

# Statoil's experiences and plans for generation of offshore wind energy Morten Nesvik, Project Leader Marketing - Processing - Renewable Energy Gdansk 4 September 2013

## Our renewables strategy: Creating value from superior offshore experience

Leveraging Statoil's existing core competencies, we focus on:

Offshore wind Carbon capture and storage



## Onshore Norway wind portfolio divested

- Haugshornet •
- Lutelandet •
- Utsira •
- Karmøy •
- Tellenes •
- Fruknuten •
- Håskogheia •





Historic:

- 440 MW in Finnmark, Statoil owned
- 415 MW in Mid-Norway, all 50% JV
- 200 MW in southern Norway, mostly Statoil controlled

### Now:

Onshore wind position divested



## Building the Portfolio: Positions in bottom fixed offshore wind

Project execution to operations: Sheringham Shoal, UK

317 MW In operation, 2012 Working to bring technology costs down: Dudgeon Offshore, UK

Up to 560 MW Under development Larger projects, deeper waters, further from shore: Dogger Bank, UK

Up to 9 GW Under consent





# Sheringham Shoal offshore wind farm

- Owned 50/50 by Statoil and Statkraft through the company Scira. Statoil was operator during development phase
- 88 Siemens 3.6 MW turbines on monopile foundations
- 317 MW installed capacity
- Water depths around 20 m
- Full production 2012
- Yearly production enough to supply 220,000 British homes with electricity (1.1 TWh)
- A reduction of 500,000 tonnes of CO<sub>2</sub> annually, compared to fossil fuels



#### **Sheringham Shoal**



### Sheringham Shoal: Capitalise on lessons learnt





# Dudgeon offshore wind farm – taking our offshore wind competence further

- Owned 70/30 by Statoil and Statkraft
- Statoil is operator
- Dudgeon has a consent for 560 MW
- The project will be further developed for a planned FID in 2014
- There are considerable synergies with Sheringham shoal
- Experiences from Sheringham shoal will be utilized in particular in cooperation with local stakeholders
- The deeper waters and larger distance to shore entails somehow different solutions from Sheringham shoal





# Dogger Bank – A long term growth option

#### **Key Figures**

- Can cover 10% of UK power need
- Forewind consortium with Statoil, Statkraft, RWE, SSE
- Total capacity
  6 to 9 GW
- Area: ~9000 km<sup>2</sup>
- Distance from shore 125-290 km
- Water depths: 18-63 m
- High wind speeds >10 m/s average





# Choosing sites: Wind conditions, wake effects, water depths, soil conditions, distance to shore, ...

- Good wind conditions
  = average 8-9 m/sec and above
- Low wake effects
  No other wind farms in near proximity
- Distance to shore
  => increased distance equals increased costs
- Prefered water depths for bottom fixed
  = below 30 m
- Soil conditions favourable for foundations





# *Hywind:* a spar buoy floater with a standard Siemens 2.3 MW wind turbine





### Hywind Demo - concept verified

- Experienced wind speed of 40 m/s and maximum wave height of 19 m
- Floater motions have no negative impact on turbine performance
- Capacity factor of 50% in 2011
  Produced more than 30 GWh since start-up
- System integrity is verified



### Working in a new industry: Success Factors

- Choice of offshore sites
- Project execution
- Cost reduction
- Safe and efficient production
- Regulatory regime



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# Comparison of support regimes – main issues in the most successful markets

ELEMENT	UK	GERMANY	DENMARK
Support period above market price	20 years	8-15 years (formally 20)	20 TWh/400 MW (time depending on efficiency of power production)
Support mechanism	Renewable Obligation/ Contract for difference	Feed-in tariff	Contract for difference
Offshore grid costs	Yes	No, only transformer	No, only switchgear
Onshore grid costs	Yes	No	No
Balancing costs	Yes	No (Only after extension period)	Yes
Nominal / Real support	Real	Nominal	Nominal



### Technology roadmap in offshore wind 2010 – 2020



