

DOCKETED	
Docket Number:	19-IEPR-07
Project Title:	Electricity Sector
TN #:	229977-1
Document Title:	Floating Offshore Wind Ready for Commercial Deployment Around the World
Description:	Presentation by Kevin Banister, Principle Power
Filer:	Harrison Reynolds
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	10/7/2019 12:21:30 PM
Docketed Date:	10/7/2019

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

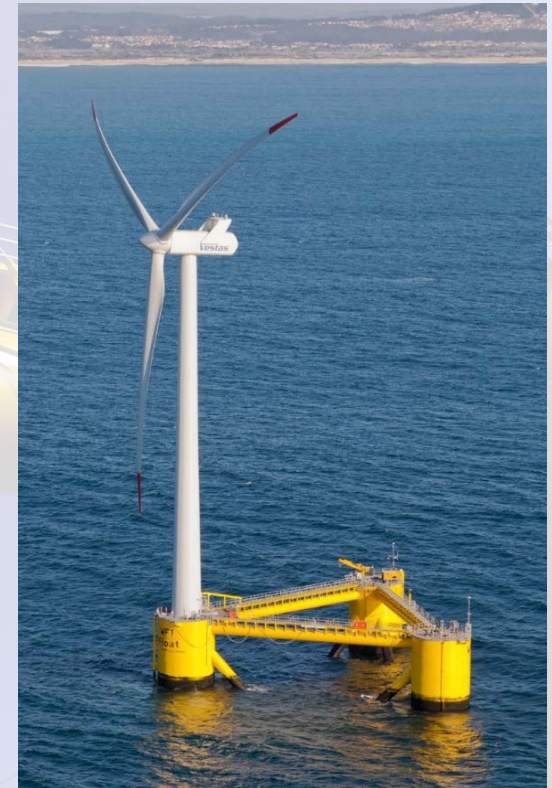
2MW Vestas, Identical Performance to Fixed Foundation

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

Project Pipeline

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

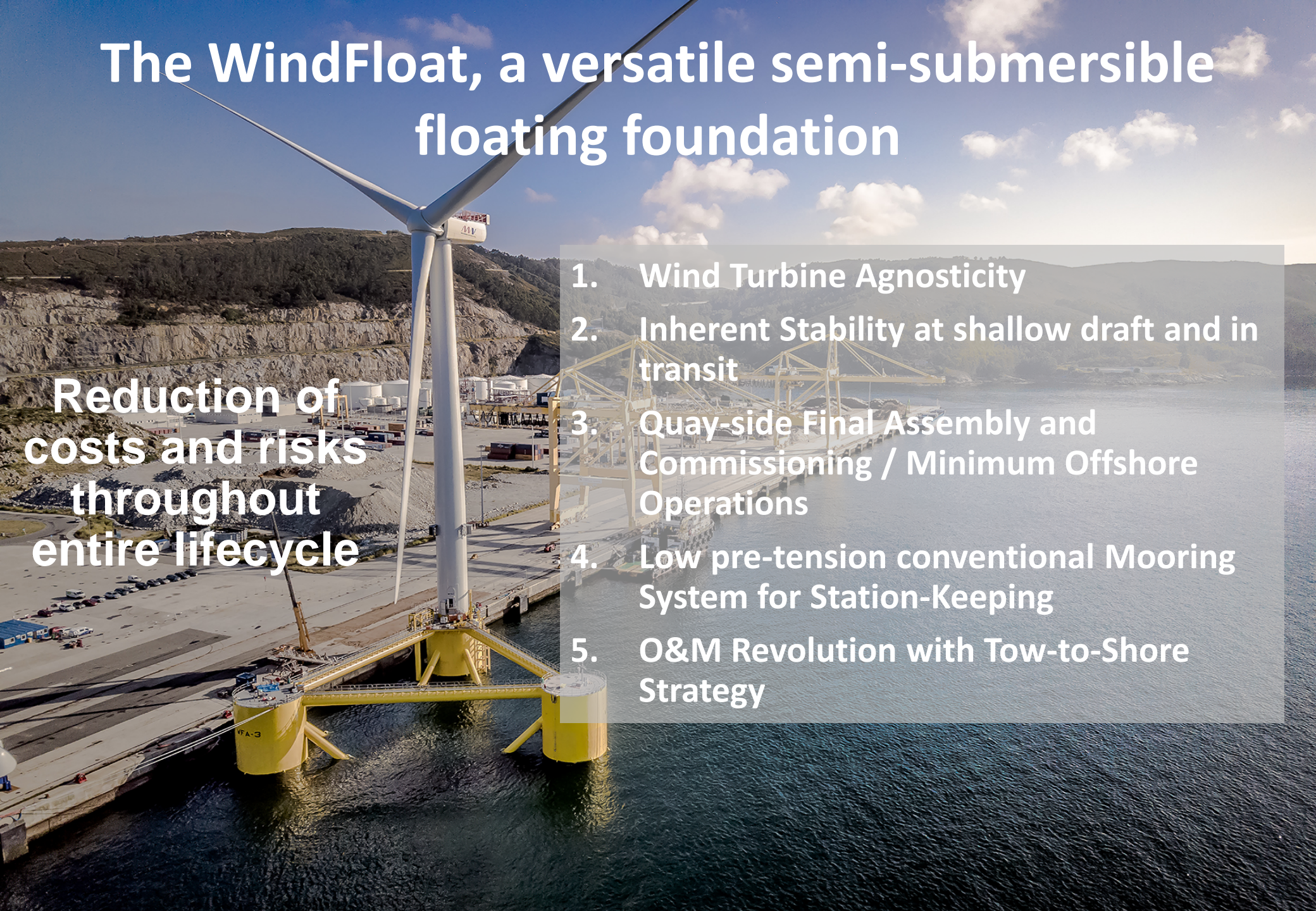
Commercial Developments in Europe, USA, Asia



The WindFloat, a versatile semi-submersible floating foundation

Reduction of costs and risks throughout entire lifecycle

1. Wind Turbine Agnosticity
2. Inherent Stability at shallow draft and in transit
3. Quay-side Final Assembly and Commissioning / Minimum Offshore Operations
4. Low pre-tension conventional Mooring System for Station-Keeping
5. O&M Revolution with Tow-to-Shore Strategy



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

ER

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
- **AFC stamped Drawings**
- **DNV certified 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**



WindFloat Kincardine – 50MW



ER

3 Floating Wind Farms underway



3 Different Markets and Customers

**75 MW currently under Construction
and Installation**

WindFloat Atlantic – 25 MW












Golfe du Lion – 24MW

100 MW in Operation by 2021

Next Generation WindFloat has been engineered with all major offshore WTMs

ER

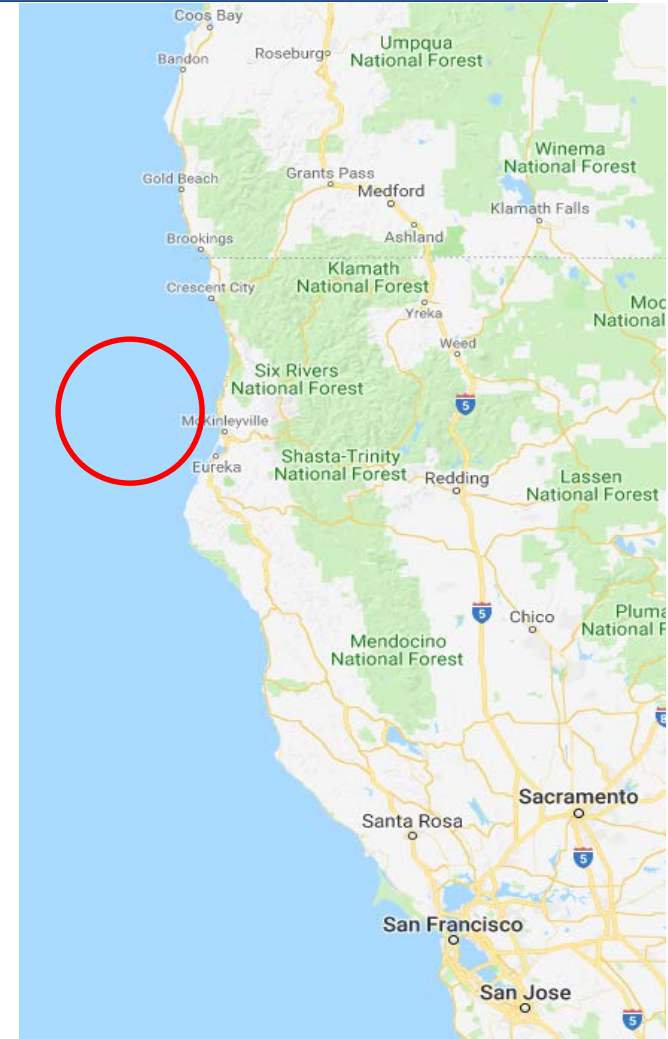
Project	Turbine OEM	Turbine Model	Power	Diameter	Status
WF1 prototype		V80	2MW	80m	Decommissioned
WindFloat Atlantic		V164	8.3MW	164m	In construction
WindFloat Kincardine		V164	9.5MW-10MW	164m	FEED
France / Golfe du Lion		Haliade 150-6MW	6MW	150m	FEED
France / Golfe du Lion		AD 8-180	8MW	180m	preFEED
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...

ER

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

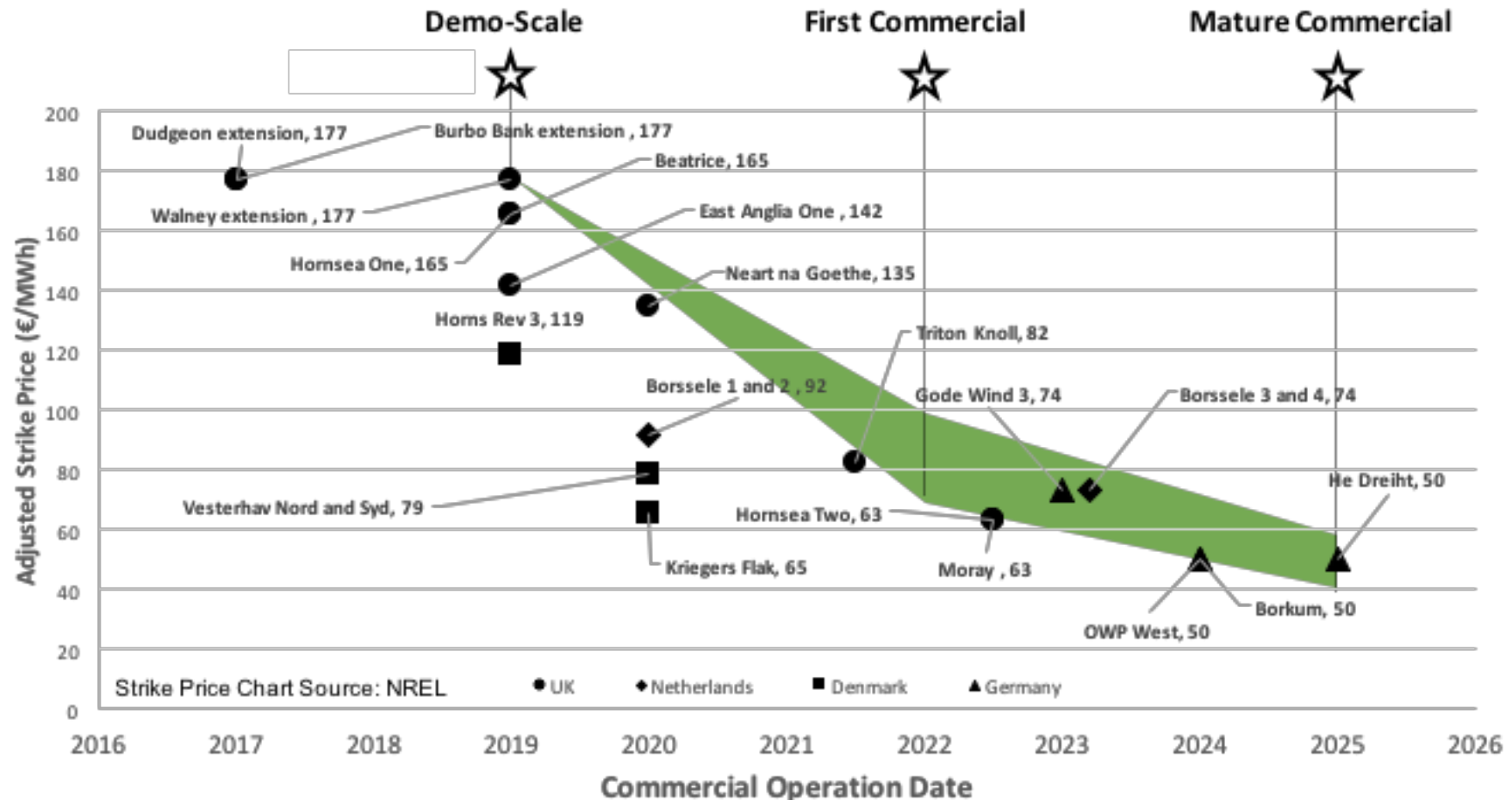


The WindFloat is on track to compete with conventional power, other renewables, and bottom-fixed offshore wind

ER

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



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!

Kevin Banister
kbanister@principlepowerinc.com

