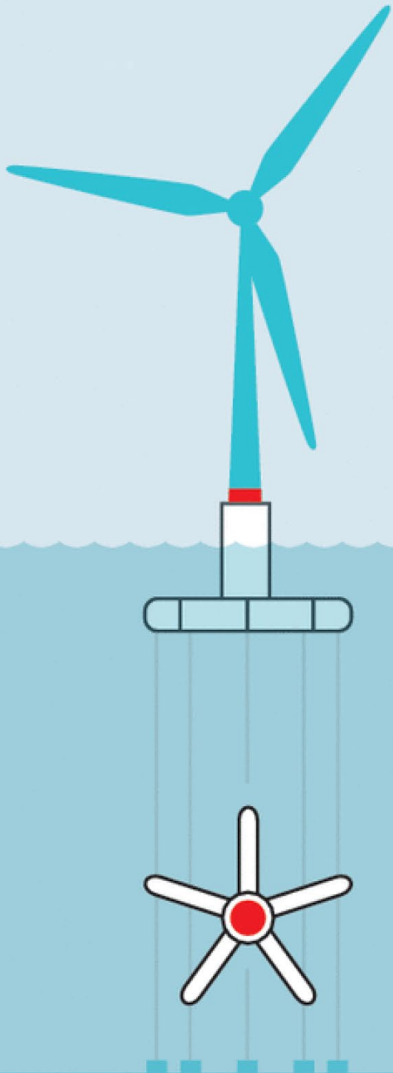
SATH
Source: SAITEC

Source: Encyclopedia MDPI



Source: Encyclopedia MDPI

Tension Leg Platform (TLP)



Source: Encyclopedia MDPI



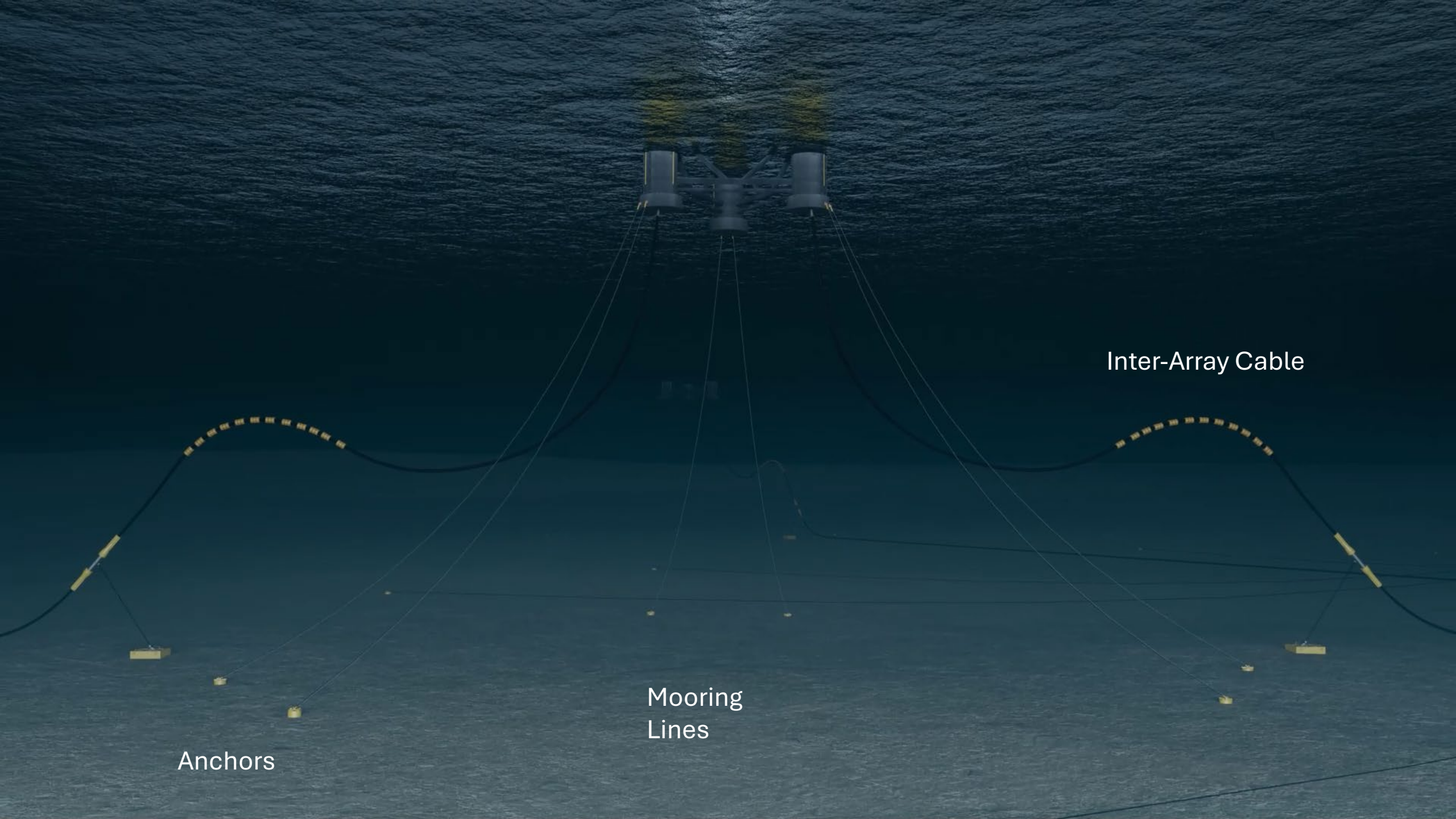
Source: Provence Grand Large, SBM design



X30
Source: X1



Source: Modec



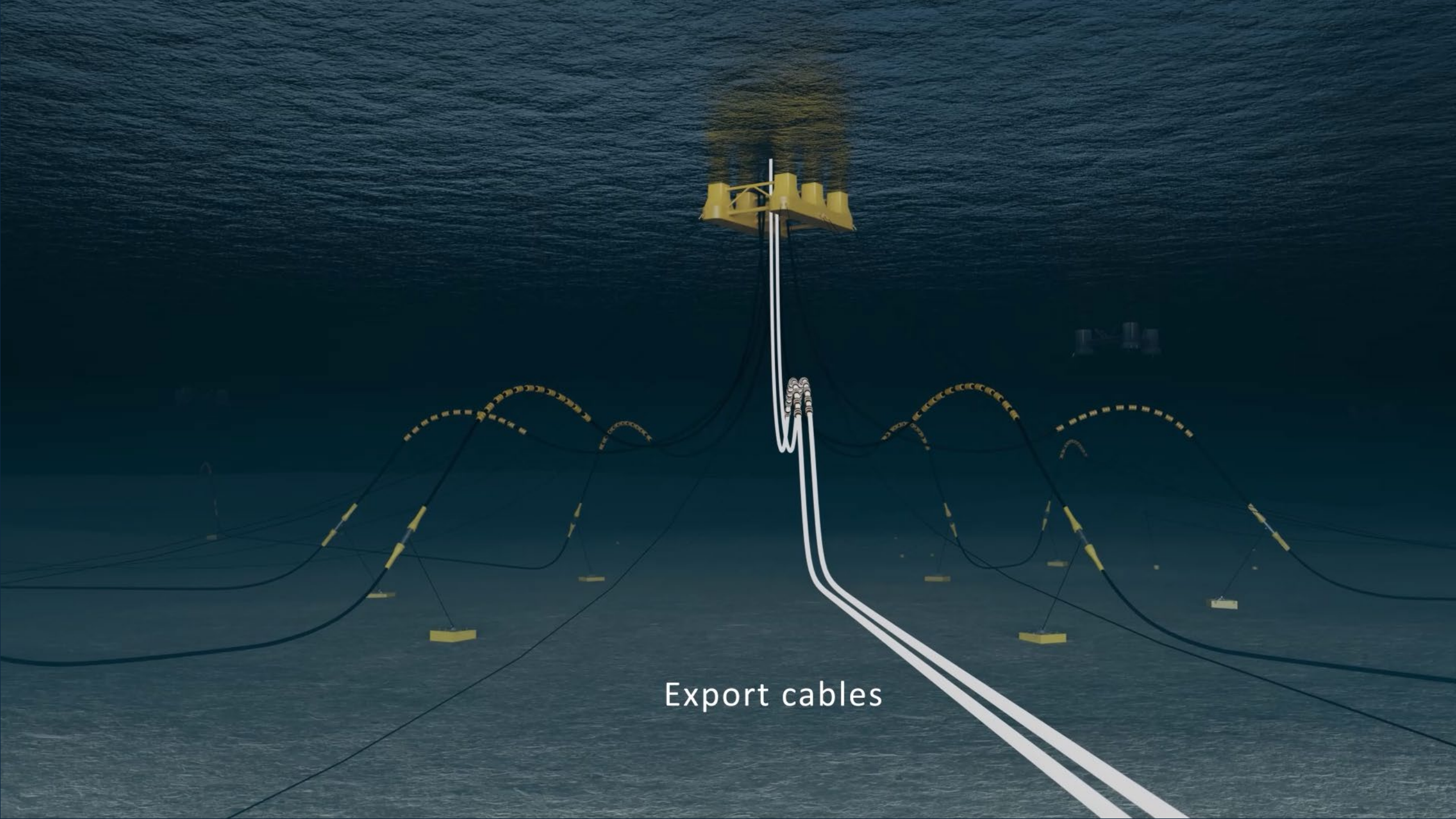
Inter-Array Cable

Mooring
Lines

Anchors



Floating Substation



Export cables

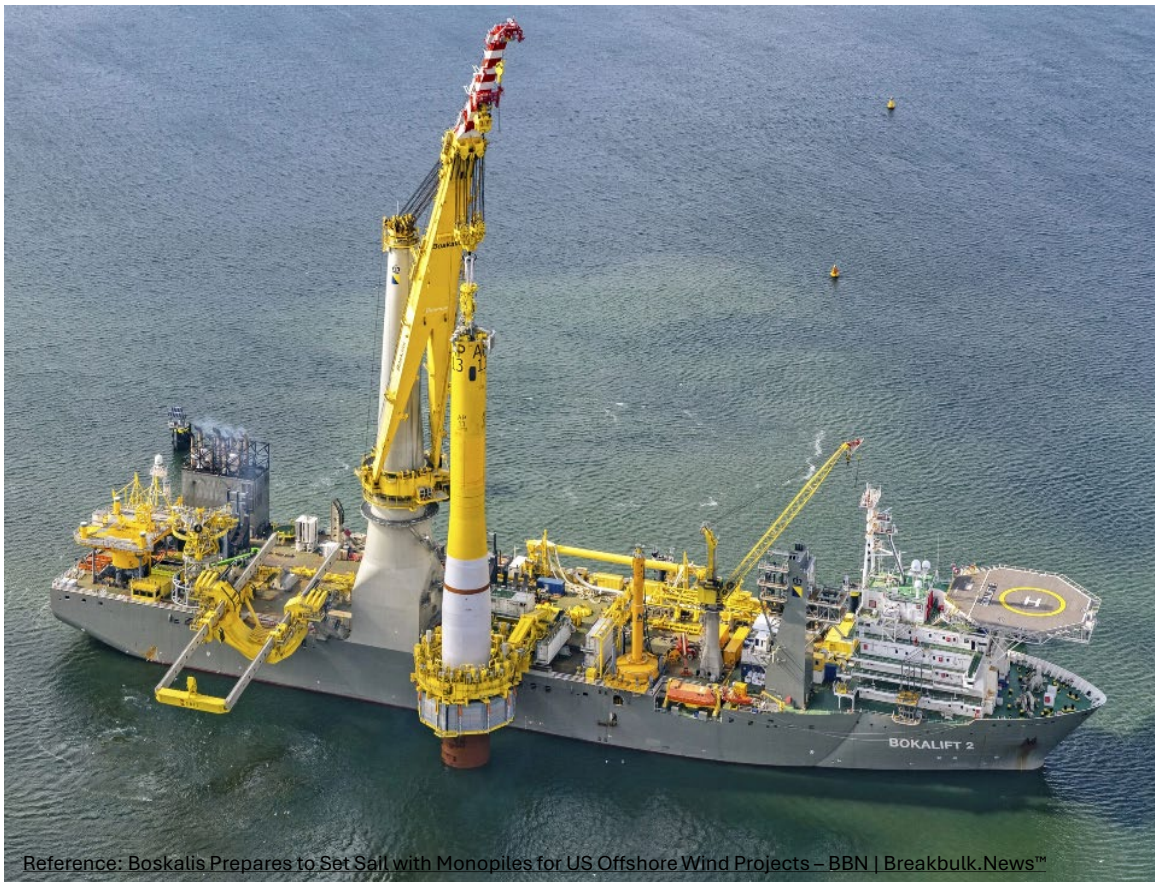
Presenter



Paulius Kavaliauskas
Trainee, NIORD

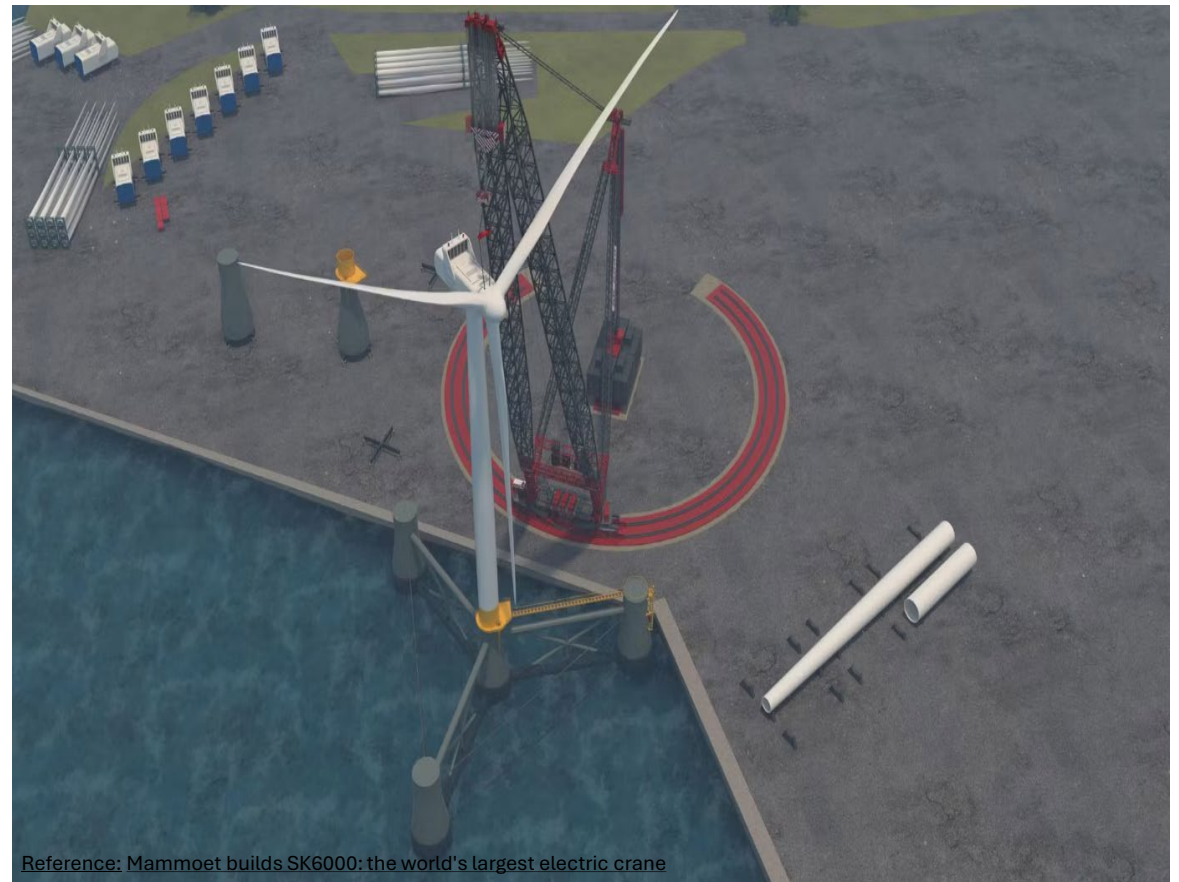
Offshore Cranes:

- Heavy Lift Jack-Up Vessel Cranes
- Monopile Installation Vessel Cranes
- Floating Crane Vessels

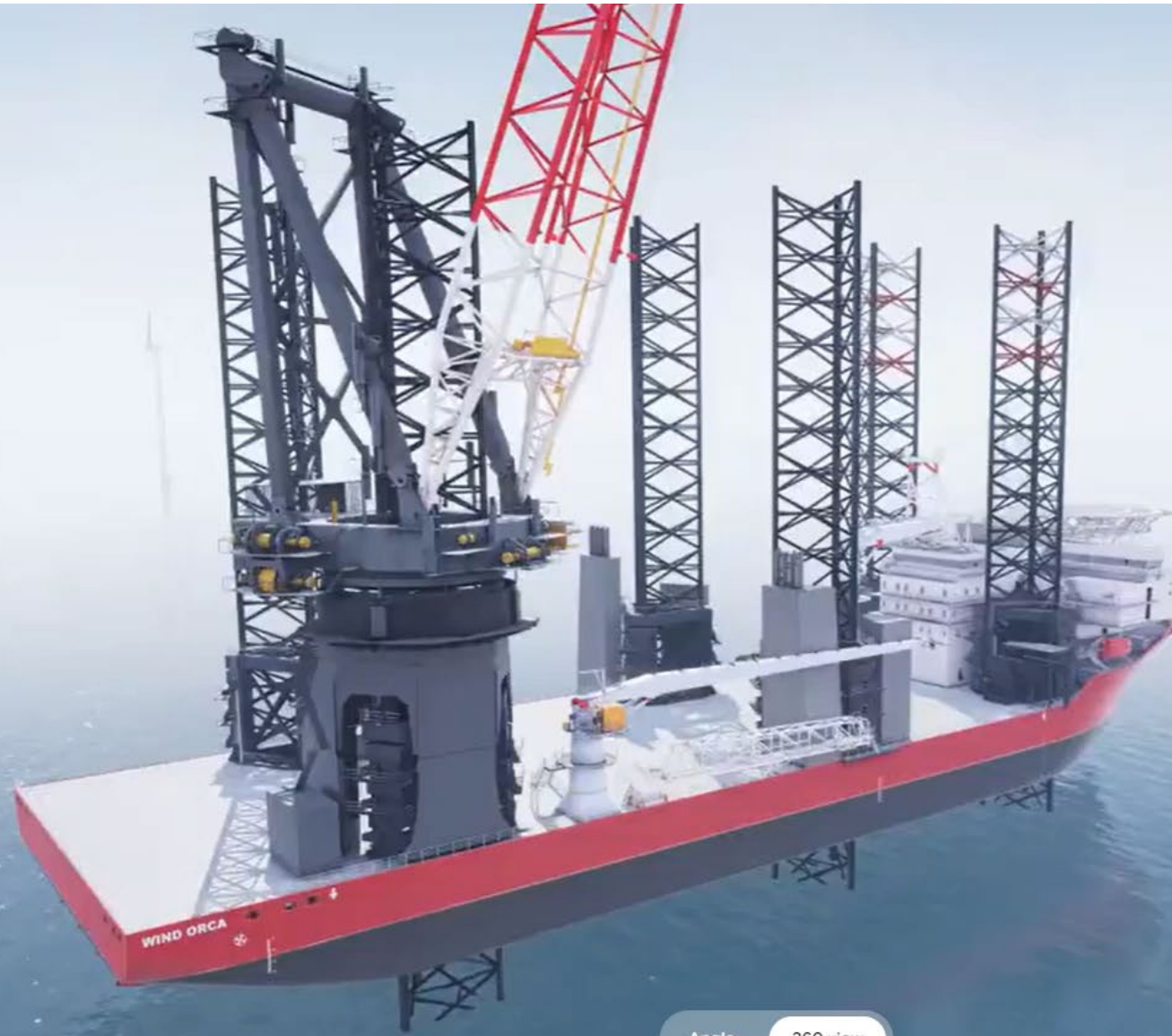


Onshore Cranes:

- Ring Cranes
- Lattice Boom Crawler Cranes
- Gantry Cranes
- Hammerhead Cranes



Heavy Lift Jack-Up Vessel Cranes

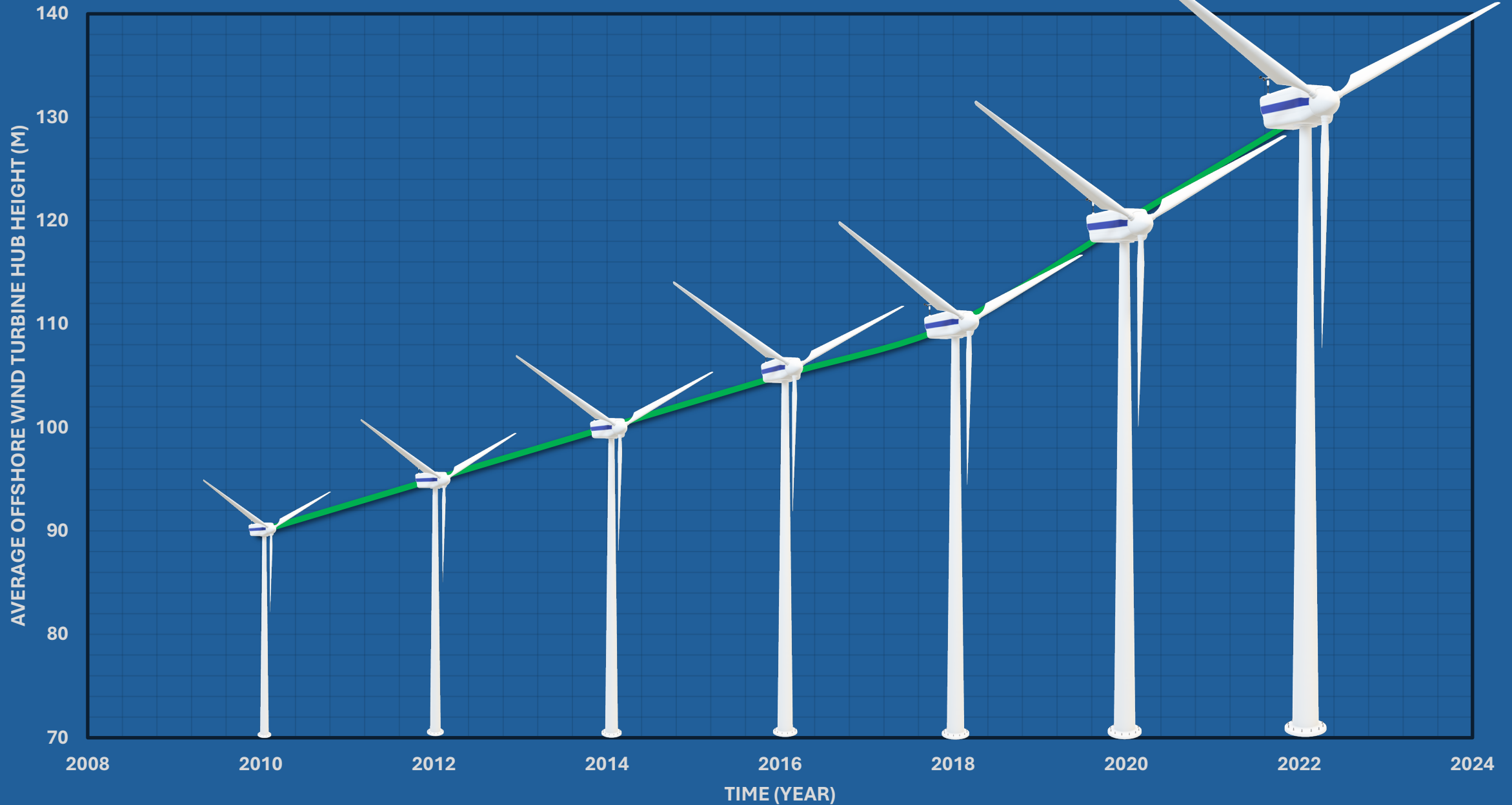


- Hydraulic jacking legs
- Legs length up to 130m
- Lifting capacity up to 3200 tons
- Lifting height up to 162,5 meters from vessel deck

Angle

360 view

Offshore Wind Turbine evolution



Gantry Cranes

- Stable
- Lifting Capacity: 20000 tons
- Lifting Height : 133 meters



Reference: 8 dos maiores guindastes do mundo - Real Guindastes



Reference: Gantry Cranes from 10 to 1500 metric ton - Ascom SpA



Reference: RTG Crane for Lifting Wind Turbine Tower Barrels 100 Tons

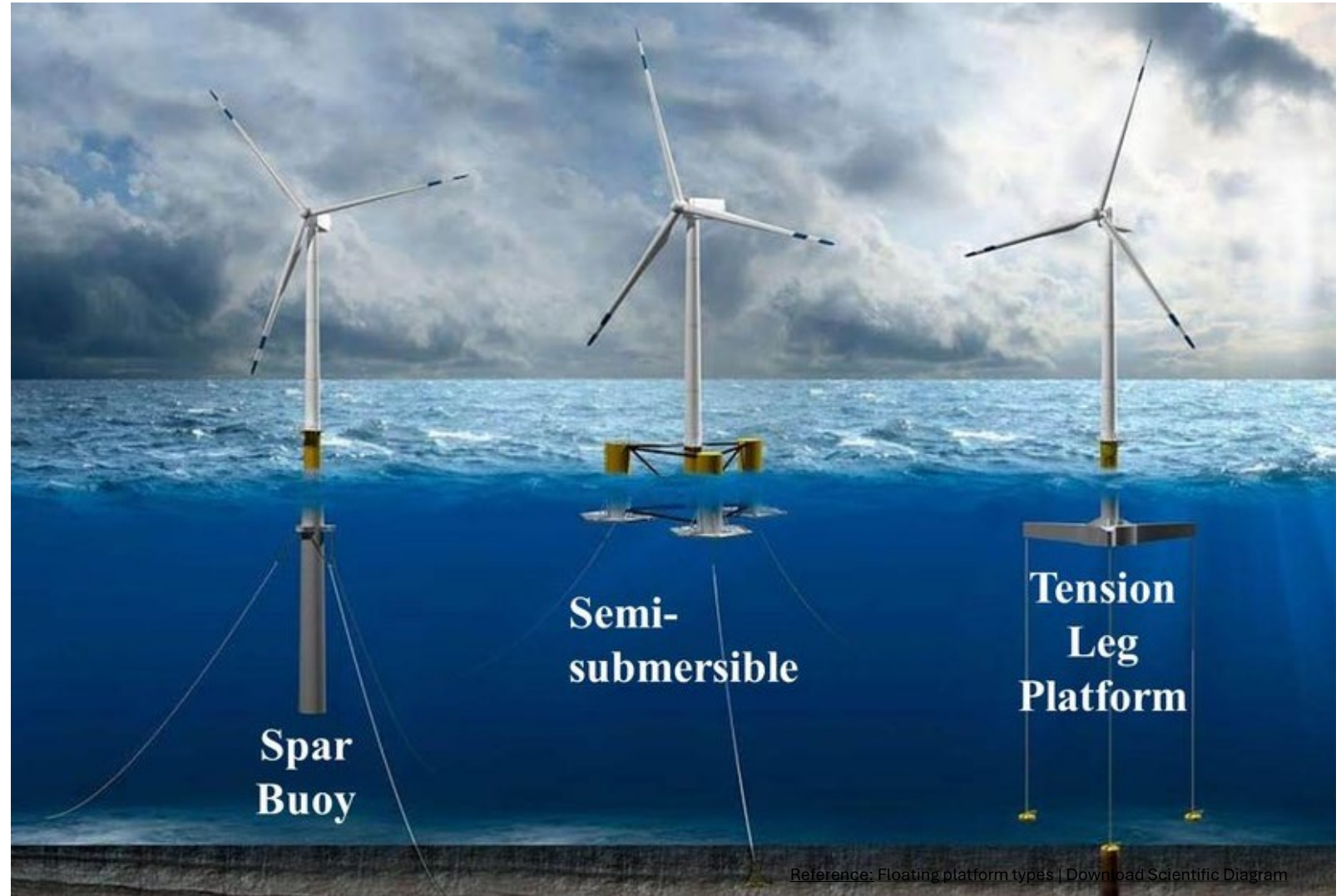
Ring cranes

- Rotation 360 degrees
- Key for floating wind turbine assembly onshore.
- Reduces lifting time and minimizes sea-related risks



Quay Infrastructure Challenges

- Variable Water Depths
- Space Requirements
- Ground Strength



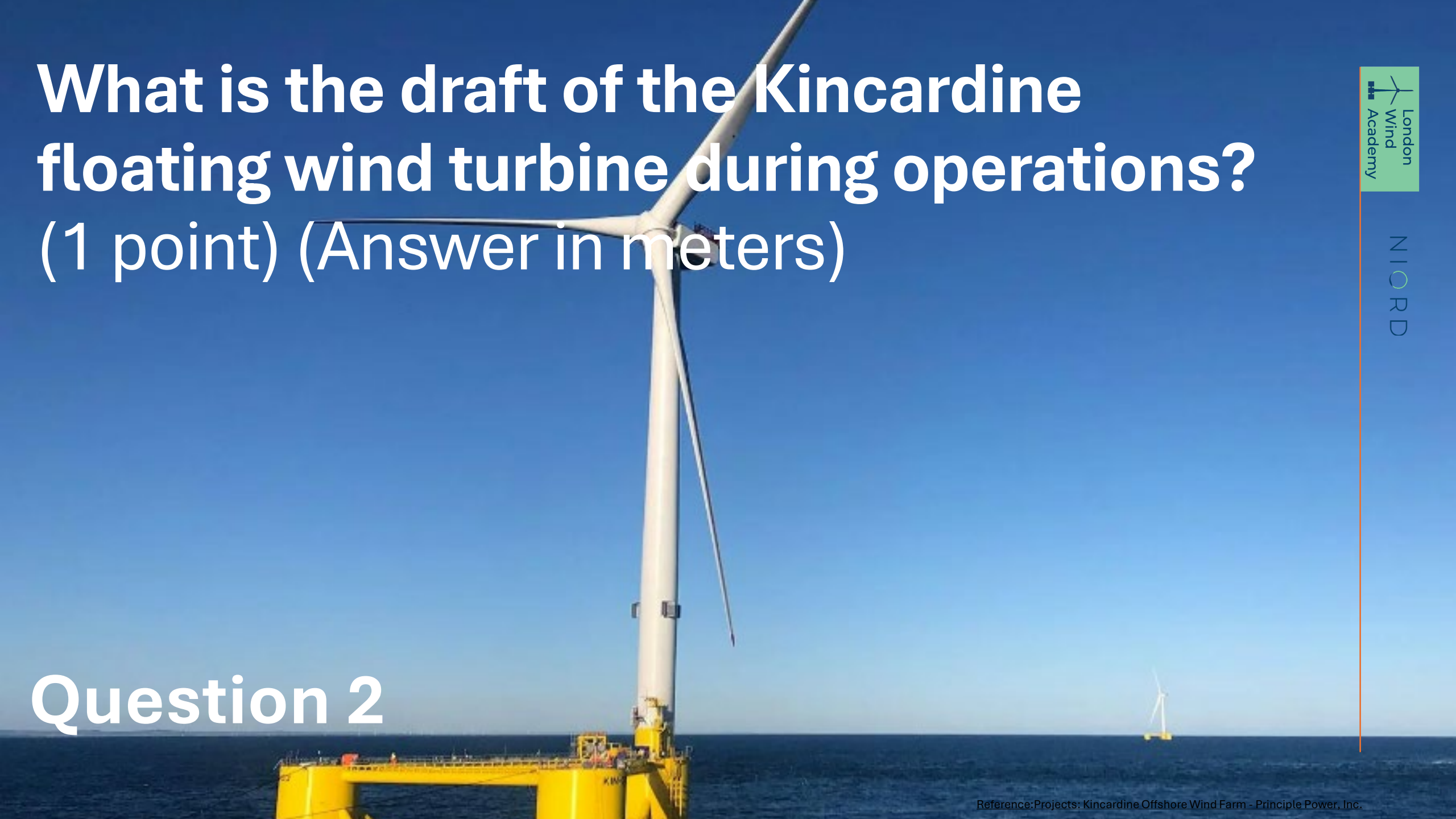


Warm-Up Questions



Question 1

What is the draft of the Hywind Tampen floating wind turbine?
(1 point) (Answer in meters)



**What is the draft of the Kincardine floating wind turbine during operations?
(1 point) (Answer in meters)**

Question 2

**What is the displacement of a single
Hywind Scotland turbine unit?**
(1 point) (Answer in tons)

Question 3

How long does it take to tow a Hywind Scotland floating turbine to the Wergeland base?

(1 point) (Answer in days)

Question 4

**What is the typical towing speed for floating wind turbines?
(1 point) (Answer in knots)**

Question 5

How long is the inter-array cable connecting turbines in the ClubFloat project?
(1 point) (Answer in meters)

Question 6

Inter-array cables



What is the diameter of the London Eye wheel?
(1 point) (Answer in meters)

Question 7

What is the diameter of the Vestas V236-15.0 wind turbine rotor?
(1 point) (Answer in meters)

Question 8



Which floating wind turbine design is likely to be the most popular in the future? (0 point)

Question 9

A large white floating wind turbine is positioned in the middle of a blue ocean. The turbine has three blades, one of which is visible in the foreground. The base of the turbine is a yellow floating platform with two large cylindrical buoys. In the background, a city skyline is visible on the horizon under a clear sky.

What is the expected largest capacity for a single floating wind turbine in the future? (0 point)

a) 18 MW

b) 18-26 MW

c) Over 26 MW

Question 10

When is floating wind energy expected to become mainstream?

(0 point)

- a) By 2030
- b) By 2035
- c) By 2040
- d) Never

Question 11

Presenter



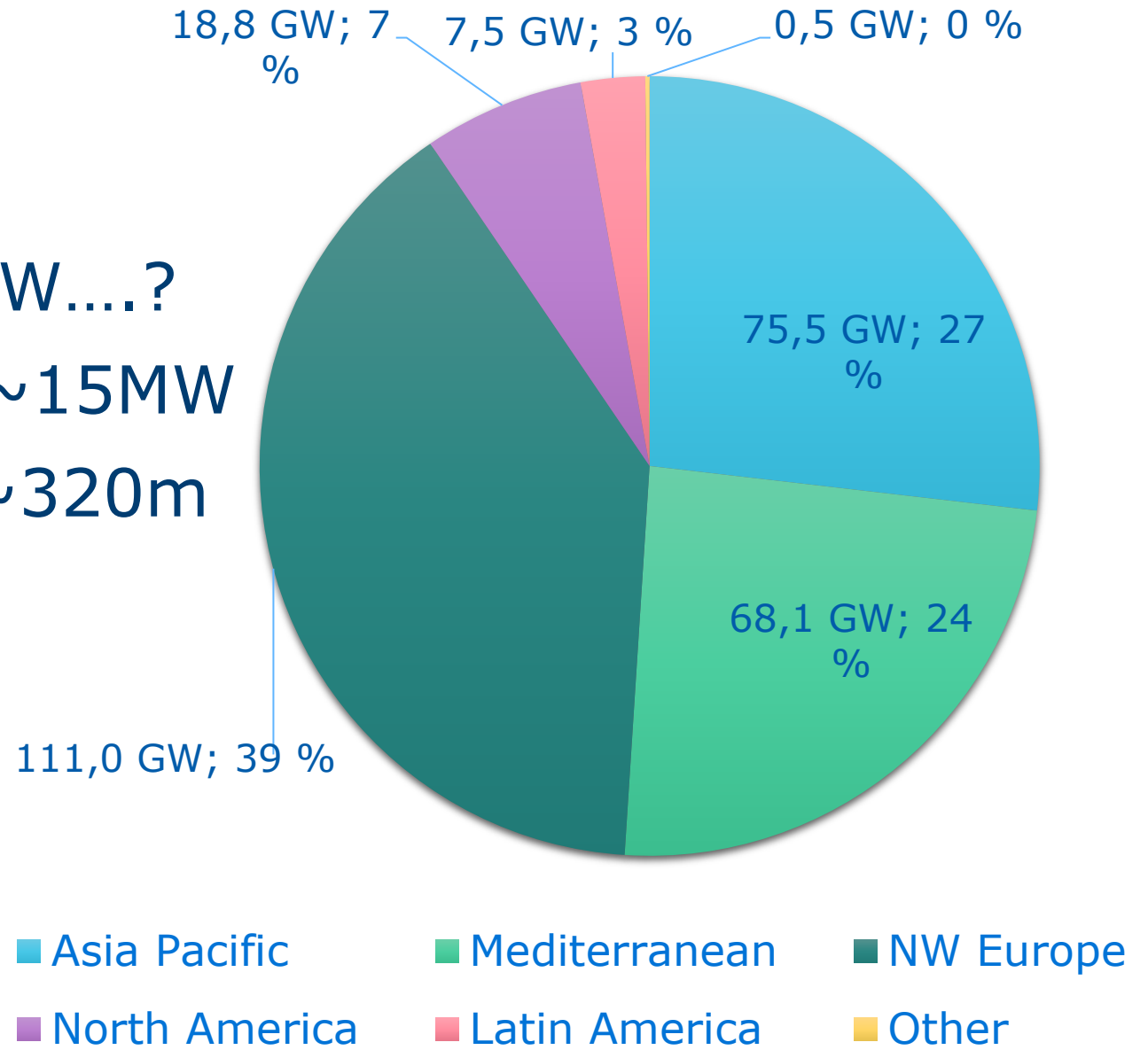
Simon Markussen
Senior Underwriter, NIORD

What's going on?



Blue Skies

- ↙ ~365 projects, ~280GW....?
- ⬆️ ~19000 turbines Avg ~15MW
- 🌊 Avg Water Depths of ~320m
- 📅 When?



Wind

Why TotalEnergies is over floating says top executive

RECHARGE

RECHARGE

Wind

Orsted says 'painful' pledge to offer investment and costlier sectors

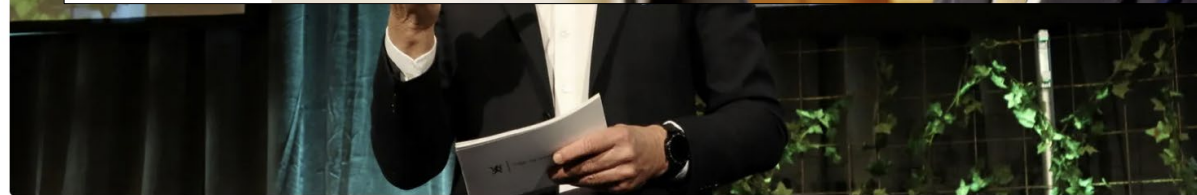
Pledge to offer investment and costlier sectors



DN

The government will provide less support for floating offshore wind than the UK

The Government proposes a support ceiling of NOK 35 billion for one project of 500 megawatts. A worrying "downscaling," according to Renewable Norway.

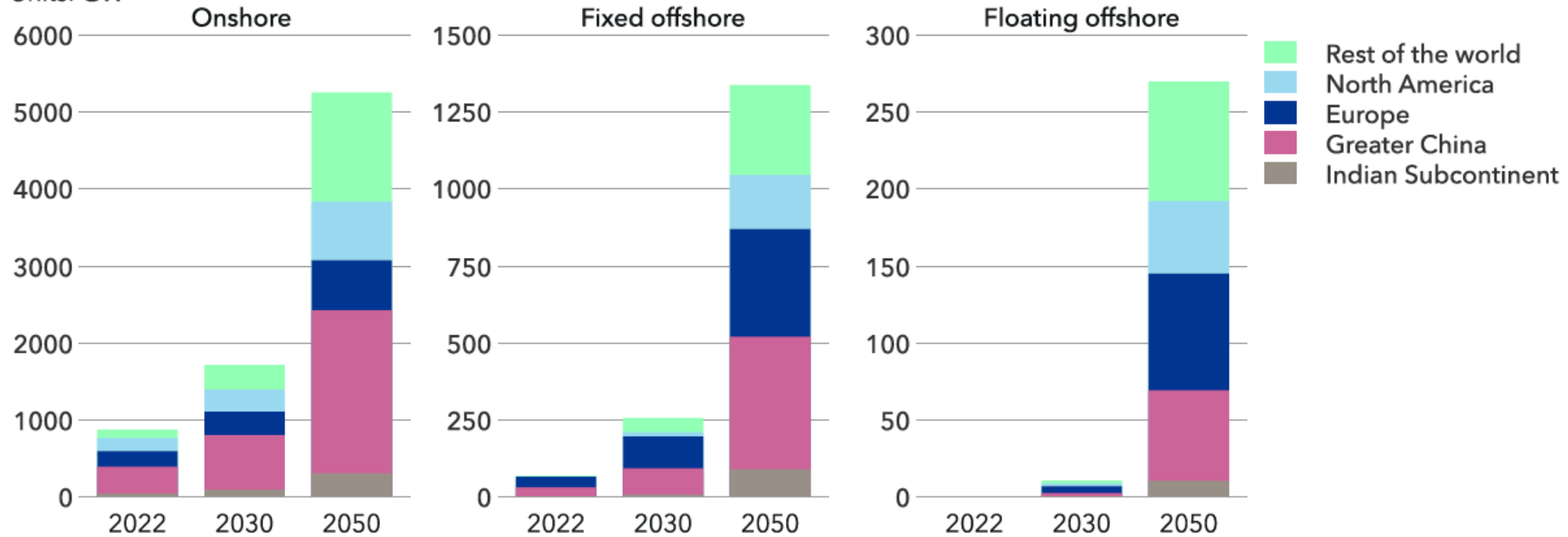


Norwegian petroleum and energy minister Terje Aasland. (Foto: Norwegian petroleum and energy ministry)

FIGURE 3.11

World installed wind capacity by region

Units: GW



Historical data source: GlobalData (2023), DNV analysis

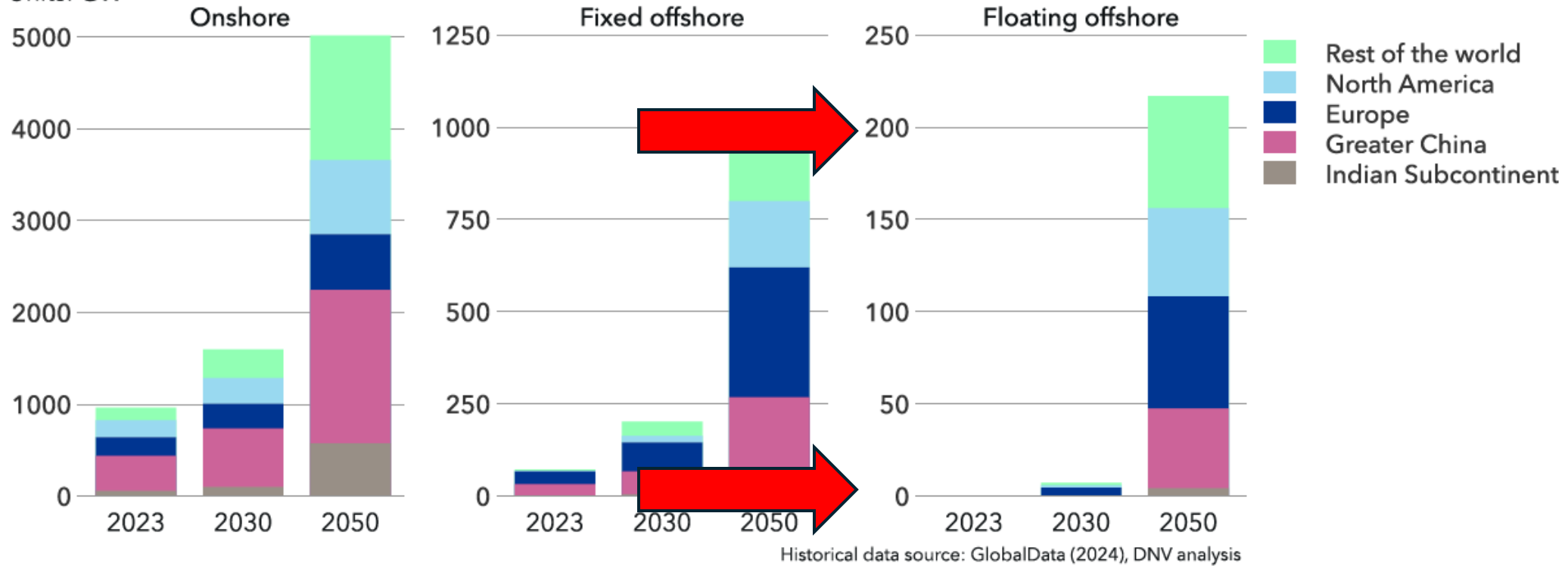


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FIGURE 3.9

World installed wind capacity by region

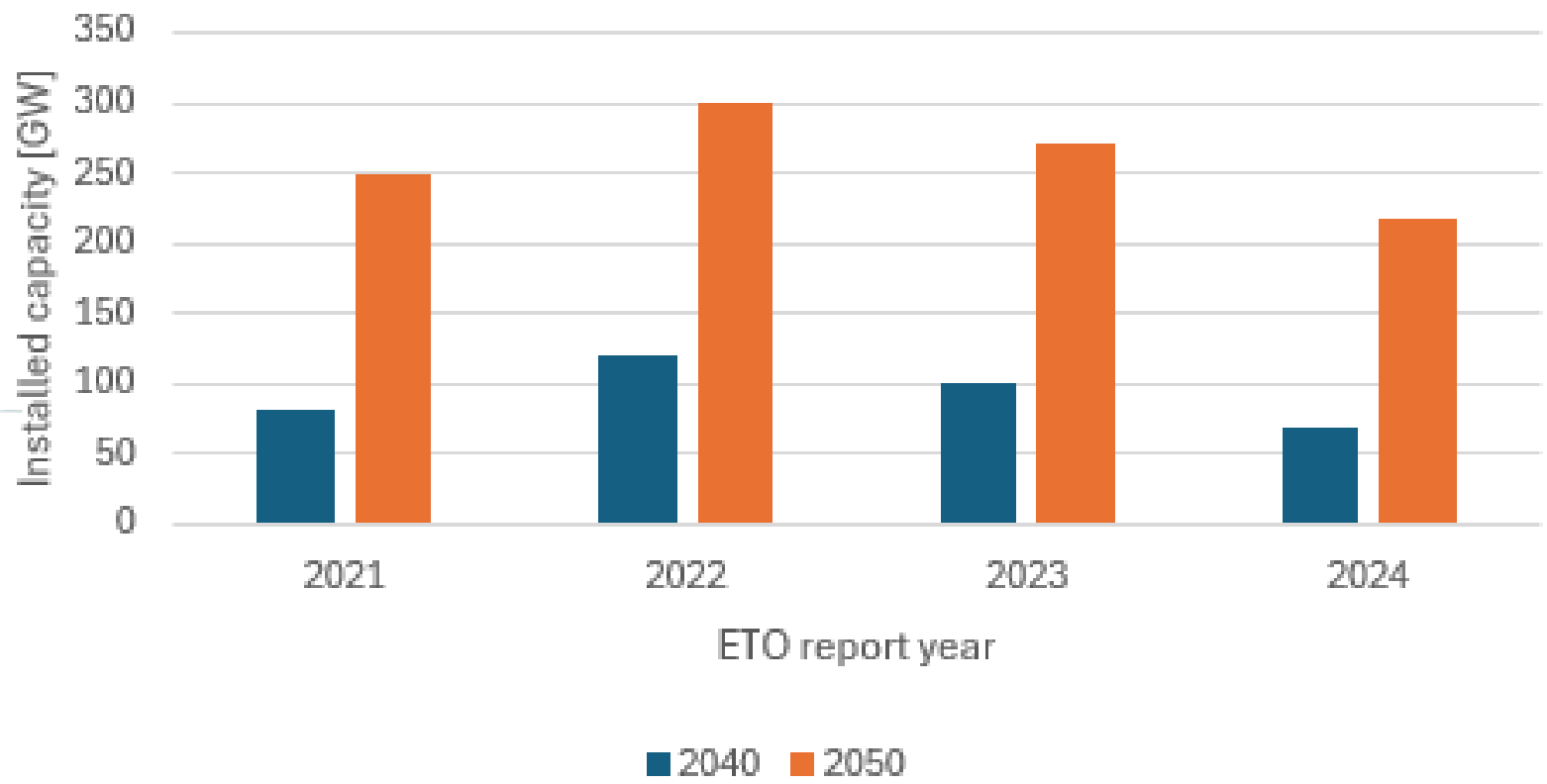
Units: GW



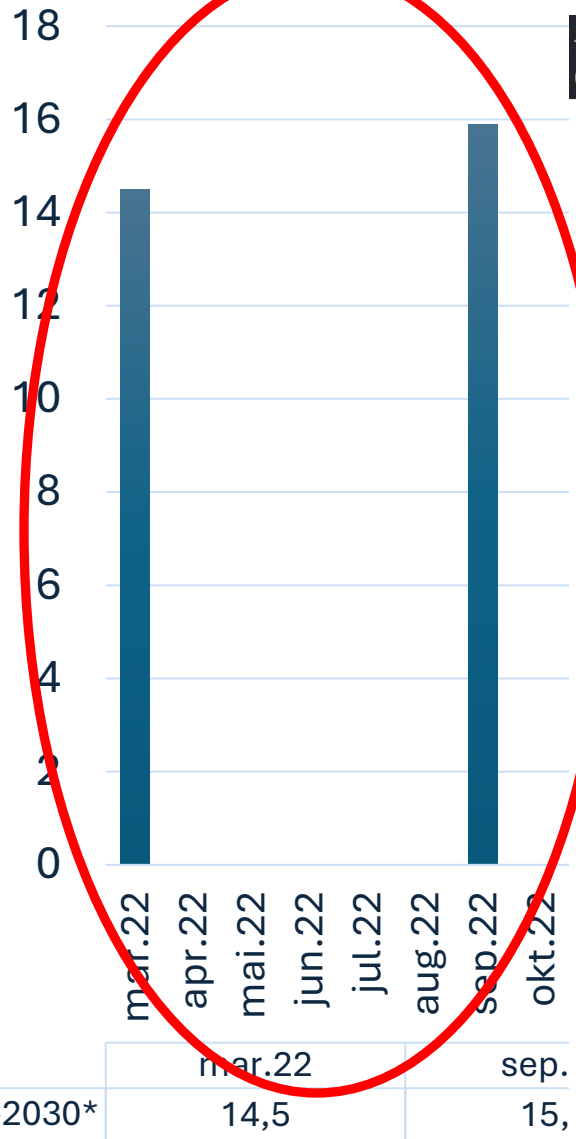
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DNV ETO forecast of FOW installed capacity



**Means operational before 1st Jan that year.*



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Scotland Awards 25 GW in ScotWind Auction, More than Half for Floating Wind Farms

AUTHORITIES

January 17, 2022, by Adrijana Buljan

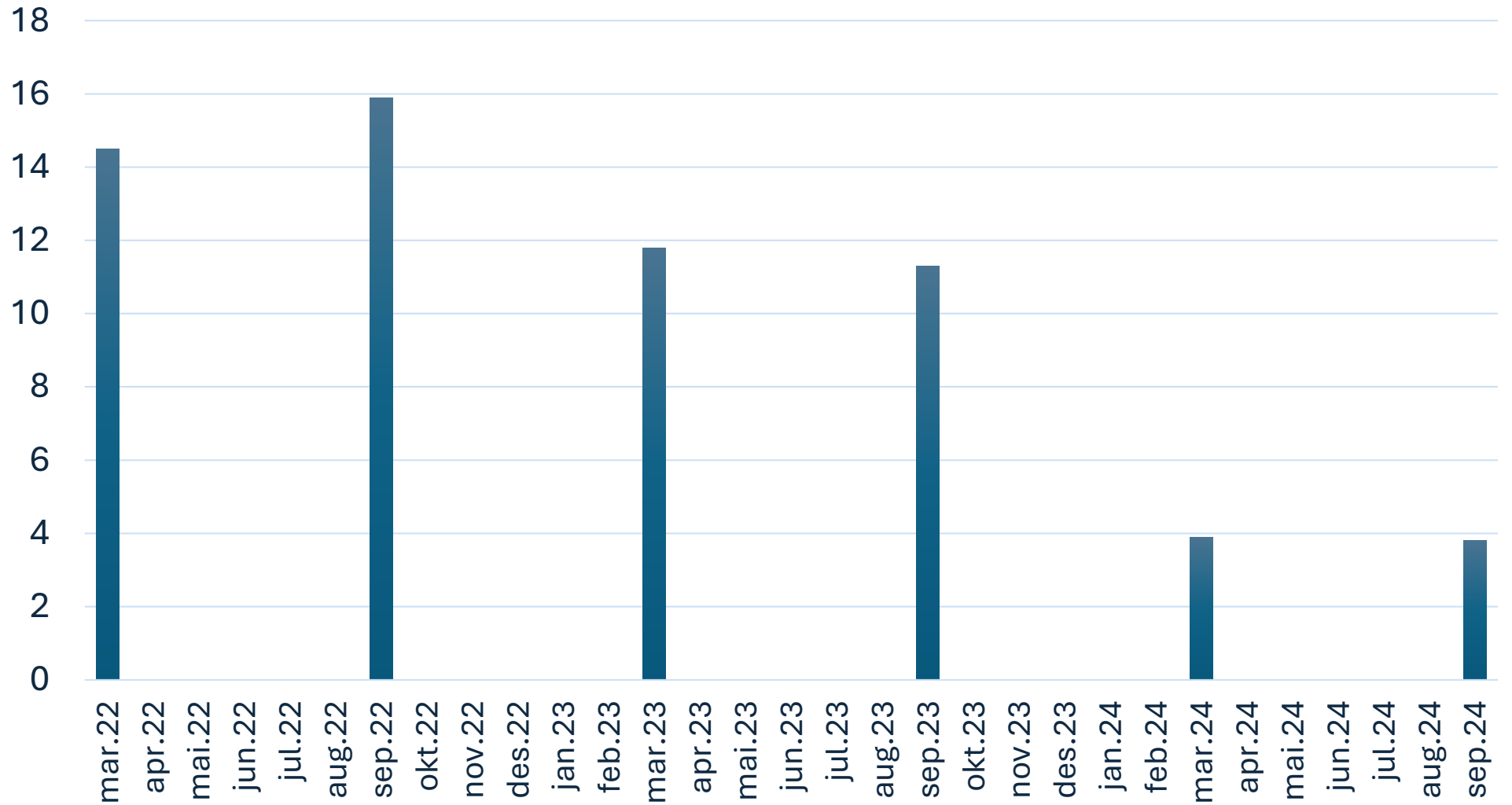
Crown Estate Scotland has selected 17 offshore wind projects in its ScotWind seabed leasing round, which aimed to procure at least 10 GW of offshore wind but resulted in the chosen proposals having a total capacity of 24,826 MW.



Start-2030*	mar.22	14,5	sep.	15,
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NIO RD

**Means operational before 1st Jan that year.*

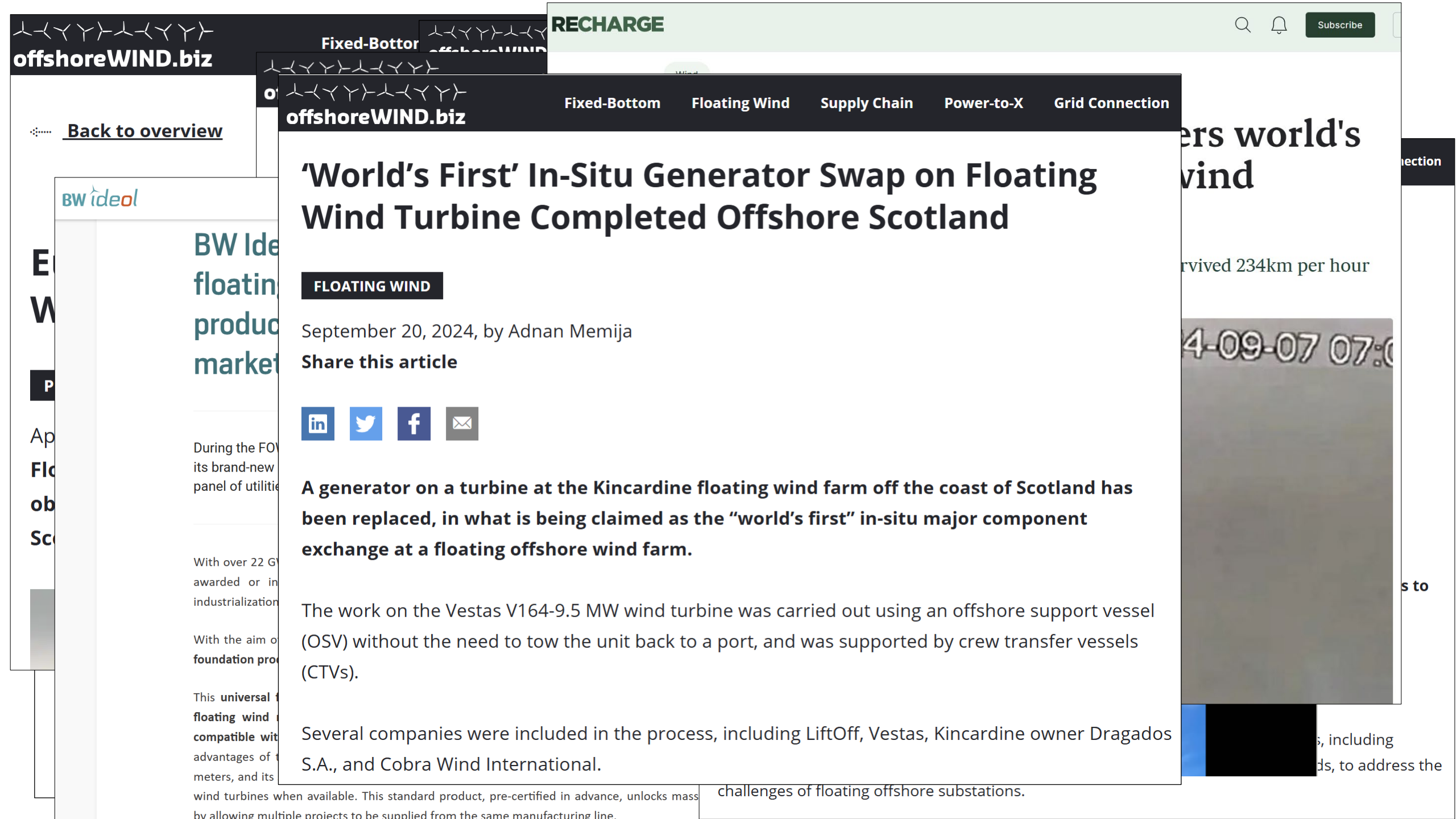


■ Start-2030*

mar.22	sep.22	mar.23	sep.23	mar.24	sep.24
14,5	15,9	11,8	11,3	3,9	3,8



N I O R D



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BW Ideal floating production market

During the FOV... its brand-new panel of utilities

With over 22 G... awarded or in industrialization

With the aim of foundation pro...

This universal floating wind compatible with advantages of meters, and its

wind turbines when available. This standard product, pre-certified in advance, unlocks mass by allowing multiple projects to be supplied from the same manufacturing line.

'World's First' In-Situ Generator Swap on Floating Wind Turbine Completed Offshore Scotland

FLOATING WIND

September 20, 2024, by Adnan Memija

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A generator on a turbine at the Kincardine floating wind farm off the coast of Scotland has been replaced, in what is being claimed as the "world's first" in-situ major component exchange at a floating offshore wind farm.

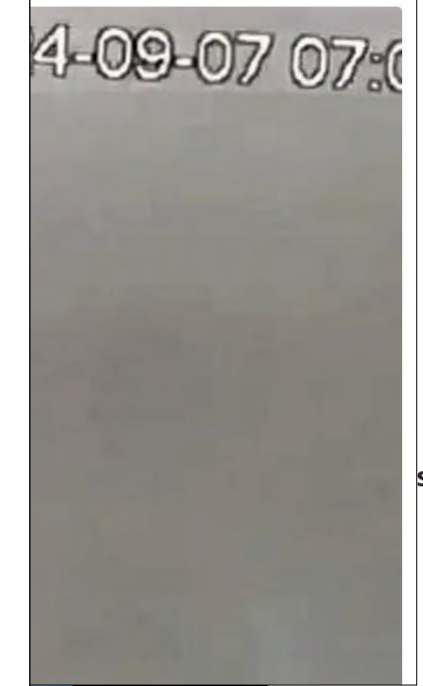
The work on the Vestas V164-9.5 MW wind turbine was carried out using an offshore support vessel (OSV) without the need to tow the unit back to a port, and was supported by crew transfer vessels (CTVs).

Several companies were included in the process, including LiftOff, Vestas, Kincardine owner Dragados S.A., and Cobra Wind International.

challenges of floating offshore substations.

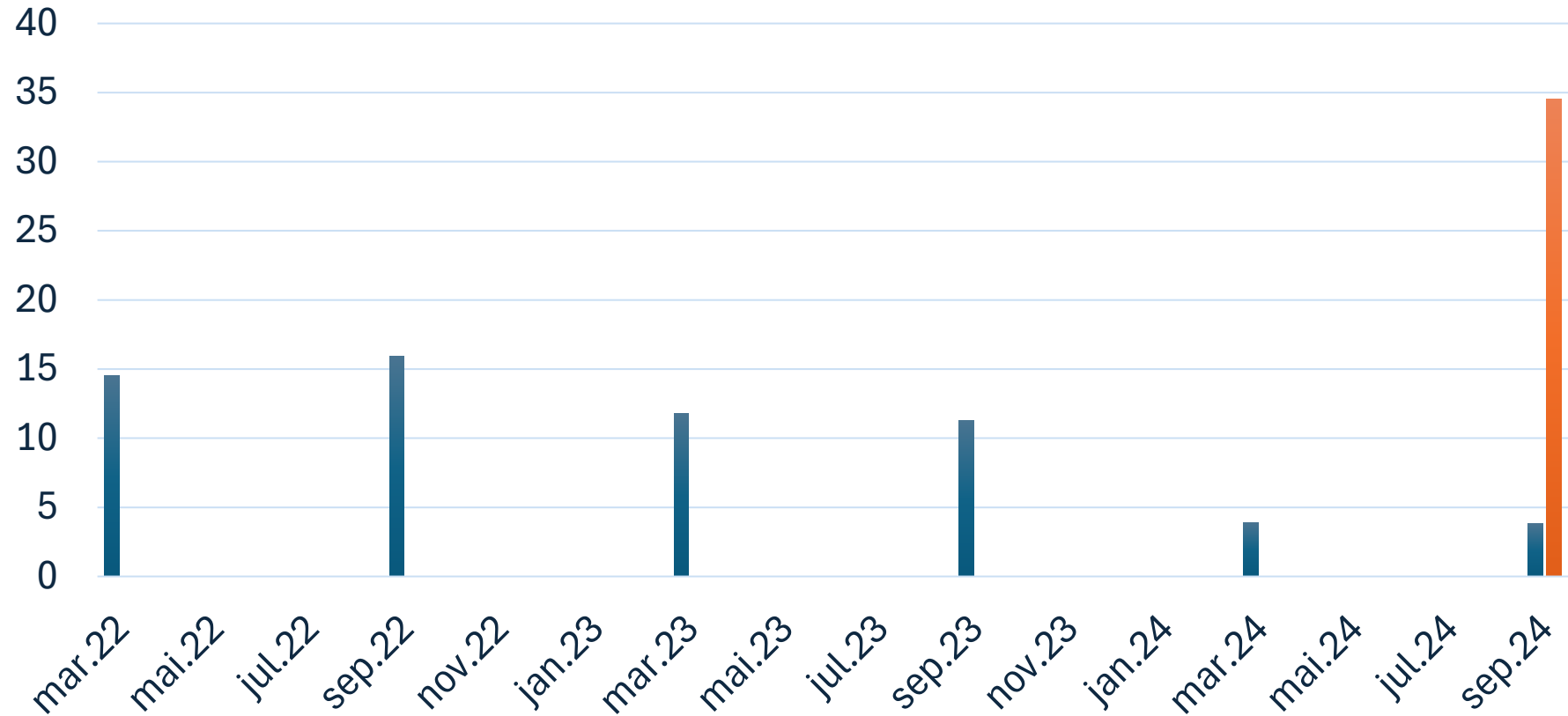
ers world's wind

rrived 234km per hour



...s to ... including ... ds, to address the

**Means operational before 1st Jan that year.*



	mar.22	sep.22	mar.23	sep.23	mar.24	sep.24
■ Start-2030*	14,5	15,9	11,8	11,3	3,9	3,8
■ Start-2035*						34,5



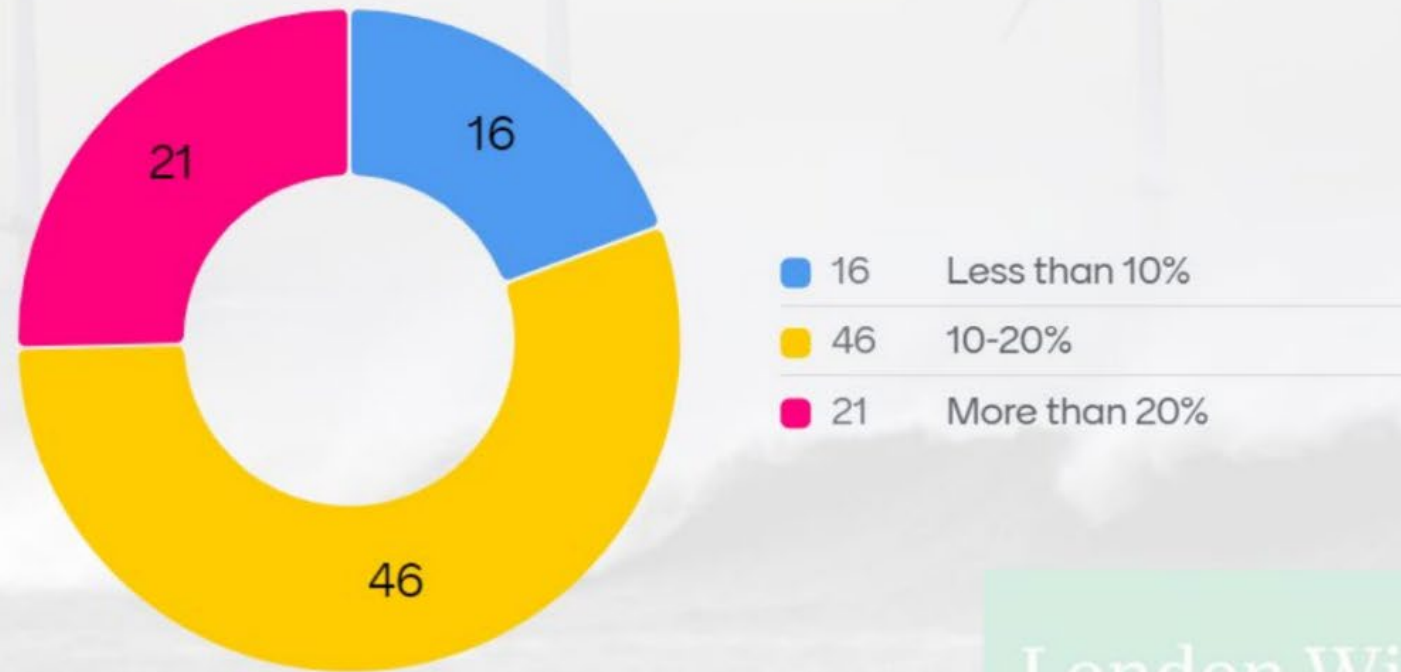
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Outlook 2050: Operational Floating Offshore Wind prior to 2050



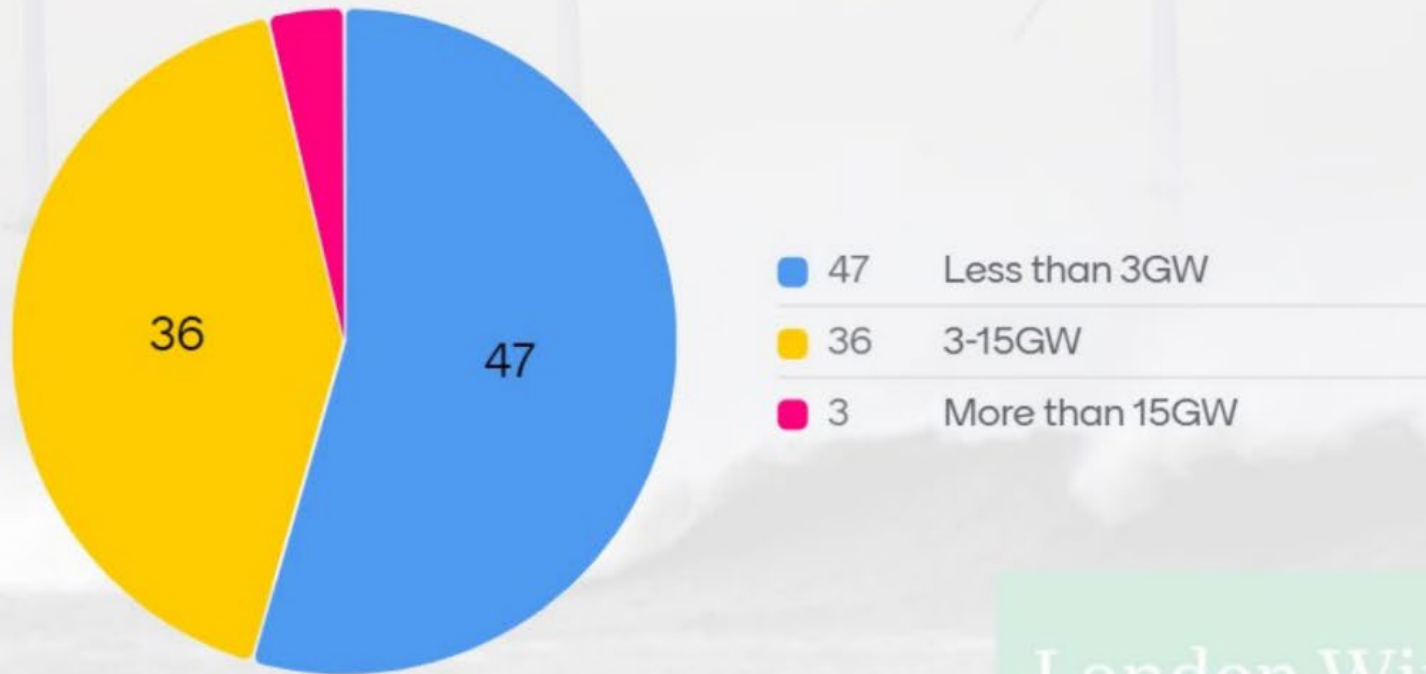
London Wind Academy

Floating wind % of total offshore wind in 2050?



London Wind Academy

Outlook 2030: Operational Floating Offshore Wind prior to 2030



London Wind Academy

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Thank you

