

Baltic InteGrid

Towards a meshed offshore grid in the Baltic Sea



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Ørsted develops energy systems that are green, independent and economically viable

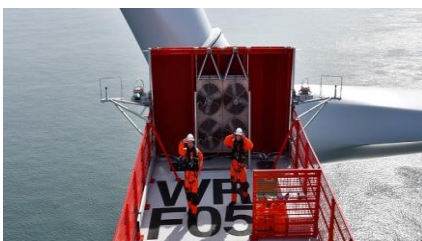
Ørsted

- Revenue (2018): DKK 76.9 bn
- EBITDA (2018): DKK 30.0 bn
- 6,080 employees
- Active in Scandinavia, United Kingdom, Germany, The Netherlands, USA, Taiwan and Japan

Major Shareholders (voting share %)

- Danish State 50%
- Seas NVE 10%
- Capital Group 5-10%

Offshore



- Global leader in offshore wind with 5.6 GW operational capacity
- Develop, construct, own and operate offshore wind farms
- Significant and attractive build-out plan of 3.4 GW towards 2022
- Ambition of 15 GW installed offshore wind capacity by 2025

Onshore



- US onshore wind portfolio with 813 MW operational capacity
- Develop, construct, own and operate onshore wind farms
- 184 MW under construction and a pipeline of more than 1.5 GW
- Energy storage solutions with the first 20 MW battery storage project in operation
- Solar: first large-scale solar PV project Permian Solar 250 MW

Bioenergy



- #1 in Danish heat and power generation with 25% of market
- Converting heat and power plants from coal and gas to biomass
- Innovative waste-to-energy technology (Resurgence)

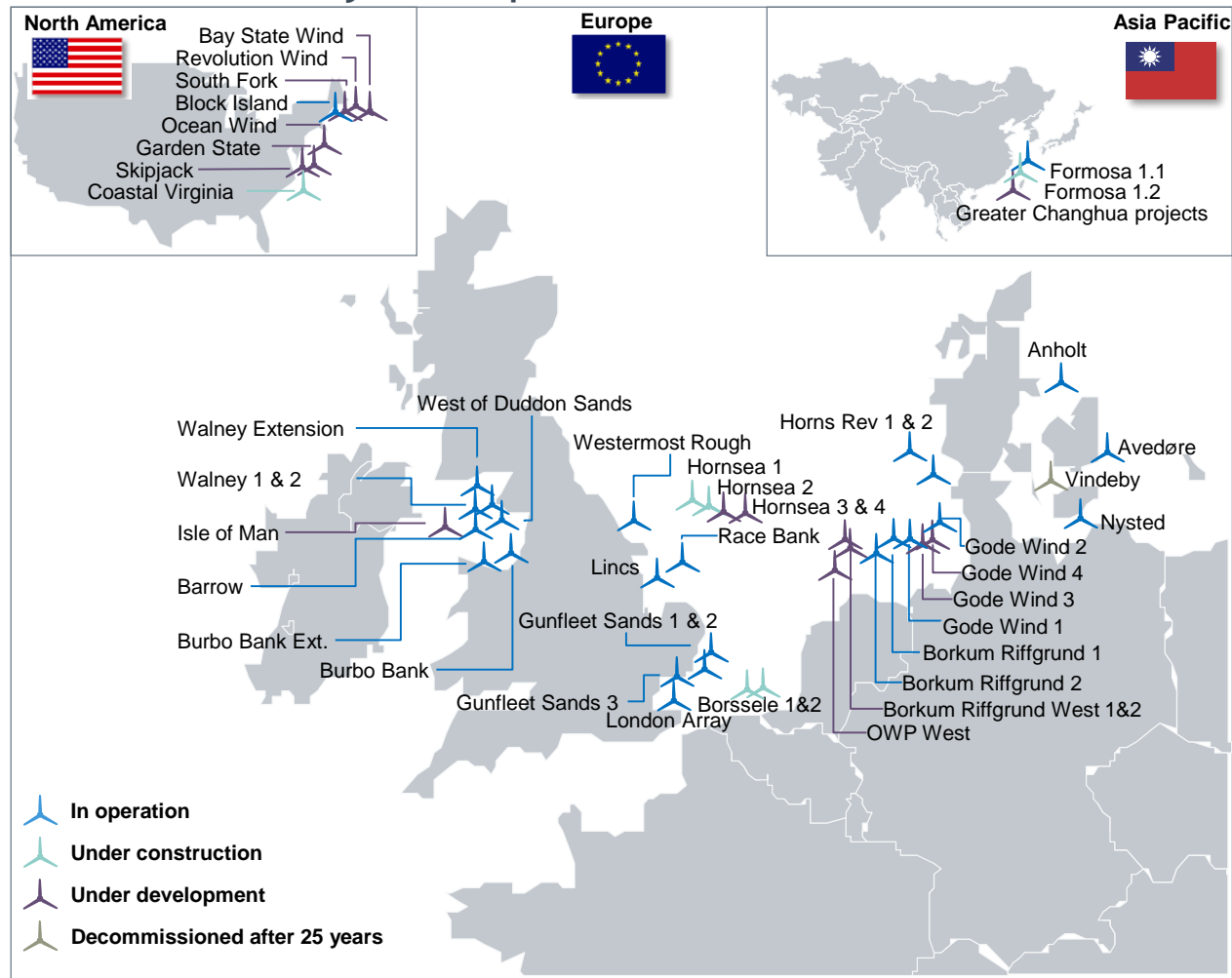
Customer Solutions



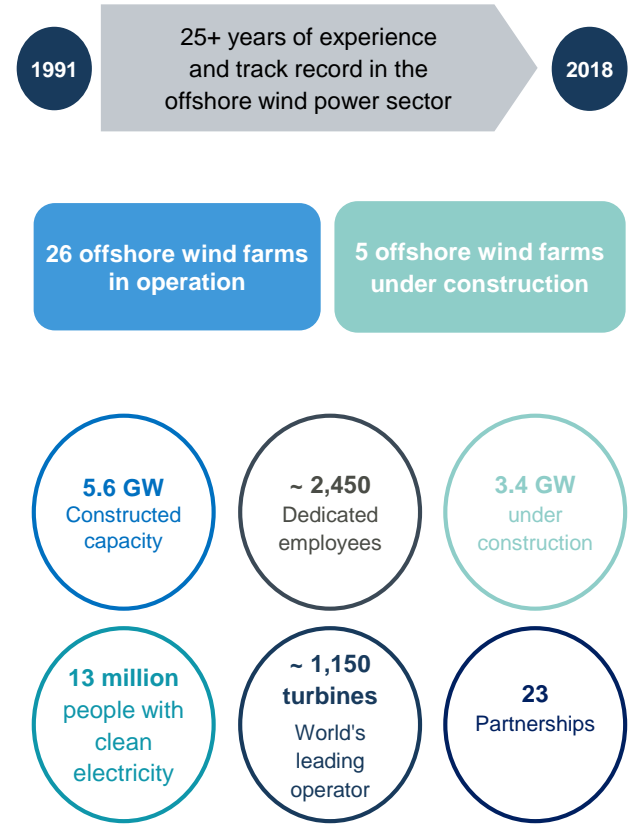
- Develop green, innovative and cost efficient solutions for our B2B customers
- Provide competitive route-to-market for own and customers' generation portfolio
- Optimize activities within natural gas
- Market trading operations to optimize hedging contracts

Ørsted Offshore overview

Ørsted offshore wind global footprint

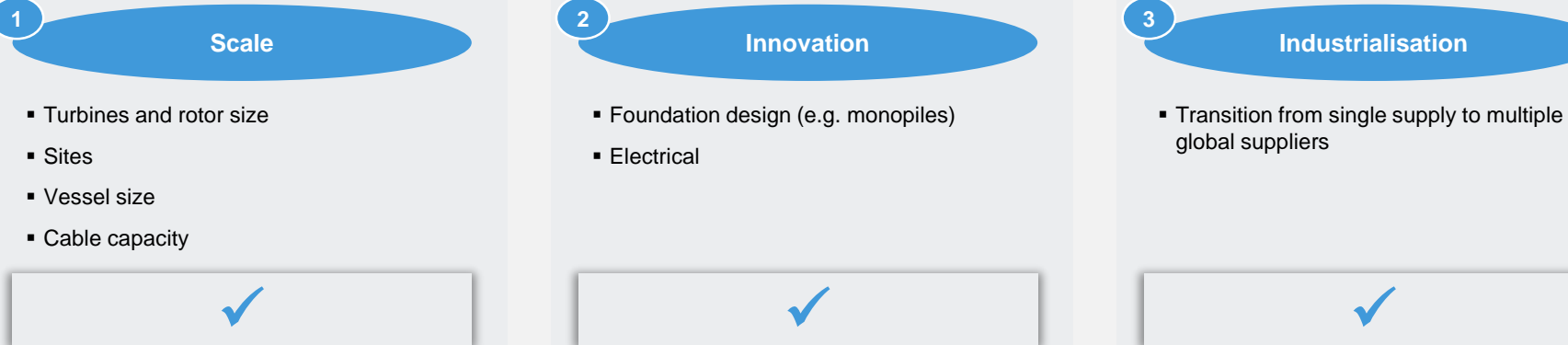


Unparalleled experience and track record



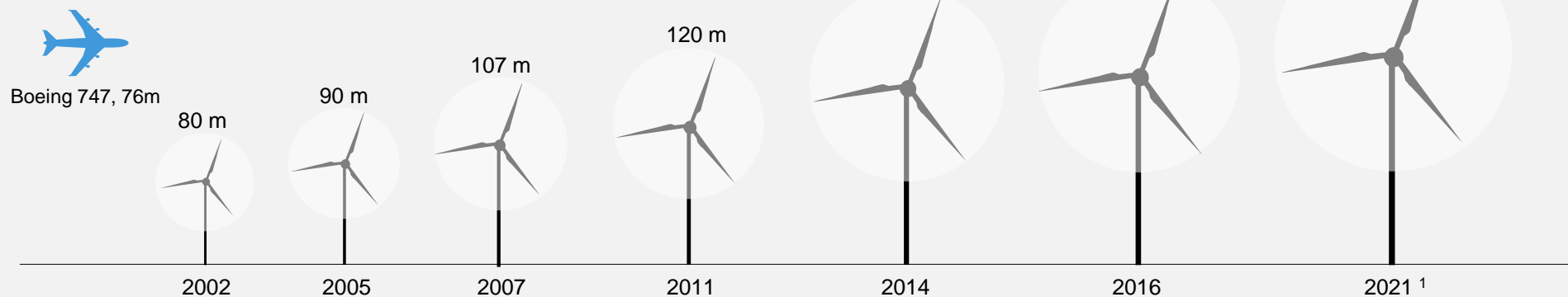
At the forefront of making the industry cost competitive

Multiple levers to drive down cost in offshore wind



Rapid technological development

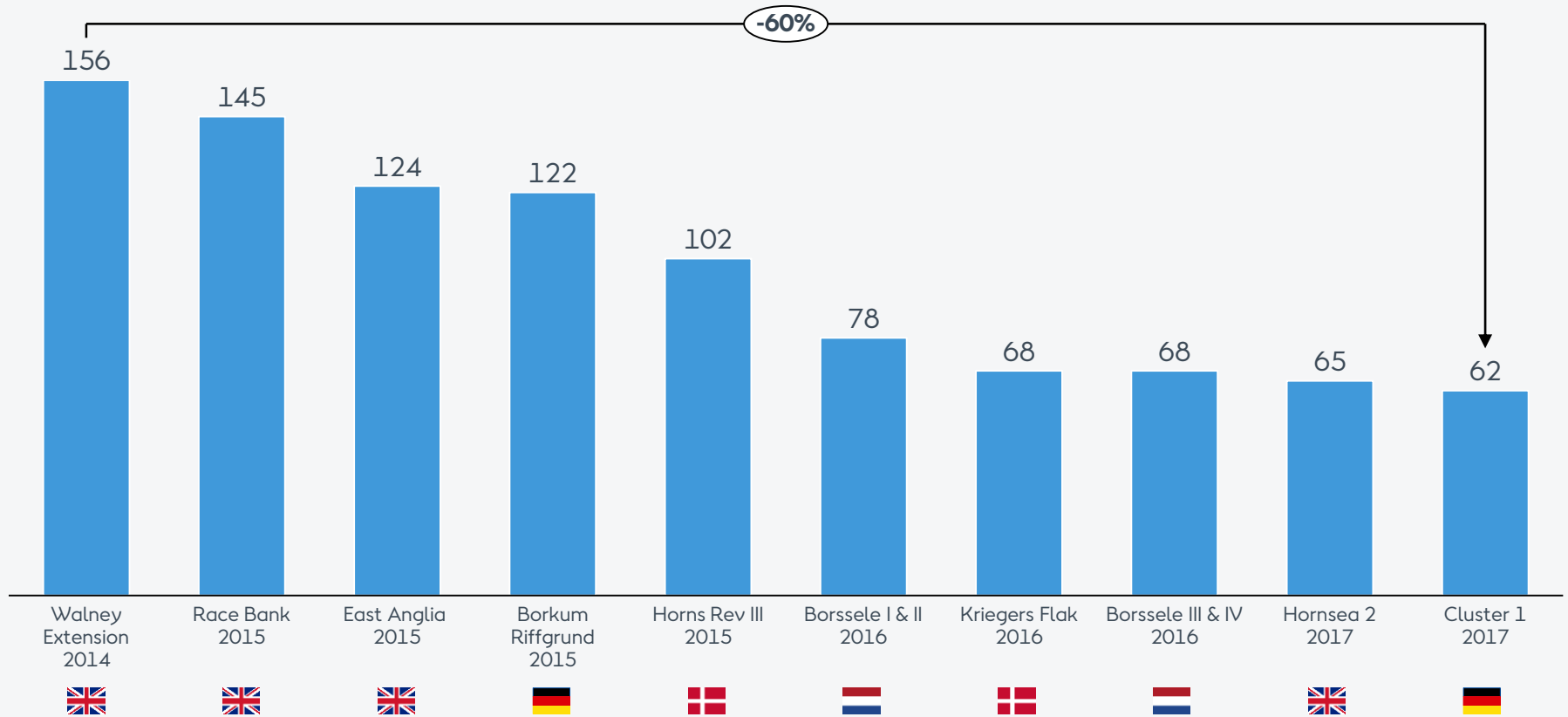
Wind turbine rotor diameter, year of commissioning



1. In Mar. 2018 GE unveiled a 12 MW turbine. Each Haliade-X unit, will be capable of powering 16,000 homes and producing 67 GW/h per year, based on wind conditions on a typical German North Sea site

Costs reduced

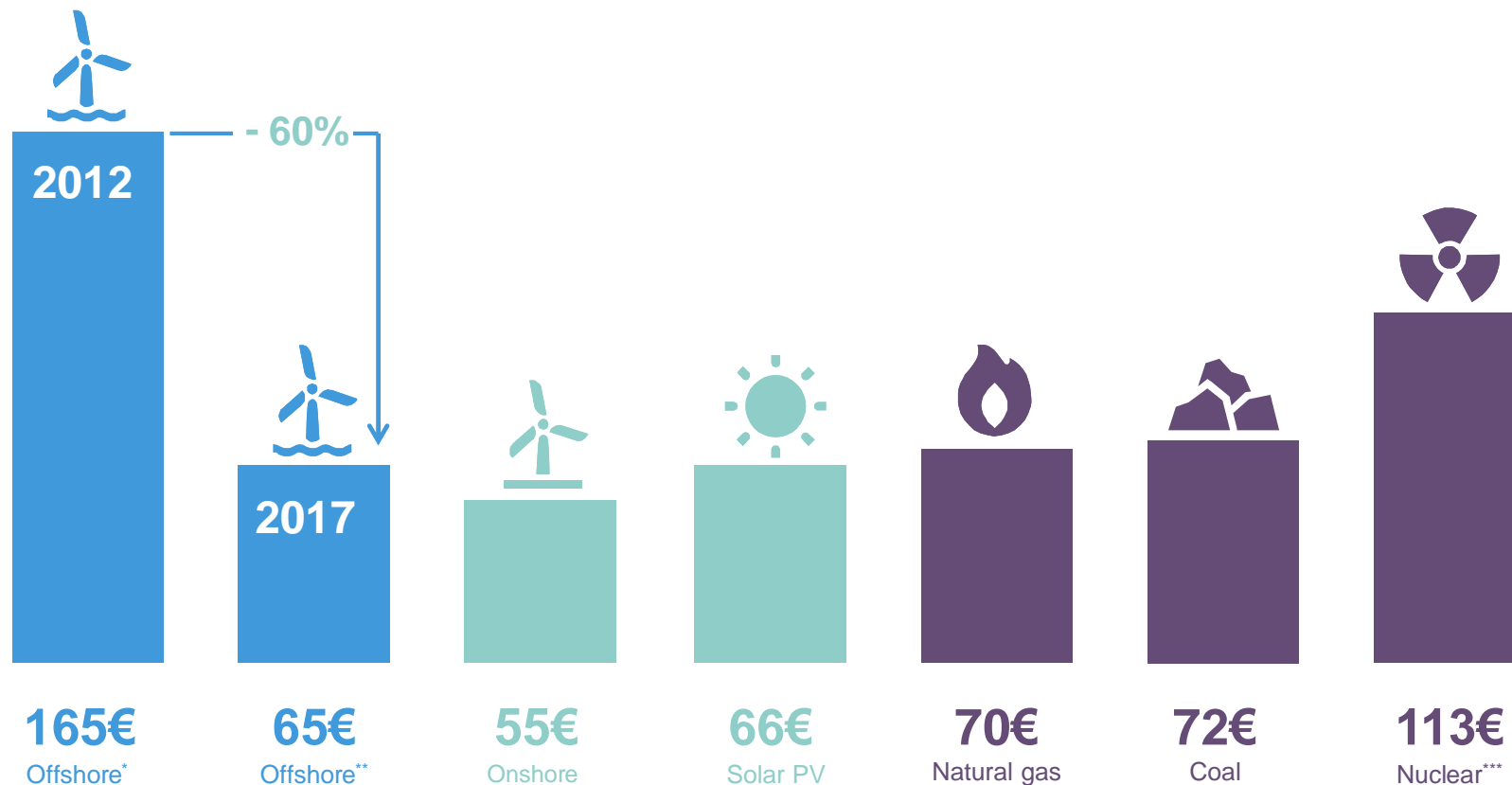
Offshore wind cost EUR/MWh



Levelised cost of electricity for different technologies

The rapid cost reductions in the industry, have made offshore wind power competitive relative to conventional power generation based on fossil fuels

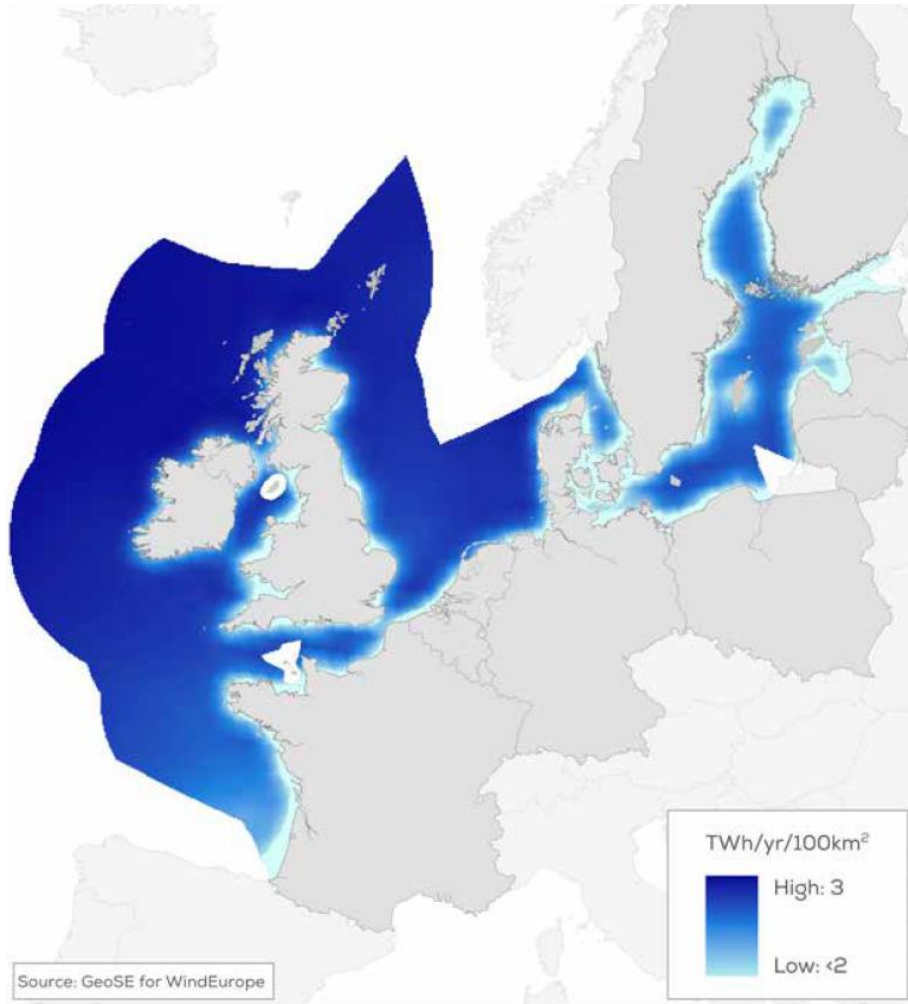
EUR/MWh 2016 prices



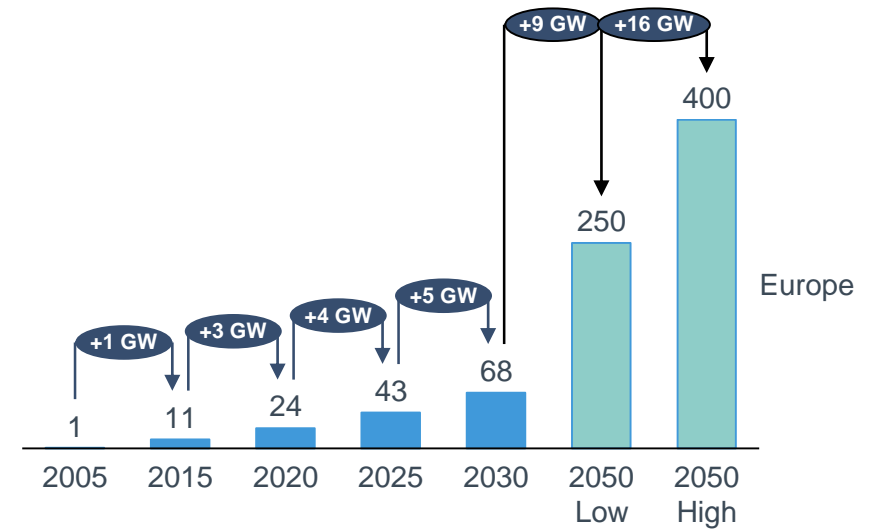
Source: Bloomberg New Energy Finance (BNEF) for CCGT and Coal plants for Northwest Europe, Danish Energy Agency and BNEF for Offshore Wind.

For offshore wind: Including cost of transmission – Calculated as Levelised revenue (subsidy and market price) of electricity over 25yrs lifetime as a proxy for the levelised cost of society. 3.5% real discount rate used. *Generic Offshore Wind, Northwest Europe, FID 2012. In 2012 our goal was to reduce offshore wind costs to 100 Euro/MWh in 2020, ** Hornsea 2, UK, *** Hinkley Point, UK. Same approach as for Offshore Wind. Strike price of 92,5 £/MWh in 2012 real prices. Lifetime of 60yrs, 91% capacity factor.

Industry matured and now ready to take off, with accelerated build out



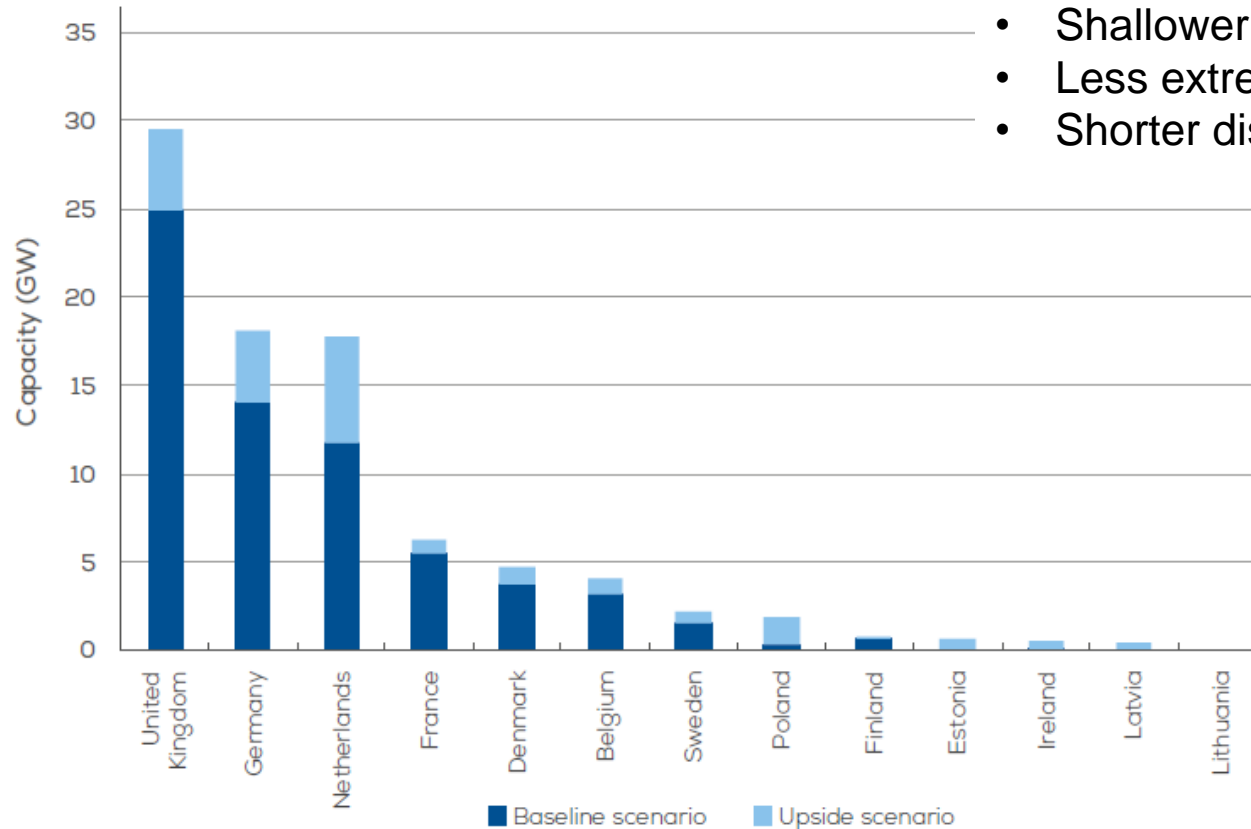
- Market forecast for Europe until 2030
- EU-Commission report until 2050
- Average yearly market



Cost reductions makes offshore wind highly relevant in the Baltic Sea

FIGURE 5

Cumulative installed capacity by country by the end of 2030

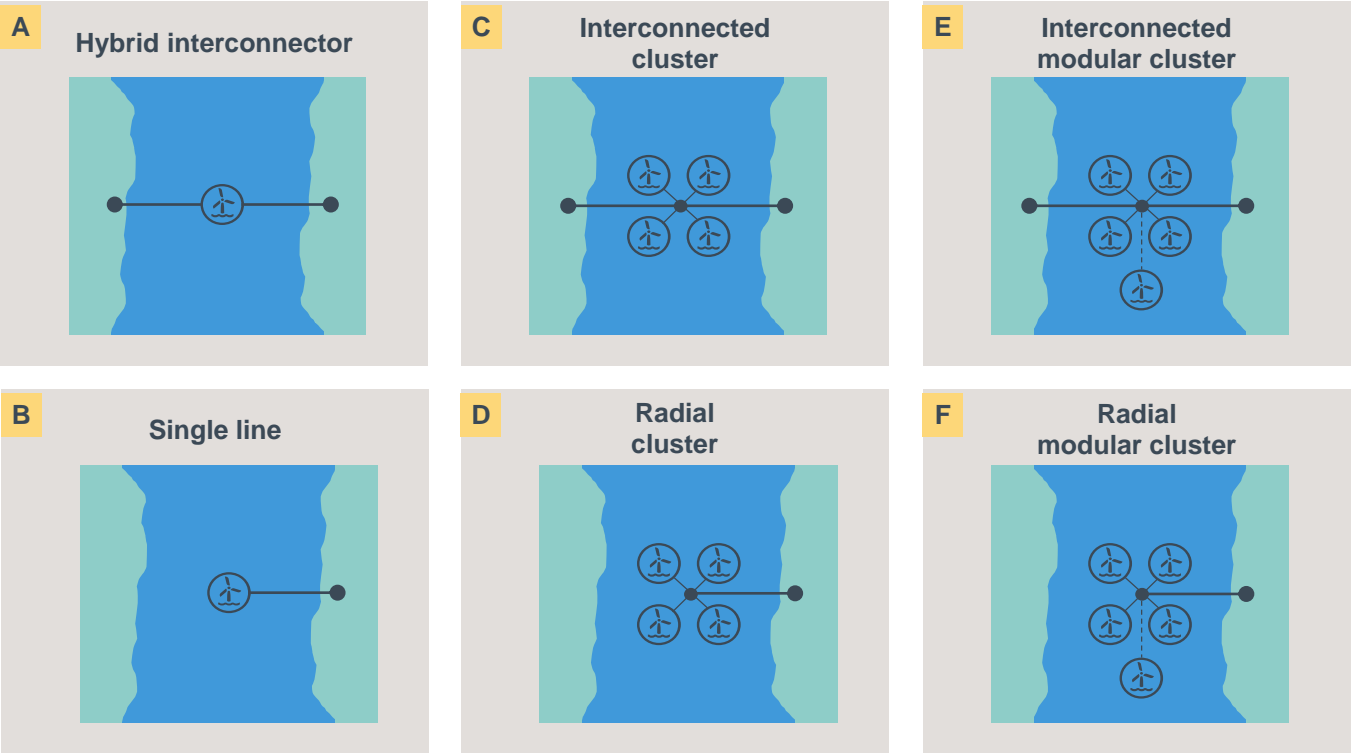


Baltic Sea¹

- Lower wind speeds
- Shallower water depths
- Less extreme sea states, and
- Shorter distances to shore

Source: BVG Associates for WindEurope

The Baltic Sea can be a innovation hub for next generation of offshore wind



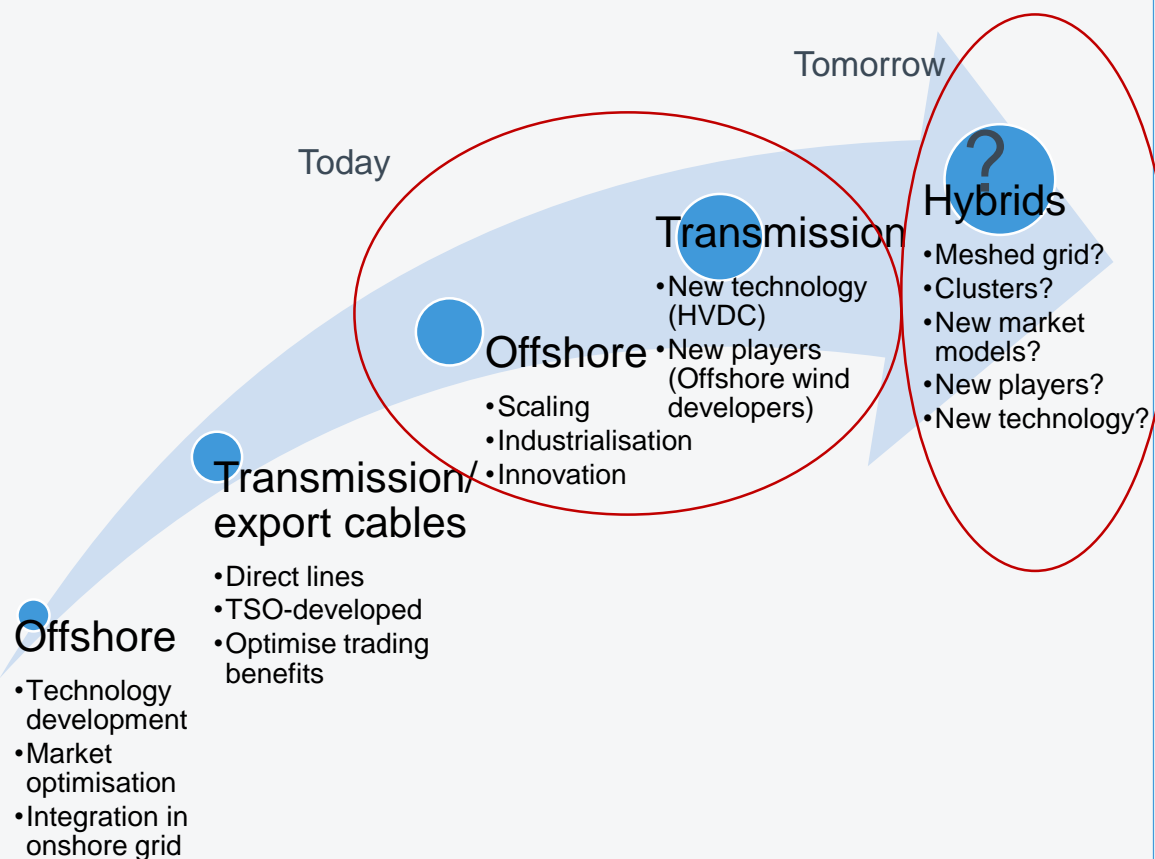
2 Increasing the interconnection is driven by access to price areas

3 Time value of money is a key driver behind modular clusters

1 Demand for renewables is the driver of cluster size

Sites / time

Can hybrids taken offshore wind and transmission to a new level



Legal Aspects

- Definitions of hybrids and unbundling rules

Permitting and Planning

- Cross-border/EU planning (enough sites are allocated to offshore wind and interconnectors)

Renewable energy support

- Is convergence needed or is compensation a possibility when direction of flow of electricity is uncertain - RES contribution to national share?
- Available EU funding?

Transmission cost allocation:

- Cost/benefit sharing of interconnectors / (Joint investor participation (e.g. public-private partnerships) and funding mechanisms
- Regulated income – cap and floor regulation?

Market setup Implementation/codification:

- Can the market setup deliver incentives for an efficient market

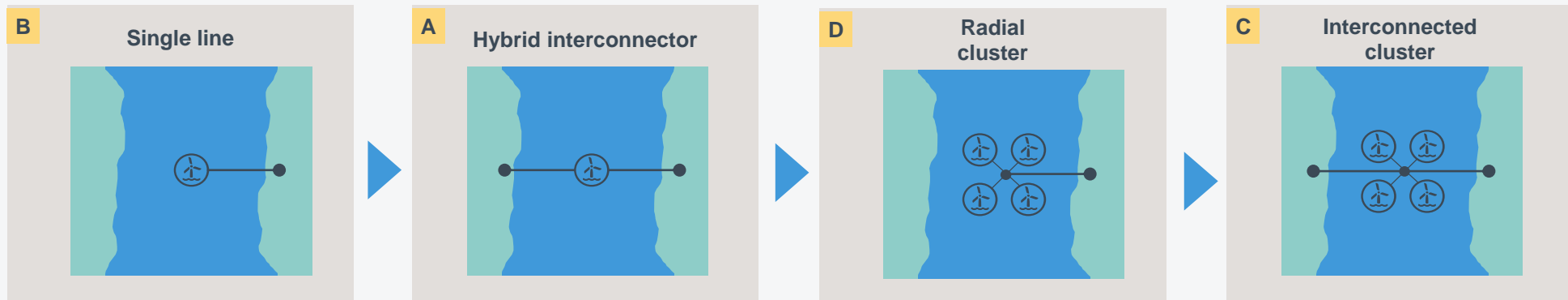
Technology development:

- How can the further develop of multi terminal technology solutions be supported?

Summary – regulatory questions

Next step – to get started!

- Governments to identify suitable areas for offshore wind and foster innovative grid solutions
- Enable organic growth of the supply chain and further cost reductions
- Develop national energy and climate plans with goals for offshore wind aligned with the road to a zero emission 2050 target
- Include joint tenders and other means of collaboration in national energy and climate plans



Innovation is in Ørsted's DNA

