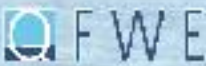



Floating Wind Solutions

Just in time - Integrating the multi-model-supply chain to meet tight installation windows.

Stephanie De Decker – Business Development Manager Floating Wind



Organized by   Quest Offshore

The logo for FWS, featuring a stylized wind turbine icon to the left of the letters "FWS" in a bold, white, sans-serif font.

The Marriott Marquis, Houston 1-3 March 2022

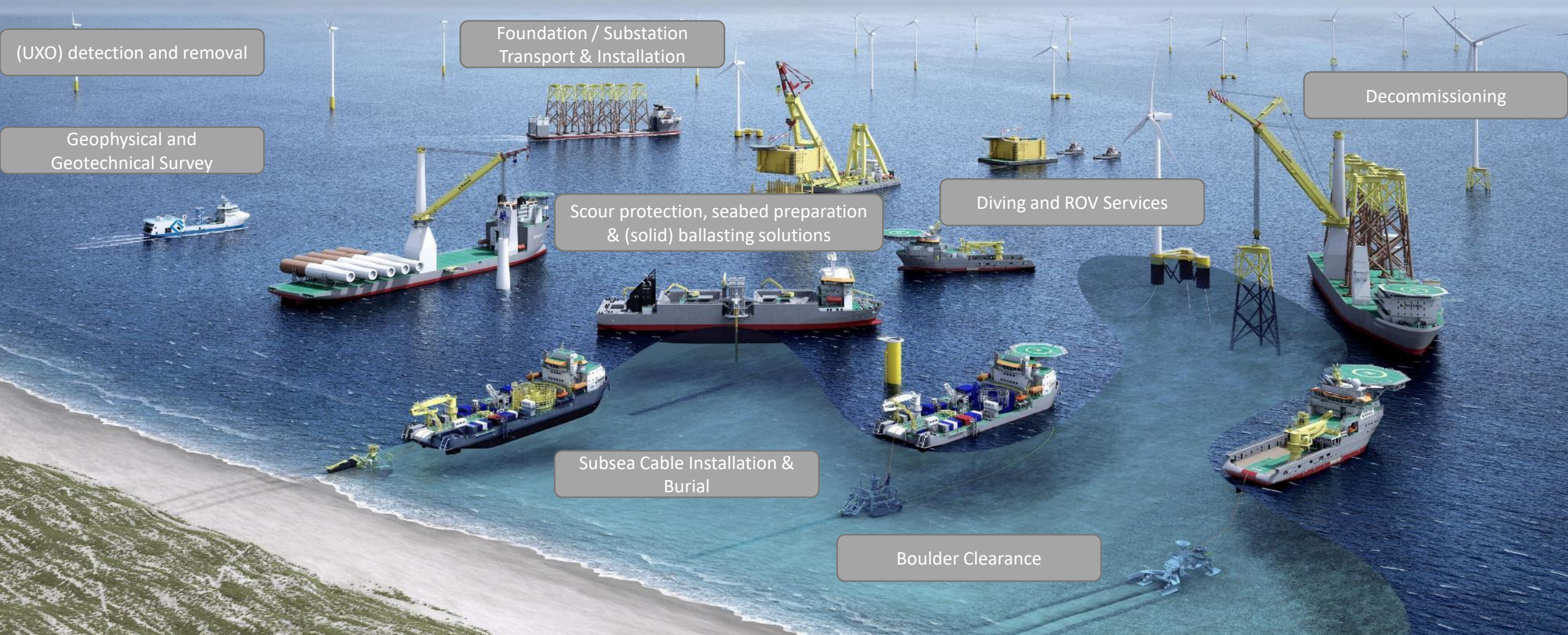
Company overview

- Leading global dredging & maritime expert
- With 9,900 employees and 650 vessels (incl JV's)
- Active in more than 90 countries across 6 continents
- Three business segments:
 - Dredging & Inland Infra
 - Offshore Energy
 - Towage & Salvage
- Headquarters in Papendrecht, the Netherlands
- Listed on Euronext



Floating Wind Solutions

Offshore Wind Projects from A to Z



(UXO) detection and removal

Foundation / Substation
Transport & Installation

Decommissioning

Geophysical and
Geotechnical Survey

Scour protection, seabed preparation
& (solid) ballasting solutions

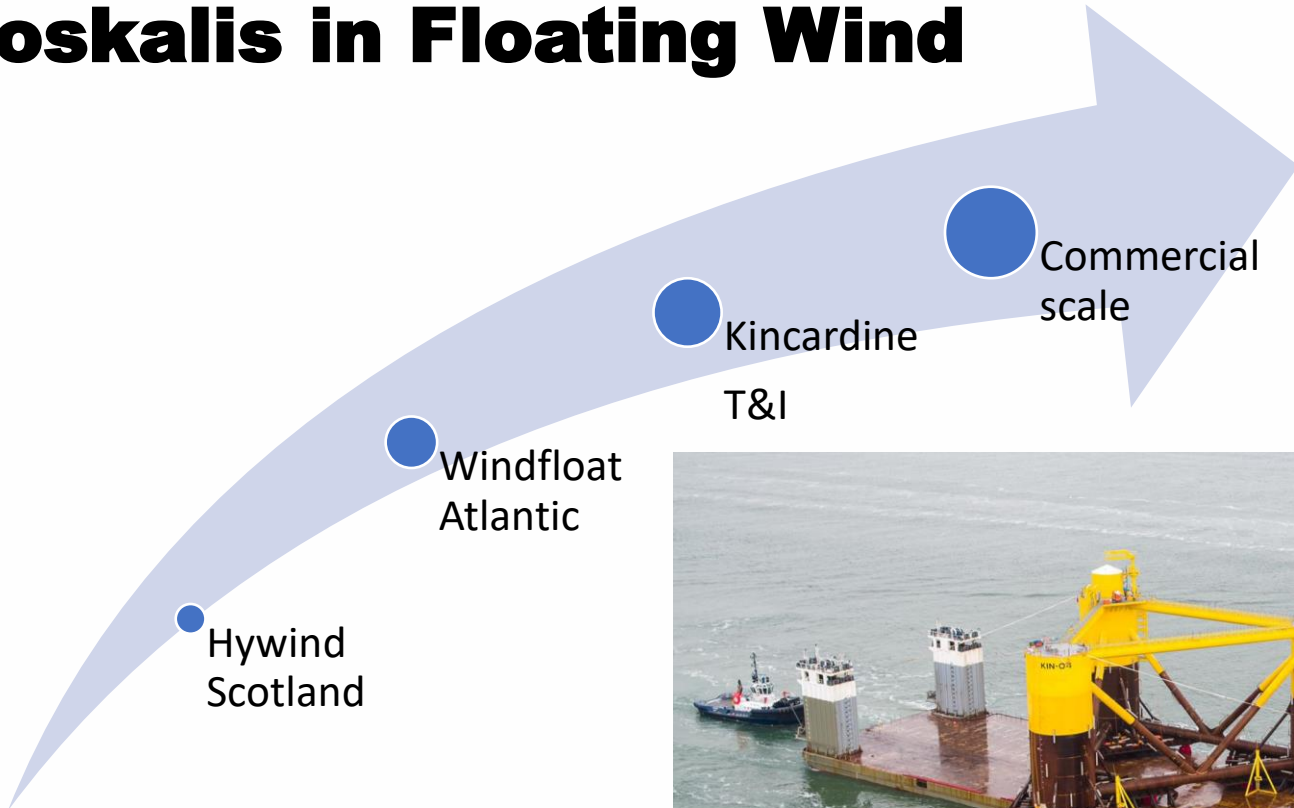
Diving and ROV Services

Subsea Cable Installation &
Burial

Boulder Clearance

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Boskalis in Floating Wind



Floating Wind Solutions

Just in time – integrating the multi-model supply chain to meet tight installation windows



Introduction

- Installation strategy is highly dependent on
 - Size and timeline of the project
 - Floater concept and design
 - Supply chain (local versus global)
 - Available Port infrastructure, water depth
 - Storage area
 - Fabrication facility
 - Serial production process
 - ⇒ Production speed and output
 - ⇒ 1 floater every 2 weeks, ideally 1 floater / week
 - ⇒ Floater storage / buffer capacity
 - Logistics hub and turbine integration hub locations to site
 - Vessel availability and specifications



Installation strategy is very project specific, but standardization is key

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- 3 countries: Spain, The Netherlands, Scotland
- 5 work sites
 - 2 fabrication locations
 - 1 turbine integration location
 - 1 logistical hub
 - 1 offshore site
- 7 vessels
 - 1 Semi-sub barge + 1 towing tug
 - 1 Anchor and mooring installation vessel
 - 1 towing tug
 - 1 positioning tug
 - 1 hook-up vessel
 - 1 CTV
- 2 installation seasons



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Tight installation windows

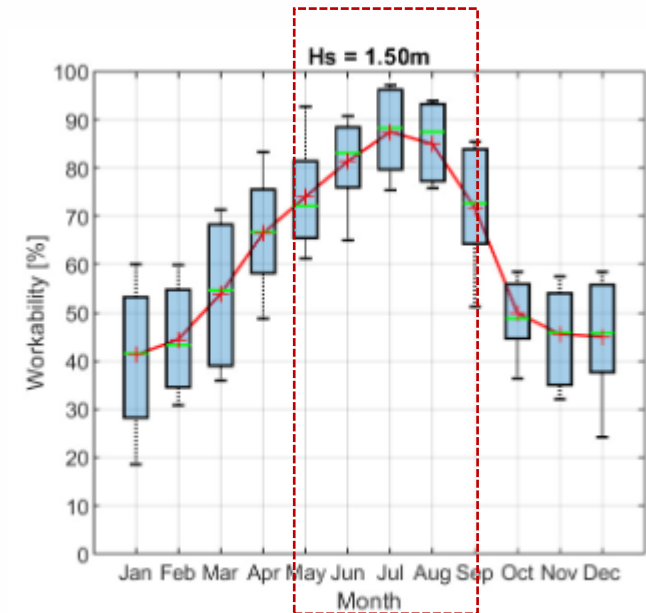
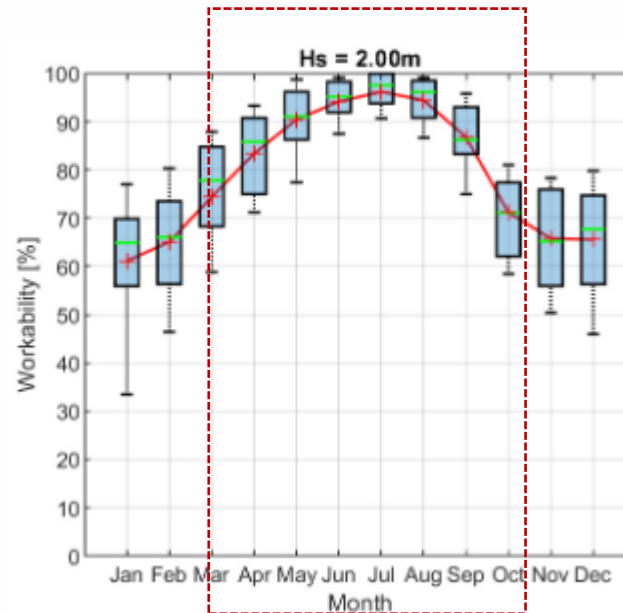
- Operational limits per offshore activity
 - Foundation dry / wet transport
 - Float-off
 - Anchor installation
 - Pre-lay of moorings
 - Tow
 - Positioning
 - Hook-up
 - Cable lay / burial

- Assessment of the environmental data and impact on the vessel's motions

- Low workability seasons resulting in tight installation windows

Innovative solutions to increase workability limits

Kincardine



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Reliability and performance

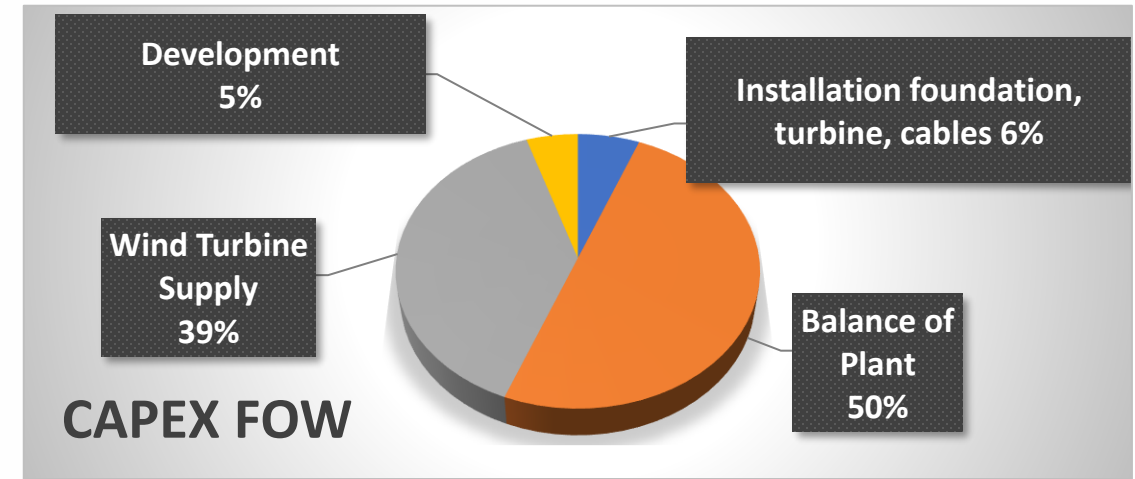
- Experience from oil and gas and demo projects
- Live DPR input for each asset during the project
 - Tracking each activity
 - Tracking each vessel
 - Tracking each floater
- Output performance reports
 - Actual output versus budget
 - Current project status
 - Forecasted estimates to complete
 - Variance
 - Realistic installation durations
 - Repetitive optimization trends



Project execution experience and reliability is crucial

Integrating supply chain in installation strategy

- Installation is a relatively small part in CAPEX cost but but is crucial for first power
- Pressure high for reduced installation cost and schedule
- Demonstrating a reliable and integrated strategy is crucial



Source: NREL - 2020

Joint effort from all stakeholders (Developer, designers, supply chain , fabricator, authorities, ports, installation contractors, vessel owners)

Conclusions

- Project execution experience is crucial
- For a competitive supply chain, we require efficient and standardized operations
- Adopt your fabrication, logistics and installation strategies to find the most viable option for schedule and cost
- Collaboration between all stakeholders (developer, fabricators, T&I contractor, ports,...) from preparation phase

Thank you and meet us at booth #404



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<https://offshorewindsolutions.boskalis.com>