Floating Foundations: Opening Up Deeper Waters In the U.S.

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A global energy company

Built on competence, technology and collaboration

Showing engagement for society

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Providing offshore wind to >1M homes

Playing to our strengths

Offshore wind projects currently in progress delivering >1100 MW, and potential for >5m homes

Attractive market

- Attractive risk/return
- Predictable revenue
- OECD countries
- High entry barriers

	Hywind demo	Sheringham Shoal	Dudgeon	Hywind pilot	Arkona	North West Europe: Dogger Bank	United States East Coast: New York	Japan / US West Coast: Hywind large scale
	In operation	In operation	In development	In development	In development	Consented	Auction won	
	2.3 MW	317 MW	402 MW	30 MW	385 MW	4 x 1.2 GW	1-2 GW	
	2009-	2012-	2017	2017	2019	2020-	2024-?	

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The Hywind Concept

Proven technology in a new setting

- Simple spar-type substructure
- Standard offshore wind turbine
- Conventional 3-line mooring system
- Blade pitch control system for motion damping
- Suitable for harsh conditions

Demo → Pilot Park → Large parks

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Hywind Demo Experience

- In operation since 2009
- Located 10km off Norwegian coast at 600ft water depth
- Produced 55 GWh since start-up
- Production as good as or better than other 2.3 MW Siemens wind power turbines
- Experienced storms with wind speed over 44 m/s and maximum wave height of 60 ft

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Realising the Hywind Scotland pilot park

- Investing around $ 300 million
- Owners:
  - Statoil 75%
  - Masdar 25 %
- 60-70% cost reduction from the Hywind Demo project in Norway

- Installed capacity: 30 MW
- Water depth: 3 – 400 ft
- Avg. wind speed: 10.1 m/s

- Average wave height: 6 ft
- Export cable length: ~20 miles
- Operational base: Peterhead
- Start power production: 2017

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Main Characteristics

- Turbine: Siemens SWP-6.0-154
- Steel Spar Substructure
- Mooring bridles & mooring chains
- Suction anchors
- Offshore cables – dynamic and static
- Onshore Substation

- Total Displacement: 11 500 tonnes

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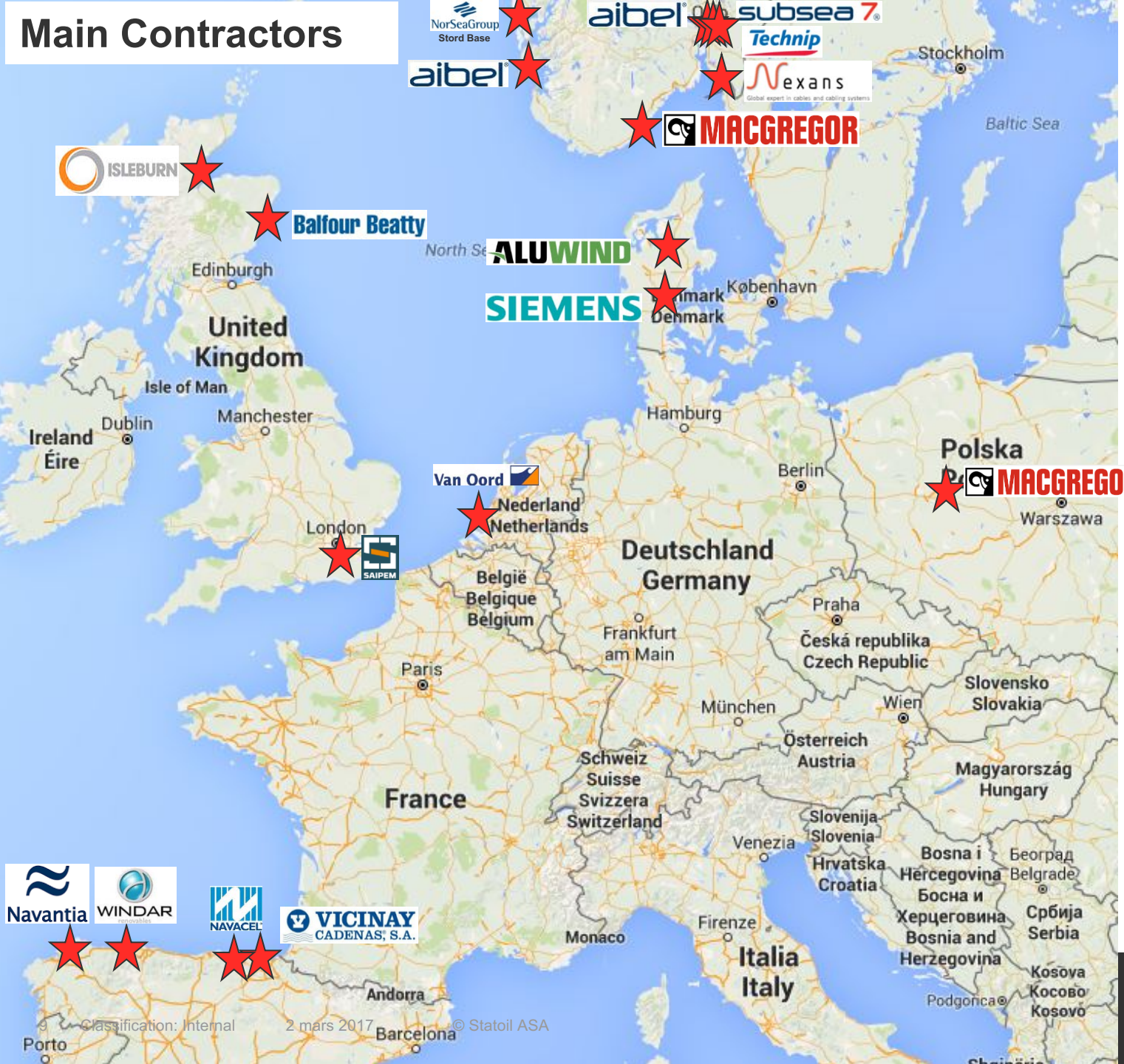
Main Contractors



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Hywind – Assembly methodology

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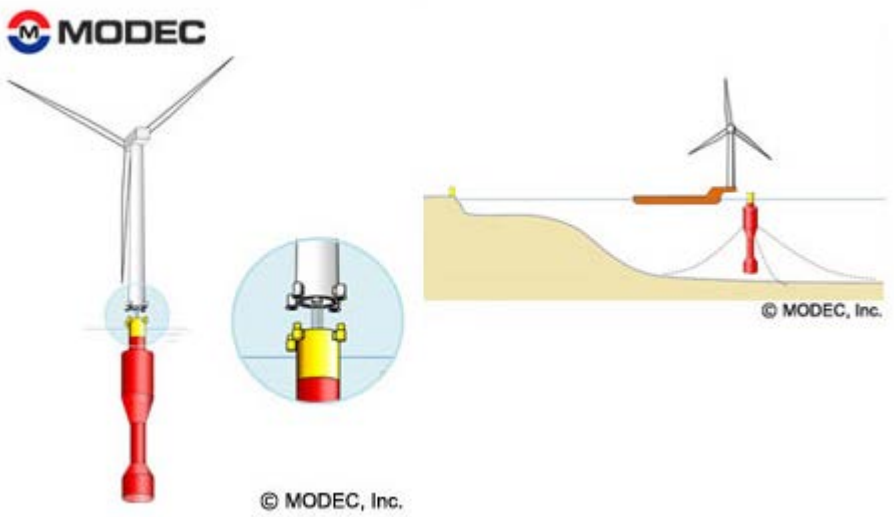
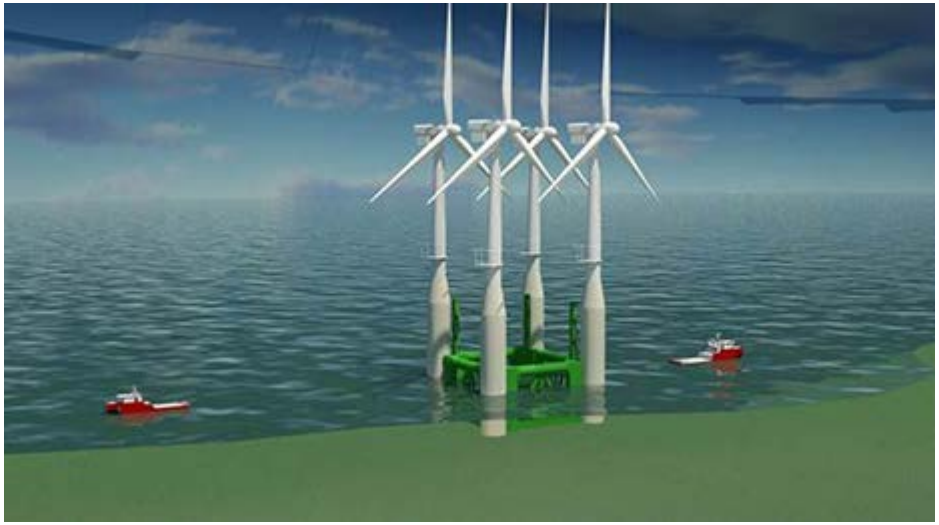
Challenges – Technical

- Main challenges for Hywind installation
  - Water depth
  - Waves and swell during assembly
- Alternative installation methods under consideration





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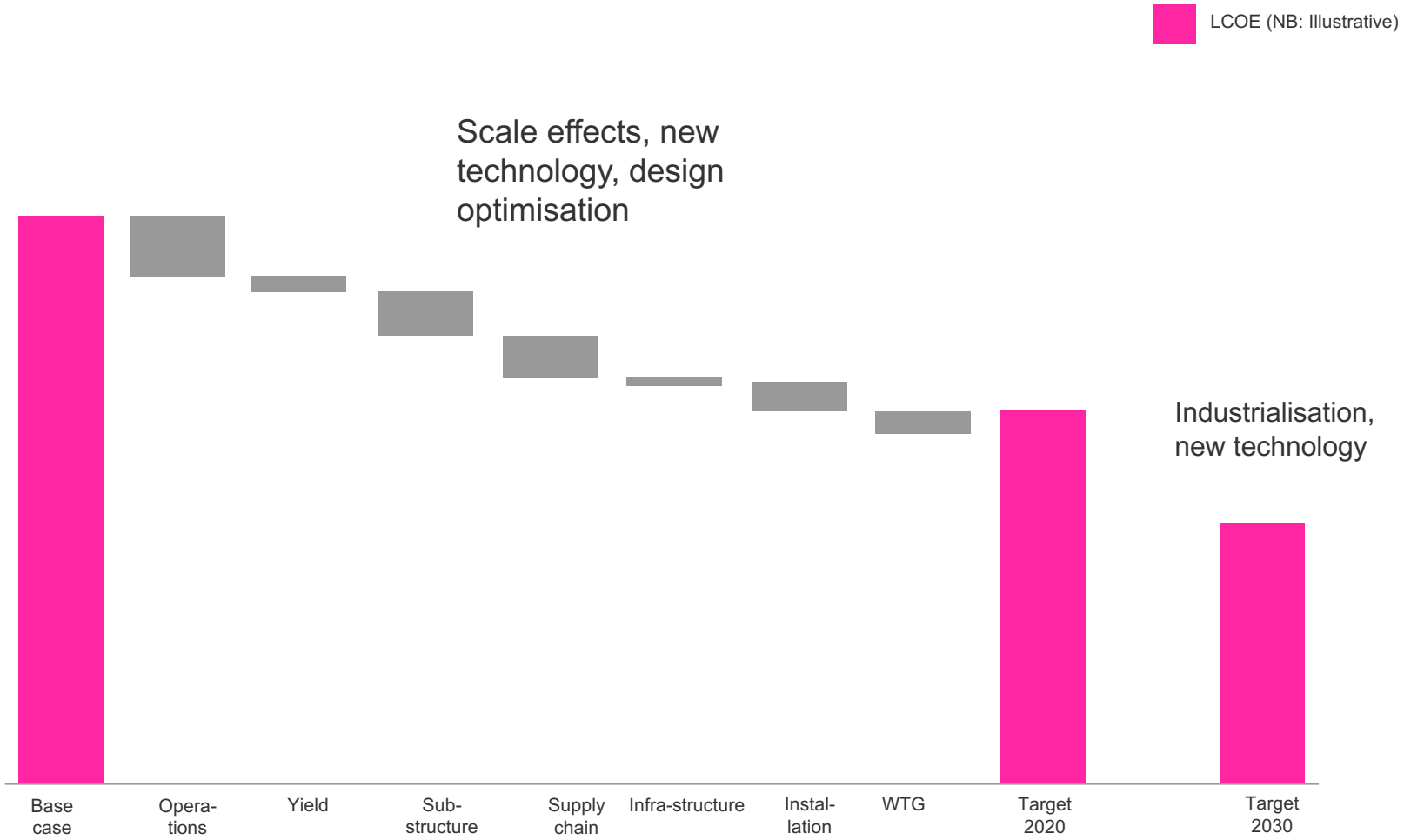
Challenges - Bringing down the cost

Cost reduction of 40-50% by 2030 a realistic target



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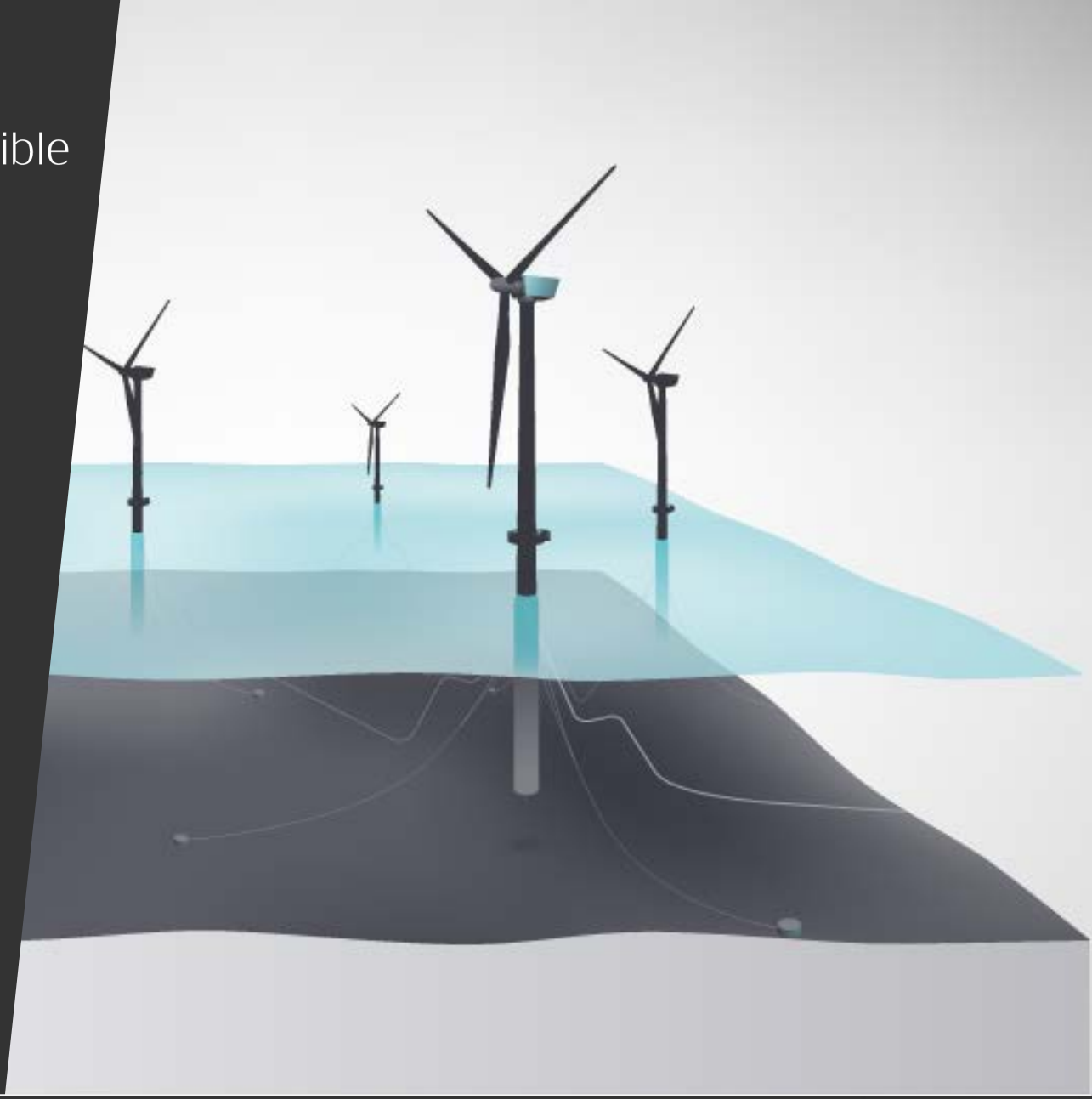
Statoil. The Power of Possible



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