



OFFSHORE WIND POWER

PAST, PRESENT AND FUTURE

SCIENCE MEET INDUSTRY 2022





Wind power professional since 1998

- 2022 - Owner of Aabo Energy
- 2022 - Product Consultant by 
- 2010 - 2022 Head of R&D by 
- 2007 - 2010 VP for Product Management by 
- 2005 - 2007 Head of Product Management by 
- 1998 - 2005 Product Management and various positions in  

Below the line

- Since 2012 **Various BoD positions** in renewables energy companies
- **Volunteer work** as WindClusion, OffshoreWind4Kids, Engineer the Future etc.
- Affiliations as wind power expert for **DOE (US)**, **Danish Research and Innovation Policy Council**, **ETIP Wind (EU)** and expert for **Innovation Fund Denmark** etc.
- Education: **M.Sc. in Civil Engineering**
- Declared TIMBY!

The short history of offshore wind power



Built in 1991, Vindeby in Denmark was the world's first offshore wind farm



Middelgrunden wind farm



Principle Power's WindFloat Prototype, Portugal, 2011



Construction of foundations for an offshore wind farm in Denmark, 1995

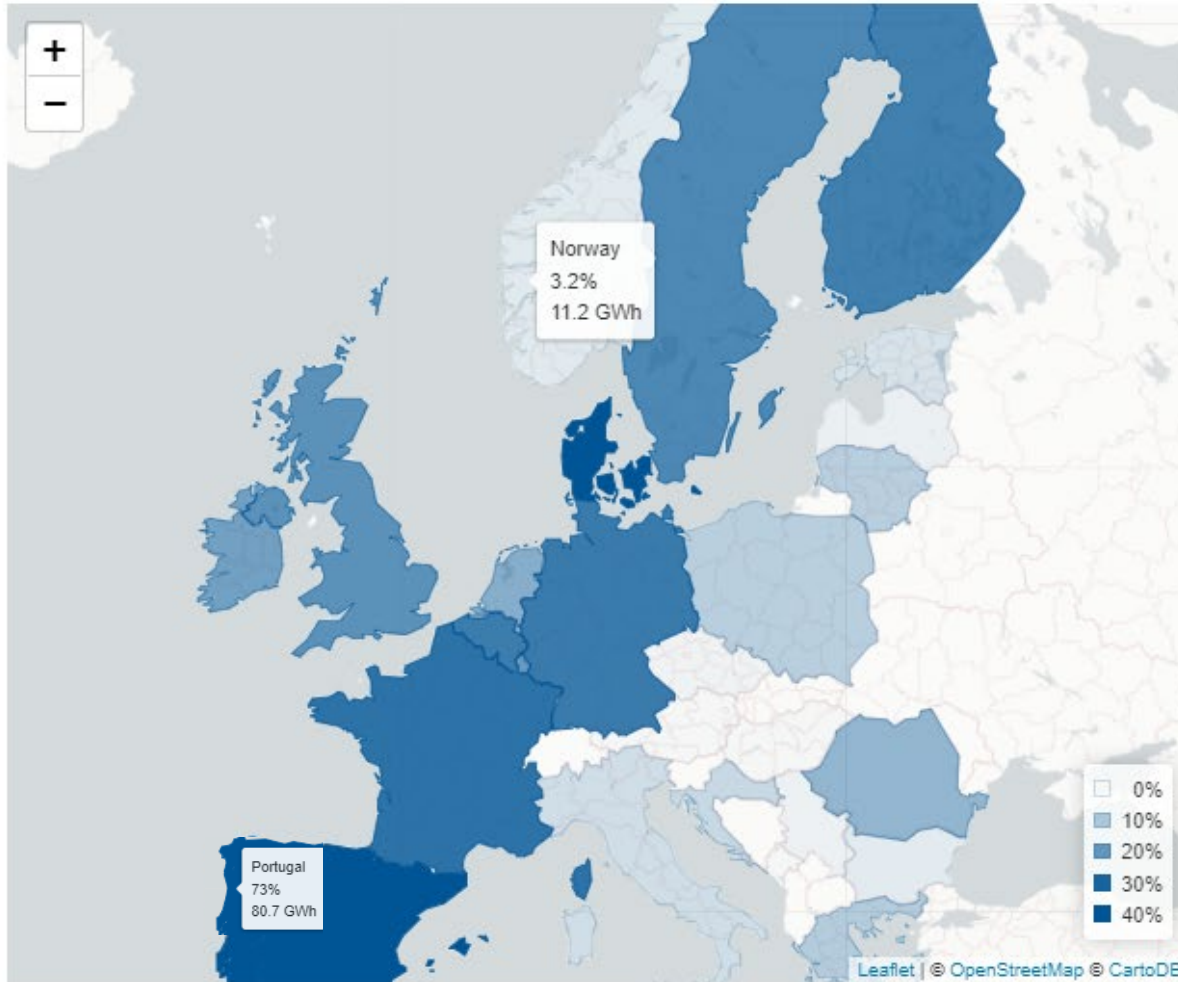
Statoil's Hywind floating turbine, Norway, 2009

- Jan. 2020 Hornsea One commissioned, 1.2 GW, 174 SWT-7.0-154
- Nov. 2020 Dogger Bank FID, 2.4 GW, 190 Haliade-X 13 MW
- Jan. 2021 Danish Energy Island announced.

How much wind was in Europe's electricity yesterday?



-  DAILY WIND ENERGY
-  YESTERDAY'S TOP 20 COUNTRIES
-  HOURLY ELECTRICITY MIX
-  HOURLY WIND ENERGY GENERATION
-  CAPACITY FACTORS



Share of wind energy in electricity demand

20.6%

 **17.4%**
1,126 GWh onshore wind

 **3.2%**
205 GWh offshore wind

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New to wind power numbers?
[See the explanation](#)

BLIND OPTIMISM?

Climbing a hill is one thing ... the mountain ahead is a completely other story!

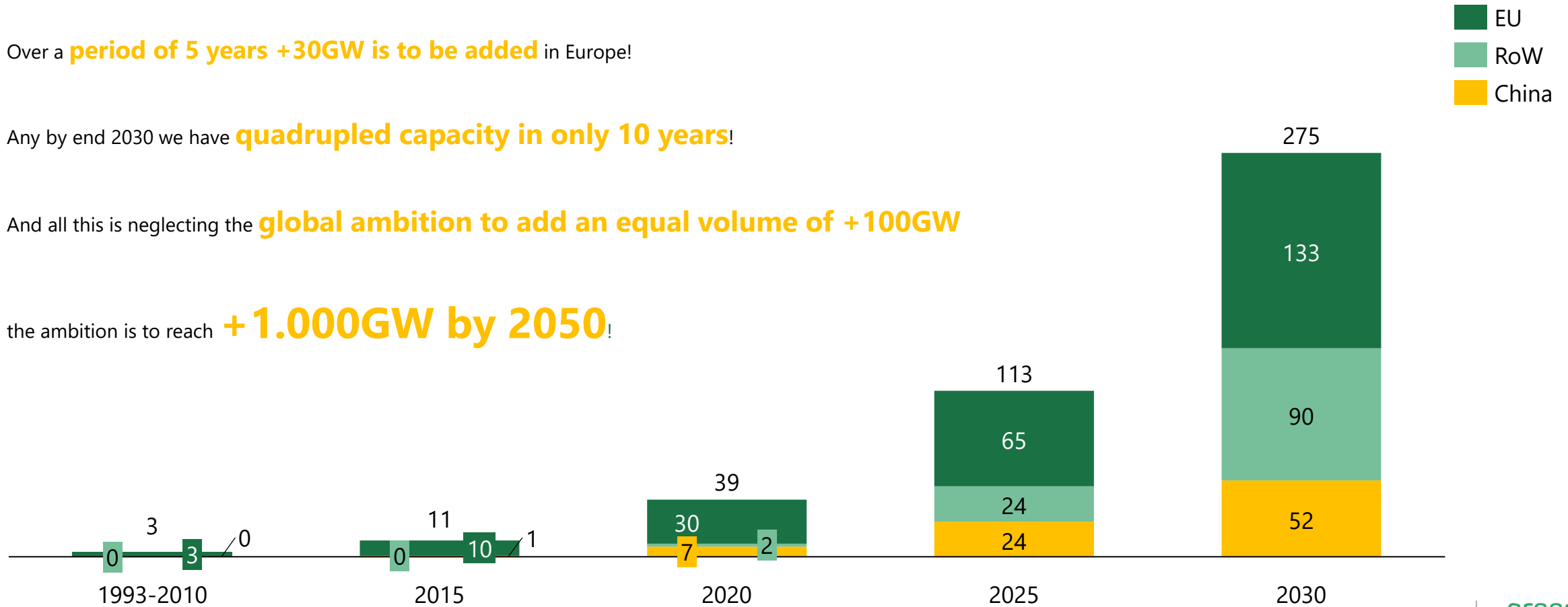
It took us **30 years to reach 30GW** offshore wind power capacity in Europe!

Over a **period of 5 years +30GW is to be added** in Europe!

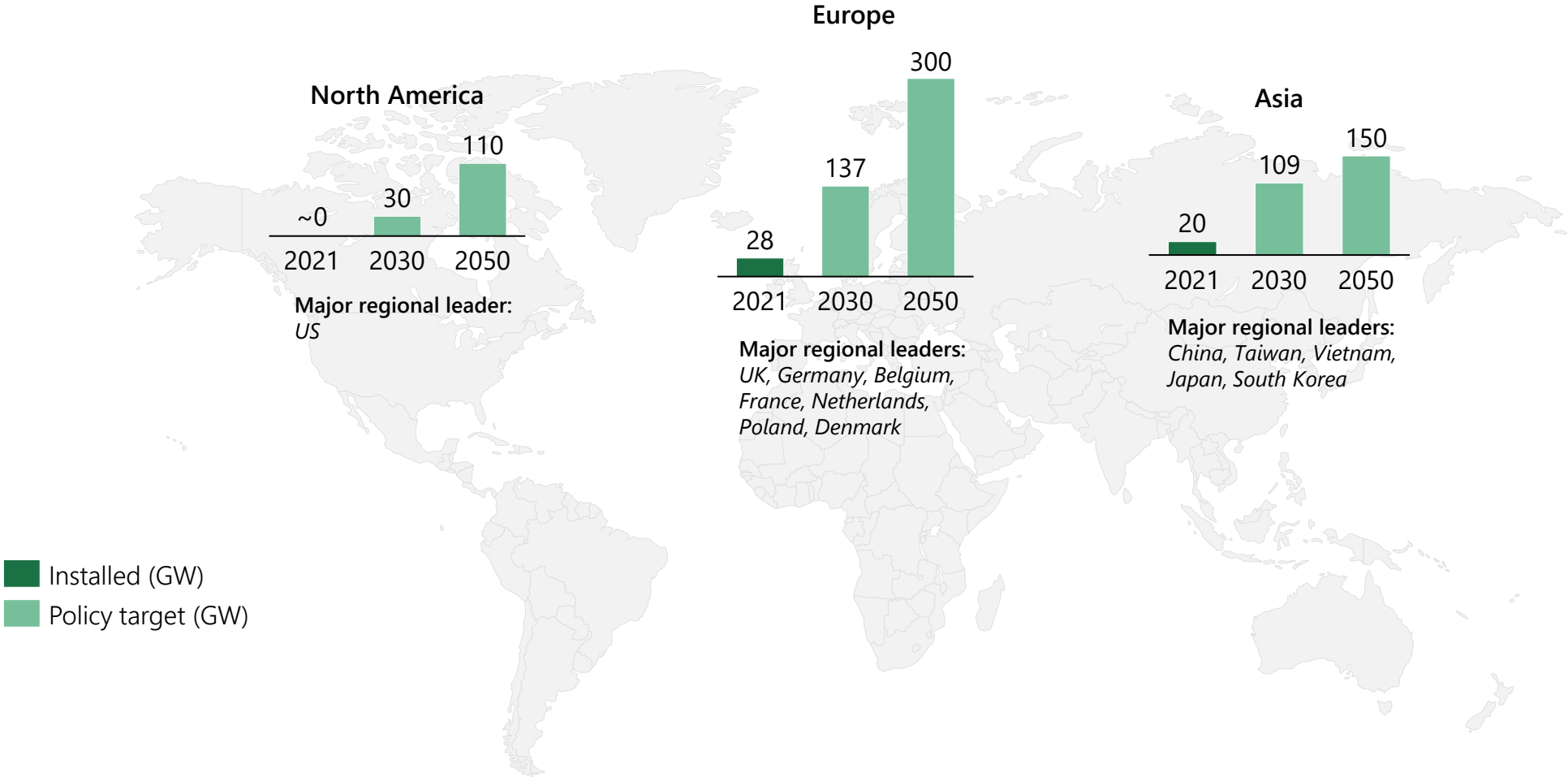
Any by end 2030 we have **quadrupled capacity in only 10 years!**

And all this is neglecting the **global ambition to add an equal volume of +100GW**

the ambition is to reach **+1.000GW by 2050!**

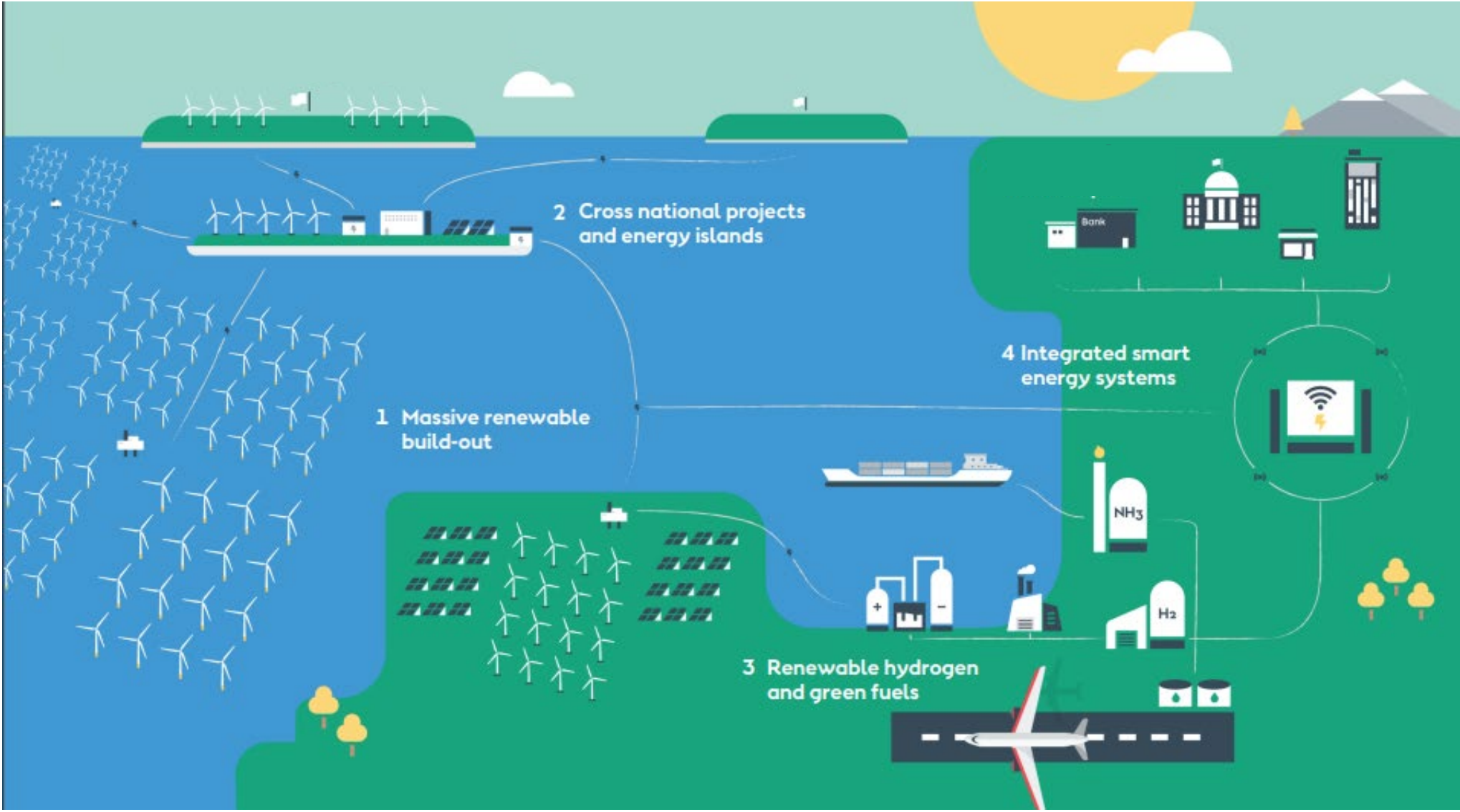


Regional offshore wind capacity targets



Source: GWEC (Q4, 2021) – Adapted by Green Ducklings

The future energy system?



What need to happen for offshore wind power build out?

Adequate policy frameworks and permitting processes

Logistics build out

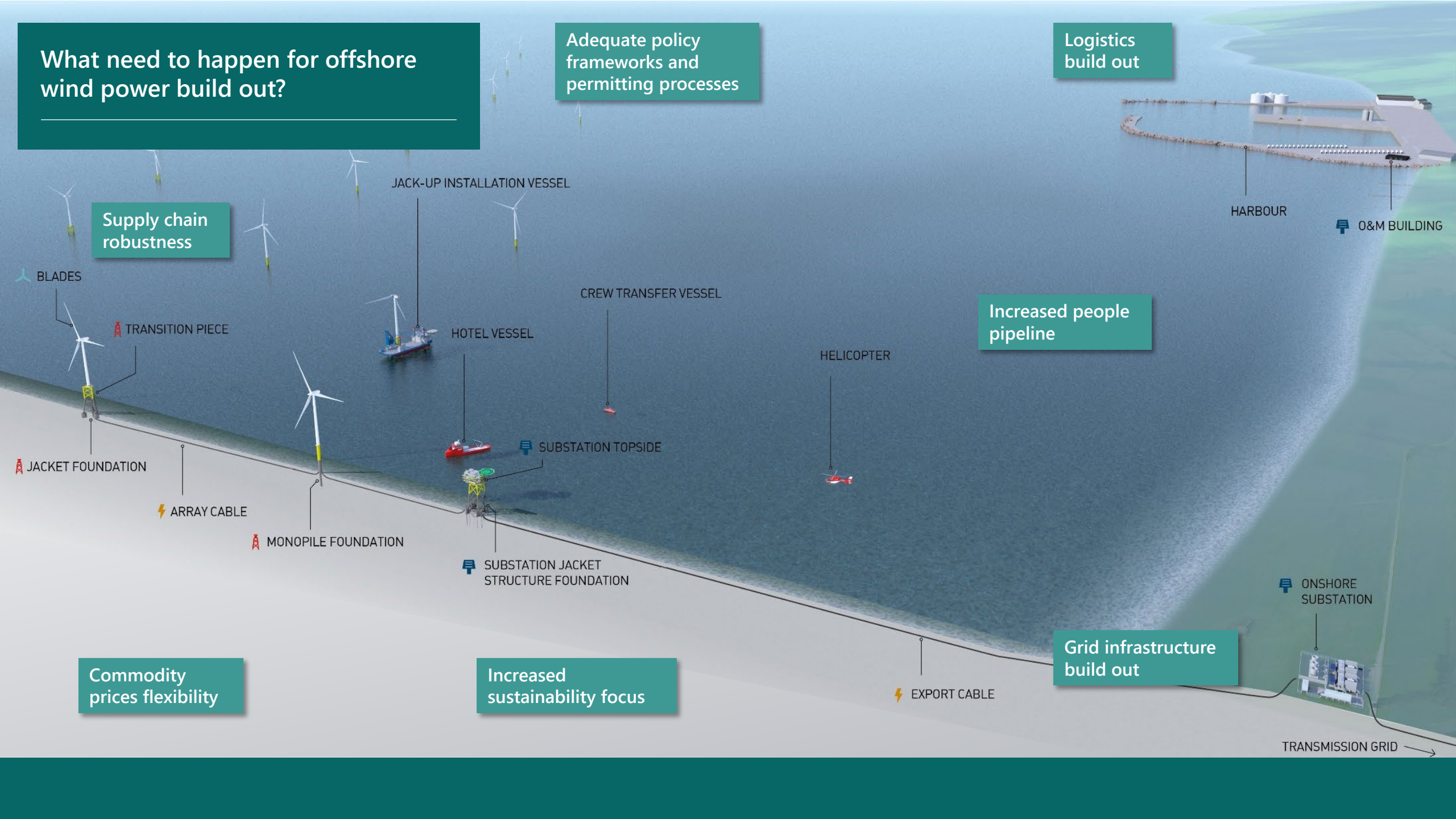
Supply chain robustness

Increased people pipeline

Commodity prices flexibility

Increased sustainability focus

Grid infrastructure build out



BLADES

TRANSITION PIECE

JACK-UP INSTALLATION VESSEL

CREW TRANSFER VESSEL

HOTEL VESSEL

HELICOPTER

SUBSTATION TOPSIDE

JACKET FOUNDATION

ARRAY CABLE

MONOPILE FOUNDATION

SUBSTATION JACKET STRUCTURE FOUNDATION

HARBOUR

O&M BUILDING

ONSHORE SUBSTATION

EXPORT CABLE

TRANSMISSION GRID