NORTH SEAS ENERGY FORUM

OFFSHORE GRID DEVELOPMENT: INDUSTRY'S PERSPECTIVE

WindEurope Working Group: Offshore Wind

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Stiftung OFFSHORE-WINDENERGIE

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windeurope.org

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Construction summary

in 2016:

1,558 MW	Installed capacity
338	Grid-connected turbines
361	Turbines erected
568	Foundations installed

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Source: WindEurope

Construction summary

Cumulative installations:

12.6 GW Installed capacity

3,589 Grid-connected turbines

82 Grid-connected sites

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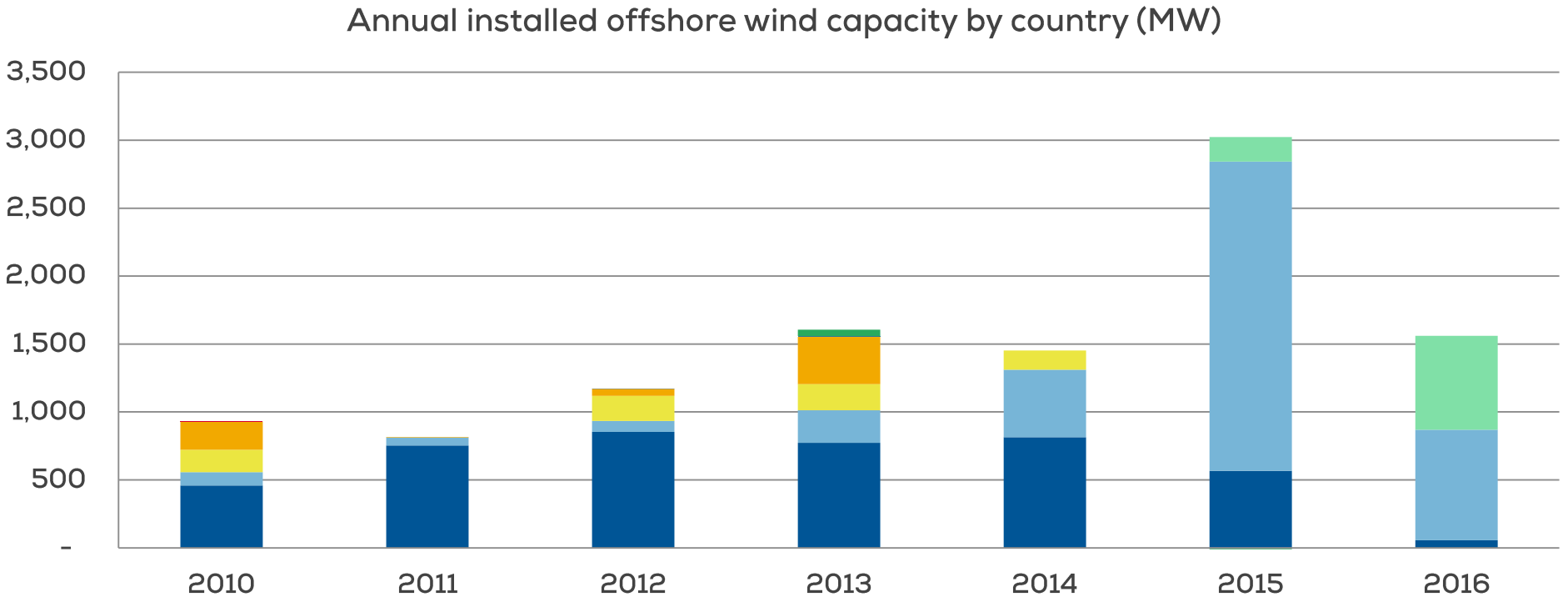
Source: WindEurope

Installed capacity



Source: WindEurope

News Highlights

- Industry cost reduction statements
- North Seas declaration on energy cooperation
- NL: Borssele I+II result: EUR 72.7/MWh
- DK: Nearshore result: EUR 60.8/MWh
- DK: Kriegers Flak EUR 49.9/MWh
- NL: Borssele III+IV: EUR 54.5/MWh

2017 TENDER SCHEDULE

- UK: Next CfD round — Bids open 3 April 2017
- NL: Zuid-Holland I +II — Bid open 2017 for 700MW
- FR: Third tender at Dunkirk — Selection process in progress
- DE: Transitional tenders
  - 1st tender April 2017 (1.55GW)
  - 2nd tender April 2018 (1.55GW)
- UK: Additional two CfD rounds before 2020

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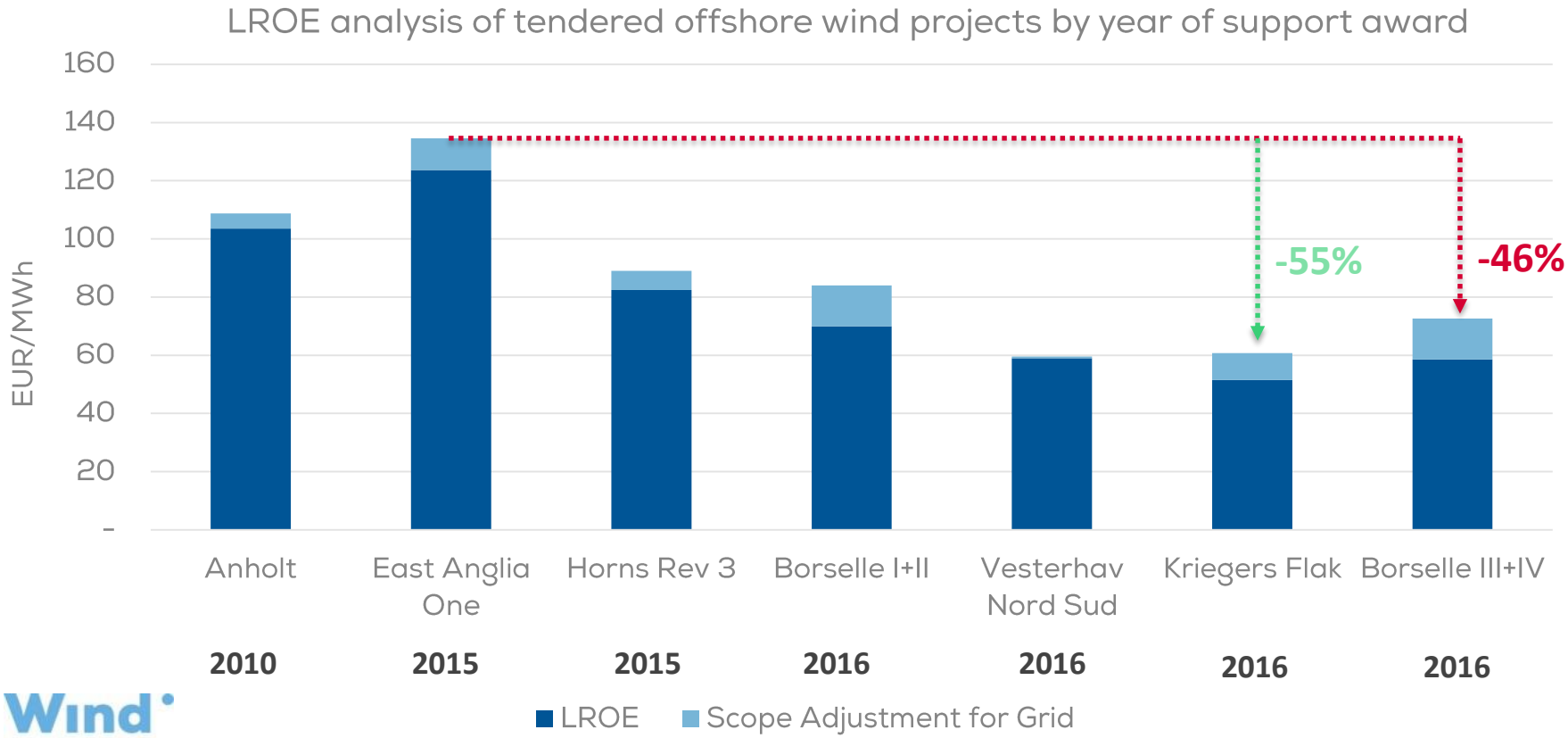
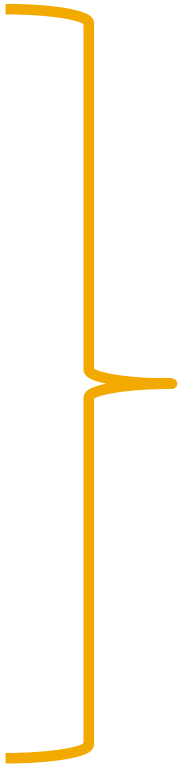
Prices are cut in half



Source: WindEurope

Drivers in cost reduction

- **Increase in energy production**
  - Latest technology and continuous innovation
  - Investments secured by market visibility
- **Economy of Scale**
  - Large projects (600-700MW)
  - Improved procurement
  - Increased standardisation
- **Good site location**
  - Strong winds, calm waters
  - *Not* record-breaking
- **Good planning**
  - 2020 targets under NREAPs providing visibility
  - A transparent one-stop shop
  - Strong business case



Lowered risk leading to better financing

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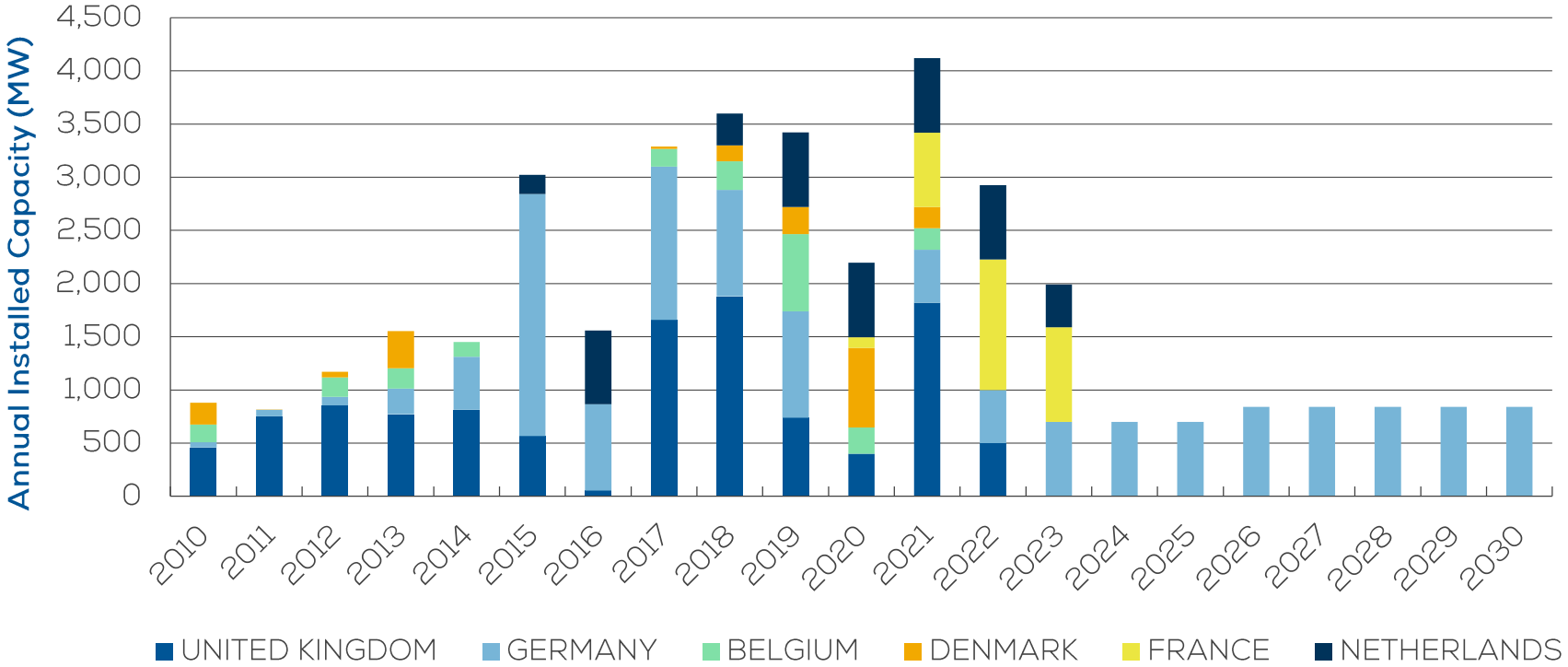
Market outlook to 2030

Projection based on real project data and firm government commitments



For presentation clarity, countries with deployment below 100 MW are not included here.

Source: WindEurope

Possible pathways to 2030

Based on WindEurope's 2030 wind energy scenarios to 2030 that look at policy support, economic outlook, and industrialisation of offshore wind:

Installed capacity:

44.6 GW Low Scenario

66.5 GW Central Scenario

98.1 GW High Scenario

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Possible pathways to 2030

Based on WindEurope's 2030 wind energy scenarios to 2030 that look at policy support, economic outlook, and industrialisation of offshore wind:

Percentage of EU electricity demand:

5.2% Low Scenario

7.7% Central Scenario

11.3% High Scenario

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Scale is key to lower cost and sustain innovation throughout the supply chain

- A market size of at least **4 GW/a from 2020 onwards**
  → ~one turbine per day [1)]
- A market size of at least **7 GW/a**
  → ~accommodates sufficiently large volume for future development

Supply industry

To ensure competition, the market needs several manufacturers and a larger number of suppliers

At least 4 GW/a in Europe is minimum for a sustainable industry from 2020 onwards,
In the future at least 7 GW/a will be necessary for EU to remain the global leader of the offshore wind industry

1) Assumed a calculatory average turbine size of 10 MW in the period from 2020 onwards

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Considerations on Hybrid Projects

WindEurope supports work that adds foresight and visibility to offshore wind and explores the potential of the North Sea, including hybrid projects.

However, the current pipeline of consented projects or projects eligible for tender and delivery up to 2023 (2025 in Germany) **should not** be identified as eligible for a hybrid interconnection due to costs sunk into development:

- Any timeline for **pilot hybrid projects should only come after 2025** as a realistic timeframe.
- Given that the Kriegers Flak CGS has been in development for 10+ years, any new CGS or hybrid should be expected to take a similar amount of time –to prove the viability of the technology demonstrated, **and** to work out a sufficiently robust regulatory framework to support such a project.
- **German HVDC clusters** are another example where development of the concept took time, as well as implementation delays that should be avoided in future grid developments.
- Any such hybrid project needs to be developed in a series of bottom-up steps to **minimize the risk of stranded or under-utilised/under-performing assets**.

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Considerations on Hybrid Projects

Any 'flagship' or 'headline' hybrid project produced under the NS declaration (either as a large scale 4/5 GW project or hybrid interconnected project) **should be subject to competition so as to reduce costs and foster innovation.**

- Ideally more than one project being announced and selected.
- This is also taken to mean that **elements of any large scale or hybrid project** need to also be **subject to competition** in order to deliver value to society.
  - E.g. Grid connection to shore should be open to competition as well as project development and technology procurement.
- It should also be noted that an area such as the Dogger Bank, or any other extremely far from shore sites are not necessarily going to immediately be the cheapest:
  - The **cheapest sites should (naturally) always be developed first**. At present, these are sites closer to shore with good wind resources, ie. 'front-line' developments. As these sites get used up, the line moves further back.
  - The Dogger Bank is 120-200km away - sites in 2016 were on average 42km away.
  - **Island Concept:** Sites nearer to shore may not necessarily benefit from an island design such as the one proposed at Dogger Bank, other viable concepts already exist (ie. Radial, and clustered approaches).

Regulatory Considerations

WindEurope supports efforts between Member States to **coordinate the timing and sizing of both tenders for Offshore Wind Farms and related Grid Infrastructure**, which we believe to be important to maintain a steady rate of investment and supply chain development.

- There are **key regulatory considerations** to be considered for hybrid interconnector or any other cross-border solutions:
  - **Proper cost-benefit alignment across all regions** that take part
  - **Grid codes** may also be harming technological development. There needs to be a check to make sure that future hybrid interconnections (and indeed current ones) can function within a supportive grid code – ones that can allow for a variety of technology to be deployed

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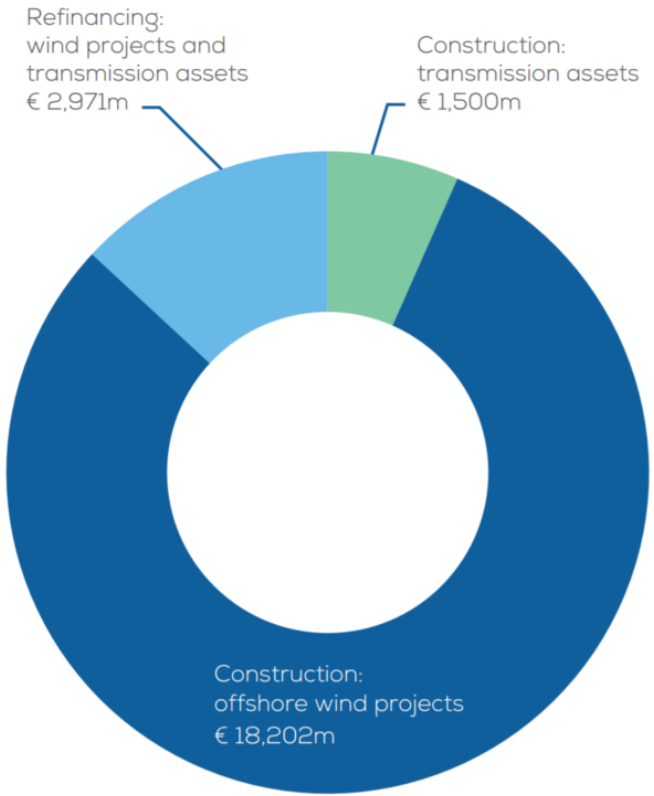
Offshore wind investments

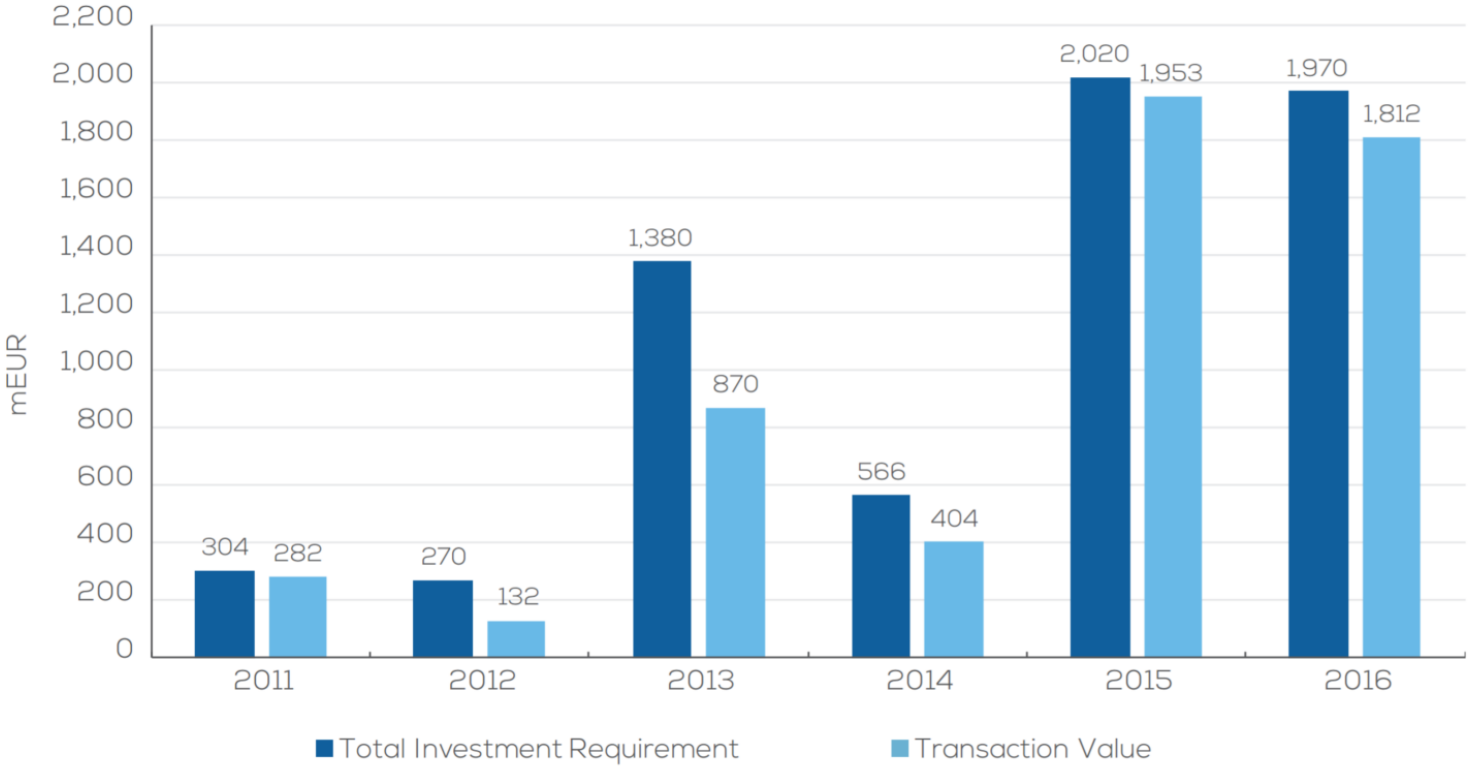
€22.6bn invested in the offshore wind sector in 2016



Source: WindEurope

Investment in transmission assets

€1.5bn
raised in green bonds in 2016



Source: WindEurope

Conclusion

- WindEurope supports work that adds foresight and visibility to offshore wind and explores the potential of the North Sea, including hybrid projects.
- However, **existing offshore wind investments should not be distorted** for the sake of producing a hybrid project.
- **Additionality is key** – any hybrid projects should add to overall market size.
- **Grid planning & development (onshore and offshore) needs to be considered with the growth trajectory of offshore wind in mind**. WindEurope's 2030 Central Scenario has determined that **66GW of total installed capacity is viable under policy that supports climate and energy change targets to 2030** and reasonable economic growth.
- **A longer-term - up to 2050 - European (Offshore) Grid Plan** needed
- **A meshed grid is not the end goal.** The whole point of offshore grid development is to improve flows and deployment, increase security of supply due to a wider regional distribution of wind and power flows
- Hybrid grid designs and deployment should also be deployed using a bottom up, stepwise approach that ensures **no-regret measures**

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EXHIBITION

Thank you

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