Offshore Wind

Presentation for EU-Korea Climate Action Initiative

PUBLIC

Ørsted

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Renewable Energy Innovation and the Energy Transition of EU Companies

1. Why did EU businesses take part in the transition?

2. An industry-government partnership approach in renewable energy

3. The offshore wind journey in Europe

4. Consumers demanding a world that runs on green energy

Ørsted

What do you know about Ørsted and offshore wind?

Ørsted

Ranked the world's most sustainable company in 2020

Ørsted

We develop energy systems that are green, independent and economically viable

Ørsted

- Revenue (2019): DKK 67.8 bn (USD 10 bn)
- EBITDA (2019): DKK 17.5 bn (USD 2.6 bn)
- Credit Rating: Moody's Baa1 (stable), S&P BBB+ (stable)
- 6,526 employees
- Active in Scandinavia, United Kingdom, Germany, The Netherlands, Poland, USA, Taiwan, Japan, Korea

Major Shareholders (voting share %)

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

Offshore

- Global market leader in offshore wind
- Develops, constructs, owns and operates offshore wind farms
- Provides 100% wind backed Corporate PPA's & merchant products to large business customers
- Renewable storage and hydrogen projects in electrolysis and Power2X technologies
- 7.6 GW operational capacity
- 2.3 GW build-out plan towards 2022
- Ambition of 15 GW installed offshore wind capacity by 2025

Onshore

- Develops, constructs, owns and operate onshore wind, solar and energy storage projects
- 1.7 GW onshore operational capacity
- 1.8 GW under construction and pipeline to reach 5GW by 2025
- Permian Energy Center which consists of 420MW Solar PV and 40MW storage facility

Markets & Bioenergy

- Heat and power plants converted from coal and gas to biomass and waste-to-energy
- #1 in Danish heat and power generation with 25% of market
- Energy supply solutions for B2B customers
- Provides route-to-market for own and customers' generation portfolio
- Market trading operations to optimize hedging contracts

DONG energy → Ørsted

Europe's desire for a clean energy transition

Announced 2007, enacted 2009:

Climate & Energy package

Climate targets	• 2020: 20% GHG reduction compared to 1990 levels
Renewable targets	• 2020: 20 % RES in final energy demand
Energy Efficiency target	• 2020: 20% reduction compared to BAU

Announced 2018, enacted 2020:

EU Green New Deal

Climate targets	• 2030: **55% GHG reduction** (orig. 40%) • **2050: climate neutral**
Renewable targets	• 2030: **at least 32 % RES** in final energy demand
Energy Efficiency target	• 2030: **32.5 % reduction compared to BAU**

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From being

Danish Oil & Natural Gas...

(Our old Siri oil platform)

... to becoming

Ørsted

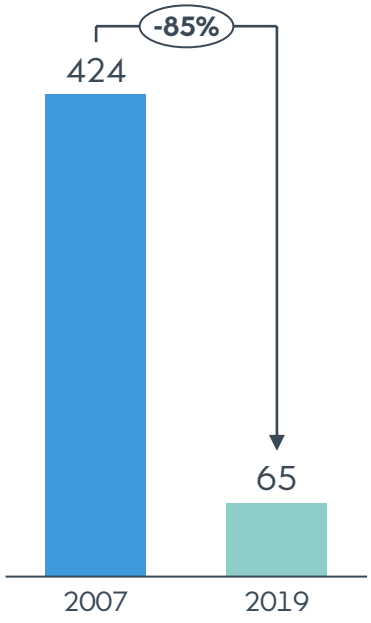
(Our Gode Wind offshore electricity substation)

Significant transformation of Ørsted over the past decade [1]

Green energy today accounts for ~95% of our heat and power generation

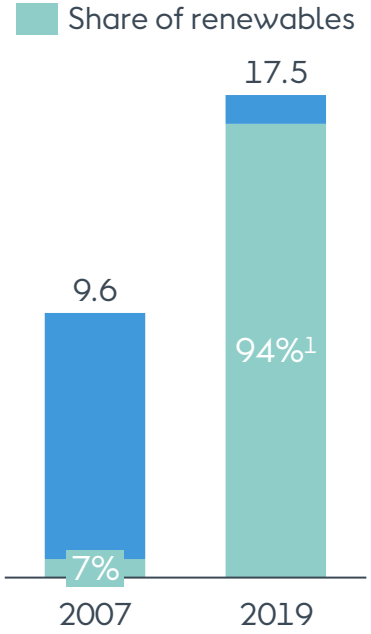
CO_2 emissions

g CO_2e/kWh



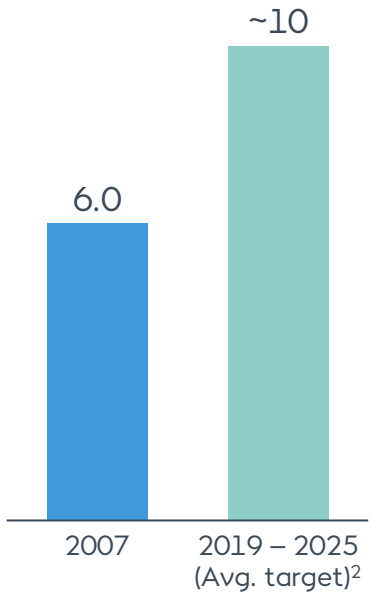
Operating profit

DKKbn, %



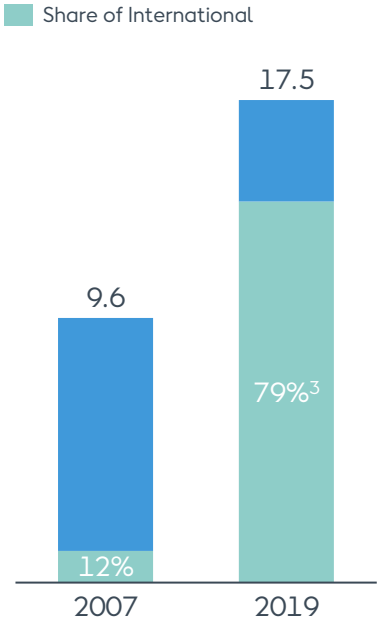
ROCE

%



Geographical footprint

Operating profit, DKKbn, %

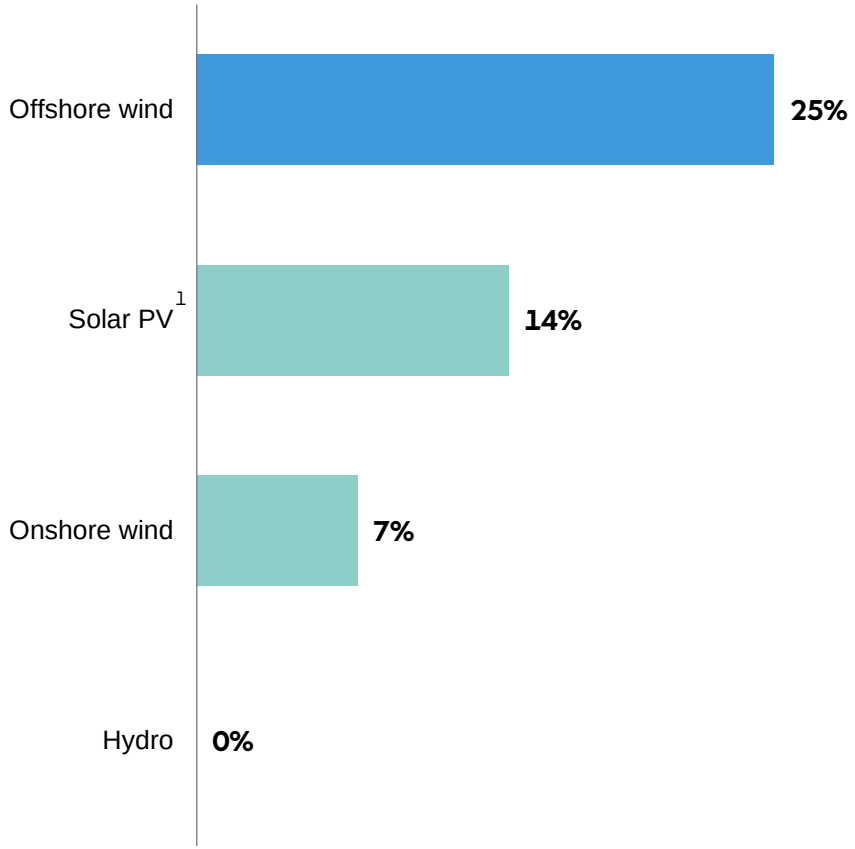


Note 1: Figures taken from Ørsted's Annual Report 2019. Excluding Radius (power distribution business which was divested during 2019)
Note 2: ROCE target for 2019-2025
Note 3: International share calculated based on Group EBITDA excl. divestments and miscellaneous un-allocated costs , totalling 16 DKKbn

Offshore wind is a large-scale renewable technology with growth rates exceeding other renewables

Fastest growing renewable technology in OECD

Installed capacity CAGR, 2014-2020
%



Offshore wind power offers multiple advantages

Utility size power generation
659 MW Walney Extension will power more than 460,000 UK homes

Offers +45% capacity factors[2]
Significantly higher than onshore wind and solar PV

Rapidly declining cost
Industry maturity, volume and technological development reduce LCoE[3]

Limited visual impact on landscape
Wind farms are built far from shore

Source: Bloomberg New Energy Finance (BNEF)
1. Sum of utility-scale PV and small-scale PV
2. Capacity factor is a performance indicator measuring to what degree a wind farm has produced according to the farms capacity (actual production / (capacity x hours in period))
3. According to BNEF, long-term offtake price required to achieve a required equity hurdle rate for the project

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2.
A government + industry partnership approach to decarbonisation

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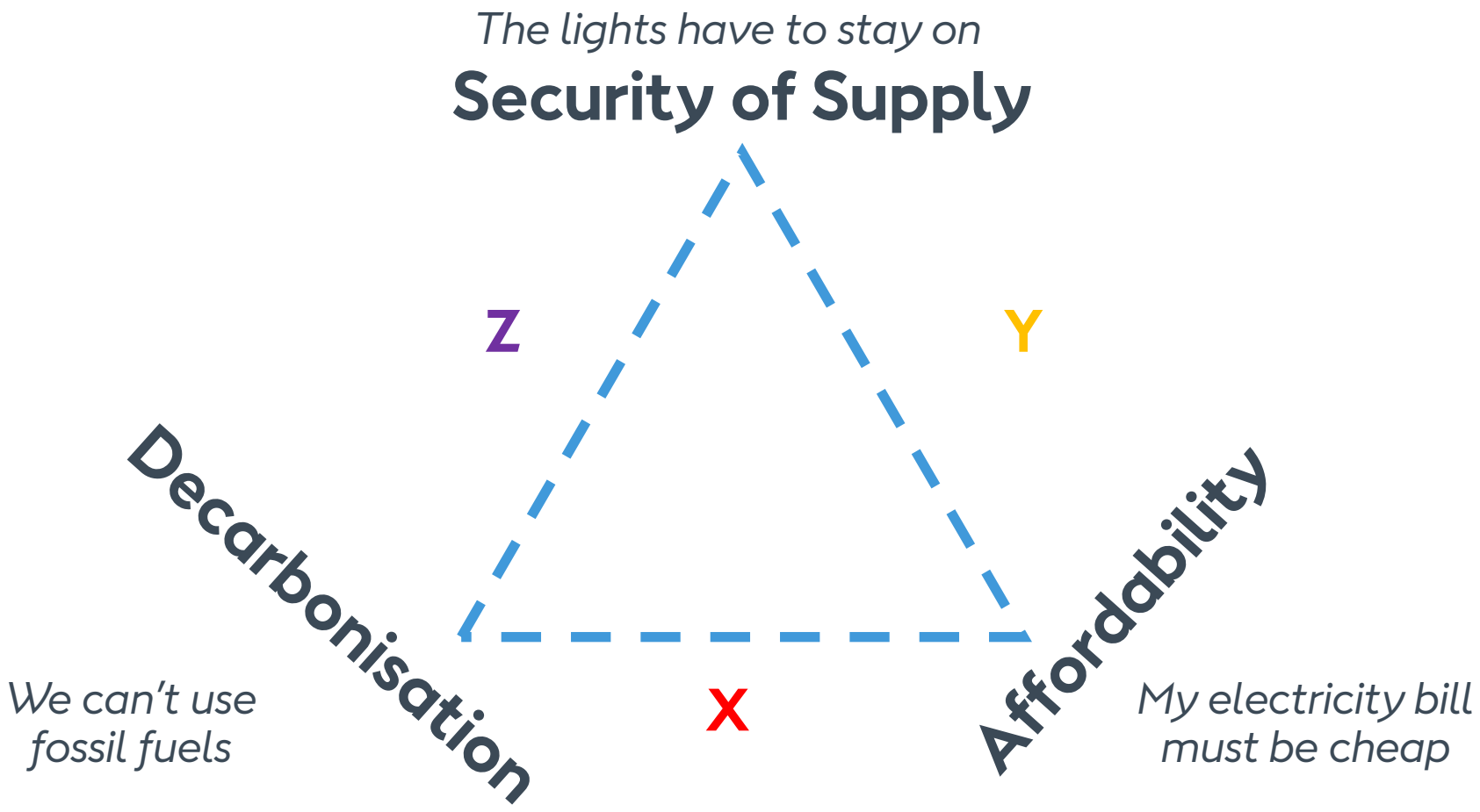
The classic energy trilemma



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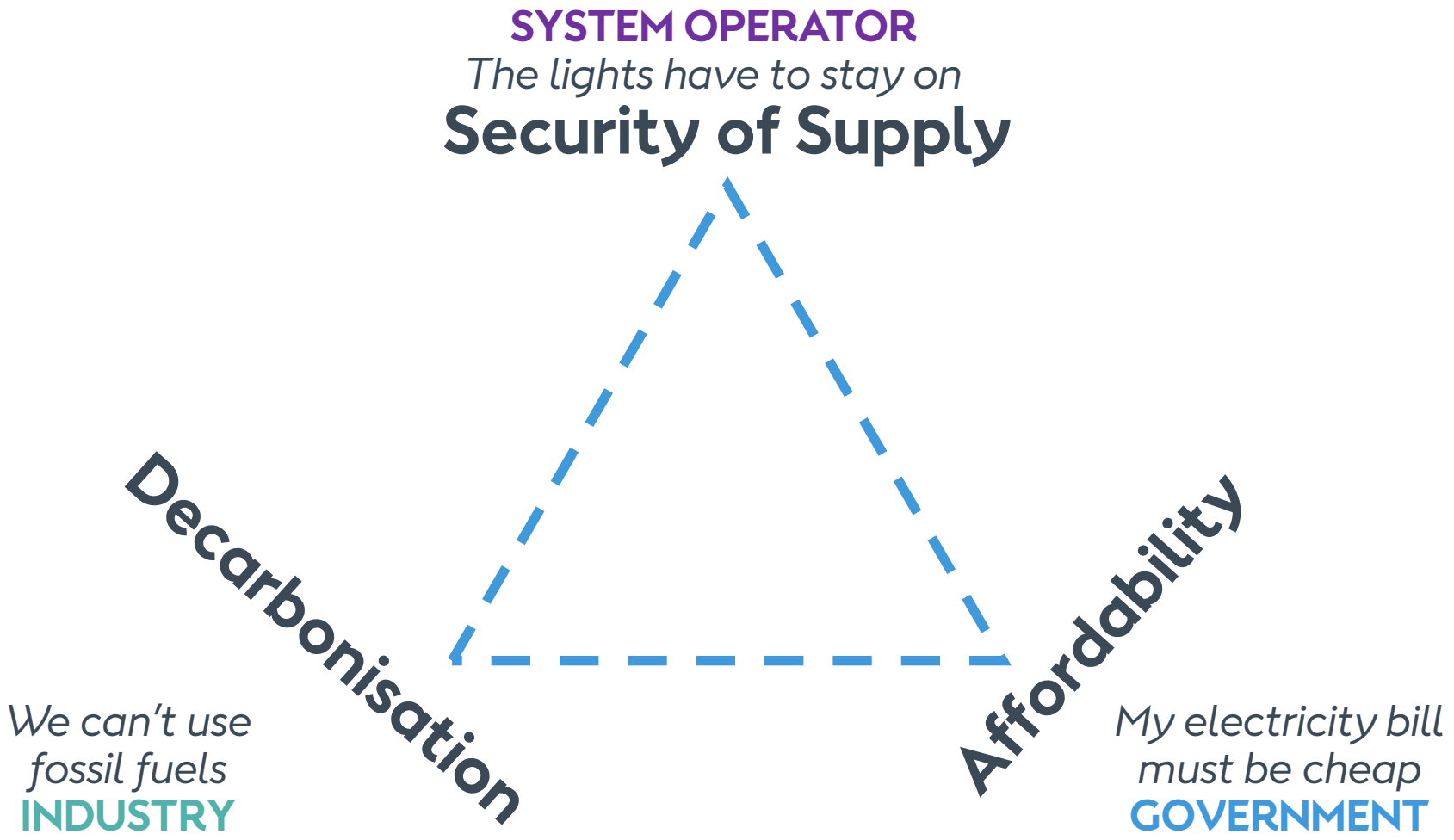
The classic energy trilemma



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Government helping to de-risk - A UK example: Contracts for Difference (CfD) - Support becoming stabilisation

CfD auctions are:

- **A market based stabilisation mechanism**
- **Awarded to projects in a competitive market place that drives down costs**
- **A way to secure multi-billion pound infrastructure investment**

Strike price levels are purely for illustrative purposes

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What else makes good policy and why does it matter?

1. Targets for delivering renewable energy

+

2. Stable frameworks

+

3. Simple and transparent frameworks that work for everyone

=

1. Attracting investors

2. Keeping investors at the table

3. Rapid deployment of renewables

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Good policy allows industry to deliver scale, innovation and industrialisation to drive down costs in offshore wind

1 Scale

- Turbines and rotor size
- Lease areas
- Vessel size
- Cable capacity

✓

2 Innovation

- Foundation design (e.g. monopiles)
- Electrical systems
- Windfarm layout
- Optimized installation schedules

✓

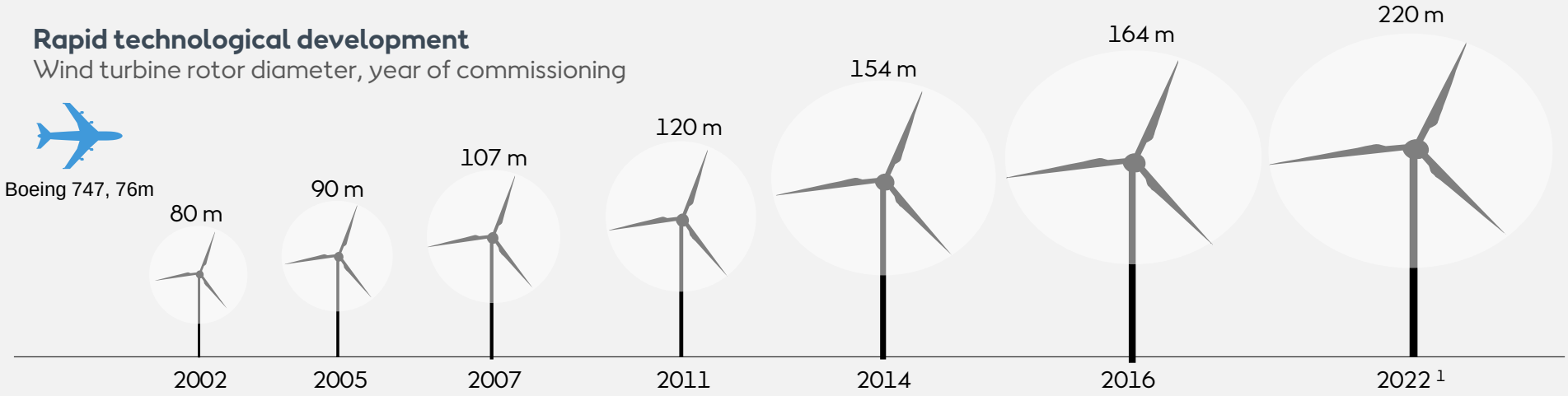
3 Industrialisation

- Transition from single supply to multiple global suppliers
- Long-term target based collaboration with key suppliers

✓

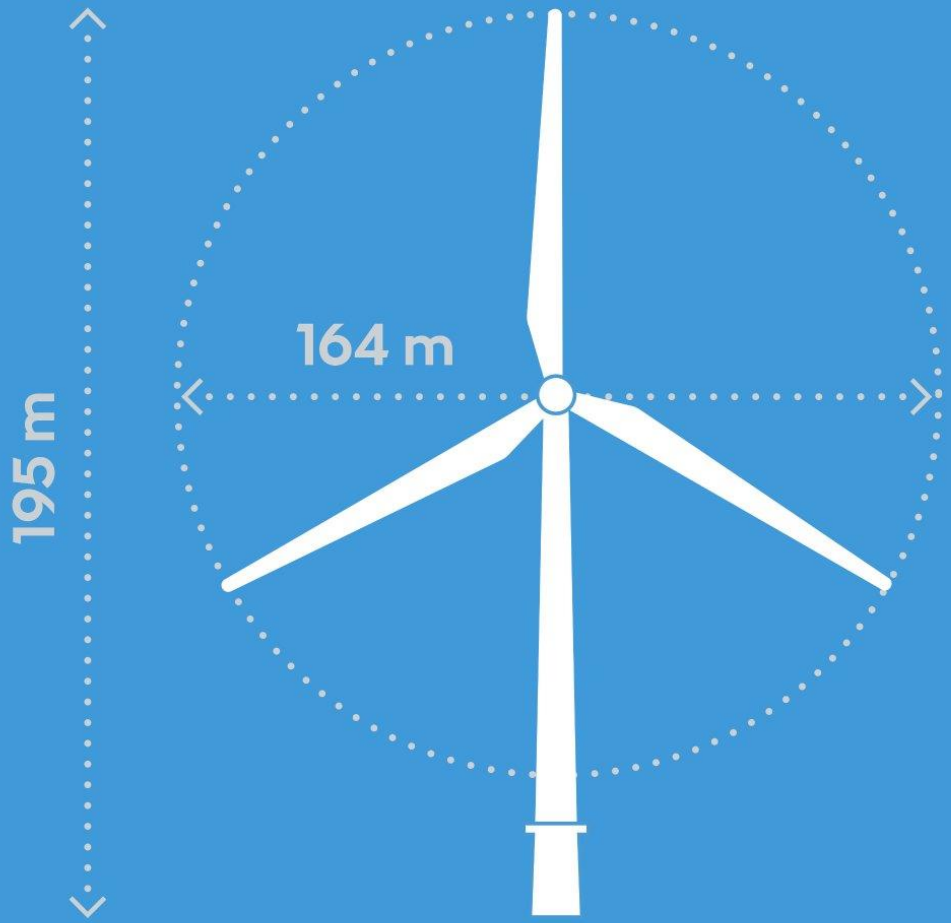
Rapid technological development

Wind turbine rotor diameter, year of commissioning

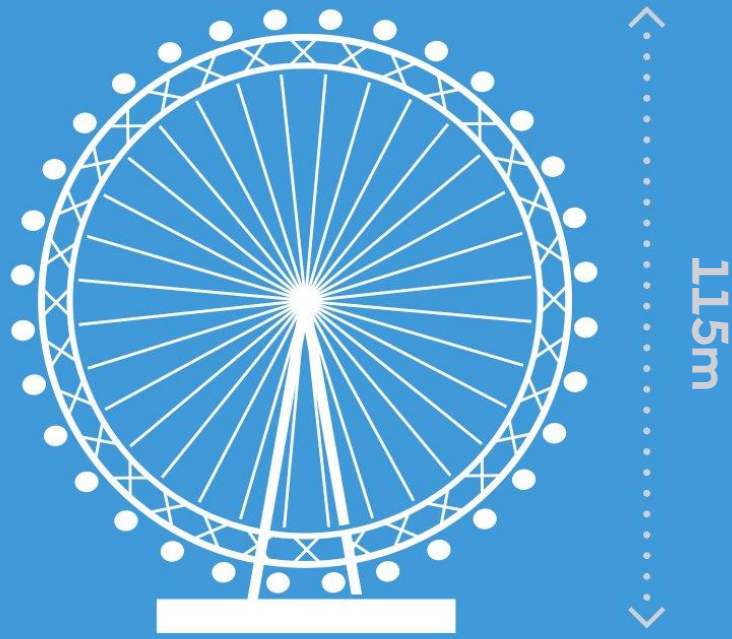


Note 1: Ørsted selected GE Renewable Energy as the preferred turbine supplier for two of its US offshore wind farms which marks the world's first commercial deployment of GE's Haliade-X 12MW offshore wind turbine

Our turbines in perspective



Burbo Bank Extension



Wolmi theme park

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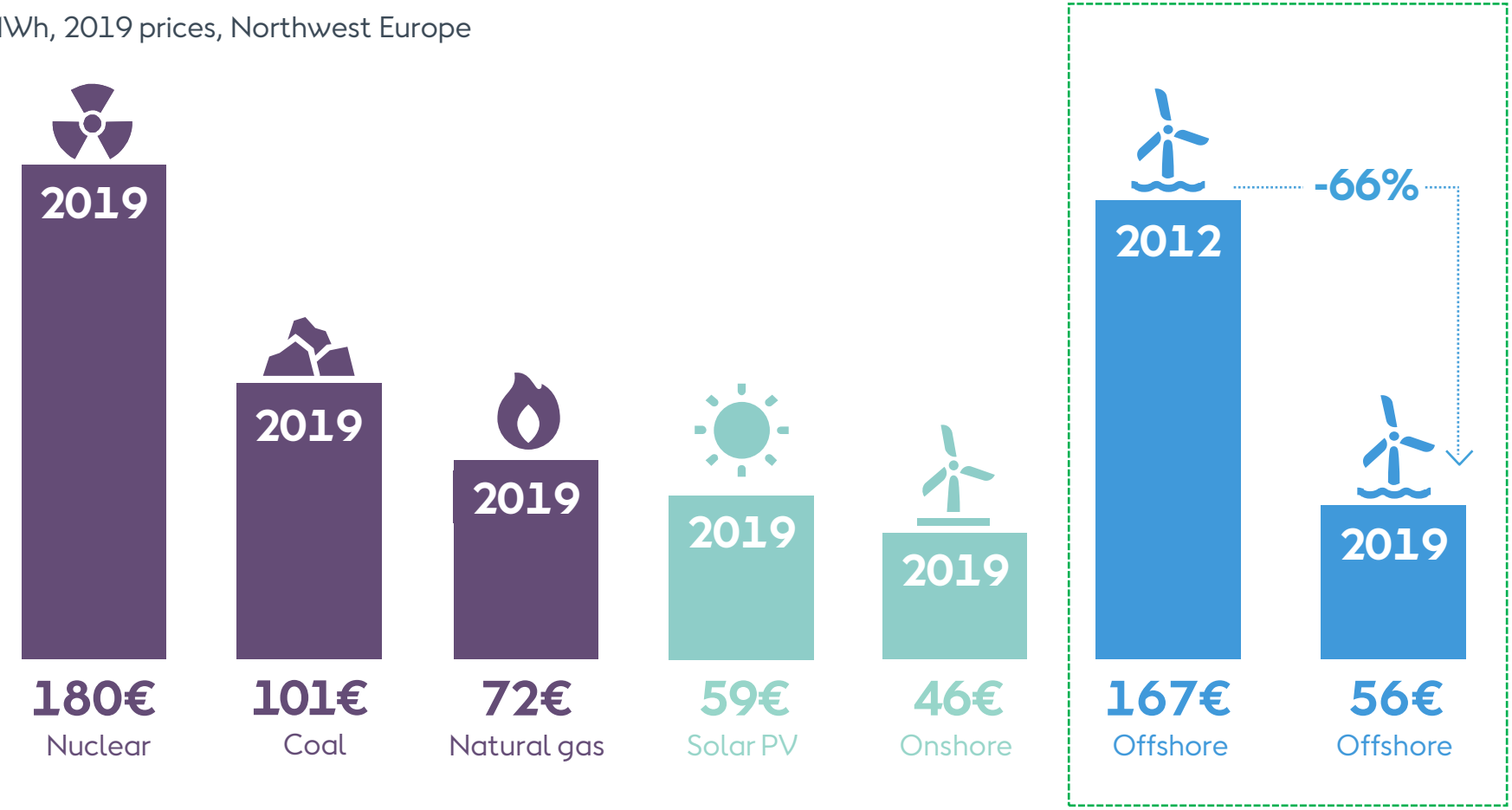
Levelised cost of electricity for different technologies

Rapid cost reductions delivered by industry have made offshore wind power competitive relative to conventional power generation based on fossil fuels

EUR/MWh, 2019 prices, Northwest Europe



Source: BloombergNEF – 1H 2019 LCOE Update, current LCOE. and Ørsted Calculation.
Onshore wind: average of DE, NL and UK mid-scenarios. Solar PV, Gas: average of DE, UK mid-scenarios. Coal: DE mid-scenario. Nuclear: UK mid-scenario.
Offshore wind: 2012 generic offshore wind, Northwest Europe, FID 2012. In 2012 our goal was to reduce offshore wind costs to EUR 100 per MWh in 2020. 2019: Ørsted calculations from UK CfD Round III. Exchange rate EUR:USD: 0.89, YoY inflation 2017-2018: 1.75%.

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European offshore wind growing to 22GW today

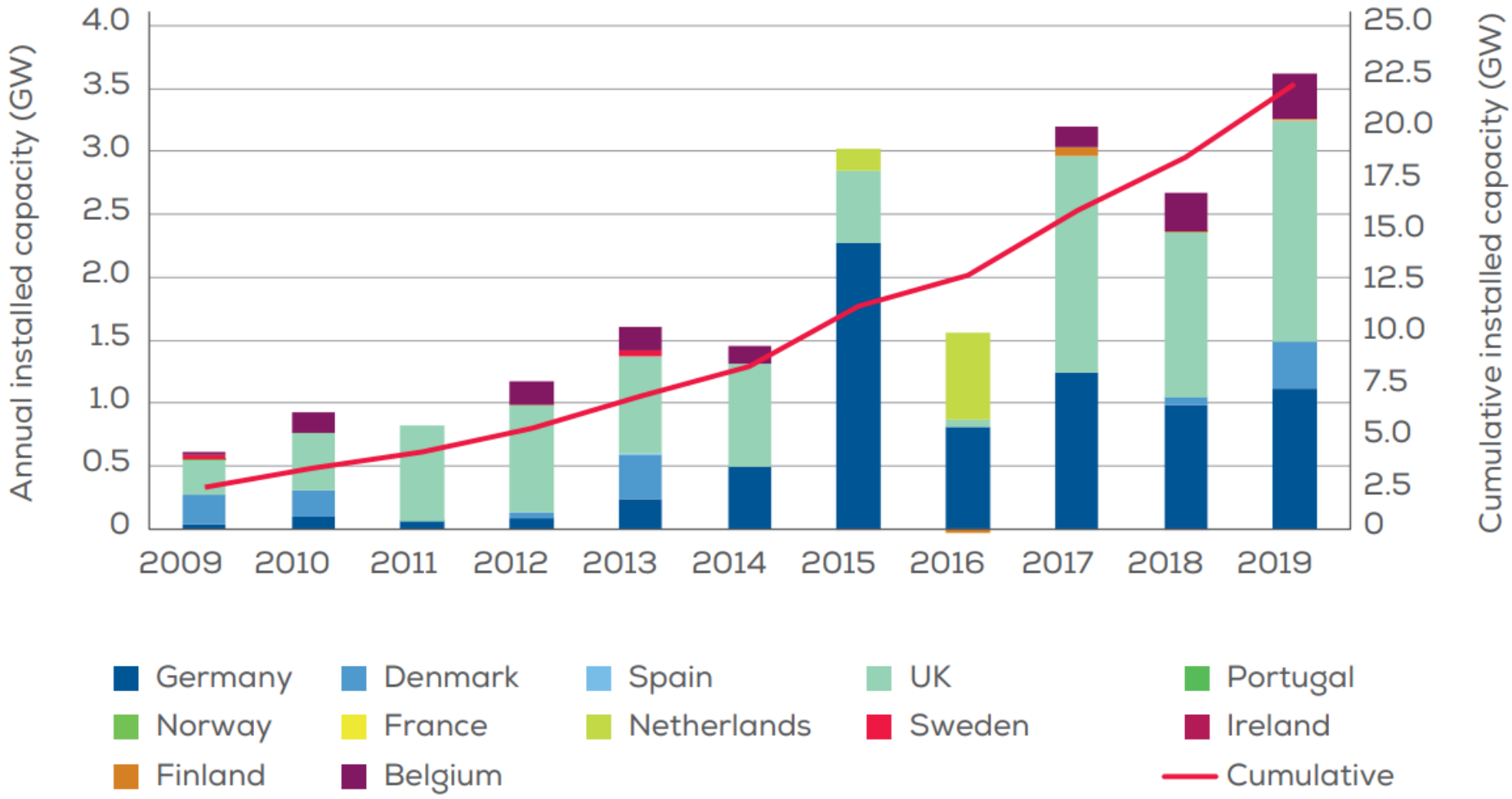

 Chart source: WindEurope (2019)

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3.
Europe's offshore wind journey

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The EU has just launched its own Offshore Wind Strategy...

targeting

60 GW

by 2030...

...and

300 GW

by 2050 (exc. UK)

...and some national govts have their own targets to 2030

Belgium	Denmark	France	Germany	Netherlands	Poland	UK
4GW	10.3GW	6GW	20GW	10GW	5.9GW	40GW

Targets based on either National Government targets or stated NECP contributions

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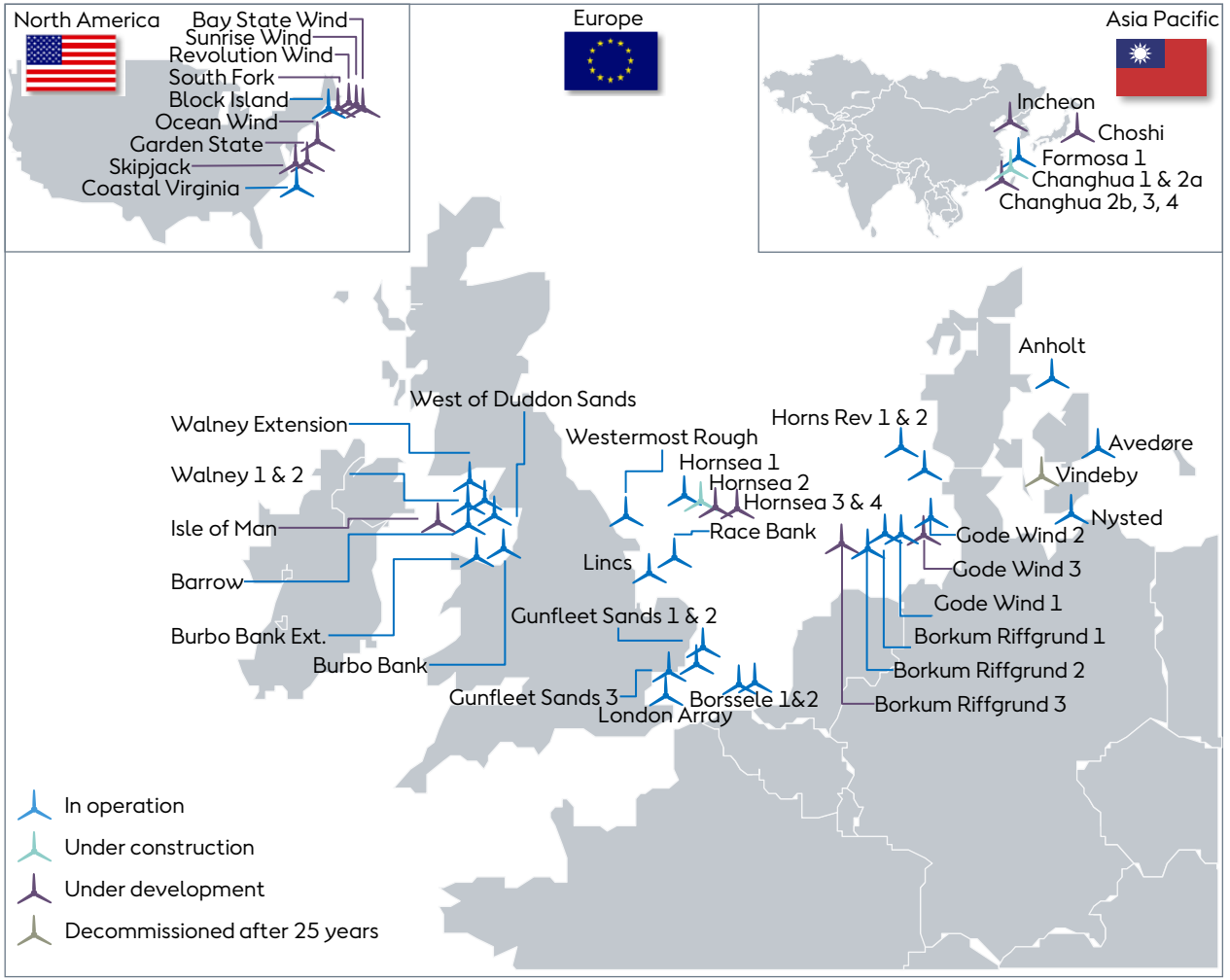
Ørsted Offshore overview

Global market leader in offshore wind with c.30 years of experience

Ørsted offshore wind global footprint



Unparalleled experience and track record

1991 — c. 30 years of experience and track record in the offshore wind power sector — 2020

28 offshore wind farms in operation

2 offshore wind farms under construction

7.6 GW Constructed capacity

2.3 GW under construction

2,777 Dedicated employees

18 million people with clean electricity

~ 1,600 turbines installed in c. 30 years

25 Partnerships

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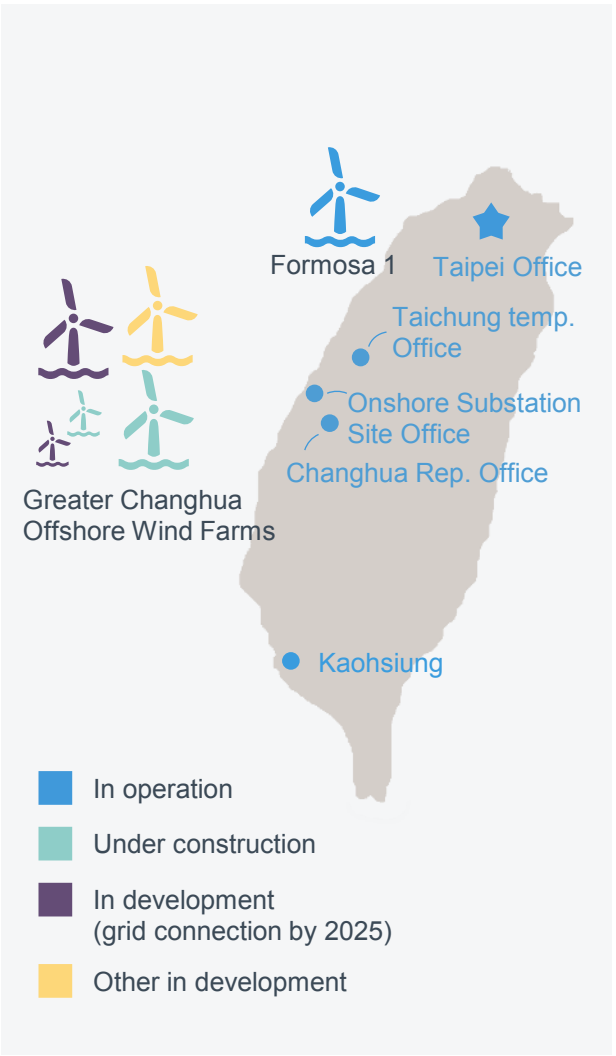
Ørsted Offshore in Asia Pacific

Frontrunner in developing large-scale offshore wind farms in the region



Taiwan

Formosa 1

- Capacity: 128MW
- COD in 2019 becoming the **first commercial scale offshore wind farm in Taiwan**

Greater Changhua

- Greater Changhua 1 & 2a
  - Capacity: **900MW**
  - Est. completion**: 2022**
  - Status**: In construction**
- Greater Changhua 2b & 4
  - Capacity: **920MW**
  - Est. completion: **2025**
  - 20-year fixed-price CPPA with TSMC
  - Status**: In development**
- Greater Changhua 3
  - Capacity (EIA awarded)**: 570MW**
  - Status**: In development**

Japan

Choshi

- Project near Tokyo (JV with TEPCO)

South Korea

Incheon

- Potential capacity of up to 1.6GW of the coast of Incheon City

Ørsted built a strong integrated end-to-end business model

Ørsted Offshore core competencies

~2,777 Full-time employees

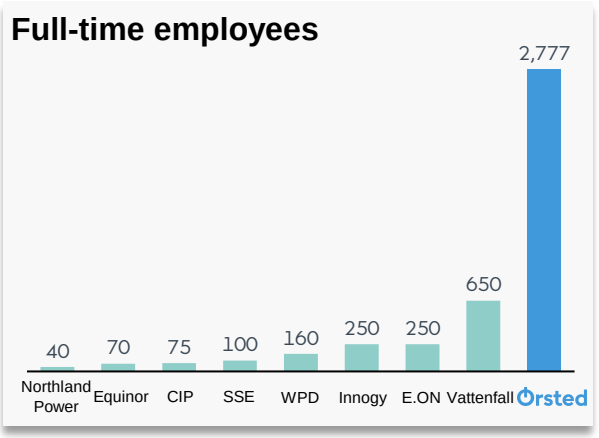
Develop ~300
Identify and mature projects

Build ~1,527
Manage construction, sourcing and supply

Operate ~800
Conduct life-cycle maintenance

Own ~150
M&A, attract capital through partnerships, asset management

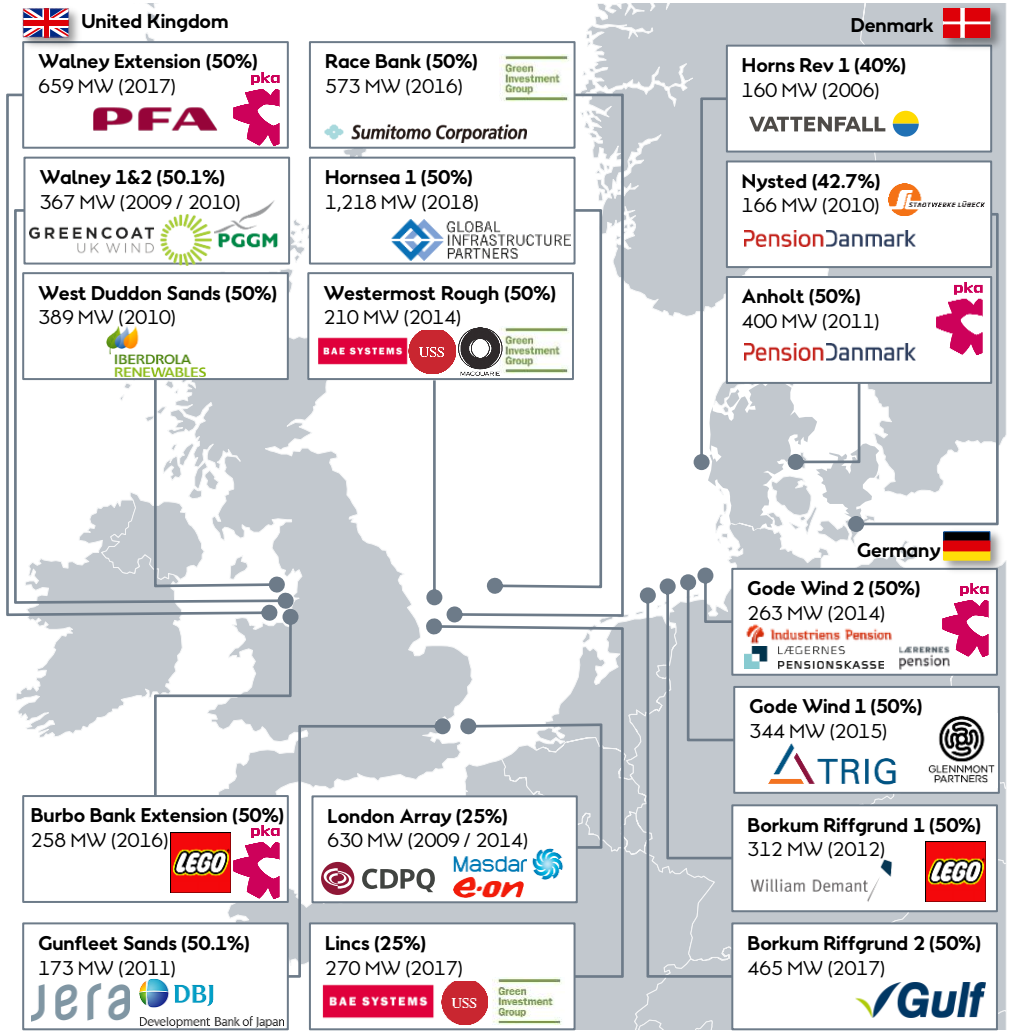
- ✓ Ability to **design and optimise** projects with a **'total life-cycle cost of wind farm'** mindset
- ✓ Experience and expertise along the entire value chain allow for **better understanding and management of risks**
- ✓ End-to-end model reduces LCoE through **fast** feedback and **learning** across the entire organisation



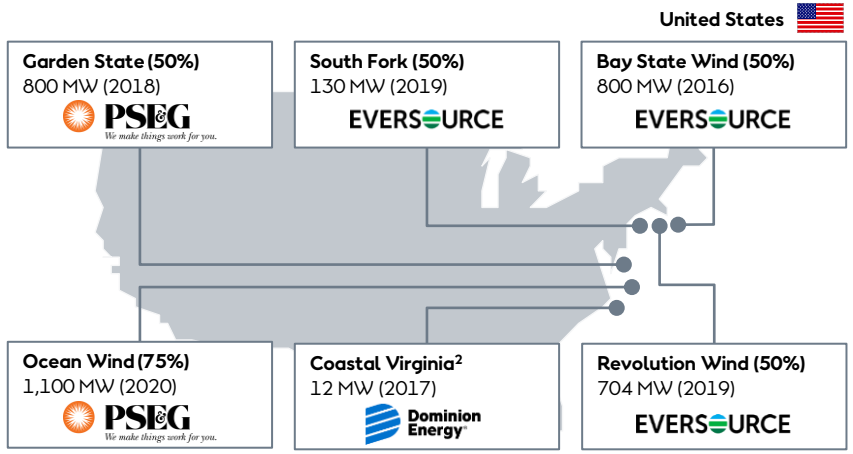
Overview of Ørsted's global partnerships

Ørsted has a long standing and proven track record in developing successful partnerships

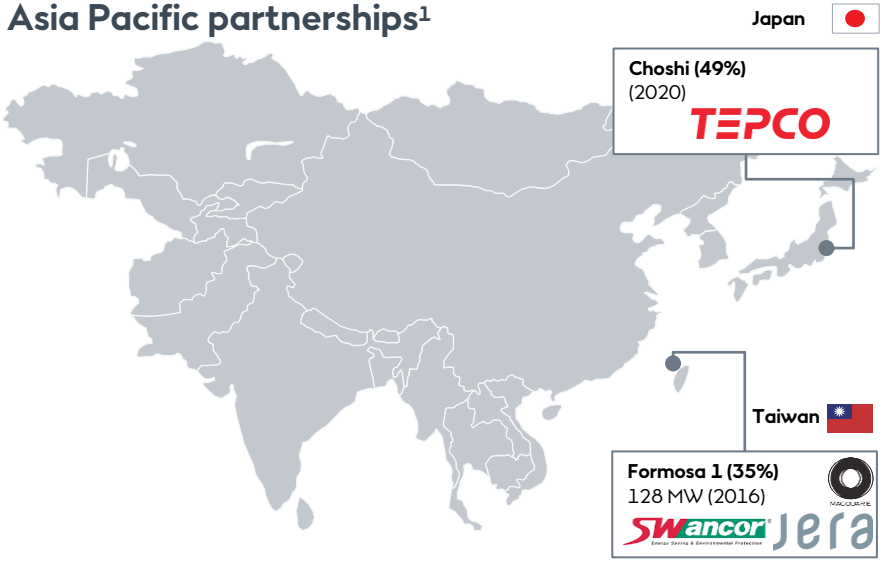
European partnerships[1]



North American partnerships[1]



Asia Pacific partnerships[1]



Note 1: The percentage in brackets represents Ørsted ownership interest and year when the original partnership was created
Note 2: In 2017 Ørsted and Dominion Energy entered into a strategic partnership in which Ørsted provided EPC services to construct the project

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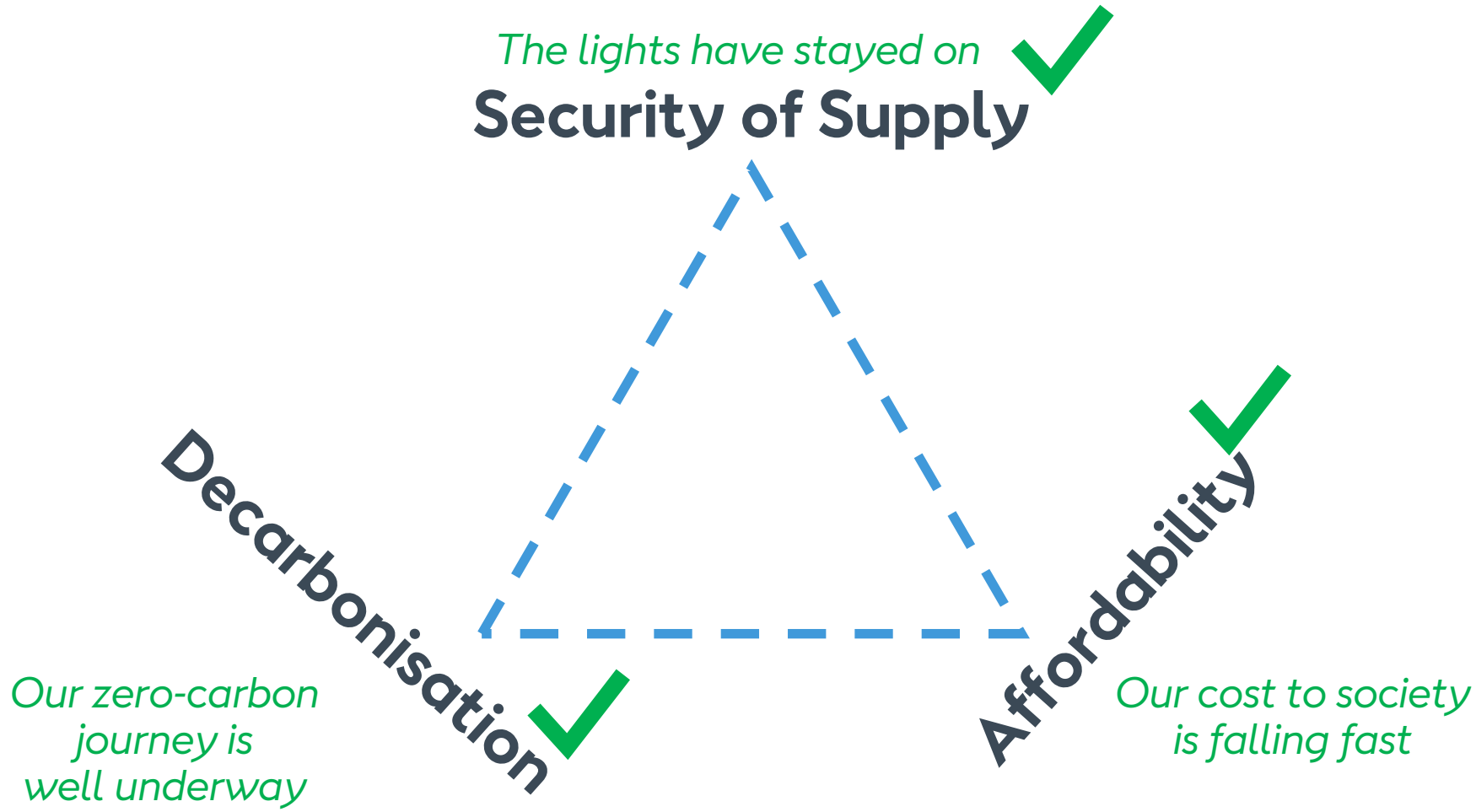
The classic energy trilemma



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4.
Consumers demanding a world that runs on green energy

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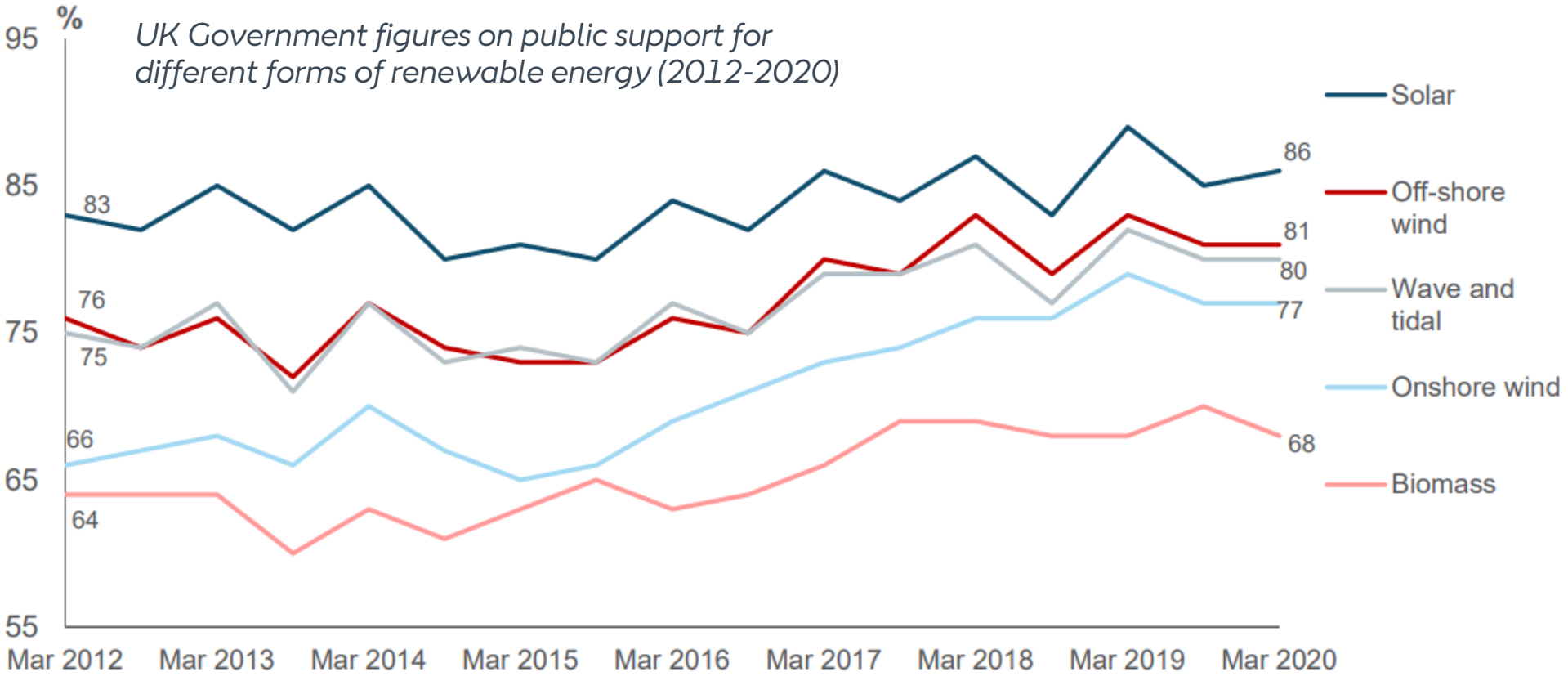
Public support for renewable energy is consistently high

Constant engagement and capacity building is important to ensure we do not lose momentum on the energy journey



Source: BEIS Public Attitudes Tracker Survey (PATS)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/884028/BEIS_PAT_W33_-_Key_findings_Final_.pdf

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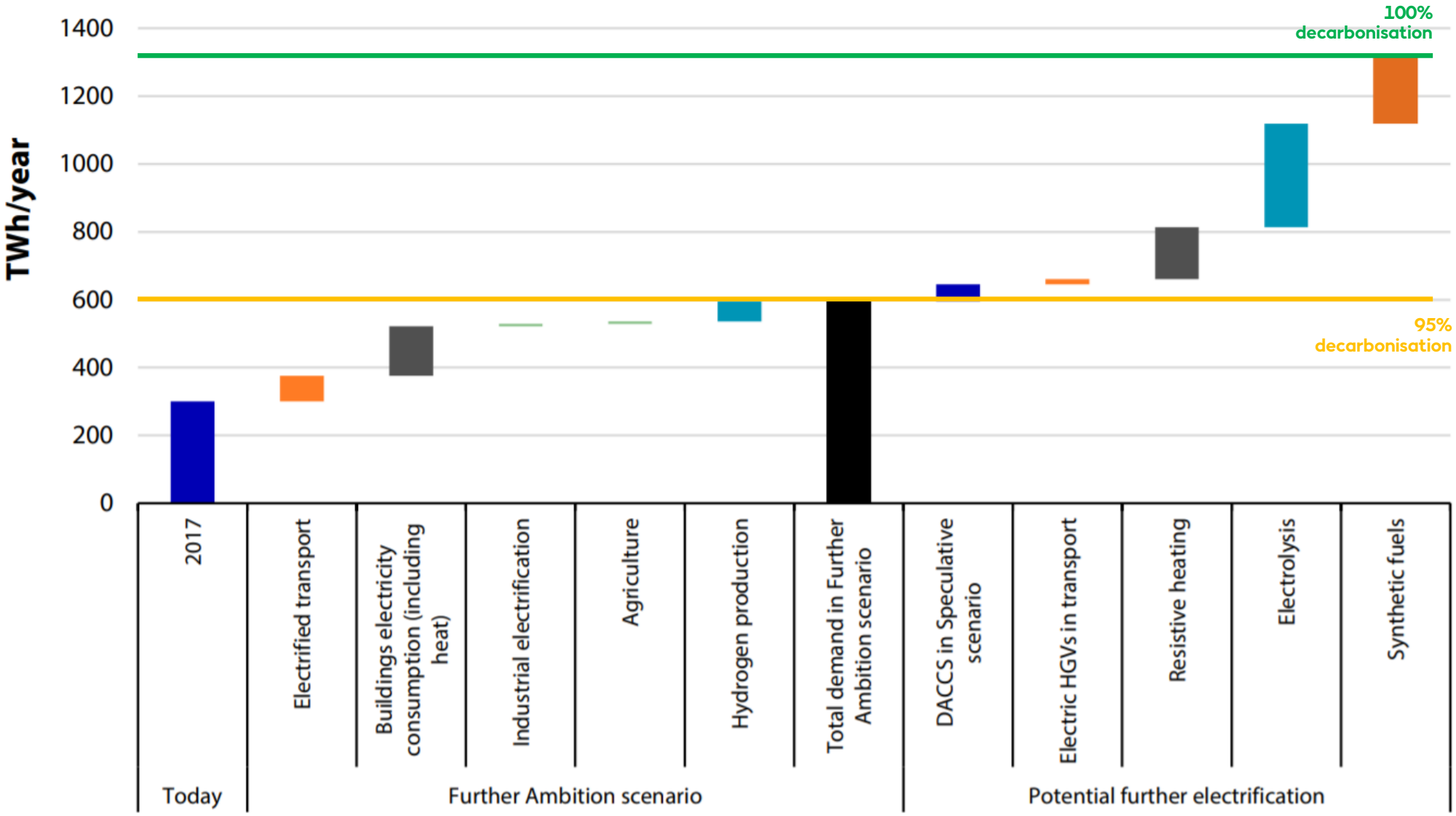
UK: Significant transformation as a route to decarbonisation



Source: CCC (2019): The UK's contribution to stopping global warming

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Green fuels for Denmark:
Bringing green electricity and renewable hydrogen to Copenhagen

Tak! Thanks!

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