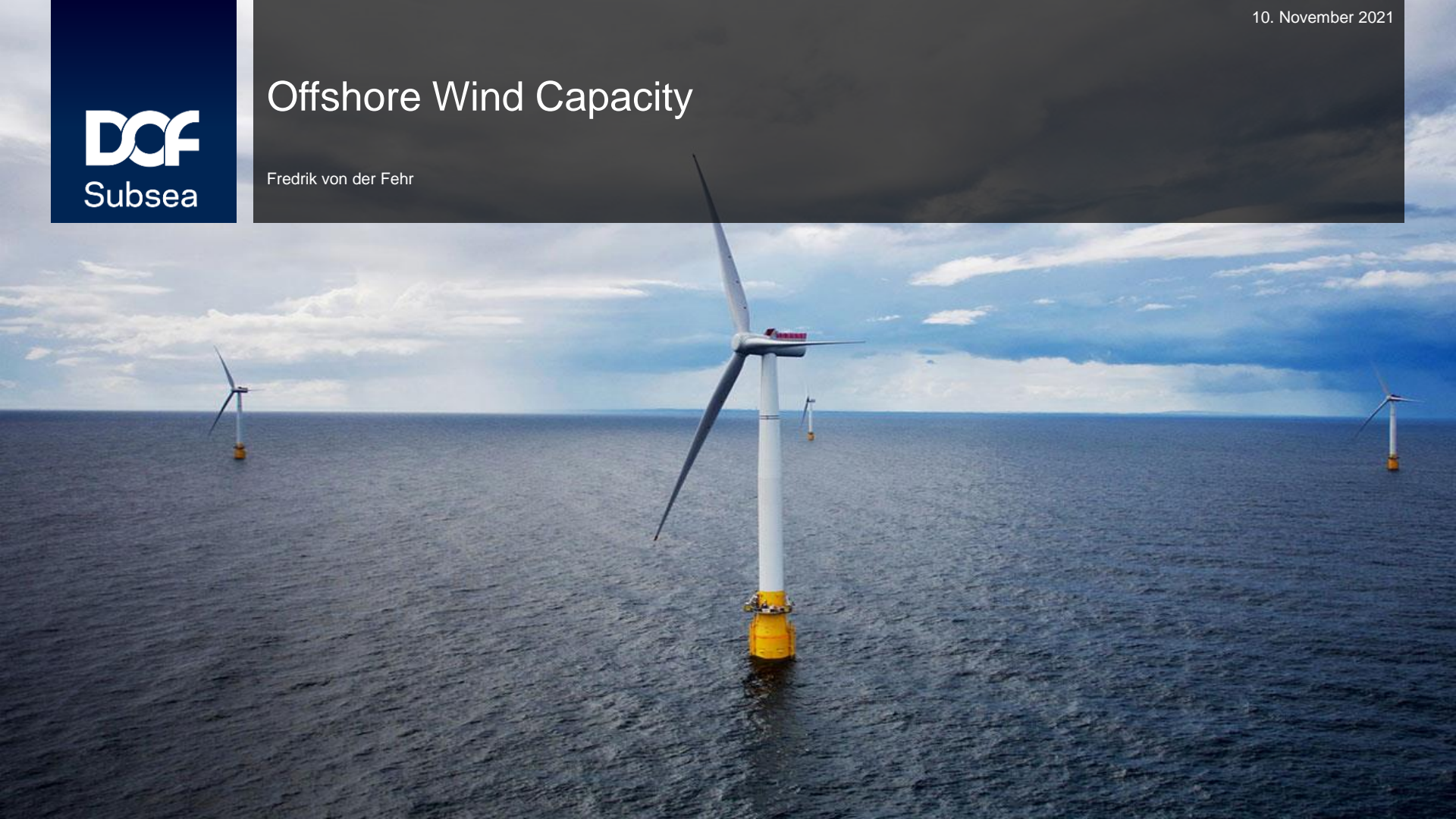





# Offshore Wind Capacity

Fredrik von der Fehr



# Agenda

- DOF Subsea
- DOF Subsea in offshore wind now
  - Hywind Tampen
- Offshore wind going forward

The background of the slide is a photograph showing the wake of a large vessel, likely a supply or towage ship, moving through the ocean. The water is dark blue, and the wake is a turbulent, white and orange-colored churning of water. A vertical black pole or mast is visible in the center of the frame, extending from the top to the bottom. The overall scene is dynamic and industrial.

**DOF is an international group of companies which owns and operates a modern fleet of towage, supply and subsea vessels. The DOF adventure started at Company Norway in 1980. DOF Subsea was created in 2005 to combining our strong engineering capacity and our modern fleet of vessels to service the offshore energy market.**

# Integrated Solutions

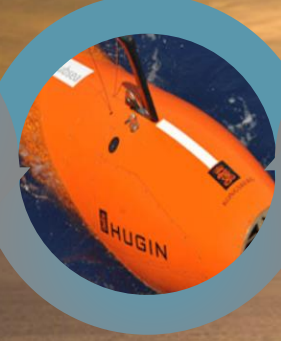
Equipment

Project Delivery

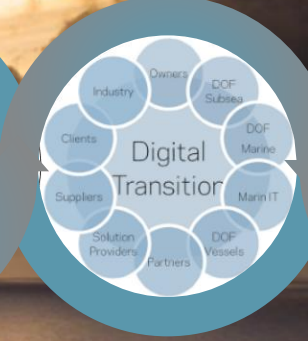
Environment



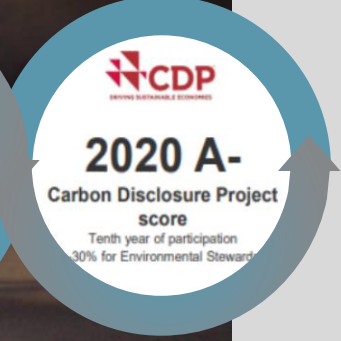
Vessels



People



Innovation



Safe  the RITE way®

Safe the RITE way enhances our behaviour-based programme, integrating three main elements: "Values", "Safe Behaviours" and "Rules, processes and procedures".





named in Financial Times **Europe's Climate Leaders 2021**

This recognition is the culmination of our decade-long strategy to minimise emissions and environmental impacts for the benefit of all our stakeholders.

# DOF in Numbers

**VESSELS<sup>1</sup> | 64**

We own and operate one of the largest fleet of subsea vessels worldwide

**OPERATIONAL TERRITORIES | Four**

We operate across 4 key regions: Atlantic, Asia Pacific, North America and Brazil

**EMPLOYEES<sup>3</sup> | 3,405**

**REGIONAL OFFICES | Eight**

Headquartered in Bergen, DOF Subsea has offices in the UK, Norway, Angola, US, Canada, Brazil, Australia and Singapore

**REVENUE Q2<sup>2</sup> | \$197m**

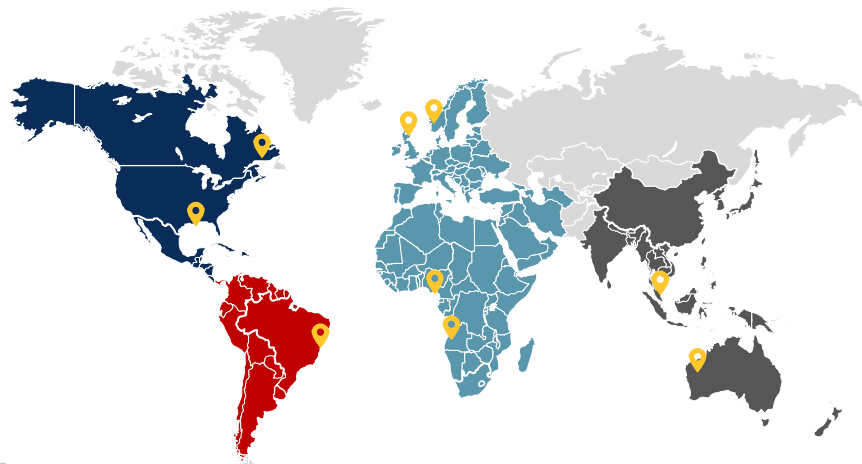
Year to date revenue is \$339m USD

**ROVs/ AUVs | 74**

Our comprehensive fleet of work class, observation class ROVs and AUVs support our global subsea operations

**BACKLOG | \$1.5bn**

Firm backlog of \$1.5bn USD



As at Q2 2021

# Our Capabilities



Oil & Gas



Renewables



CONSTRUCTION



DECOMMISSIONING



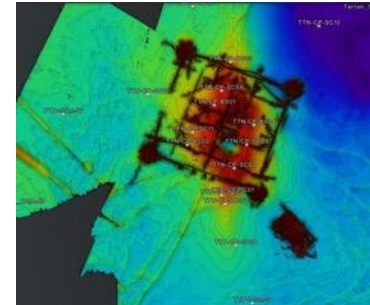
MOORINGS



SURF



IRM



SURVEY

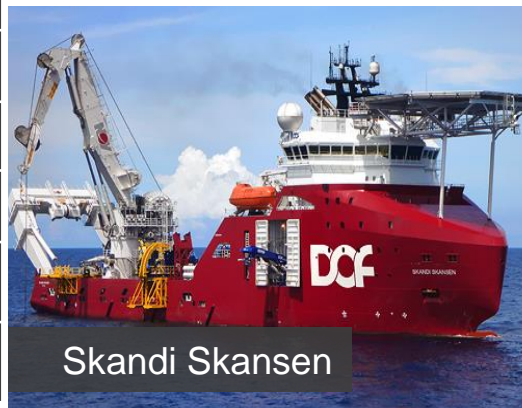
# Atlantic Region - Vessels

	<b>Skandi Seven</b> Construction Support	<b>Skandi Skansen</b> Mooring Installation	<b>Skandi Carla</b> Survey / IRM
<b>LOA (m)</b>	120.7	107.2	83.9
<b>Offshore Crane (t)</b>	250	250	50
<b>Tower (t)</b>	-	-	-
<b>Accommodation</b>	120	90	80
<b>Deck Space (m<sup>2</sup>)</b>	1300	1070	620
<b>Deck Capacity (t)</b>	3150	3050	
<b>ROV</b>	2 x Triton XLX WROV	2 x Triton XLX WROV	2 x Triton XLS WROV
<b>Moonpool</b>	7.2 x 7.2m	7.2 x 7.2m	30m <sup>2</sup>

Our strategy is continually under review and we have the ability to pull in other DOF Fleet vessels as required



Skandi Seven



Skandi Skansen



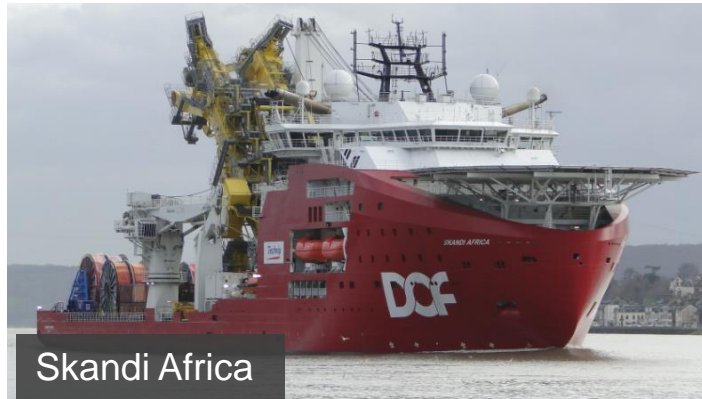
Skandi Carla

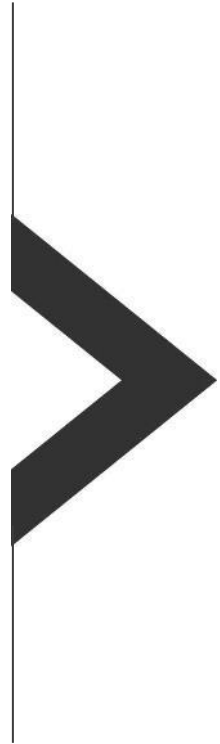


# Atlantic Region – Vessels

	Skandi Constructor	Skandi Acergy Construction Support	Skandi Africa
LOA (m)	120.2	156.9	160.9
Offshore Crane (t)	250	400 & 100	900 & 150
Tower (t)	140	125*	650
Accommodation	100	140	140
Deck Space (m <sup>2</sup> )	1470	2100	2700
Product Capacity (t)	1470	7000	
ROV	2 x Triton XLS WROV (3 <sup>rd</sup> Party)	2 x WROV (3 <sup>rd</sup> Party)	2 x WROV
Moonpool	8.0 x 8.0m	7.2m x 7.2m 5.6m x 3.5m (2 off)	8.0 x 8.0m

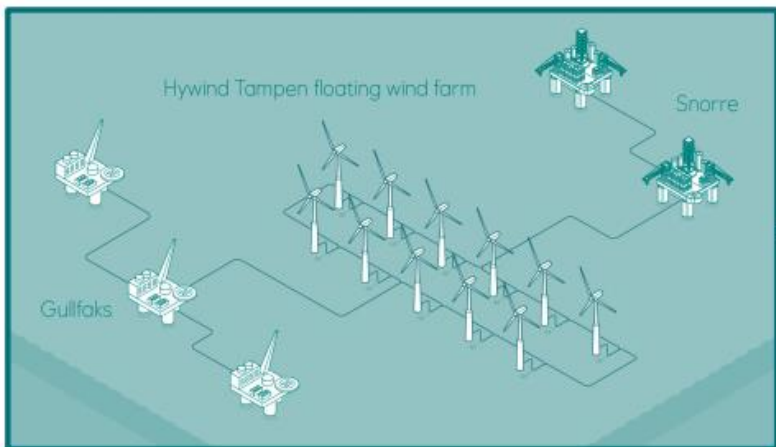
\* Option to install 125t FLS tower





DOF Subsea in offshore wind now

# Hywind Tampen – offshore wind farm in the North Sea



11 wind turbines between  
Snorre and Gullfaks

Combined capacity of  
88MW

Concrete substructures  
and shared anchors

Considerable CO2  
emission reductions



# Our role in Hywind Tampen

## WHAT

EPCI Contract for the Substructure and Mooring system. (Excluding subsea power cables). AKSO has the main contract and DOF has the Marine Installation Manager in that contract, and we share marine engineering services.

KDS JV (AKSO DOF) is subcontracted to AKSO for the Installation of the 11 substructures including Wind Turbine Generator assembly.

## WHEN

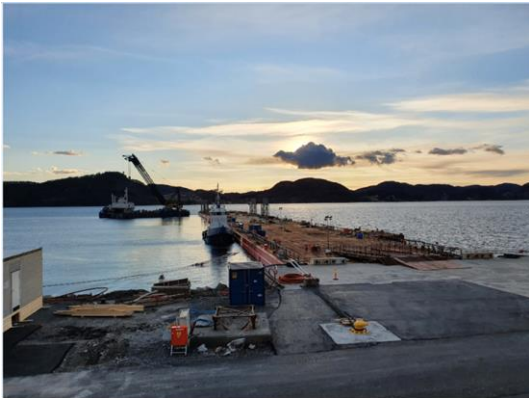
Tendering 2018-2019

Contract 2019 (Oct) – 2022 Q3



# Marine Operation's during Construction

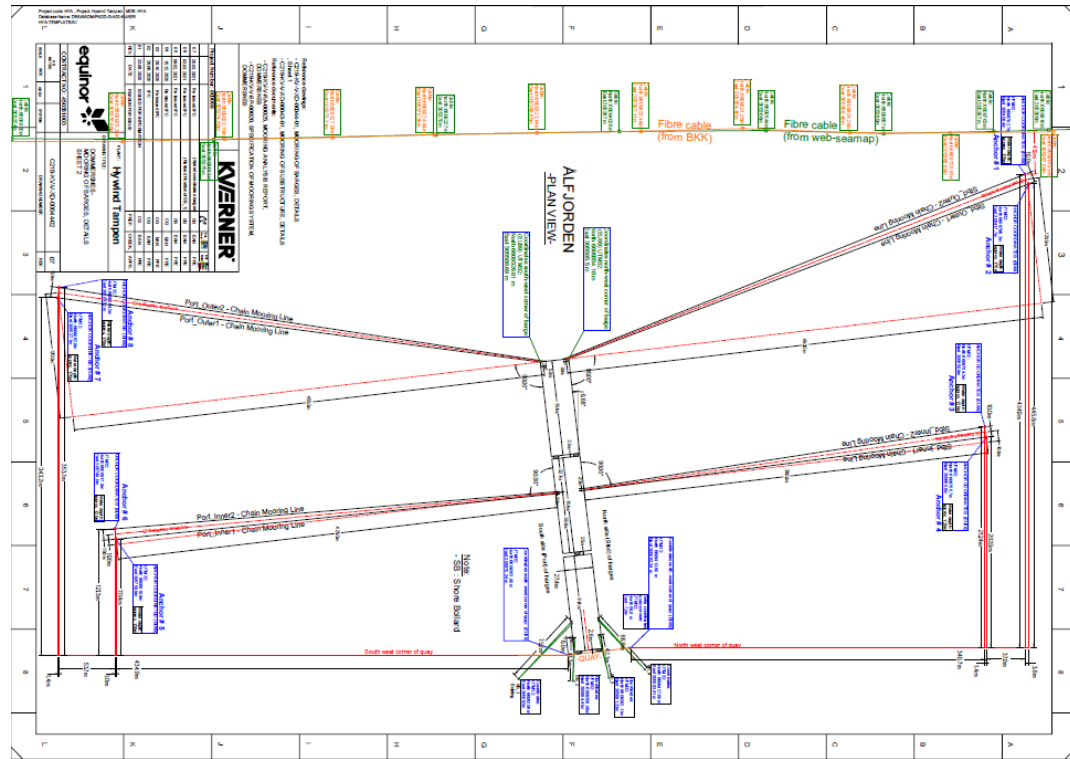
Installation of the 3  
North Sea Barges @  
Dommersnes.



# Marine Operation's during Construction

Installation of the 3 North Sea Barges.

- Large loads in the system, flexibility.
- Soli inshore
- Fiber optic cable, recently installed - BKK.



# Marine Operation's during Construction

## Out of dock operation

- Stability VS Crane capacity.
- Release of hooks



# Marine Operation's during Construction

Installation of the mooring Bridles.





# Status now

## Today

Solid ballast completed.  
4 @ 107,5 m height.  
2 @ 70m under constr.  
5 @ 66m



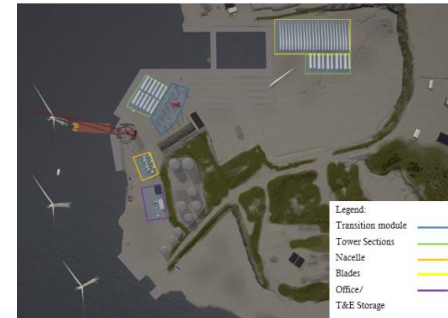
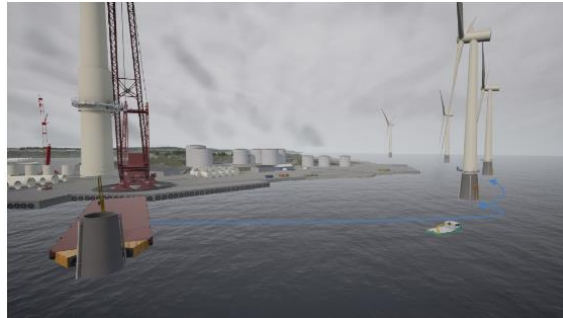
## March

Towing to FWT Assembly  
site starts



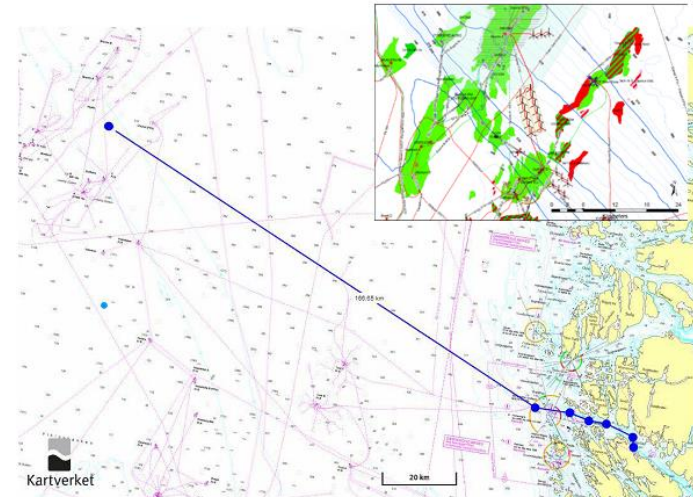
# Scope of Work 2022 – Assembly Site.

- Principle contractor for the assembly location at Wergeland Base in Gulen.
- Receipt, storage, preparation and loadout of WTG parts
- Install 3 off mooring locations for commissioning
- Outfit and install one off assembly barge
- Perform mooring of substructure during assembly operation
- Coordinate all CPI contractors on site (Wergeland Base AS, Siemens, Mammoet and substructure contractor)
- Management of yard from 1/11-2021 until last FWT have been towed out.

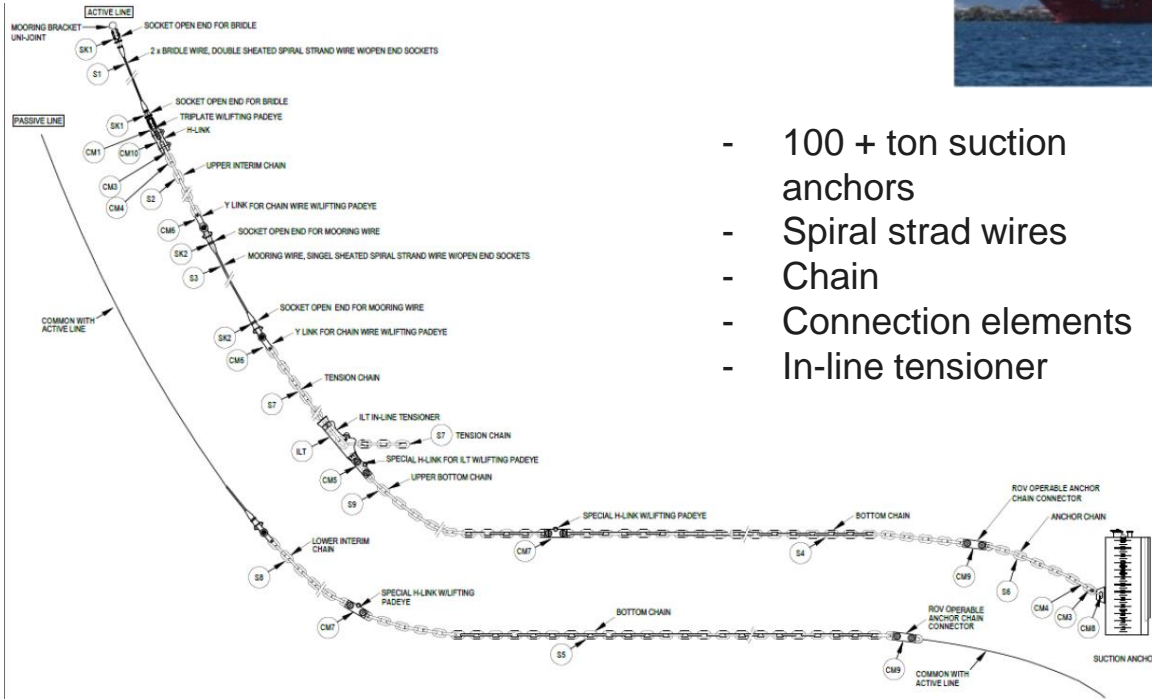


# Scope of Work 2022 – Offshore Marine Ops.

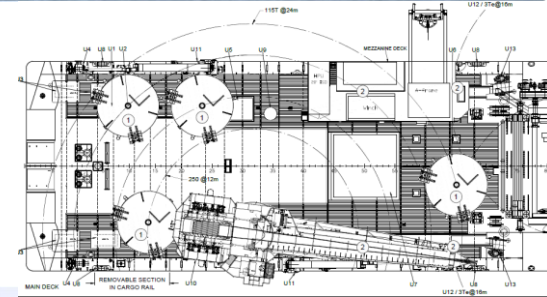
- Receipt, storage, preparation and loadout of mooring system
- Pre-installation of mooring system (incl. tensioning to 300Te for 30min)
- Tow of Floating Wind Turbine (FWT) to Hywind Tampen offshore site
- Hook-up of FWT to the pre-installed mooring system



# The mooring lines



- 100 + ton suction anchors
- Spiral strand wires
- Chain
- Connection elements
- In-line tensioner

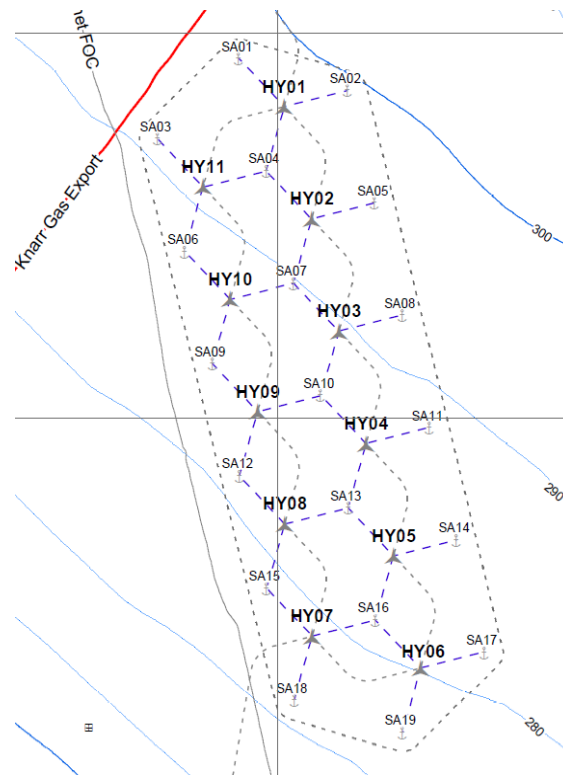
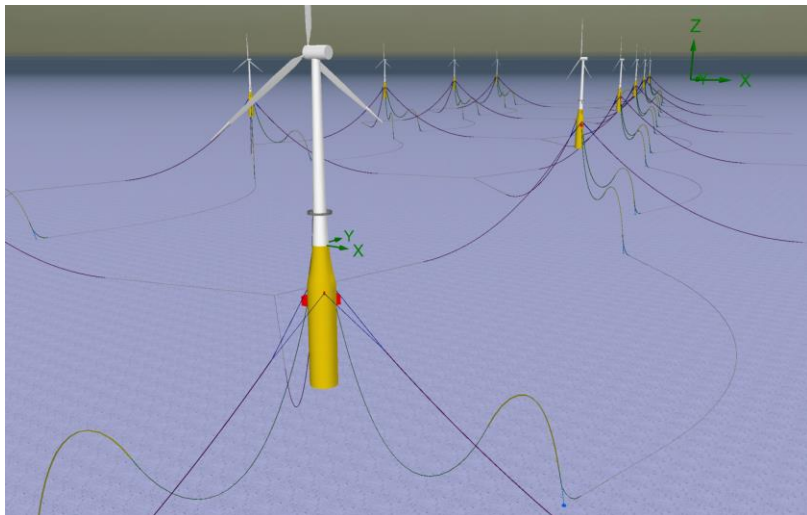


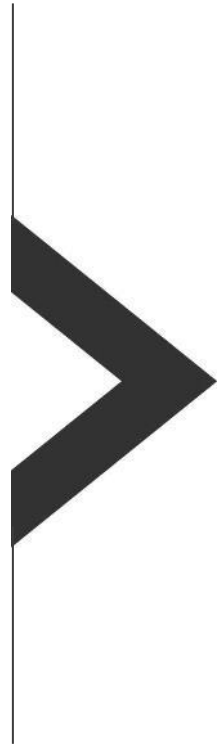
# The Field Layout

## Optimised mooring system

19 anchors

1.7 pr turbine





Offshore wind going forward

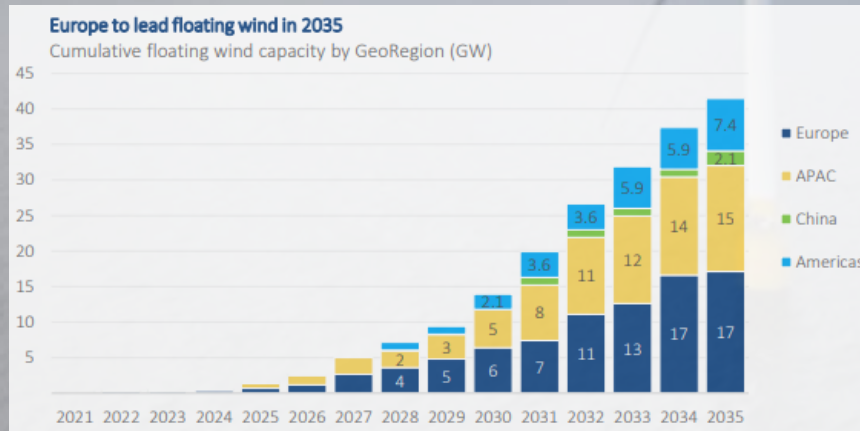
# Electricity Generation for the Grid

## Why Floating Wind?

- Higher Yield
- Further from Shore
- Mobile
- Suitable for deep water
- Smaller structure

## Why Not?

- More expensive
- More restrictive to trawling
- Underdeveloped supply chain



# Floating will be commercialized

Up to 12-13GW to be operational by 2030

Japan alone could see 4GW of FOWT

Increasingly seeing 100-500MW capacity announcements

**Groix & Belle-Île**  
Eolfi-led  
24MW  
2021  
Geophysical surveys underway

**Kincardine**  
Scotland  
Pilot Offshore  
50MW  
2020  
Under development

**Hywind Tampen**  
Norway  
Equinor  
88MW  
2021  
Major contracts awarded

**Ulsan Donghae**  
Korea  
Korea East West,  
Equinor, KNOC  
200MW  
2024  
Feasibility stage

**Humboldt**  
USA (California)  
EDP Renewables  
Up to 150MW  
2024  
Lease application submitted to BOEM

**WindFloat Atlantic**  
Portugal  
EDP Renewables  
25MW  
2020  
Installation underway

**FOW Aegean Sea**  
Greece  
300-400MW  
Development Zone  
Late 2020s  
Tender to be announced

**Goto City**  
Japan  
Toda Corporation  
22MW  
2021  
150m water depth  
EIA stage

FOWT offers greater diversification opportunities, including

- Mooring systems
- Experience in greater water depths
- Floating structures
- Dynamic cables

Price, technological advancements and scaled deployment will be key

Importance/value of FOWT increasingly recognised

- ScotWind Leasing Round 2019-2020
- French FOW tender schedule early 2020s
- BOEM to hold 2020 US West Coast leasing round
- Calls for Mediterranean developments



# Why We Do It

## Pre-Construction

4 - 6 Years

Survey Data Acquisition

Design, consultancy & FEED

Detailed Engineering

## Construction

1 - 2 Years

Mooring assembly

Towing and anchoring

Cable Installation

Commissioning

25 Years

## Operation & Maintenance

Live monitoring

Annual inspection

Subsea Maintenance

Thank you