



Statoil

Offshore wind going forward – Technological challenges and opportunities

Jan-Fredrik Stadaas

Head of Marine Renewable Technology - Statoil

Classification: Internal 2010-12-13

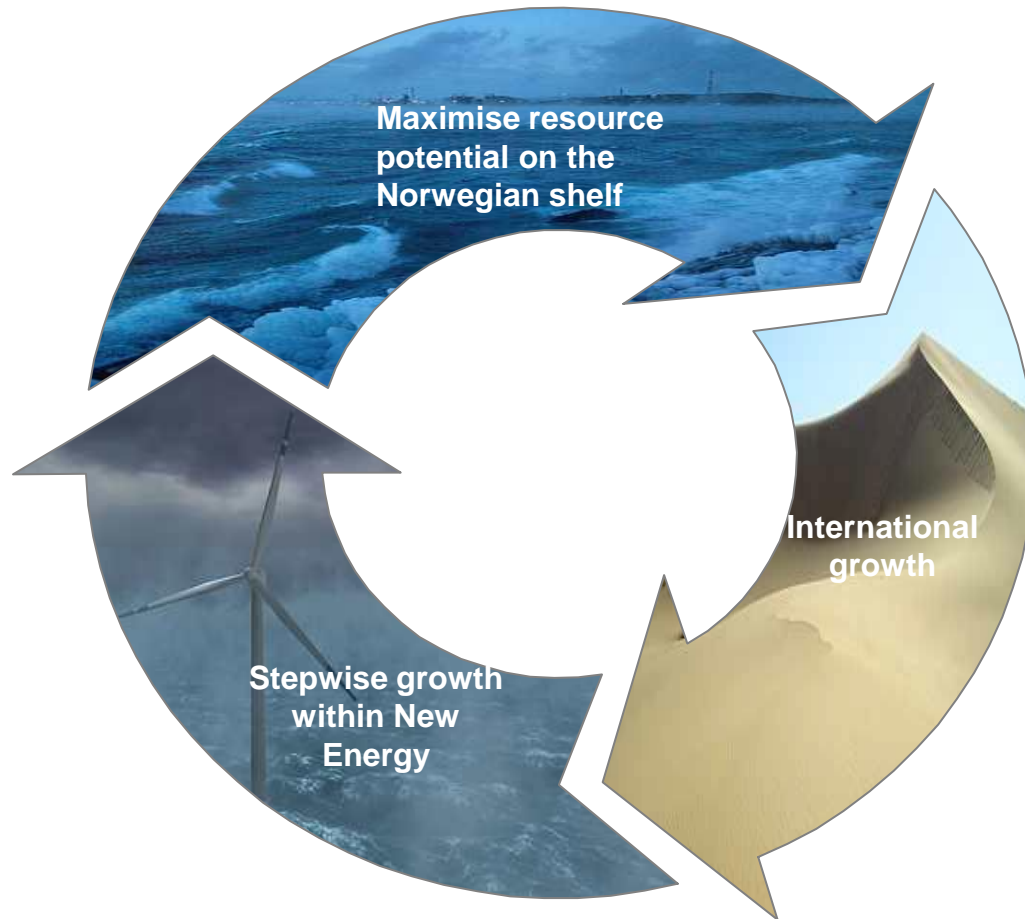


Our business environment



- Competition for access to oil and gas resources is sharpening
- Demand for energy increasing due to population growth and higher standards of living
- The climate change and the need for reduced emissions
- Oil and gas industry impacted by the economic turbulence

Statoil`s threefold strategy



Harsh environment

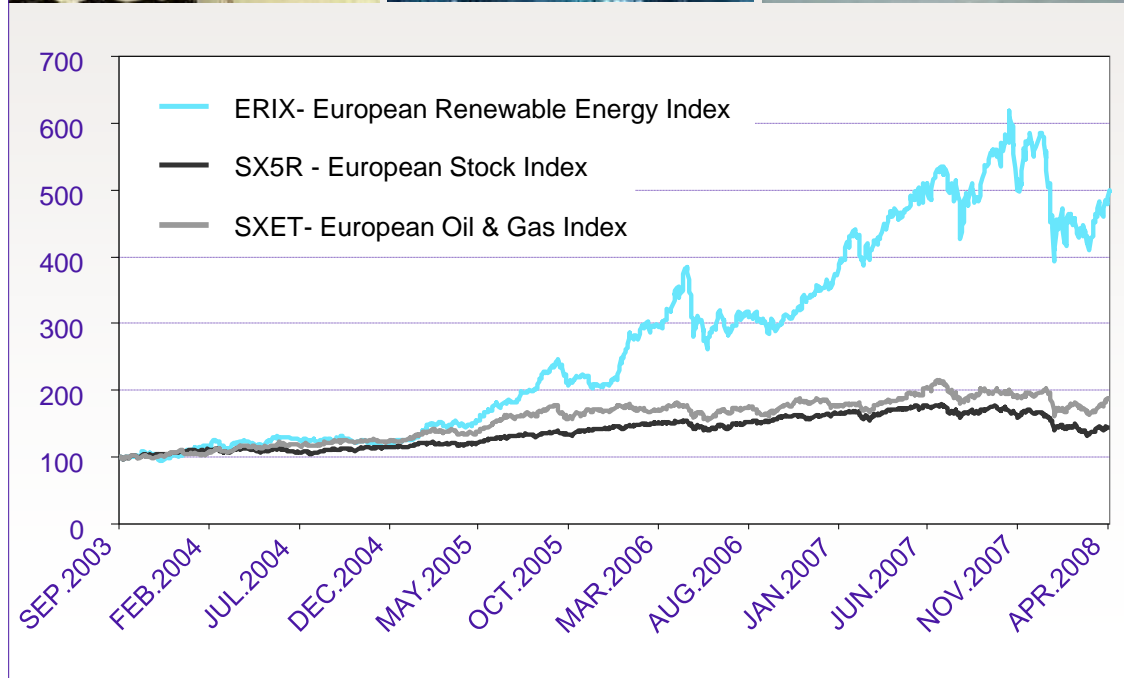
Deep water

Heavy oil

Gas value chain

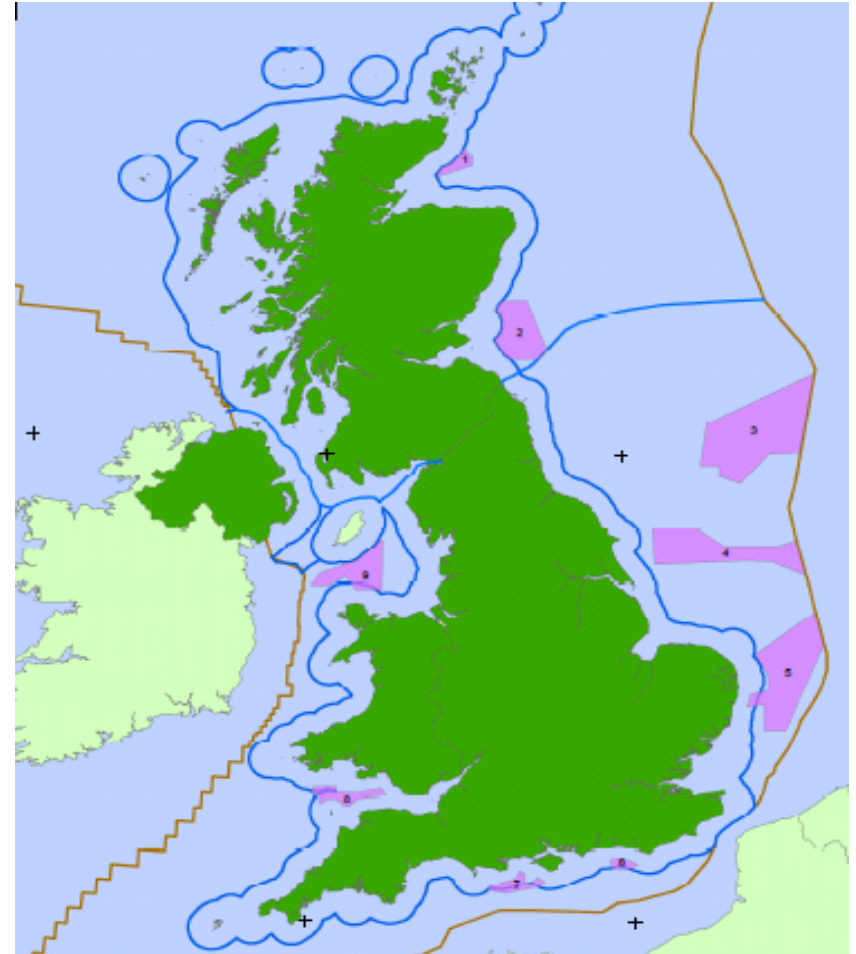
Putting sustainable energy into action

- Using our capabilities and positions to build substantial and profitable business in:
 - Wind and offshore renewables
 - Carbon management (CCS and Kyoto credits)
- Exploring positioning in wave, tidal, hydrogen, solar and geothermal, mainly based on technology ownership



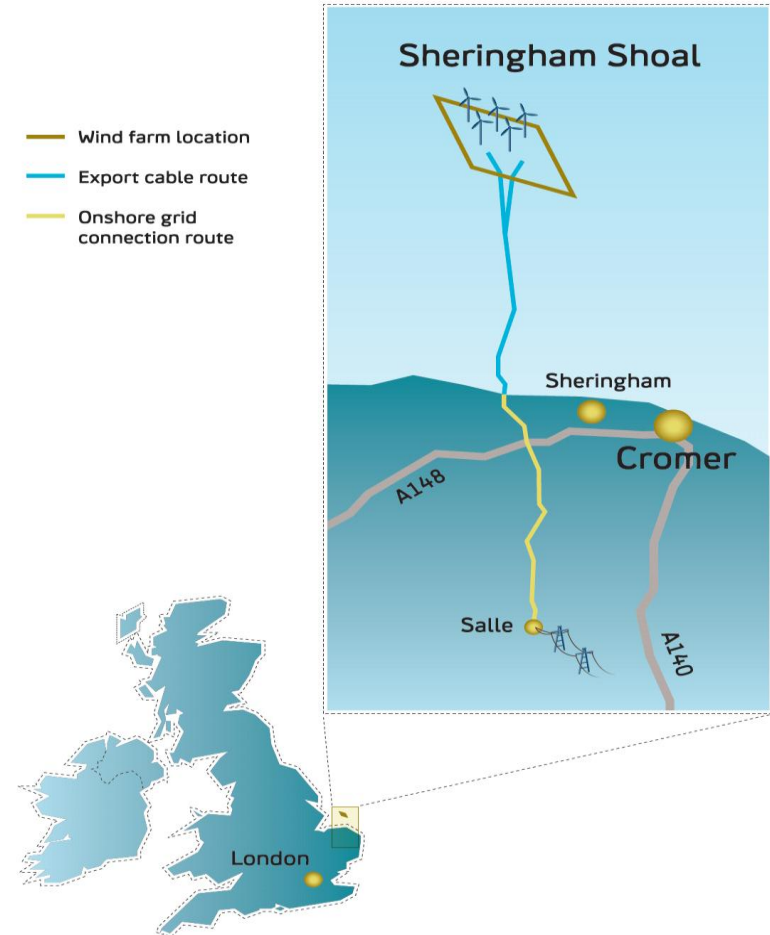
UK is committed to offshore wind

- Licensing rounds for offshore wind
 - R1 (2001): 1.5 GW
 - R2 (2004): 7.2 GW
 - R3 (2010): >25 GW
- Green Certificates (Renewable Obligation Certificates)
 - 20 years from start of production
 - by law
- EU obligation (Directive on Renewables) has led to a UK national plan:
 - 30 % of all electricity generation to come from renewables by 2020
 - most of it from offshore wind



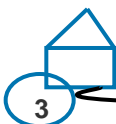
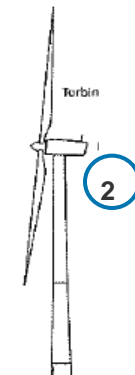
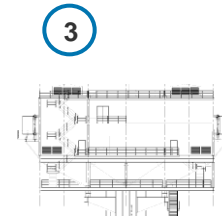
Sheringham Shoal – a large offshore wind farm currently under construction

- **NOK 10 billion investment:** 317 MW capacity, annual production of 1.1 TWh, Financial investment decision 2009.
- **Scira Offshore Energy Ltd** owned by Statoil and Statkraft (50/50)
Statoil is the operator of the development and construction phase
- **Operations and Maintenance** by Scira:
To build on wind relevant best practice from offshore O&M and Statkraft best practice from onshore wind farms and power plants

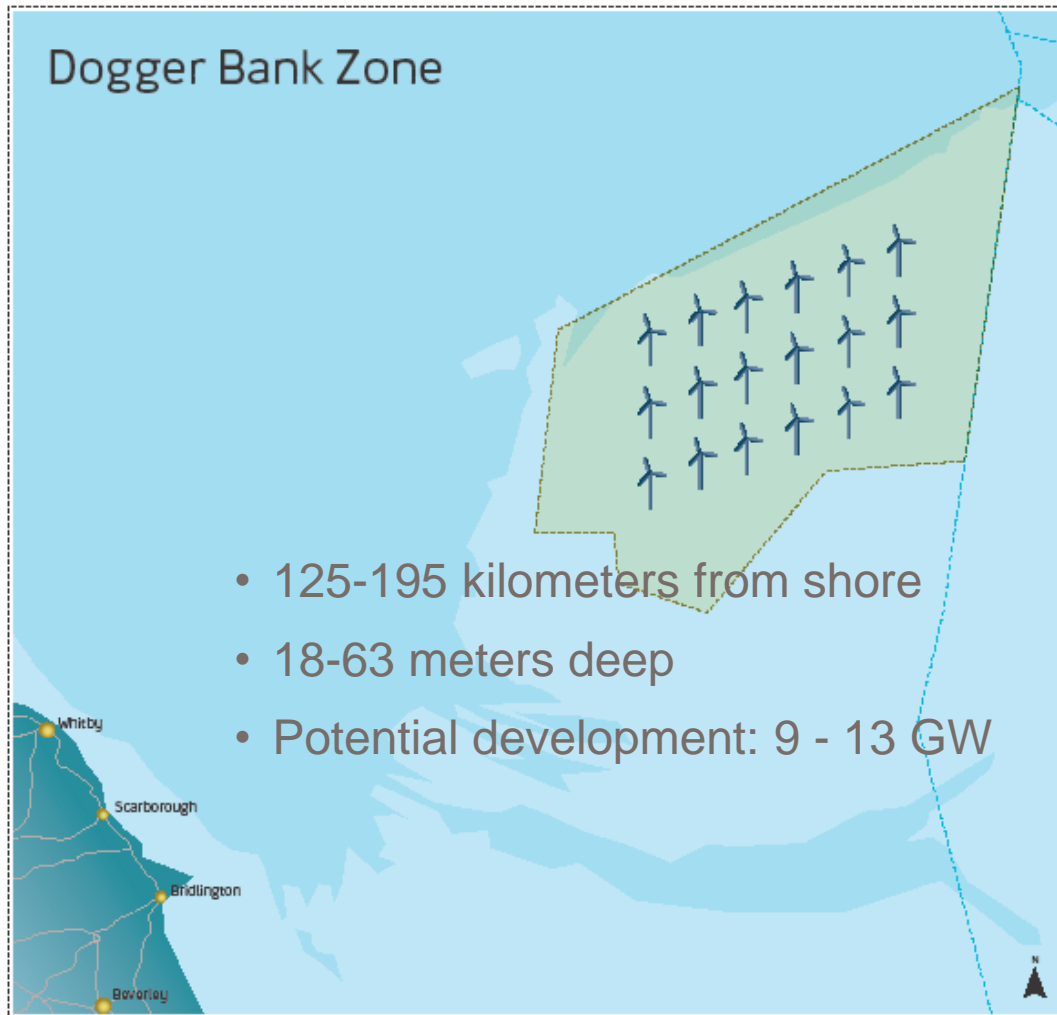


Contract strategy

| Item | Contract type |
|---|---------------|
| 1 Foundations, 90 pieces | EPCI |
| 2 WTGs, 88 pieces | PO |
| 3 Substations, 2 offshore and 1 onshore | EPCI |
| 4 Infield cables | EPC |
| 5 Export cables | EPC |
| 6 Onshore cables | EPCI |
| 7 Installation of WTGs | EI |
| 8 Installation of Substations | EI |
| 9 Installation of infield cables | EI |
| 10 Installation of export cables | EI |



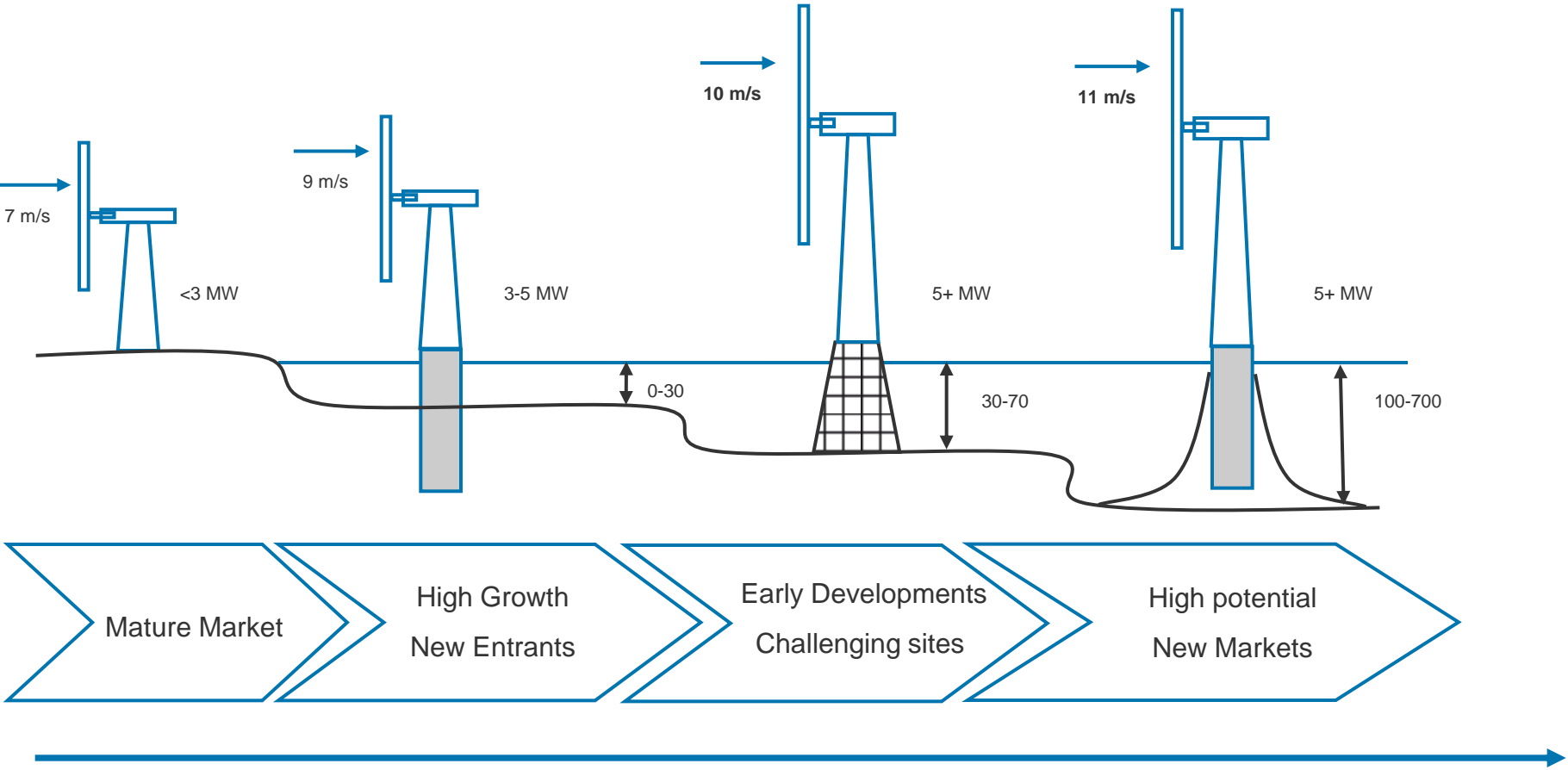
Dogger Bank – the next great challenge



- Awarded early 2010 to the Forewind consortium (RWE, Scottish & Southern Energy, Statkraft, Statoil)
- Several projects to be developed to consent
- No obligation to invest
- Investment decision on first development anticipated 2014
- Will require technology development, supplier diversification and competition

Dogger Bank Modified Round 3 Zone
 Deeper than 50 m
 Shallower than 50 m
 Offshore International Boundaries

The wind technology development ambitions



Challenges has to be solved



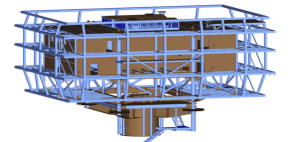
Lighter, larger, more robust turbines, and more competition



Cheaper foundations and more efficient installation for deep waters



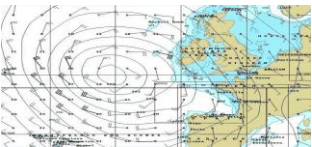
Operations solutions for lower costs and improved safety



Reduced grid losses

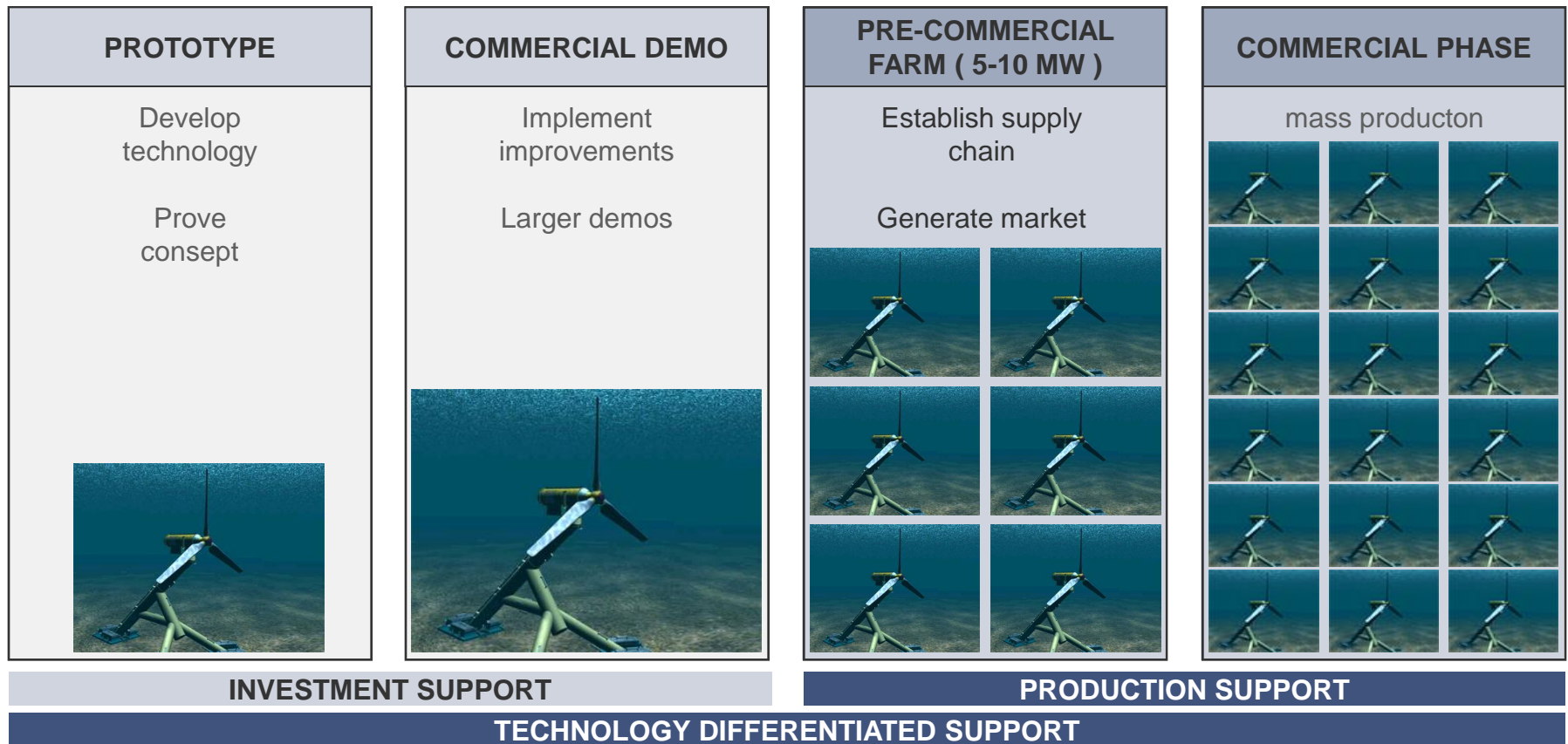


Power balancing

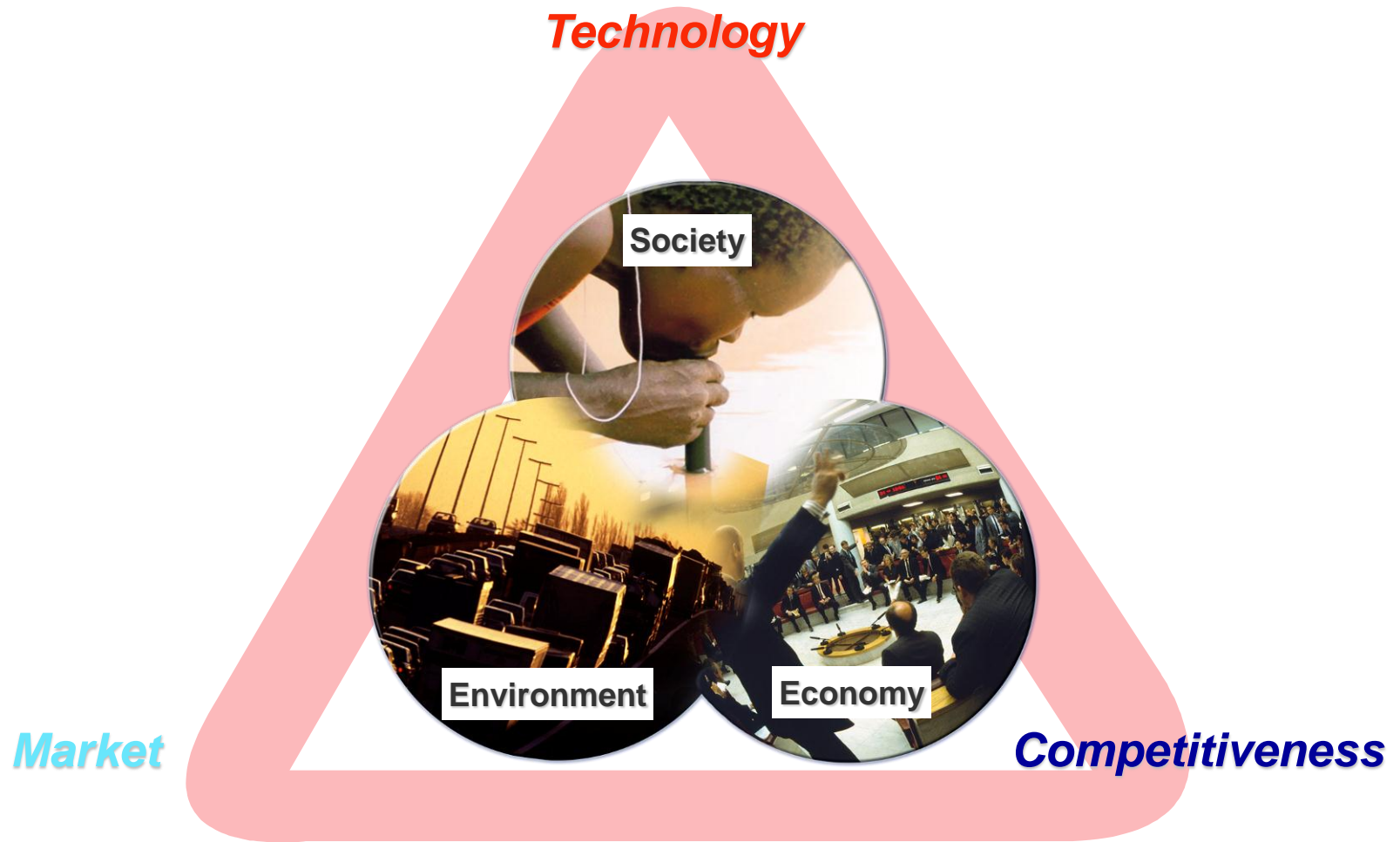


Optimal weather and production prediction for power sales

The path to commercial renewable energy technology



Bringing Wind Power into a new era



A large offshore oil rig is shown in the middle of the ocean. The rig is a complex of steel structures, including a large crane that extends high into the sky. In the foreground, a group of five workers in bright orange safety suits and white hard hats stand on a metal platform. The sea is a deep blue with white-capped waves. The sky is overcast and grey.

Thank you

Presenters name: Jan-Fredrik Stadaas

Presenters title: Head of Marine Renewable Technology

E-mail address: Jastad@Statoil.com

www.statoil.com