

DOCKETED	
Docket Number:	19-IEPR-07
Project Title:	Electricity Sector
TN #:	229921
Document Title:	Floating Offshore Wind Ready for Commercial Deployment around the World
Description:	Presentation by Kevin Banister, Principle Power
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Organization:	Principle Power
Submitter Role:	Public
Submission Date:	10/1/2019 3:58:23 PM
Docketed Date:	10/1/2019

Floating Offshore Wind: Ready for Commercial Deployment around the World



October 2019





Introduction to Principle Power

Global
Presence

Founded in 2007

> 70 employees - Offices in California, FR, and PT

Strong
Backing

Shareholders



Partners



A Proven
Technology

Successful 5-year Full Life-Cycle Demonstration

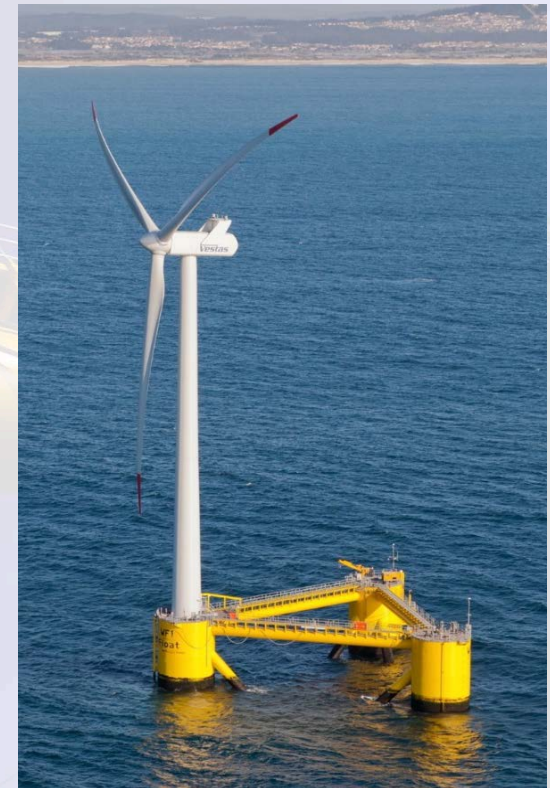
2MW Vestas, Identical Performance to Fixed Foundation

17GWh, Produced in 12m waves; Survived 17m waves

Project
Pipeline

3 Precommercial Projects in Progress (~100MW of installed floating capacity by 2021 in Europe)

Commercial Developments in Europe, USA, Asia



WindFloat Technology Presentation

1 Turbine Agnostic

- Any conventional commercial Turbines
- Minimum redesign in:
 - Control system – software
 - Tower – structural interface

2 Hull Trim System (Active ballast)

- Displaces some water between columns to compensate for changes in mean wind velocity and direction

3 Water Ballast (Operational draft)

- Located at the bottom of each column and used to achieve operating draft
- More water in the columns not supporting the turbine

4 Heave Plates (Dynamic Stability)

- Move platform natural response above the wave excitation (mass of entrained water)
- Viscous damping reduces wave induced motions





Financing Entities are already seeing the large paradigm shift the WindFloat represents in terms of Reduction of Cost and Risk...

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Cost

Risk



- ✓ Reduce Environmental Impact and Geotechnical Requirements
- ✓ Flexible Site Location / Water Depth independence
- ✓ **Serial Production**
- ✓ **Quayside Commissioning and WTG Installation**

- ✓ Marine Spread / Existing Vessels
- ✓ Lower Interface Risk with offshore contractor
- ✓ Lower Weather Dependence
- ✓ **Return to Shore for Unanticipated Maintenance**



WindFloat technology signed off by Key International Certification bodies in different markets, prepared for deployment in China

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WindFloat Pacific, US

- US West Coast – high wind, high wave
- 8MW turbine, Turbine TBD
- **Approval in Principle**
- **Full Document and Project Review with no critical findings**



WindFloat Atlantic, Portugal

- Portugal – medium wind, high wave
- 8 MW turbine, MHI Vestas
- **Approval in Principle**
- **Final stages of full certification / AFC stamped Drawings**
→ **DNV certifying MHI Vestas turbine (coupled system)**



Golfe du Lion, France

- France – high wind, medium wave
- 6 MW turbine, GE/Alstom
- **Approval in Principle issued**



WindFloat Japan

- Japan – medium wind, medium wave
- 5 MW downwind turbine, Hitachi
- Japan Model Testing performed
- Passed all technical committees with Class NK and NEDO
- **Approval in Principle issued**



Demo-scale projects structured to: 1) Prove Bankability and 2) Advance LCOE => a Gateway to large commercial scale

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WindFloat Atlantic

25 MW, Portugal, Operational 2019

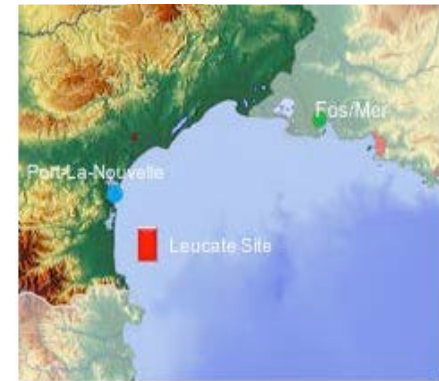
- 3x 8.3 MW MHI Vestas
- 20 km out; 100 m deep
- Local Shipyard Construction
- Certified by ABS
- Feed-In Tariff
- Equity Financing complete w/ strong international sponsors
- First Non-Recourse Project Finance of a Floating Wind Farm



Golfe du Lion

24 MW, France, Operational 2021

- 4x 6 MW
- 18 km out; 70-100 m deep
- Local Shipyard Construction
- Certified by BV
- Feed-In Tariff (through competitive process)
- Very strong consortium with major energy companies and industrials
- Major innovations to advance technology to the next level of competitiveness



Mitsubishi Corporation



MINISTÈRE DE L'ENVIRONNEMENT,
DE L'ÉNERGIE ET DE LA MER










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- The map displays the Kincardine Offshore Windfarm project area in the North Sea. The coastline of Scotland is shown from Peterhead in the north to Stonehaven in the south. Key locations marked include Peterhead, Oldmeldrum, Elgin, Inverurie, Kintore, Dyce, Aberdeen, and Stonehaven. The European Offshore Wind Deployment Centre is indicated by a dashed line. The Kincardine Offshore Windfarm is outlined in red, and the Kincardine Floating Offshore Windfarm is outlined in blue. The map includes a scale bar (0-25 km), a north arrow, and a legend for project site, turbine locations, 10km limit, and offshore wind farm site. A depth scale (0-100m) is also shown. An inset map shows the location of the Kincardine Offshore Windfarm within the larger context of the North Sea.





Next Generation WindFloat has been engineered with all major offshore WTMs

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Project	Turbine OEM	Turbine Model	Power	Diameter	Status
WF1 prototype		V80	2MW	80m	Decommissioned
WindFloat Atlantic		V164	8.3MW	164m	In construction
WindFloat Kincardine		V164	9.5MW-10MW	164m	FEED
France / Golfe du Lion		Haliade 150-6MW	6MW	150m	FEED
France / Golfe du Lion		AD 8-180	8MW	180m	preFEED
WindFloat Pacific		SWT6.0-154	6MW	154m	FEED
WindFloat Pacific		V164	8MW	164m	FEED
NEDO project		HTW5.0-126	5MW	126m	FEED
NEDO project		6.2M 152	6.2MW	152m	FEED

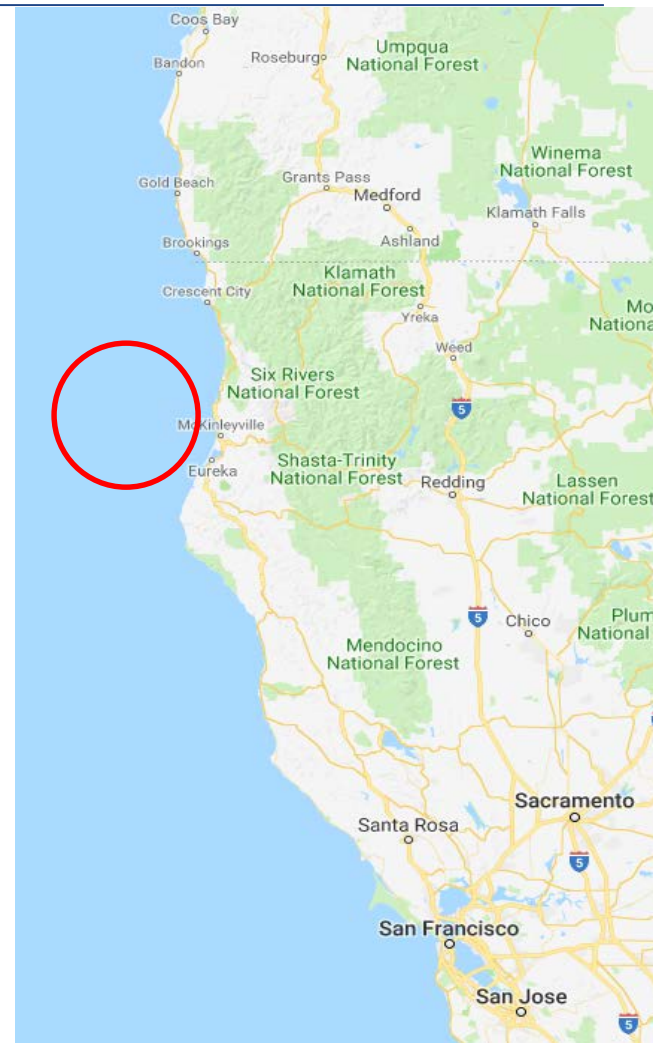


Jump-starting the industry in CA with the Redwood Coast Offshore Wind Project...

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100-150 MW, Humboldt County, California, Operational 2024 Flagship project for offshore wind industry in CA and the West Coast

- 12+ MW offshore wind turbines
- 25+ miles out; 700-900 m deep; world-class wind resource (9.5+ m/s)
- Deployable by 2024
- Creation of a public-private partnership with RCEA
 - **PPI part of Consortium and WindFloat tech selected by RCEA's RFQ in March 2018**
- Strong local community support and control
- Potential to revitalize the Port of Humboldt Bay; could become leading hub on West Coast
- Large potential to drive investments in infrastructure and create local jobs

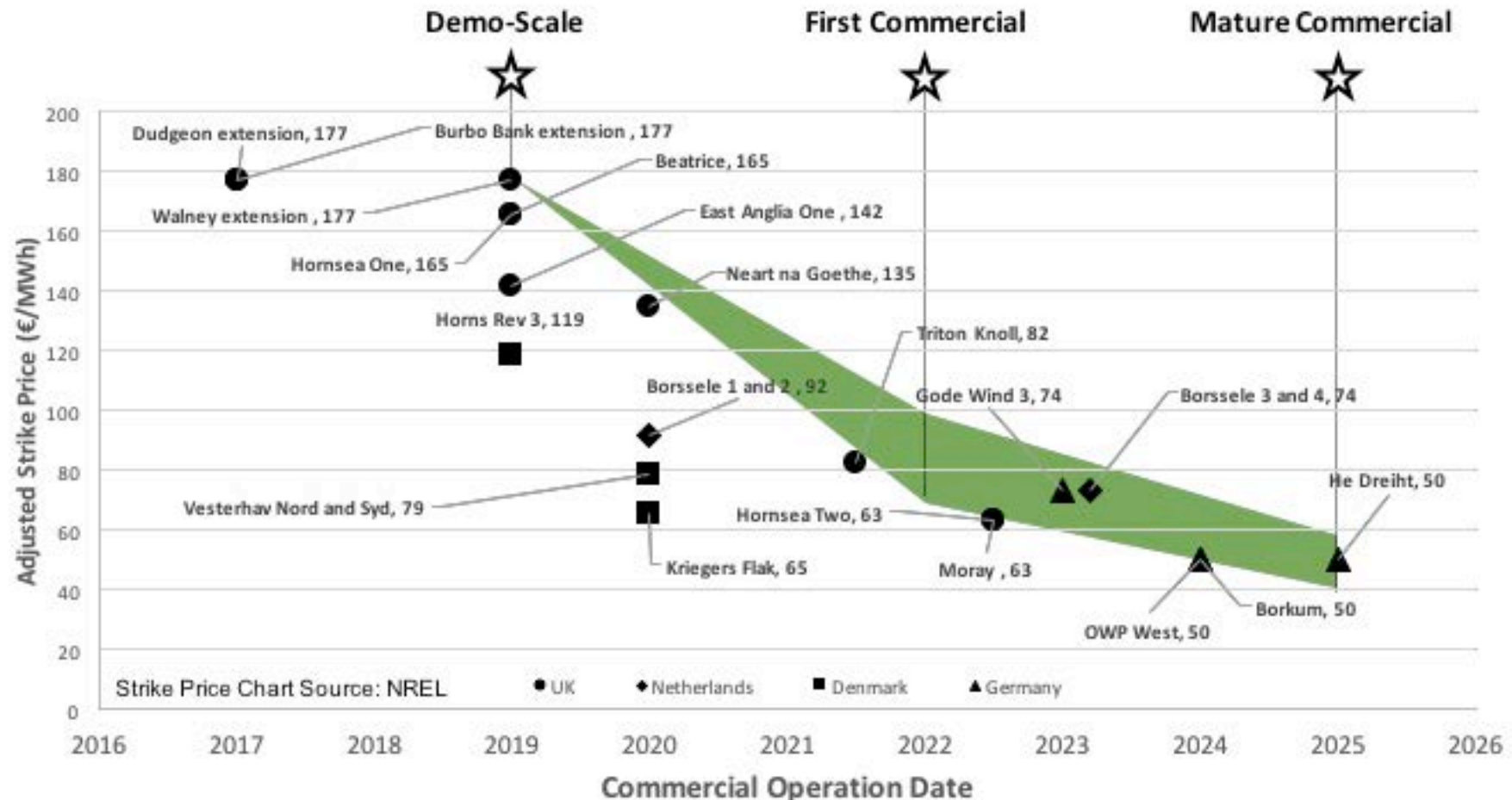


The WindFloat is on track to compete with conventional power, other renewables, and bottom-fixed offshore wind

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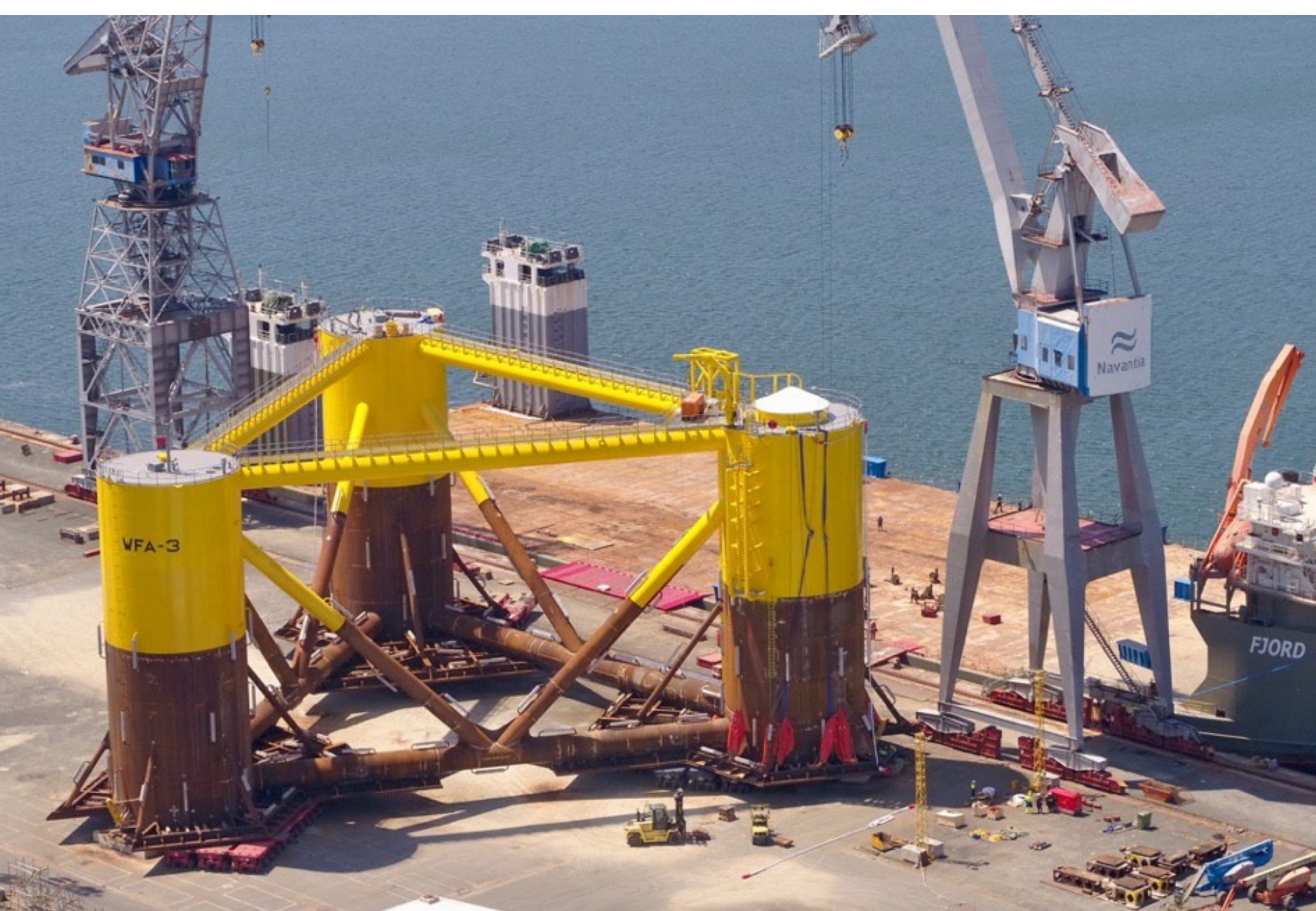
Adjusted Strike Price (EUR/MWh)
Announced Fixed Projects vs WindFloat

Demo-Scale: 25-30 MW, 8 MW Turbines
First Commercial: 300 MW, 9-10 MW Turbines
Mature Commercial: 500 MW, >10 MW Turbines





WindFloat Atlantic 25 MW Portugal





Key Take Aways

1

Floating wind is proven technically, and is now proving its financial and economic viability;

2

The WindFloat addresses the industry's bottom-fixed foundation challenges, while enabling offshore wind to reach its full potential;

3

Companies like Principle Power are already executing on several pre-commercial projects globally => ~100MW of expected floating wind capacity installed by 2021);

4

Floating Wind expected to be deployed commercially in the marketplace by end of decade;

5

The key for market leadership is to advance to 'next scale' projects and to prepare for developing utility-scale commercial projects.

Thank you!

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