

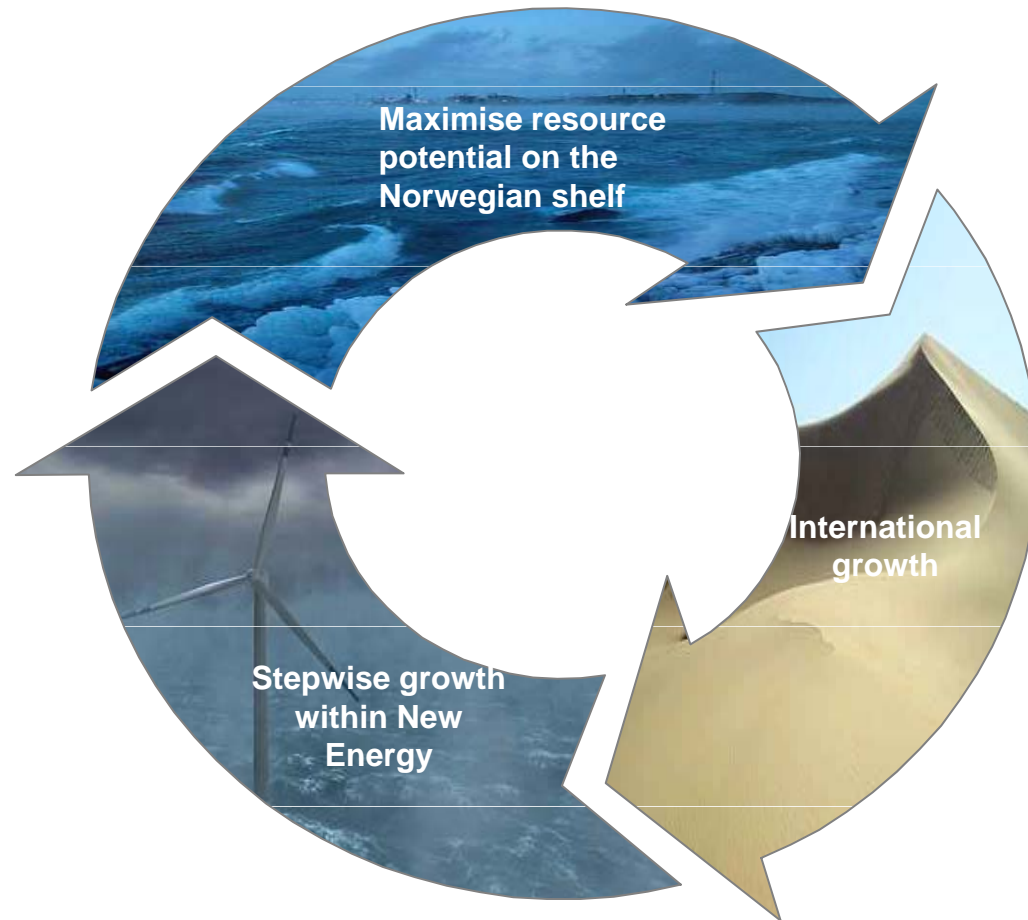


Statoil

*HyWind – A success story –
A catalyst with Access as an example*

Trondheim 21.01.2011

Statoil`s threefold strategy



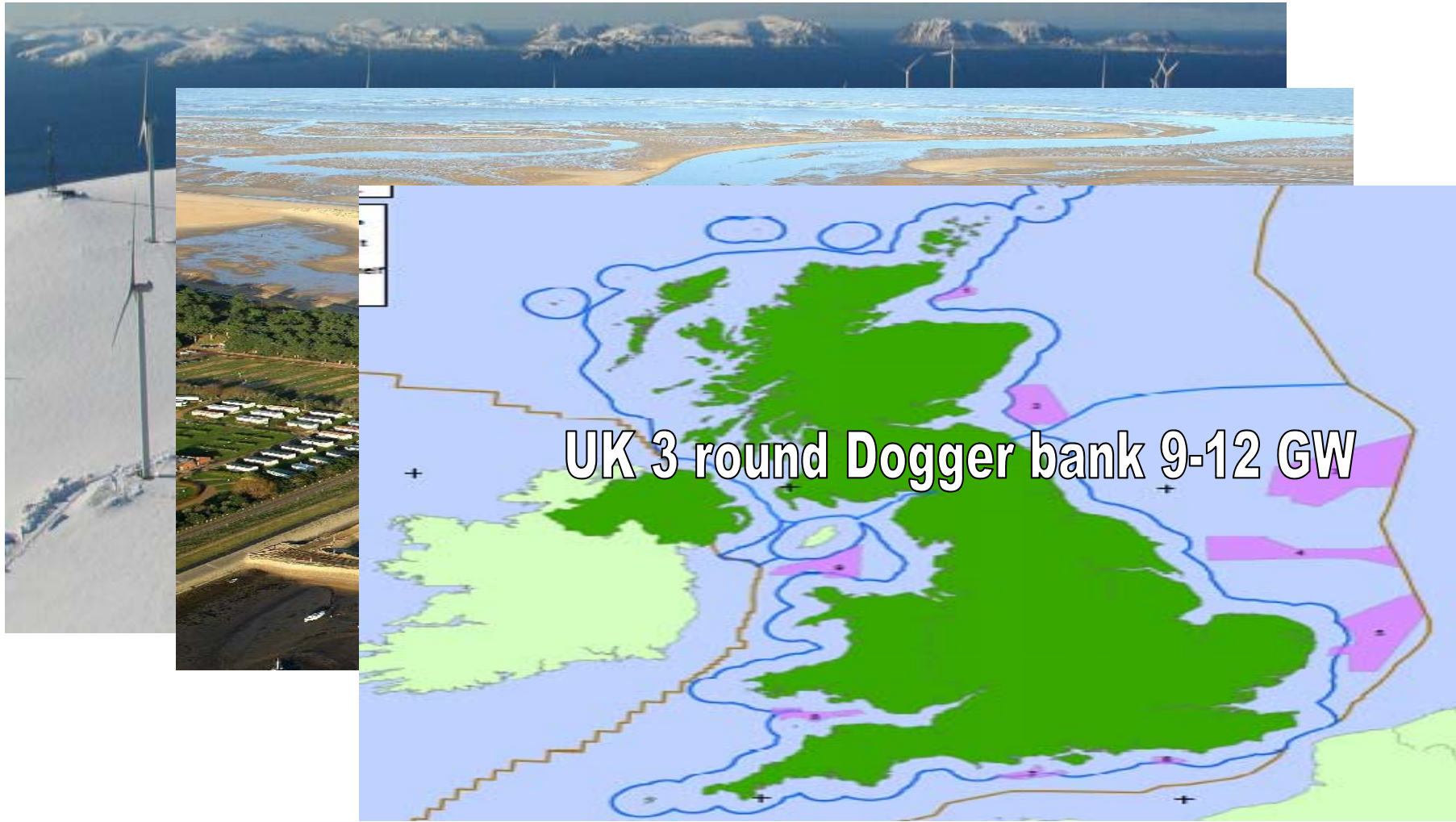
Harsh environment

Deep water

Heavy oil

Gas value chain

Building our Competence



Hywind – slender cylinder concept

- Decision to invest was taken in May 08
- Experience and knowledge from the petroleum sector have been essential to enhance concept

Partners/Contractors

- Siemens
- Technip
- Nexans
- Haugaland Kraft
- Enova

Onshore on quay Stavanger

- Preassembly of tower, nacelle and rotor
- Turbine, tower and blades assembled



Lift of upper tower and nacelle on 13 May 2009

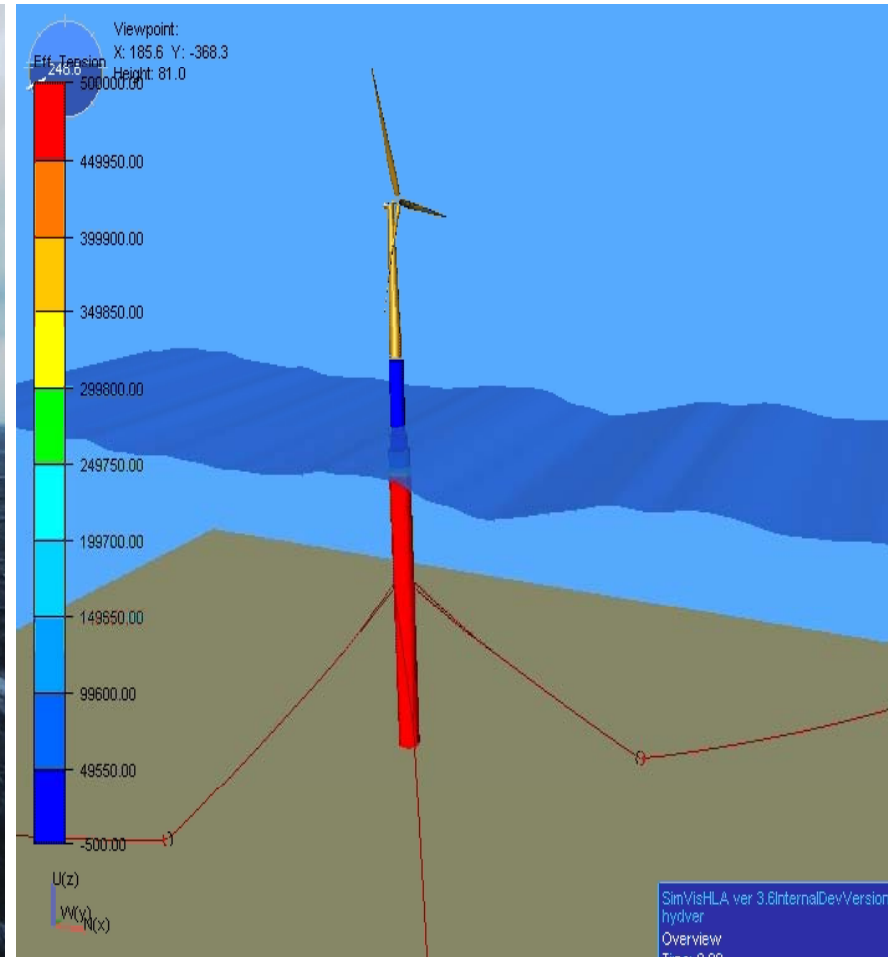




Hywind – Status after one year of operation

Hywind – opens new markets

A game changing technology, qualified?



One year of operation – The Hywind concept is qualified

- Production is as good as or better than other 2.3 MW Siemens wind power turbines
 - Loads factors above 40 %
- Wind turbine has performed well. No drawbacks from being installed on a floater
 - Less alarms than anticipated
- Access and maintenance equal to other offshore wind installations
- All technical systems are working well



System integrity is verified

All sub system inspected

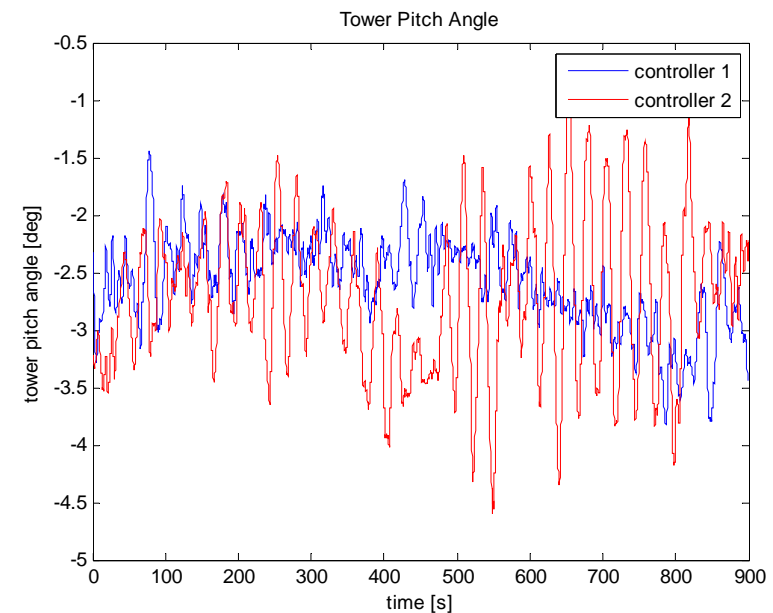
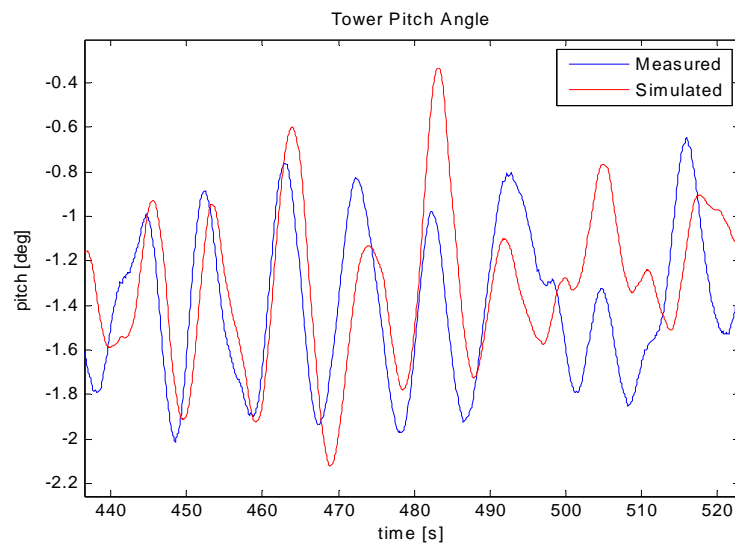
- Mechanical systems
- Electrical systems
- Alarms
- Temperatures
- Oil samples



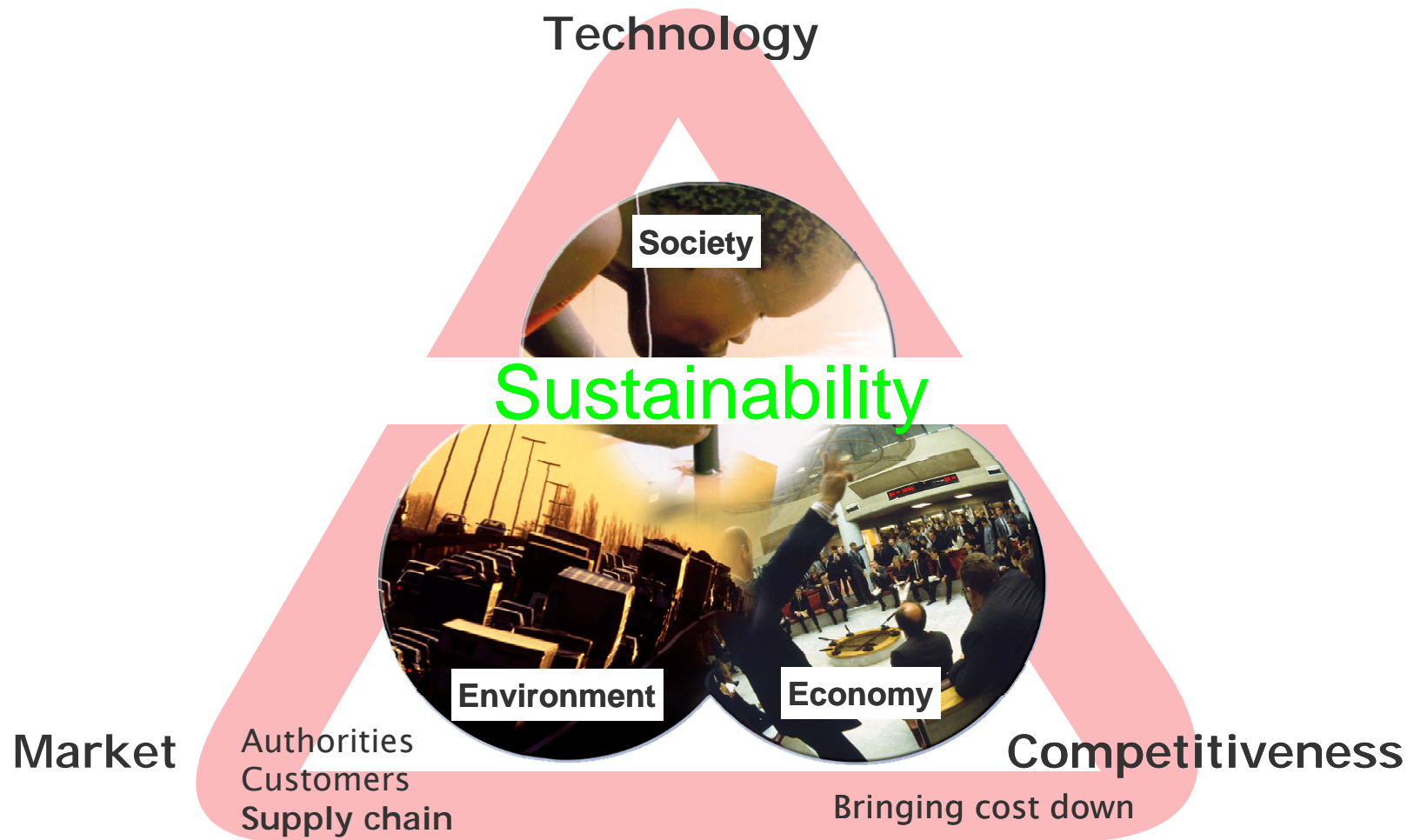
- The Hywind movements has proven not to be an issue for the system integrity

Verification of our structural load model

- The models simulate the motions and the structural loads which we control with different regulators
- We have tested two regulators working differently towards the structural loads and which have been used as important components in the cost and design optimization



Bringing Wind Power into a new era (floating) is about working along 3 axis

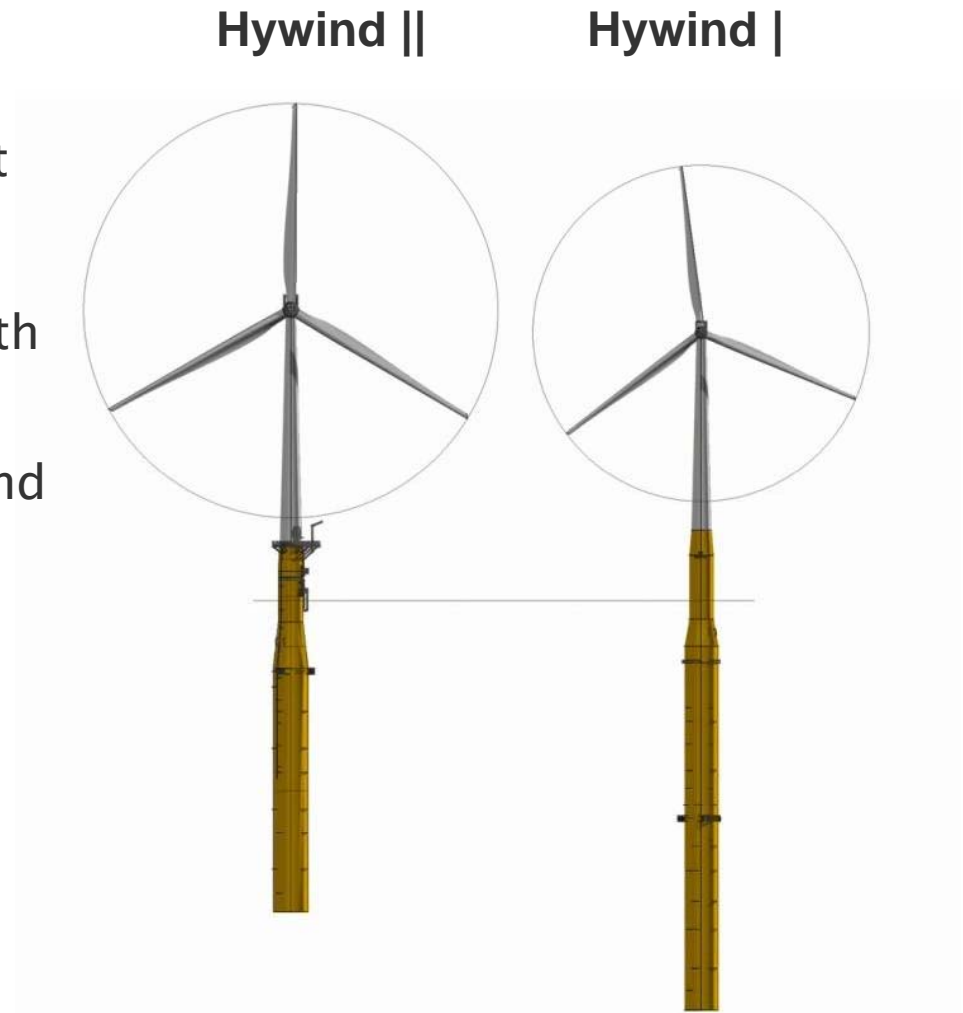


Focus areas bringing cost down

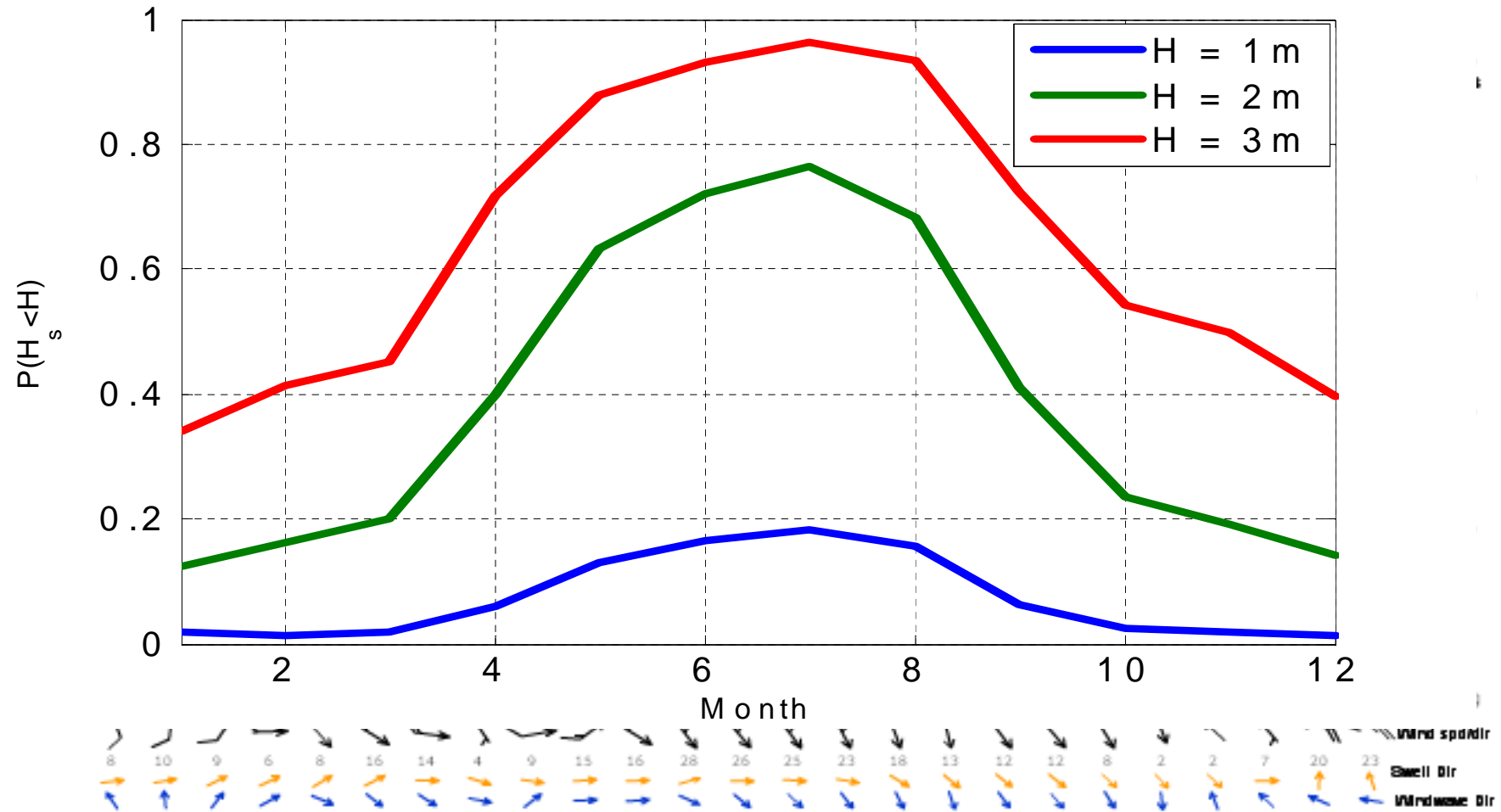
- **Turbine** – Close cooperation with suppliers to reduce unit costs, bring weight down and increase reliability.
 - Create believe in future markets
- **Marine operations** – Utilize established routines and experience from our offshore activity, working together with new and established suppliers
 - Active and demanding customer
- **Sub-structure** – Optimizing within Hywind patents and design
 - Our main task

Hywind II will have a shorter design and larger turbine

- Conservative design for Hywind pilot
- WTG weight sensitive
- Large scale park cost comparable with bottom fixed
- Focus on commercialization of Hywind technology



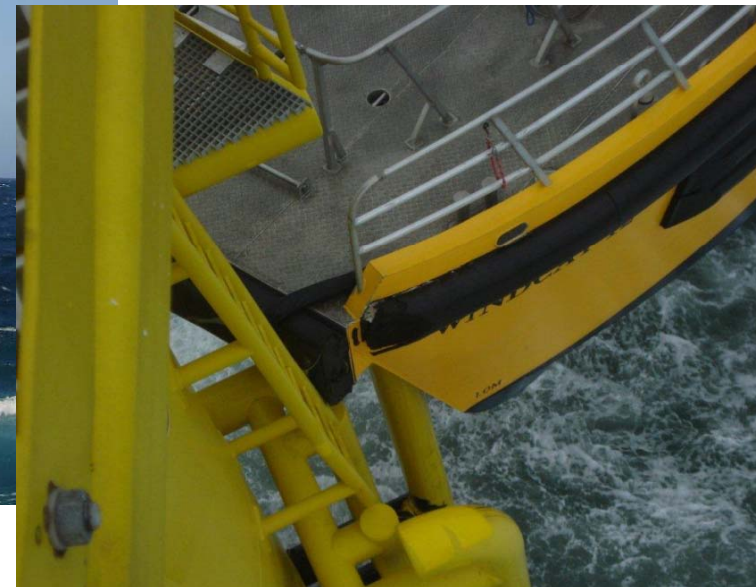
Access challenges



Fob Trim



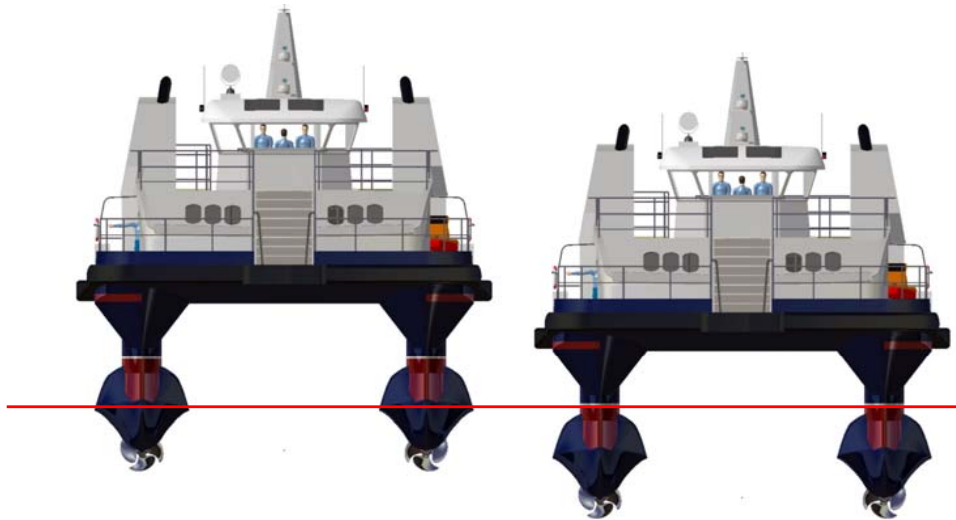
Access challenging



Buddy



FOB Swath



1. Improve access and utilization:
Operate in SWATH MODE (Small Waterplane Area Twin Hull) in up to 3 m. significant wave heights and in high sea swells;
2. Reduce fuel consumption, 10 liters per nautical mile at 25 knots;
3. 30 knots as top speed and 25 knots as service speed;
4. Improve passenger comfort for 36 passengers;
5. Improve flexibilities: Shallow water, DP, Crane, Additional boat, etc.
6. Improve safeties;

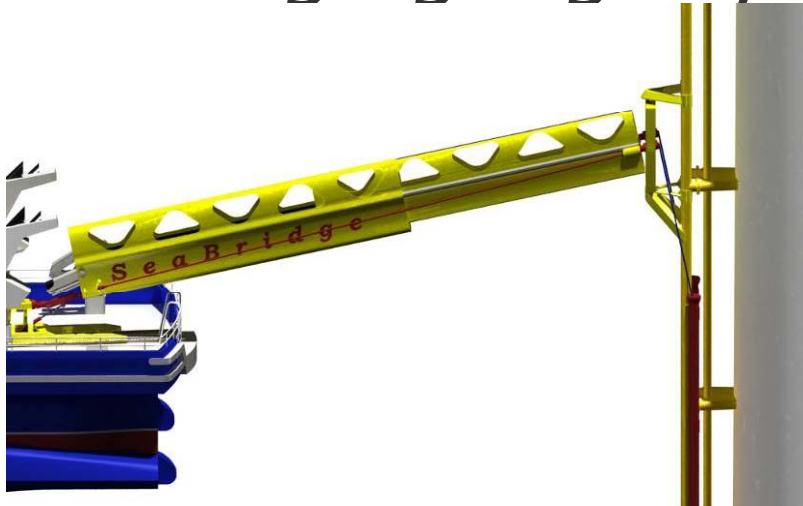
FOB Swath seatrials



Gangway by Undertun Industri

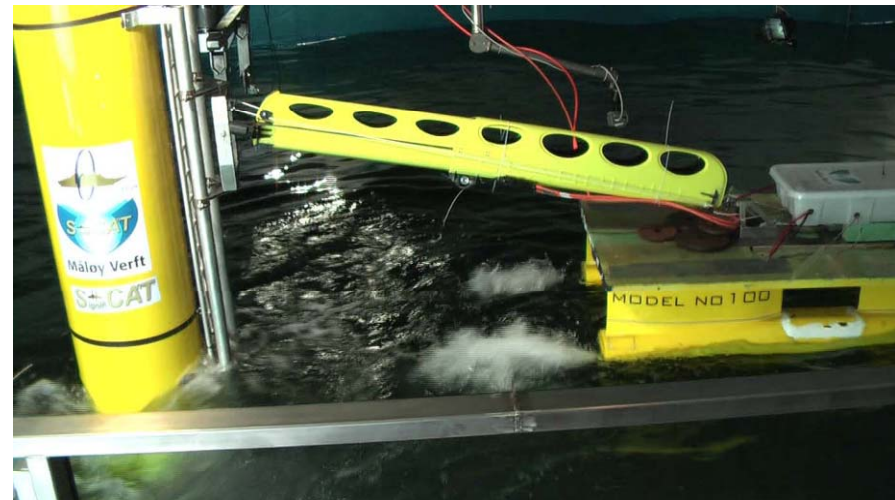


SeaBridge gangway concept by Brothers AS



The SeaBridge concept consists of three main units:

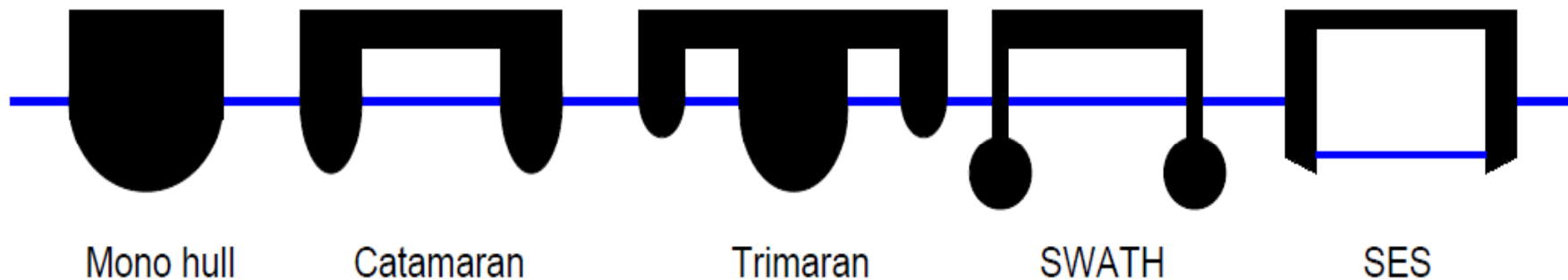
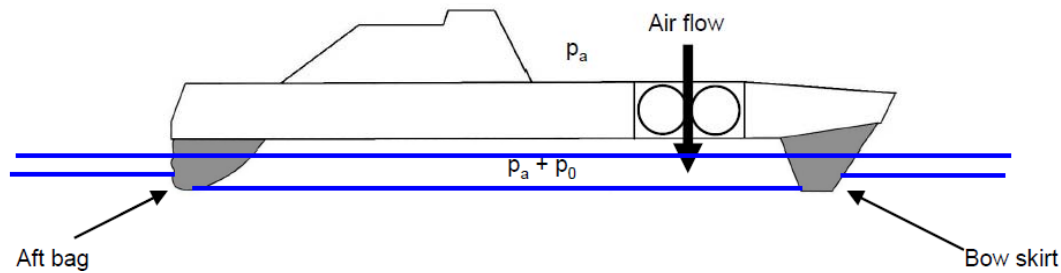
- Gangway
- Docking station
- Universal joint/towing point



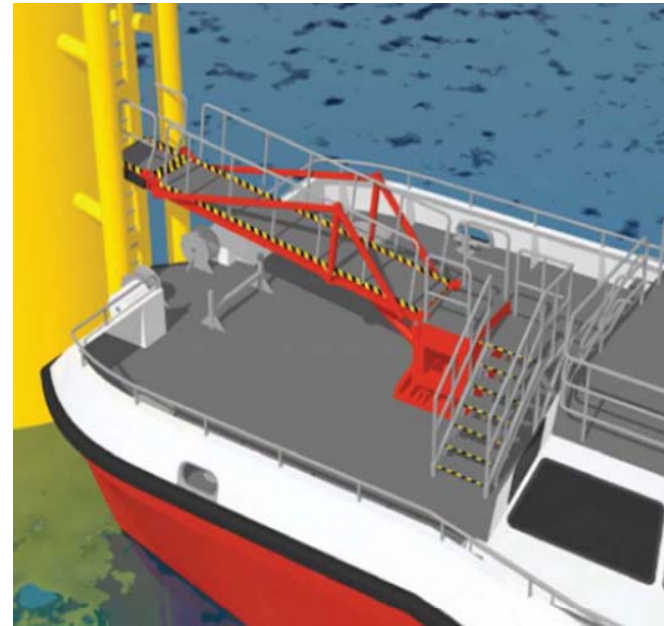
SES Concept by Umoe Mandal

Air supplied to cushion by centrifugal lift fans

- Increasing the air cushion pressure relative outside atmospheric pressure
- Typically 80% of lift force from air cushion (20% from hull)

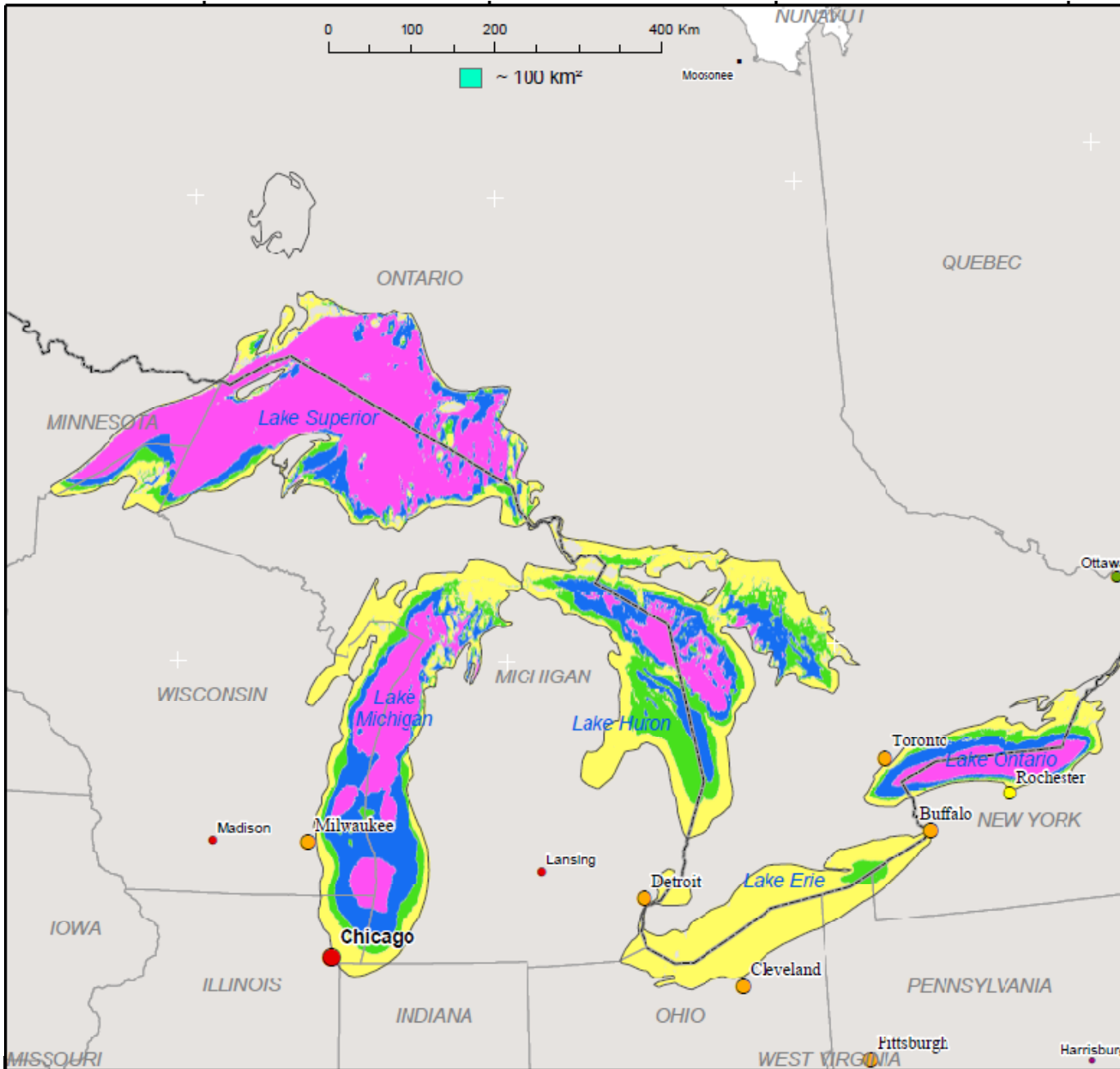


Access systems



Markets

- Initial markets
 - Scotland
 - US
 - East coast –Maine, Great lakes
 - Norway
- Next phase
 - Asia –Japan
 - Spain/Portugal - Mediterranean
 - Greece, Egypt, Malta, France, Korea, Turkey, Brazil, Italy
- Third phase
 - South America, New Zealand, South Africa



Classified depth / Great Lakes



StatoilHydro Offshore Wind Development	
Figure / Drawing Title:	
Depth Class Distribution / The Great Lakes	
Drawing Number: HY_US_GL_Depthpdf	
Rev 1	Date: 18/08/09 By: LIR/QC:
Scale: 1:6 500 000	
Datum: WGS1984	Proj.: UTM Zone 16N

Great Lakes

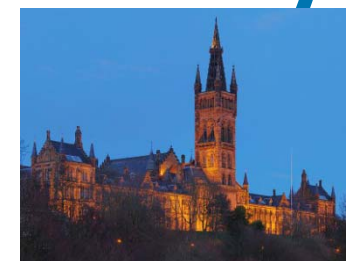


Scotland/Norway – A Marine Renewable Axis

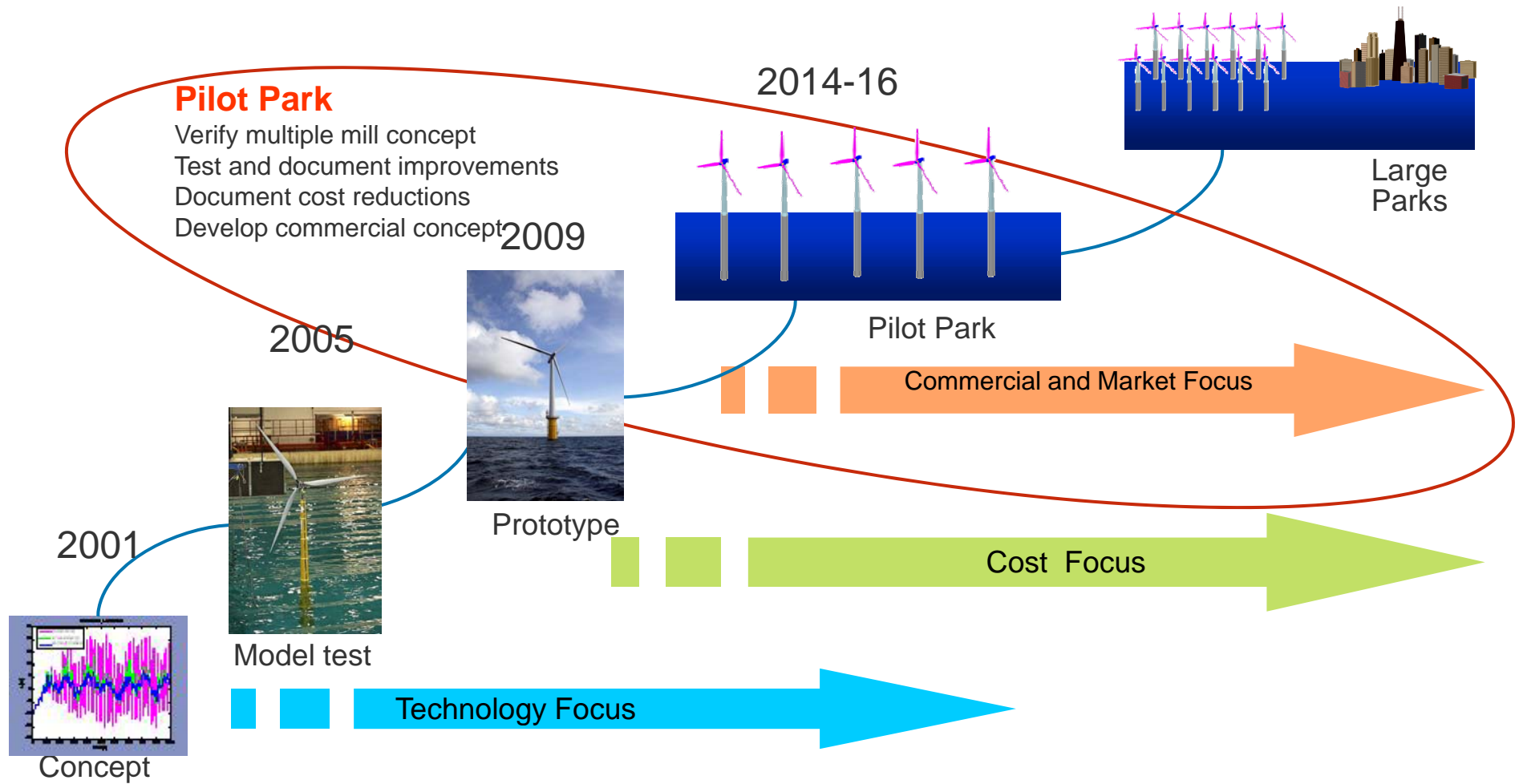
Sustain Statoil's leading position in offshore technology development

Develop an attractive arena for Marine Renewable business

Projects near home with potential for integration with core activity



From Idea to Commercial Concept



Thank you for your attention

