

#### Shippingforum

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**Fred. Olsen Windcarrier** 

**Fred. Olsen United** 

## Fred. Olsen & the Energy Sector



Building on 164 years experience from logistics, marine operations and installation



# European Market: Long Term Outlook (mid case)



- Strong investments in offshore wind dominated by UK short term
- Germany becomes the key market post 2013 with round 3 delays

1) Contingent on start-up of round 3 projects in the UK 2) Accumulated installed capacity 3) Estimated CAPEX per year

Source: Arkwright (EWEA, Morgan Stanley, Quest Offshore)

#### European Market: Looking to the Future



#### New Capacity in European<sup>1)</sup> Offshore Wind Farms



Will the industry continue to grow at such a fast rate?

And is that a wanted development?

1) Europe currently constitutes > 95% of global installed wind energy capacity

Source: Arkwright (EWEA, Emerging energy research)

#### **European Market: Risk Factors**



#### **Market Risks and Uncertainties**

- European recession
- The depth of financial markets investing in offshore wind
- Government Policies UK EMR & strike price, German grid issues
- Weak offshore wind economics compared to the falling prices for gas & coal
- Supply Chain Logistics capacity to scale up
- Grid Connection capacity and timing



- Costs have increased substantially; currently costing over the historical average of £140/MWh, driven by
  - Move to deep water sites
  - Jonger distances to shore
  - Reaching a threshold for yesterday's technologies and execution methods?
- DECC's target for offshore wind is £100/MWh by 2020 will be challenging, but is feasible





- Systematic sharing of experience
- New contracting forms
- New technologies
- Focus on project execution and logistics

Industrialization

## Fred. Olsen United: Integrated Value Chain



Taking a holistic approach to delivery through an integrated value chain







By controlling all main input factors, we can better manage and optimise the totality





# Are current foundation technologies at a threshold?



#### Monopile:

- "Industry standard"
- May be cheaper in limited water depths
- Issues with grouting and scour
- Noisy installation
- Less suitable in deeper waters
- Turbine size limitations



#### Steel jacket:

- Preferred concept for deeper waters and larger turbines
- Supply chain limitations
- Noisy installation
- Expensive to build and install



#### Fred. Olsen's Bucket Foundation

- Suitable for deeper waters and large turbines
- Cheaper than jacket to build
- Quiet and cost efficient installation
- Low life-cycle cost
- Easy removal

## High Expectations to the Bucket Foundation



# The Carbon Trust / Offshore Wind Accelerator Perspective

#### Installation

- Reduced vessel requirements, fewer offshore operations
- **a** No piling noise

#### Fabrication

Simple welds

#### Commercial

Fred Olsen end-to-end EPC model

























#### Vessels of the Next Generation





Brave Tern & Bold Tern primarily turbine installation vessels

- Length: 132m
- Hull Breadth: 39m
- Propulsion: Transit speed of 12 knots, DP2
- Water depth range: 7.5 -45m
- Crane: 800 tonnes at 24m
- Typical payload: 5300 tonnes



Seven off Bayard-class crew/service vessels .

- Crew: Highly qualified and purpose-trained crew Passengers: 12 persons
- Sea keeping: Hull optimized for sea-keeping and fine positioning
- Speed: 25 knots
- Cargo: Capacity of 8 tonnes



New, dedicated Foundation Installation Vessel on the drawing board

- Capacity to take up to 7 turbine bucket foundations
- Flexibility to install jackets & monopiles
- Installation in 2.5m Hs
- 1600 tonnes lifting capacity

## Typical offshore wind turbines





## Wind Turbine Generator size





## The start of offshore wind











#### Motions in crane tip not acceptable

![](_page_21_Picture_1.jpeg)

![](_page_21_Picture_2.jpeg)

### Equipment either too small...

![](_page_22_Picture_1.jpeg)

![](_page_22_Picture_2.jpeg)

![](_page_23_Picture_0.jpeg)

![](_page_23_Picture_1.jpeg)

![](_page_23_Picture_2.jpeg)

![](_page_24_Picture_0.jpeg)

![](_page_24_Picture_1.jpeg)

![](_page_24_Picture_2.jpeg)

![](_page_25_Picture_0.jpeg)

![](_page_25_Picture_1.jpeg)

![](_page_25_Picture_2.jpeg)

![](_page_26_Picture_0.jpeg)

![](_page_26_Picture_1.jpeg)

![](_page_27_Picture_0.jpeg)

## Wind Crew 1 (converted to windfarm use)

![](_page_28_Picture_1.jpeg)

![](_page_28_Picture_2.jpeg)

## Bayard class

![](_page_29_Picture_1.jpeg)

![](_page_29_Picture_2.jpeg)

# Bayard class

![](_page_30_Picture_1.jpeg)

![](_page_30_Picture_2.jpeg)

# The beauty and the beast

![](_page_31_Picture_1.jpeg)

![](_page_31_Picture_2.jpeg)

![](_page_32_Picture_0.jpeg)

![](_page_32_Picture_1.jpeg)

"Development cost has to be lowered by 30% in the next 4 -5 years".

Quote: Fred. Olsen, Shipowner, FRED. OLSEN & Co.

![](_page_33_Picture_0.jpeg)

# Thank You

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