Hywind Tampen
An industrial part of the solution
Hywind Tampen – An industrial part of the solution

- Reduce CO₂ and NOx emissions on Gullfaks and Snorre
- Further develop floating wind and the Hywind concept, technology and execution methods
- Demonstrate a fully integrated gas and renewable power generation system with large global deployment potential
Hywind Tampen

The world’s first floating offshore wind farm to supply renewable power to offshore oil and gas installations.

- 11 wind turbines
- Combined capacity of 88MW
- 200,000 tons/year CO₂ emission reduction
Technology development at Hywind Tampen

- Larger turbines
- Installation method
- Simplified mooring
- Concrete substructure
- Gas and wind power generation system integration
Hywind Tampen Execution

Main contractors

Wind Turbine generators: Siemens Gamesa Renewable Energy
Substructure and marine operations: Kværner
Inter-array and export cables: JDR Cable Systems
Cable installation: Subsea 7 / Seaway 7
Topside modifications: Wood Group Norway
Assembly site Sløvåg: Wergeland Base
Onshore crane: Mammoet Norway
Hywind Tampen Operations

- Equinor is the operator on behalf of the licenses
- The Wind Farm will be operated and maintained by using synergies with oil and gas operations in the area
- Wind turbines are integrated into the existing power management systems

- Siemens Gamesa Renewables has a five year service agreement
- Ring solution design allows for flexibility
- SOV used for corrective and planned (annual) service
Floating to become fully competitive – Equinor to remain a world leader

- **2001** – Idea and technology development
  - Hywind demo
  - 2.3 MW
- **2009** – Hywind Scotland
  - 30 MW
- **2017** – Hywind Tampen
  - 88 MW
- **2022** – Next floating project
  - 200-400 MW

**Technology development**

- **Utility scale projects**
  - 500-1000 MW
- **Fully commercial technology**
  - 40-60 EUR/MWh

**Key markets:**
- South Korea, Japan, US, Scotland, France, Spain (Canary Islands), Greece, Ireland, Norway

**Cost reduction**
A vision for offshore wind in Norway

Industrial development and floating offshore wind short/medium term

Power export to Europe on a longer term

Power to x/Hydrogen might be significant

Sources: BVG Associates, Thema Consulting project team assessments
Offshore wind to Oil & Gas
Report from Rystad Energy 10 March 2020

Offshore platforms are attractive off-takers for first large scale floating wind farm(s) in Norway

- Offshore oil and gas producers more attractive off-takers of electricity from first large scale floating wind farm(s), than power to grid

- Northern North Sea most suitable for combining offshore facilities with large scale floating wind (~500MW). Low cost capital combined with investment friendly fiscal regime can turn the case commercial

- Further costs reductions could trigger 1-3 additional large scale floating wind farms (~500 MW) towards oil and gas facilities within 2030, as part of the ambition to realize floating wind in Norway

- Realize floating wind in Norway sooner rather than later:
  - Likely industrialized within 2030
  - Expand toolbox to meet climate targets
  - Oil & gas fields with limited remaining life
Havvind til O&G – et mulig kostnadseffektivt bidrag til klimaveikartet

- Equinor og oljebransjen la i januar frem klimaveikartet som vil kunne gi 40% kutt i klimagassutslipp fra installasjonene innen 2030

- For mange felt vil den naturlige løsningen være elektrifisering gjennom kabel fra land, som i mange tilfeller er mest kostnadseffektivt og kan kutte all CO₂

- Havvind kan være en attraktiv løsning i tilfeller hvor
  - flere felt/lisenser kan koples sammen i en områdeløsning for å gi tilstrekkelig størrelse til vindparken
  - det finnes CO₂-frie kilder som kan levere strøm når det ikke blåser
  - vindkraften er konkurransedyktig versus kraft fra land, f.eks ved at det kan oppnå synergieeffekter eller kostnadsbeparelsler
More offshore wind in Norway - what would it take?

Collaboration between authorities, developers, suppliers, other industries, NGOs, Universities/R&D

Scale

Competitive supplier industry

Well designed framework conditions