

Contractor & Developer Partnerships

The smart way to commercialize projects

Emilie Reeve

Executive Vice President

Offshore Wind Development

Organized by



Quest Offshore

Havfram Introduction

Havfram leverages on the experience from subsea into its offshore wind initiatives



1

Offshore Wind Development

Early phase offshore wind development partner

Offshore wind developer for O&G electrification

Partnership with RWE and NTE for Norwegian license

2

Offshore Wind Installation

20MW WTG installation vessels on order (US and EU)

Supporting projects in APAC and EU

Established team with 8+ years experience from Offshore Wind

3

Floating Installation

Complete installation services for floating projects

10+ years of complex subsea project experience from O&G

300+ subsea engineers

A truly independent installation contractor, bringing a decade of experience to floating wind



Moorings Installation



Dynamic Risers installation (close to 100 pull-ins)



Cables Installation

Experience and Skillset

- 10+ years of delivering large and complex subsea projects
- Strong mooring track record, floaters towing and hook-up in shallow and deep water
- Strong track record in laying and hooking up dynamic risers
- Extensive EPCI track record
- Current involved in studies and RFQs beyond Utsira

Strong Client Relationships

- Work performed for all major Oil & Gas companies
- Many of which are now moving into renewables



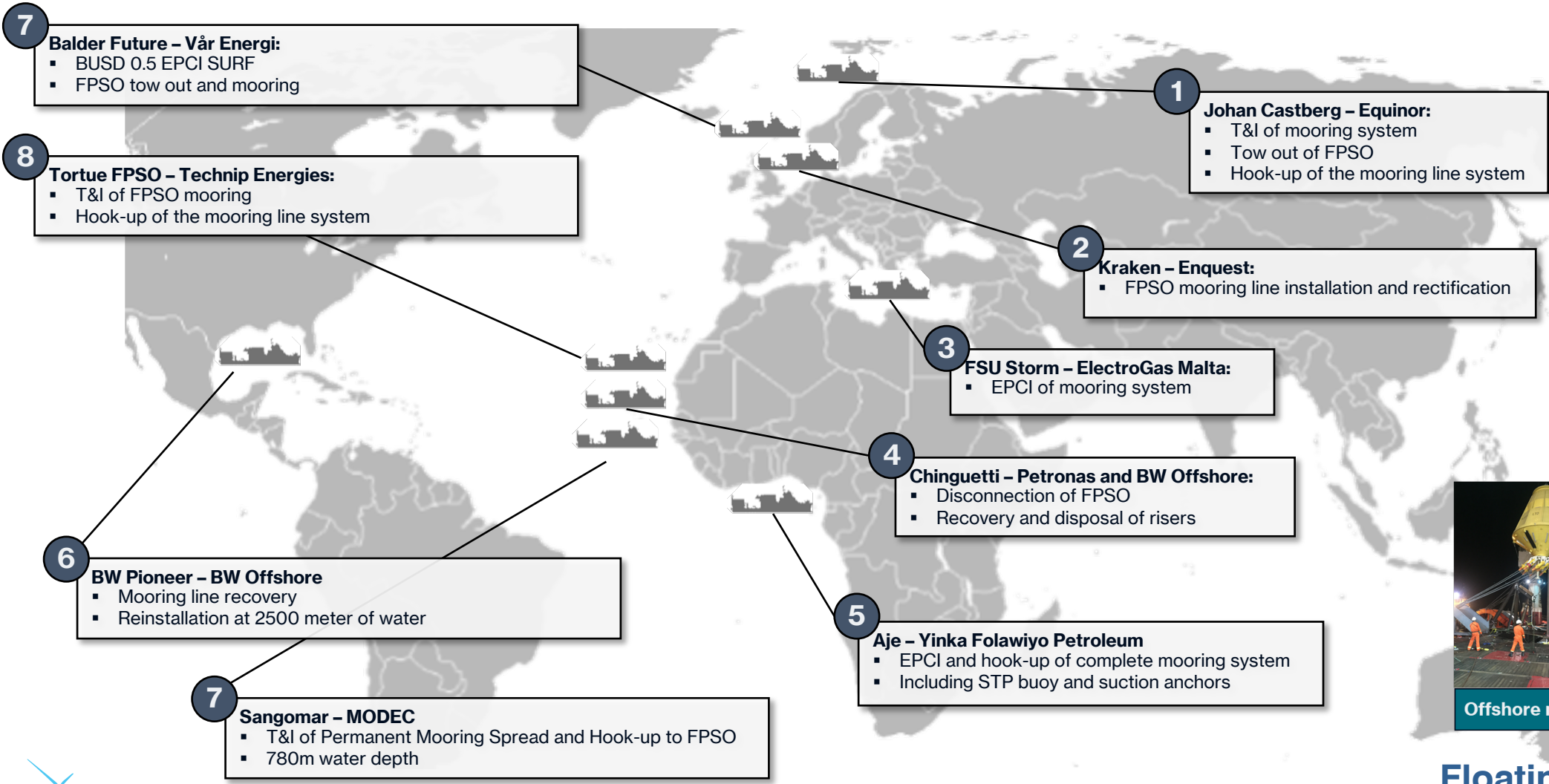
Strong Safety and Quality Record

- Strong safety culture embedded in organisation
- Always delivered according to client's first oil/gas production date
- More than 8 million man-hours and 11,000 vessel days completed
- **2 lost time incidents in 10 years and zero last 4 years**

Floating Wind Solutions

Global provider of mooring related services Havfram

Track-record in both remote and harsh environment, and benign inshore waters



Floating Wind Solutions

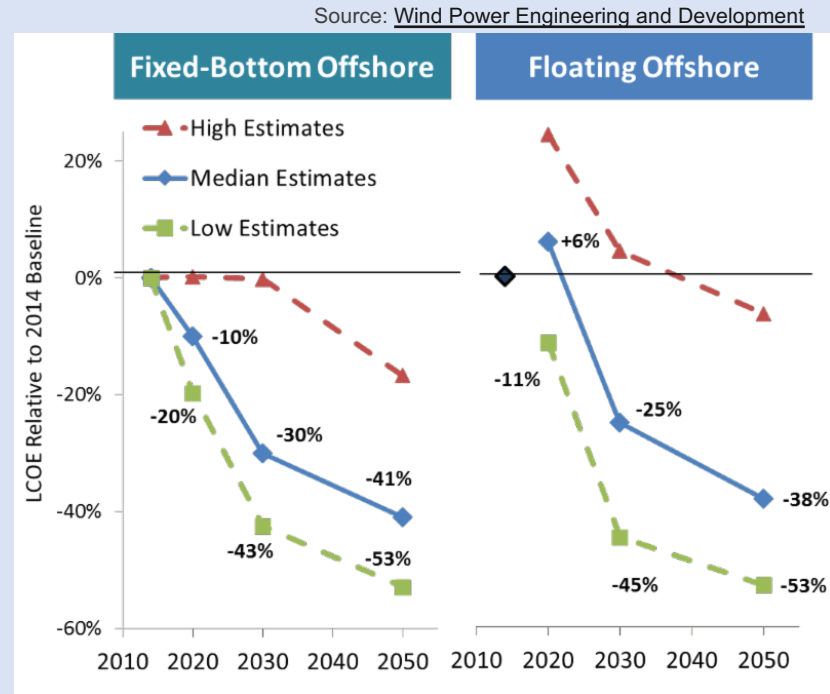


A race to the bottom

The rising uncertainty in future offshore wind costs

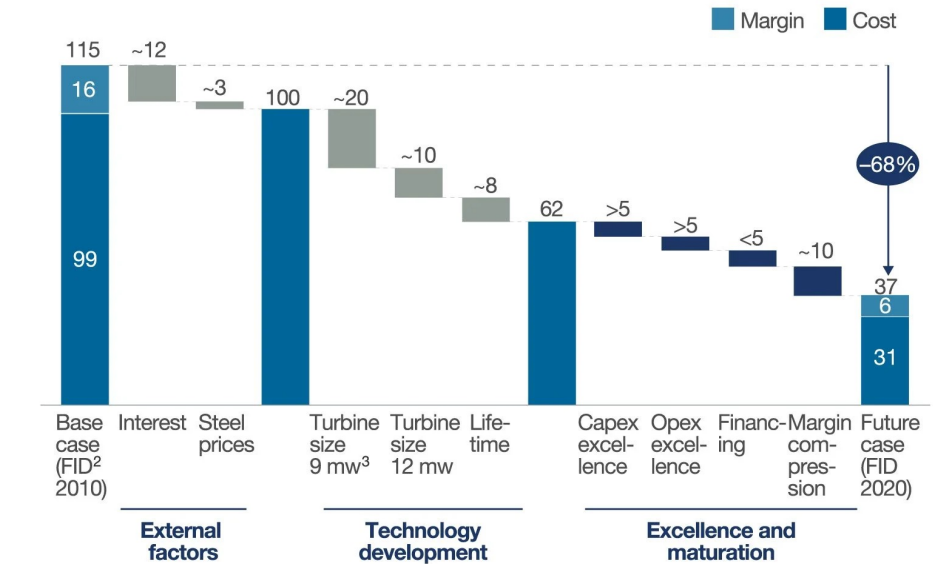
- Cost of offshore wind has decreased significantly in the past decade with the majority of new projects globally being proposed as zero subsidy.
- This cost reduction has predominantly been a result of CapEx reduction through:

- Technology innovation
- Larger turbine sizes
- Economies of scale
- Industry learning
- Manufacturing



Cost declines in offshore wind are being driven by external factors, technology development, and excellence.

Potential levelized-cost-of-electricity path, €/mWh,¹ normalized



¹Megawatt-hour.

²Final investment decision.

³Megawatts.

Source: Jens Hobohm, et al., *Cost reduction potentials of offshore wind power in Germany*, a joint report from the Fichtner and Prognos, 2013, prognos.com; *Cost reduction options for offshore wind in the Netherlands FID 2010-2020*, TKI Wind op Zee (TKI Offshore Wind), October 2015, tki-windopzee.nl; McKinsey analysis

McKinsey&Company

Floating Wind Solutions

A race to the bottom

The rising uncertainty in future offshore wind costs

Phase	Development & Consenting	Component manufacture		Installation	Operations/ Maintenance	Decommission
		Turbine manufacture			Support services	
Time	4 – 5 years	1 – 2 years		1.5 – 2.5 years	20+ years	1 – 2 years
Stage	CAPEX 70-80%				OPEX 20-30%	
Costs	5–10% CAPEX	Components & structure 20–30% CAPEX	Turbine 20–30% CAPEX	10 – 15% CAPEX	Vessel & equipment 20 – 30% OPEX	0 – 5% OPEX
Risks	Regulatory uncertainty; Costly surveys; Risk bias on developers	Multiple contracting; Lack of standardisation	Lack of risk sharing; Insufficient capacity	Constrained vessel supply & lack of bespoke vessels; Inefficient logistics; Grid connectivity bottlenecks	Heavy dependence on subsidies; Reliability	Low EOL value; Recyclability

Source: [EIRWIND project](#)

- More recently there has been a growing popularity globally for governments to use auction mechanisms to lease offshore wind sites.
- This enables governments to achieve the lowest price possible for offshore wind energy by significantly increasing the competition.
- **However...**
- In order to win sites, developers are forced to seek every solution possible to propose the lowest project cost.
- In many cases developers have had to propose project costs, based on big assumptions that the supply chain:
 - Will lower their costs
 - Can take on more of the project risk
 - In making these assumptions, there is increased uncertainty in the successful delivery of the project, in:
 - Achieving the proposed low cost
 - Assuming the supply chain will take the risk
 - Achieving the proposed delivery schedule

Involving the supply chain early can reduce risk and increase project certainty

- Until recently common practice has been for high-level early engagement with the supply chain

However...

- With governments stipulating increased local content requirements, developers are changing their approach and, more and more starting to engage with different EPCI package contractors and the supply chain at the bid phase of the project.
- This has many benefits, in that:
 - The EPCI package contractors can input on project design including feasibility of delivery, cost and schedule
 - Provides greater confidence to the developer, investors and awarding government agency in the successful delivery of the project
 - The EPCI package contractors can identify and engage with local suppliers to increase local content early on
 - The procurement process and timeframe can be shortened due to early engagement
 - It strengthens the relationship between the developer and EPCI package contractors

“If you don’t change what you are doing today, all of your tomorrows will look like yesterday.” Jim Rohn

Havfram partnership with RWE and NTE on Norwegian floating wind project

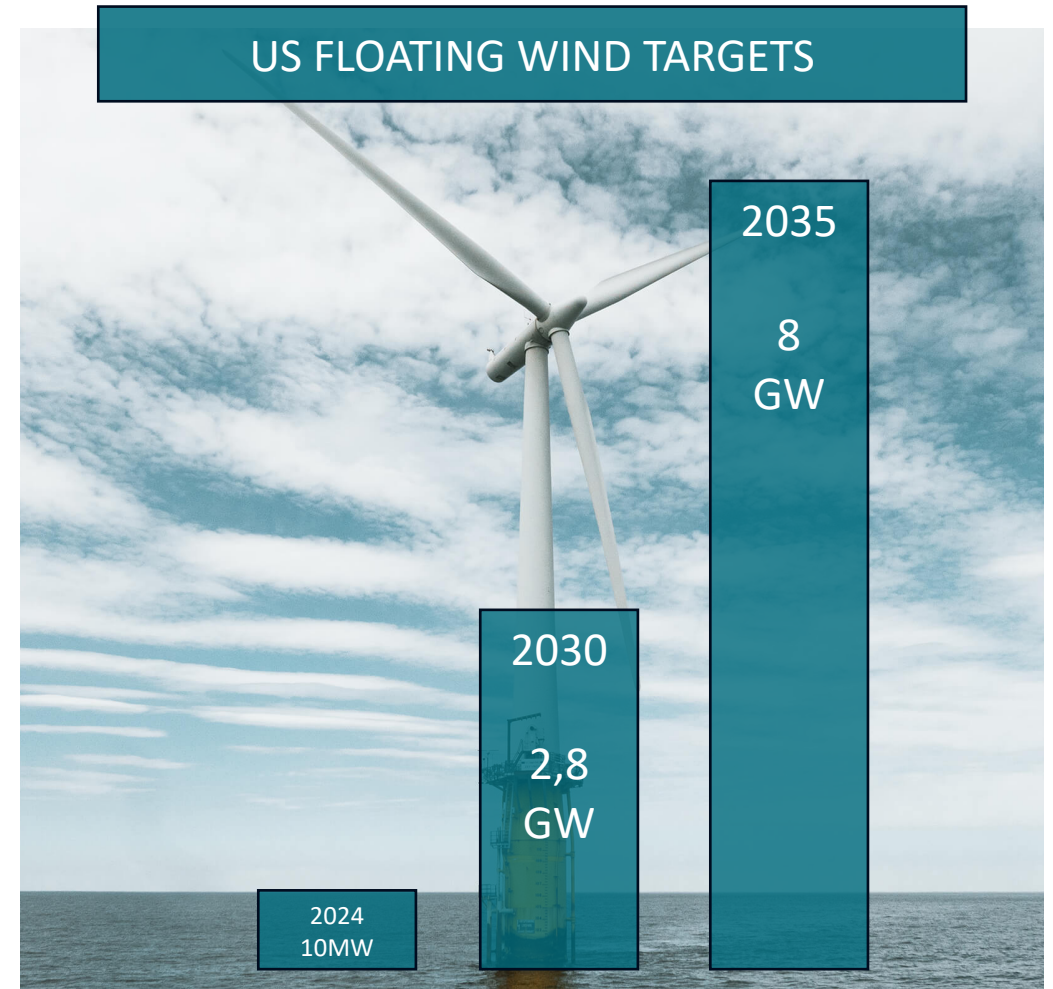
- Havfram is in partnership with RWE and NTE for the Norwegian floating wind site Utsira Nord.
- Being an installation contractor partner on the project allows us to:
 - Identify and input on the best equipment to support project delivery incl. input on project design parameters
 - Assess and manage market availability in certain areas
 - Lock in assets to secure delivery
 - Ensuring equipment are designed for efficient marine operations – with the assets available at the correct price
 - Identify local supply chain capabilities to achieve local content requirements.
 - Assess latest and future technologies which could be implemented to reduce costs and improve safety during project execution
- Havfram will follow the process from pre-acreage award until the constructions phase



Floating Wind Solutions

Relevance for US and globally

- Havfram is already present in US for subsea and bottom fixed wind
- US supply chain is limited for floating wind
 - No firm pipeline - TBC
 - Needs to be built from scratch based on oil & gas and relevant bottom-fixed offshore wind experiences
- US specials
 - Foundation manufacture/assembly (ports, quays, bearing capacity etc..)
 - Local content and working with unions – state by state
 - In country vessel capacity
 - Site specifics weather analysis
 - Overall installation philosophy (such as number of seasons, mooring and cable wet storage, tow-out sequence etc.)



Floating Wind Solutions

Winning projects with smart partnering

- With growing need to reduce costs and increase local content in offshore wind projects, it is inevitable that developers and contractors will need to partner and collaborate more at an early stage
- This need is even more so when it comes to floating wind, where there is considerable pressure for the cost of floating wind to reach parity with fixed bottom wind.
- Developer / contractor partnerships are a smart solution to achieving successful projects in a competitive environment.

**D
e
v
e
l
o
p
e
r
/
C
o
n
t
r
a
c
t
o
r
/
P
a
r
t
n
e
r
s
h
i
p**

Increase local content

Increase ability to deliver proposed project

Increase certainty of project schedule

Increase government and investor confidence

Increase certainty on project costs

Thank You

Emilie.Reeve@havfram.com

Executive Vice President

Offshore Wind Development

Organized by



Quest Offshore

Divider Slide