

# **MASTER MARINE**

Sheringham Shoal

Installation  
of

Sub-Stations and Wind Turbines Generators by the new and  
innovative Service Jack-Up Vessel

Liverpool 30 June 2010

Thor Stenersen, Sales & Marketing Director

- Norwegian based company founded in 1997
- Broad experience from complex marine operations
- Two Jack Up Construction vessels from Drydocks World, Batam Indonesia
- Basic design by Global Maritime
- Delivery 2nd & 4th quarter of 2010
- Accomodation contract with ConocoPhillips signed October 2008



Wind contract with Scira Offshore Energy Ltd (Sheringham Shoal)

**Available for new commitments from Q4 2011**

# Installation Vessel: Service Jack 2



## Dimension

L112 × B 50 × D 9 (d7.5) m

## Deck

Deck space 2,200 m<sup>2</sup>

Payload 7,200t

## Propulsion

4 × 2.5MW azimuth thrusters

DP2 Dynamic positioning system

## Cargo handling

2 × 750t offshore revolving cranes

1 × 7200t skidding system

## Jack up legs

Rack & pinion jacking principle

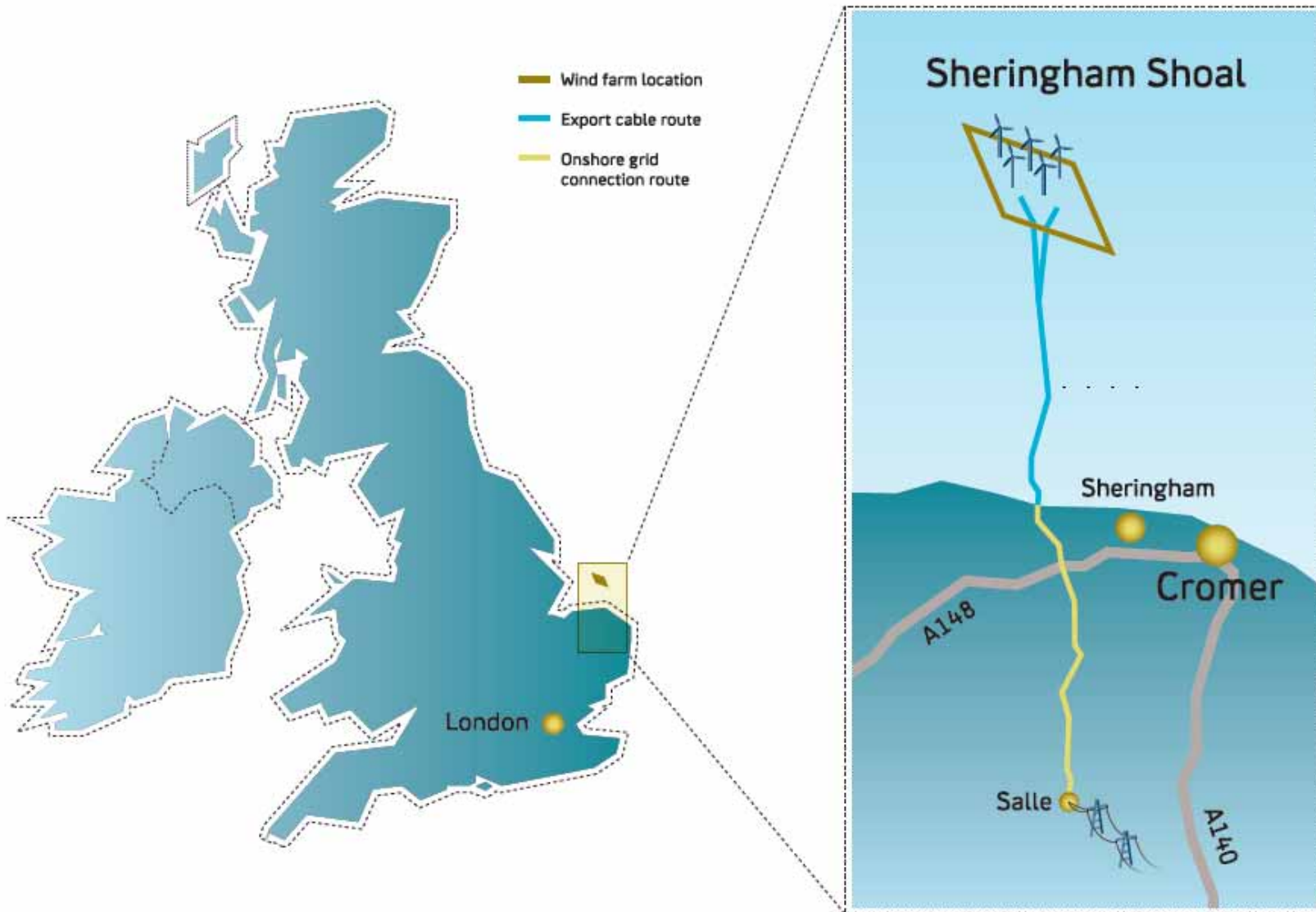
4 × 130m truss legs

**Delivery scheduled in 4Q of 2010**

# First Contract Offshore Wind

- Counterparty:  
Scira Offshore Energy  
(50/50 JV between Statoil and Statkraft)
- Project: Sheringham Shoal Offshore Wind Park (UK)
- Installation of 88 wind turbines and 2 substation modules
- Contract signed April 2009
- Installation work to start Q1 2011

# Sheringham Shoal location



# Substations



”Service Jack 2” with the two substations on deck

- Transportation and installation of 2 substations including hook up and commissioning
- Weight : 1000 Tonnes each



# Wind Turbine Generator

## Type

3.6 MW

## 1 WTG consists of

- 2 x Tower sections
- 1 x Nacelle + 1 x Hub
- 3 x Blades

## Dimension & Weight

	Dimension	Weight
Tower (2sections)	L5 × B5 × H60 m	210t
Nacelle & Hub	L20 × B 4 × H4.5 m	180t
Blade	L52 × B 2.5 × H4.5 m	18t

## Height

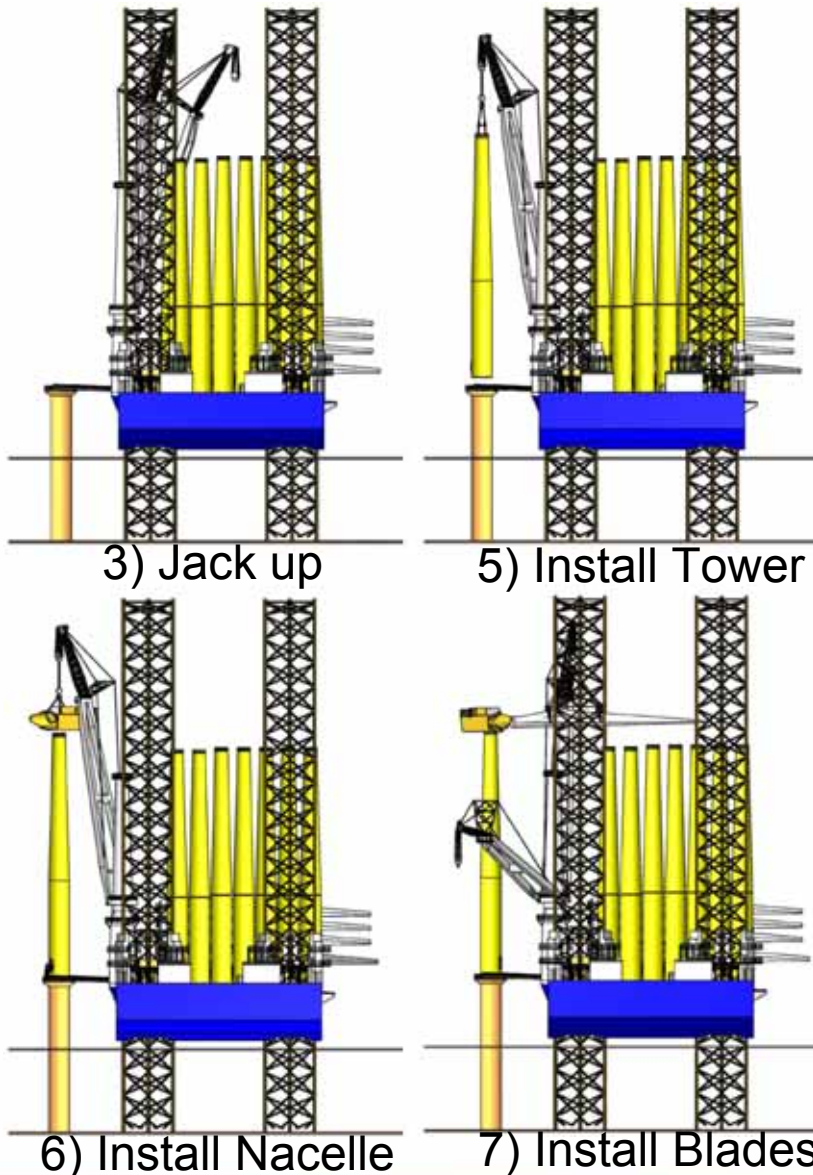
- Height of Foundation 22m from LAT
- Height of Nacelle 81.75m



Scira Offshore Energy

# WTG Installation

## Typical sequence



- 1) Load out in Esbjerg
- 2) Sailing to the wind farm (300miles)
- 3) Positioning to a specific site by DP and jack up to the planned height.
- 4) Establish access to the foundation
- 5) Install Tower
- 6) Install Nacelle
- 7) Install 3 Blades to Hub horizontally
- 8) Jack down and position to the next site
- 9) Repeat 3) to 8)
- 10) Sailing back to Esbjerg.
- 11) Offload backload frames

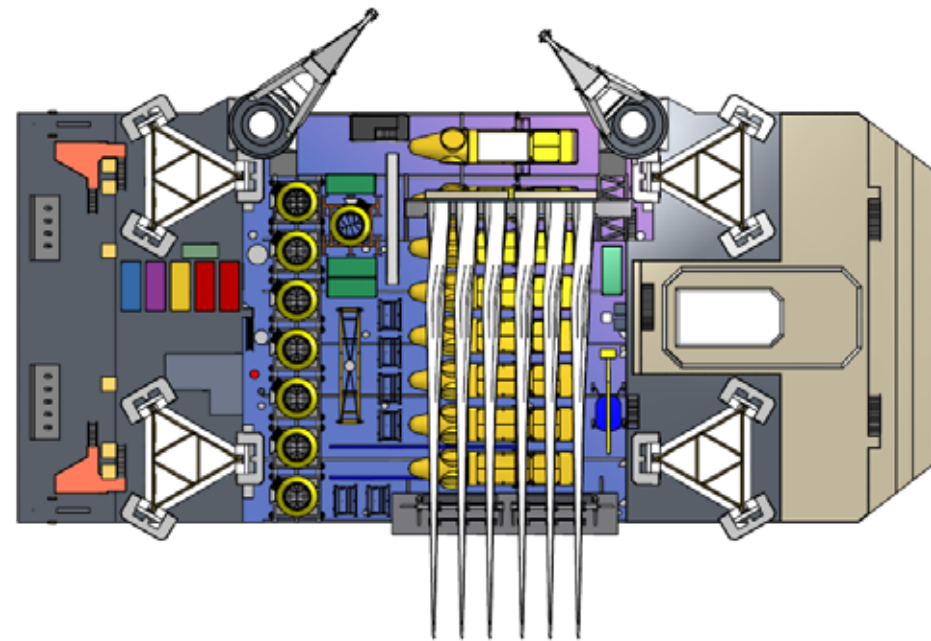
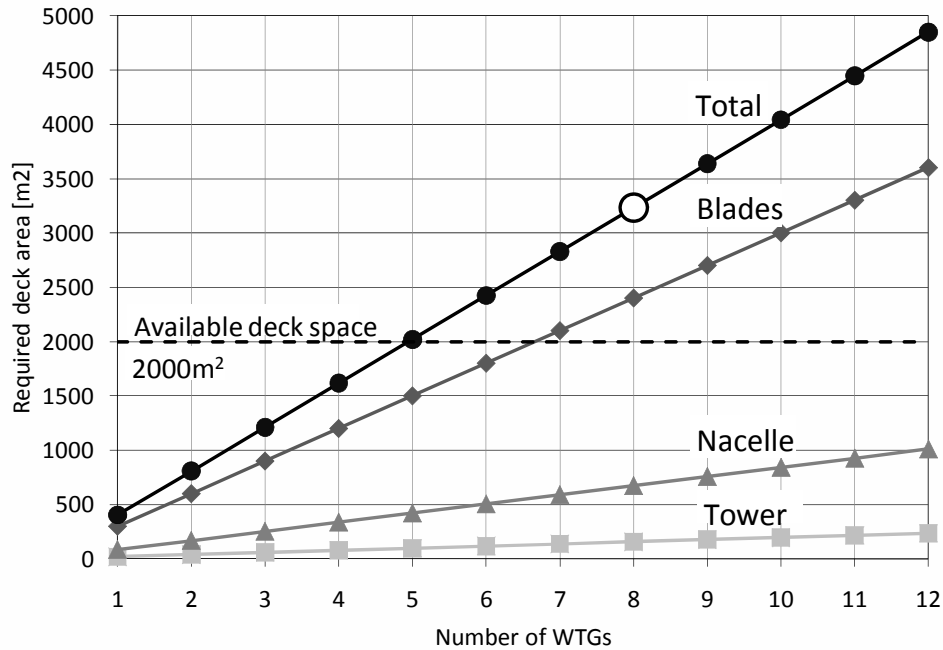
# Installation Scope - WTG



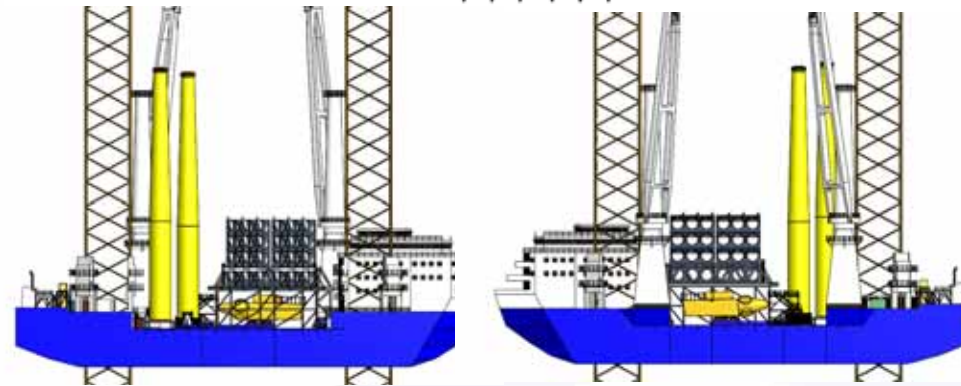
# Installation Scope - WTG



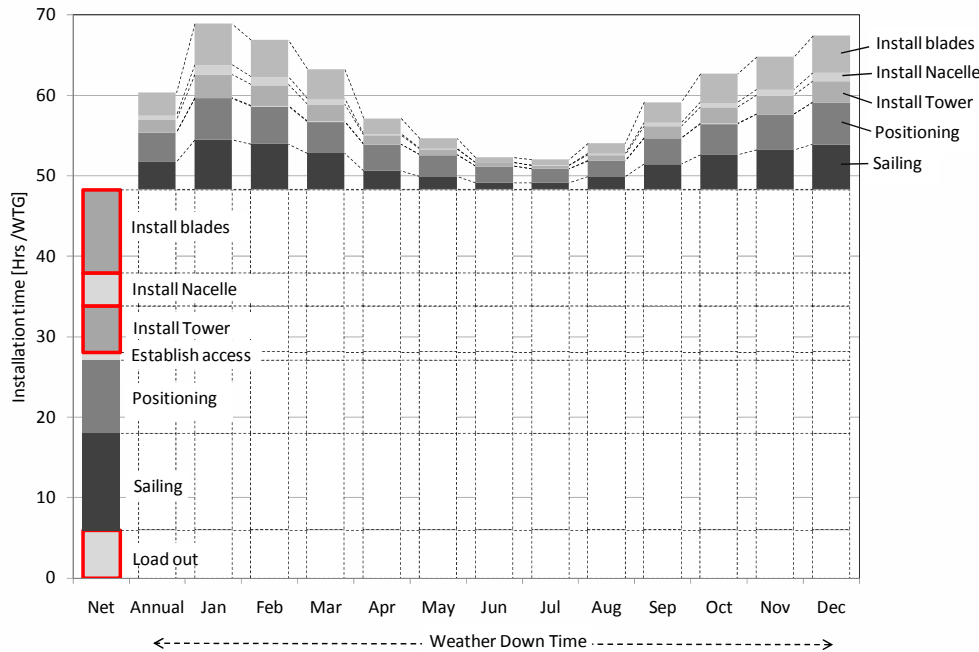
# Deck Space



- Blades take space
- Location of Towers
- Crane access behind Towers



# Lifting Capacity

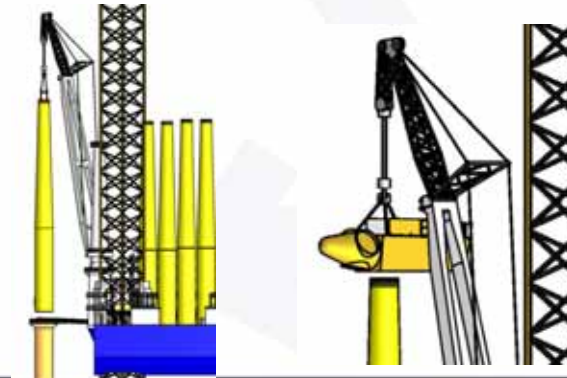


## Possible improvement

- More parts in 1 lift
  - 9 Blade pack, etc



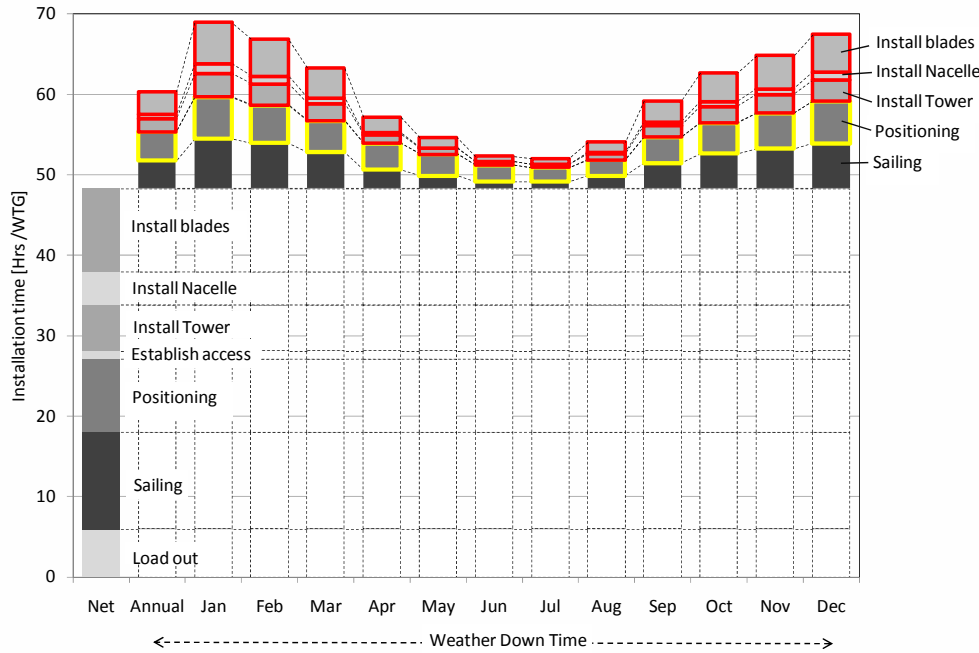
- More assembled WTG in 1 lift
  - 2 Tower sections in 1 piece
  - Nacelle + Hub in 1 piece, etc.



## Time related to Lifting Capacity

- Load out: 10% of total time
- Installation: 33% of total time

# Weather Criteria



## Weather criteria

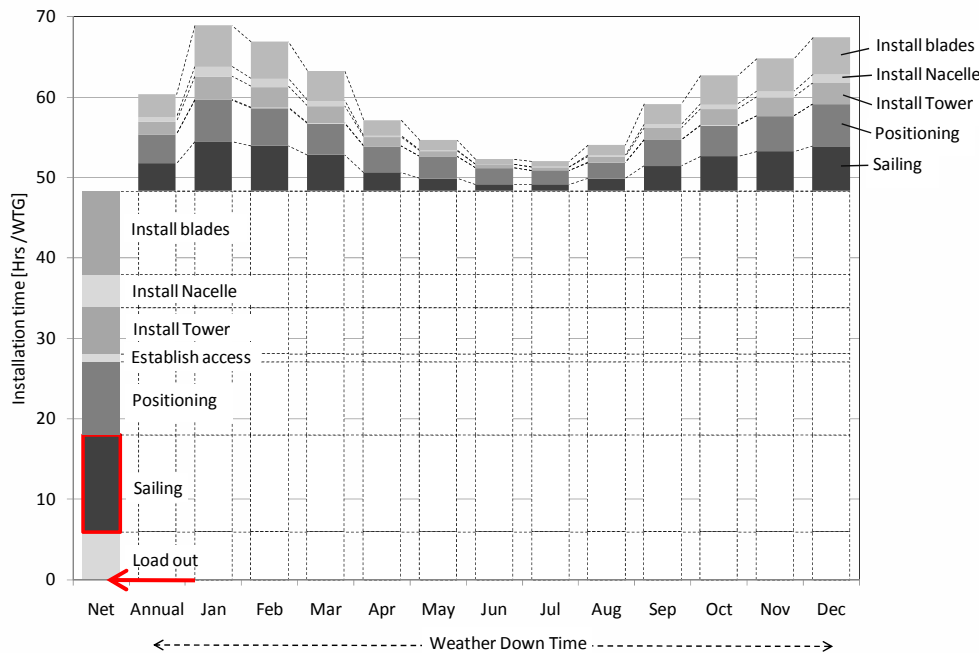
	Wind m/s	Wave		Current m/s
		Height m	Period sec	
Load out	12.0	-	-	-
Sailing	12.5	3.5	-	-
Positioning (incl. jacking)	14.5	3.5	6.8	1.5
		1.5 (Swell)		
Install Gangway	20.0	-	-	-
Install Tower	12.0	-	-	-
Install Nacelle	15.0	-	-	-
Install Blade	12.0	-	-	-

## Weather down time

- Annual 20% of Total time
- January 30% of Total time

## Possible improvement

- Limit season
- Weather independent method
  - Installation(lifting)
  - (Manual) Fastening
  - Jacking operation



## Possible improvement

- Increase process capacity(speed)
  - Deck space
  - Sailing speed, etc
- Avoid queuing
  - Following process > Leading process

## Caution!!

- Not too big process capacity
  - Operating rate could reduce...

## Time related to Logistics

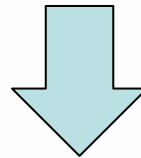
- Sailing: 20% of Total time
- Possible waiting before load out

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# Future Challenges

It is not a question **if** we are facing an increase in the offshore wind development.....

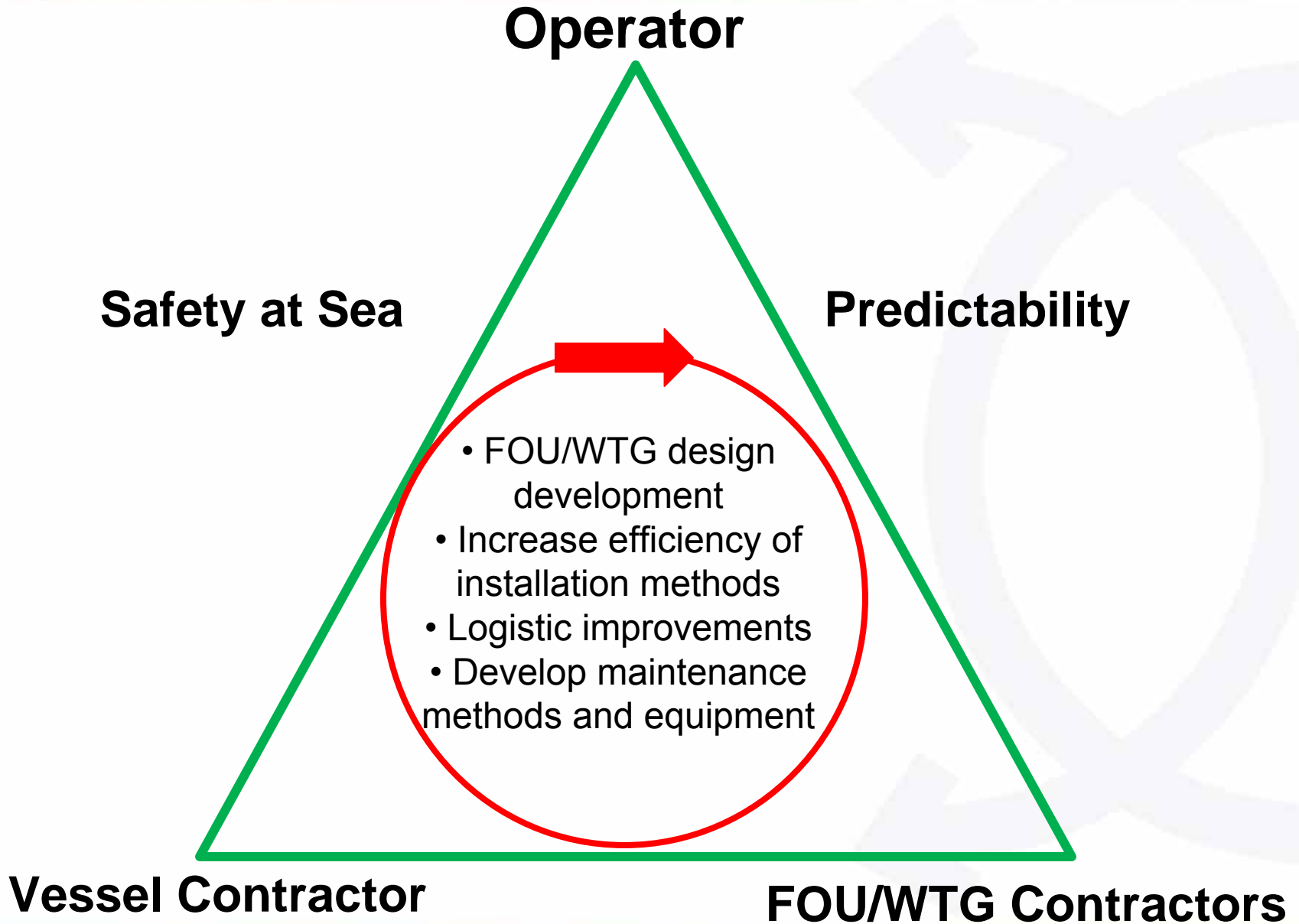
It is more the question of **how** to overcome the accelerated pace we will be facing the future challenges !



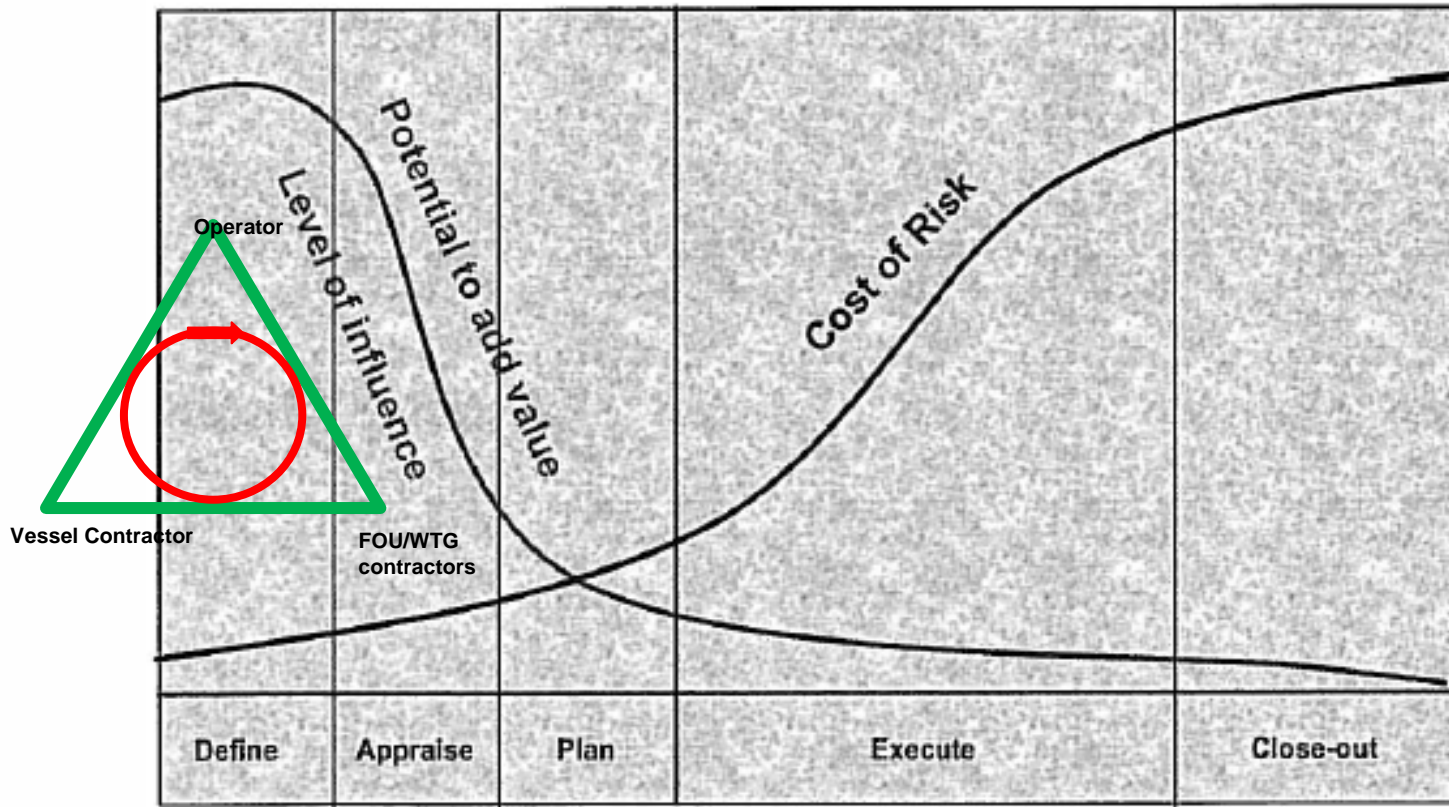
Financing  
**Competence and Skill**  
Production Capacity  
**Availability of capable installation vessels**

Source: Input from wind conferences in 2009/10

# Cooperation and Synergies



# Effect of early involvement



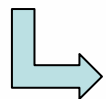
Involve all parties as early as possible when level of influence and the potential for added value are highest

# Different contracting strategies

- Offshore Wind vs. Oil & Gas has been more fragmented and different in the tendering procedures
- From strict EU-TED to direct negotiations
- Often has the vessel contractor been the last one in the tendering line – change emerging ?
- Installation capacity a bottleneck- ensure early involvement of vessel contractors.

## Multi-Contracting Approach

- Skilled, Competent, Experienced staff
- Sufficient resources in all phases from pre tender – during tender and project execution
- Emphasis on Contractual Interface
- Requires high level of technical and detailed tender process



Favored by the Operators who have an heritage from the Oil & Gas Industry

# Multi Contracting vs. EPC (I)

## EPC (I)

- Contractors take on ALL risk – higher sale price ?
- Less detailed invitation and tender process
- More fragmented and "multi options"
- Opportunity :
  - Steer development and contracting strategy
  - Join forces and provide "Turnkey Solutions"
  - "Compatimates" – strategically opportunities

↳ Often favored by the smaller Energy Operators

# Lessons for the Future

- The offshore wind industry is still “teething” and in a process of “learning by doing”  
It is vital to ensure its long-term health by streamlining and benchmark experiences.
- **Further** Utilize and Capitalize on “lessons learnt” from decades of offshore developments (Oil & Gas) – adapt to the logistical challenges in offshore wind !
- An industrial approach is required to develop competitive solutions for offshore wind farms. The products and the processes must be optimized throughout the entire value chain.

- How can offshore wind stand on its own two feet and become less dependent on subsidies ?
- Supply chain – "Compatimates" ?



Let us join our forces!



# Do not believe always what you think you see!



Source: Dr Mohr REpower

Thank you very much!

The logo for Master Marine features the word "MASTER" in dark blue, a stylized infinity symbol in dark blue, and the word "MARINE" in dark blue. To the left of "MASTER" are three horizontal red bars, and to the right of "MARINE" are three horizontal green bars.

**MASTER ∞ MARINE**

[www.master-marine.no](http://www.master-marine.no)