



## Offshore wind - the past, present and the future

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*Learn from the past, live the present and prepare for the future*

## The past

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It takes time

It was about taking many steps in the same direction

You can not do it alone



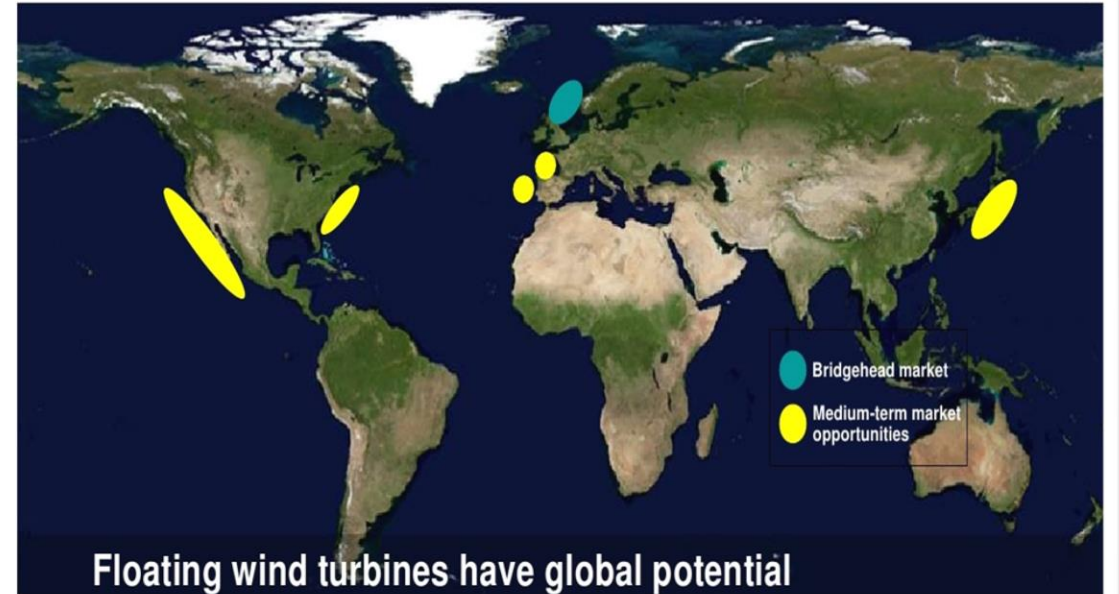
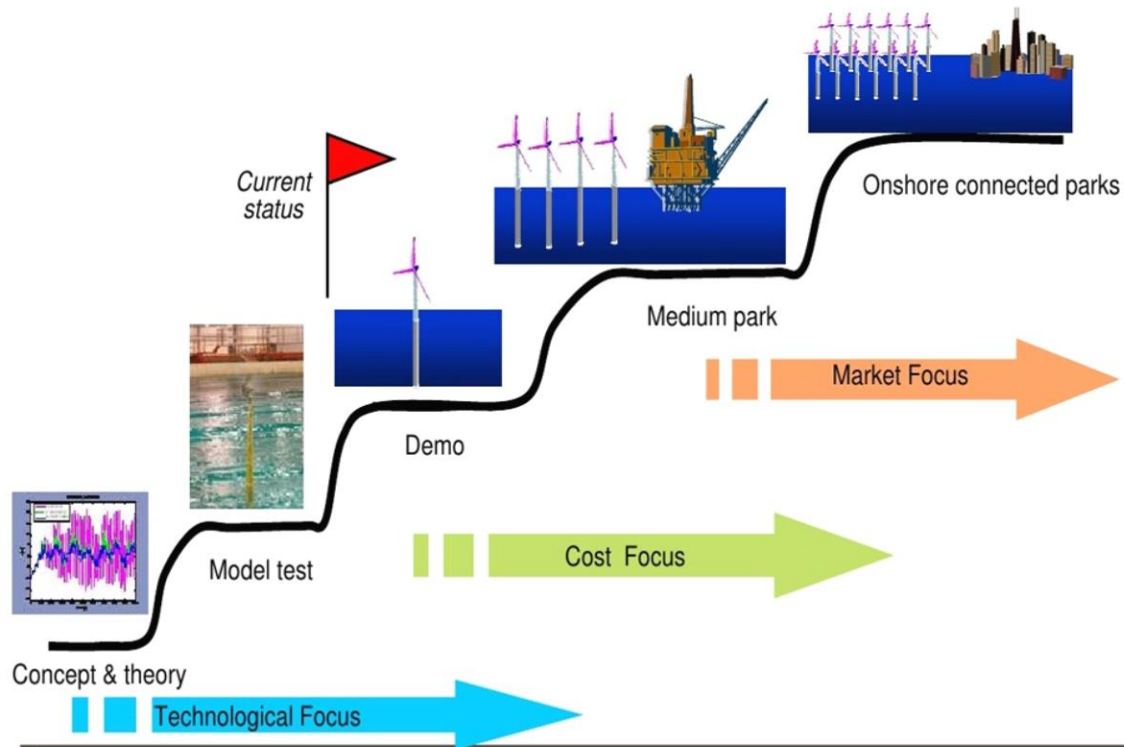


# It takes time and you have to have patience....

2006

7

## Long way from idea to commercial concept



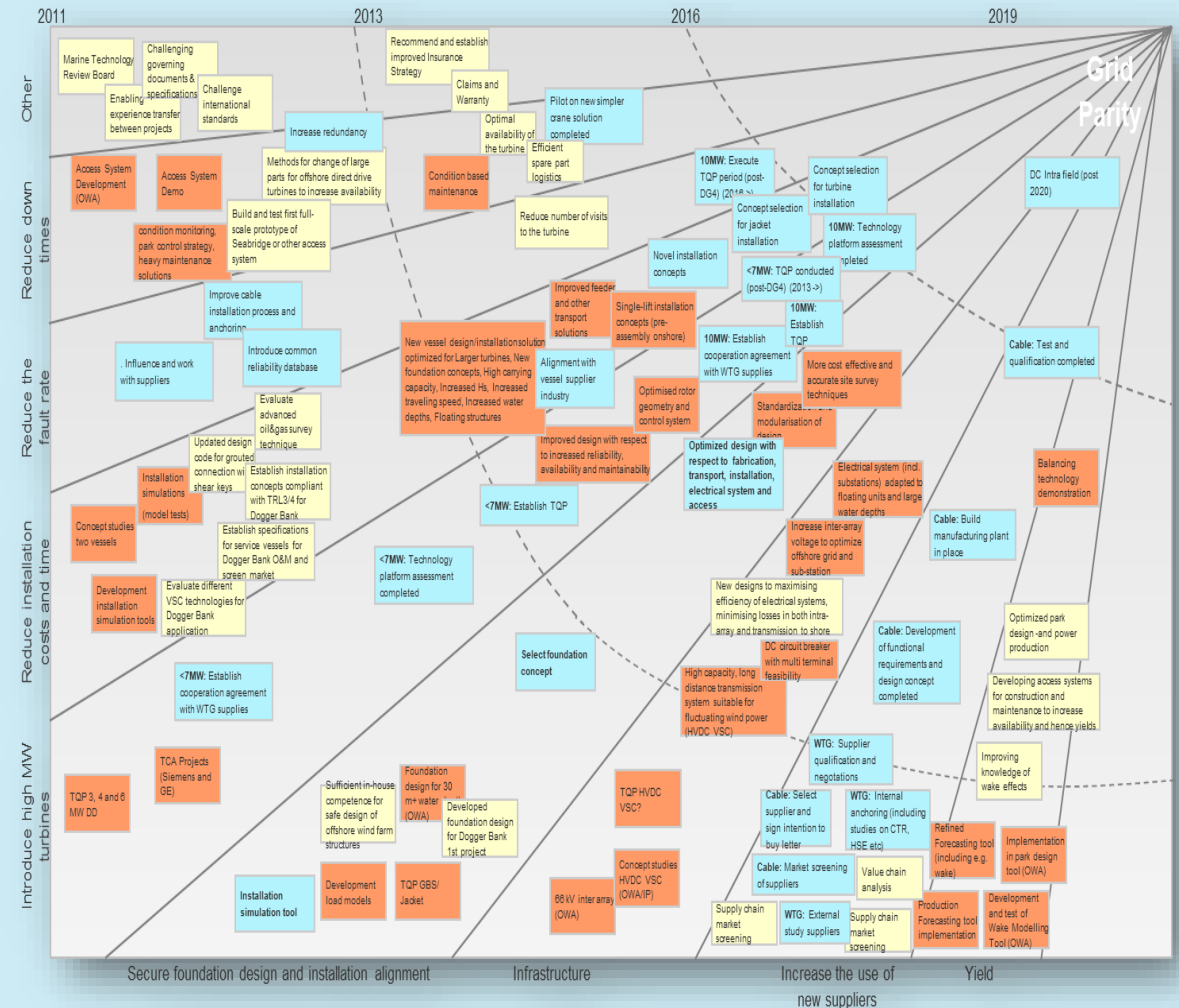
Map: NASA

- Deepwater sites exist near major consumption areas
- Market assessment based on:
  - Water depth
  - Wind conditions
  - Regulatory regimes
  - Market size
  - Price/incentives schemes

# No easy fix – many pieces to the puzzle



- De-risking
- Testing
- Implementation
- Scaling
- .....
- Cooperation



## The present

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It is all about delivering projects

Sharing is fundamental

Winning is not everything





# Building experience through execution and operations



## Technology Game – Learn

- Develop technology
- Learn from project to project
- Identify potential

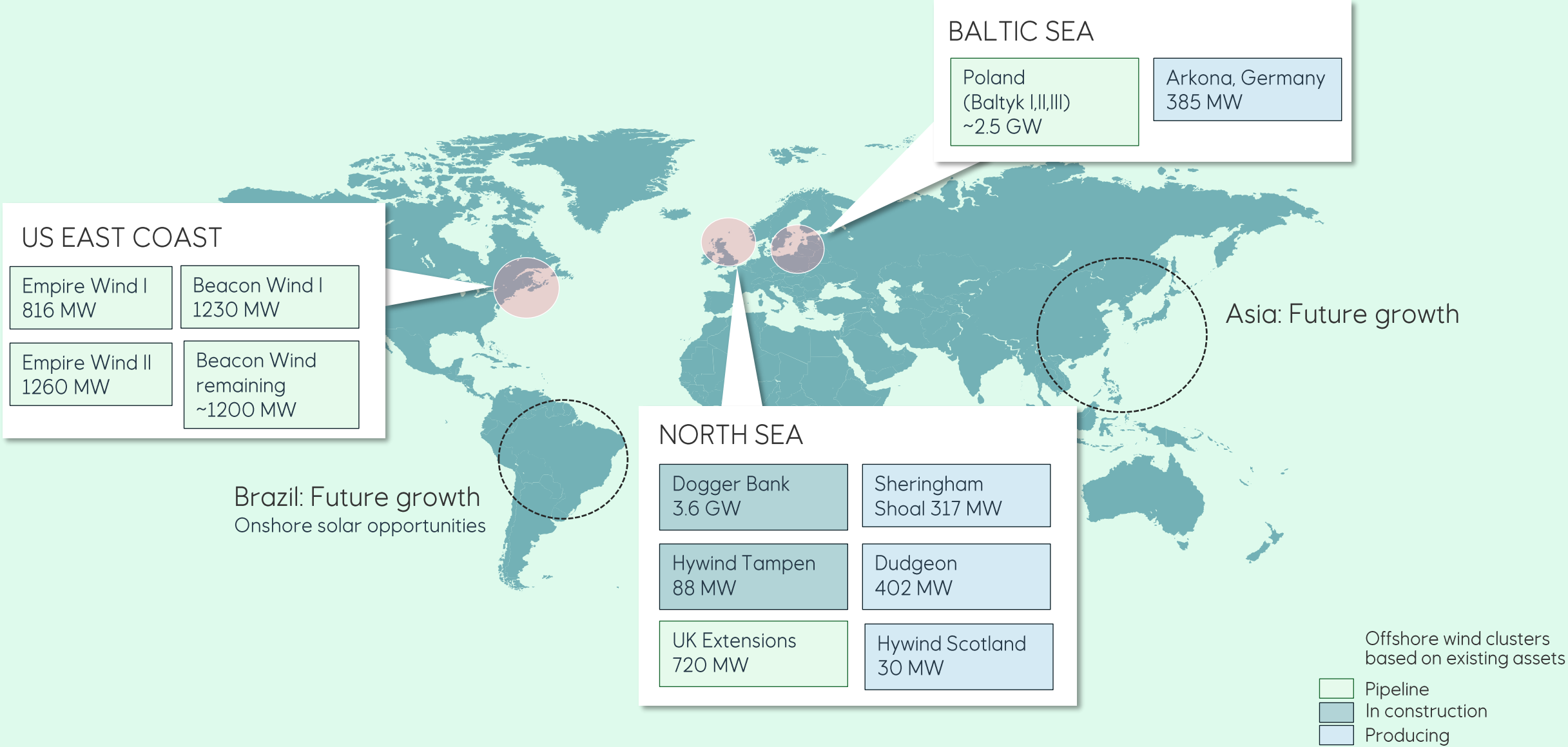
## Cost Game – Demonstrate & Mobilize

- Consolidate technologies
- Work with suppliers
- Share information and discuss issues

## Scaling Game – Commercialize

- Develop local supply chain
- Industrialise and scale up
- Competitive auctions
- Work locally

# Creating value from scale in regional clusters





# The future

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The total energy offering

Local is the new global

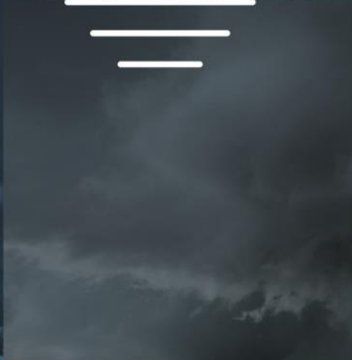
One size does not fit all

Floating the next wave



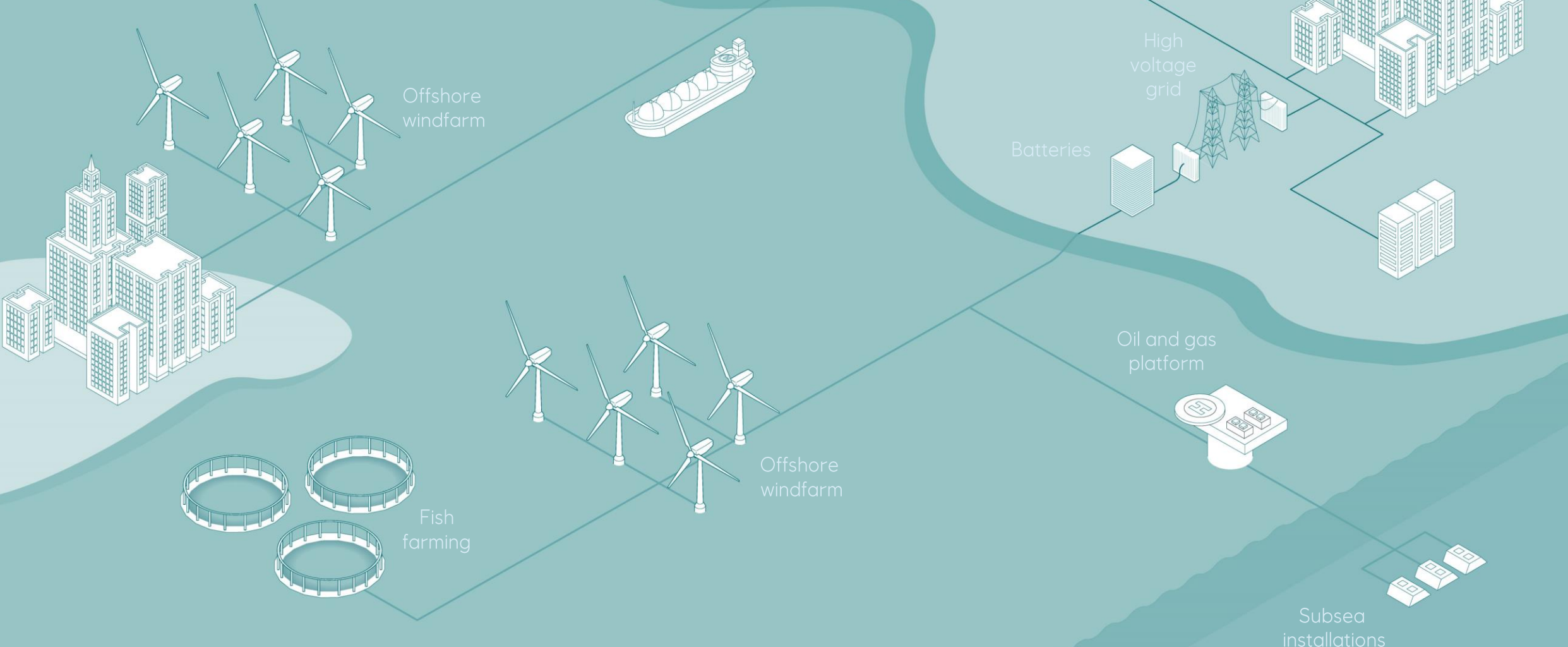


A demanding context around energy and climate



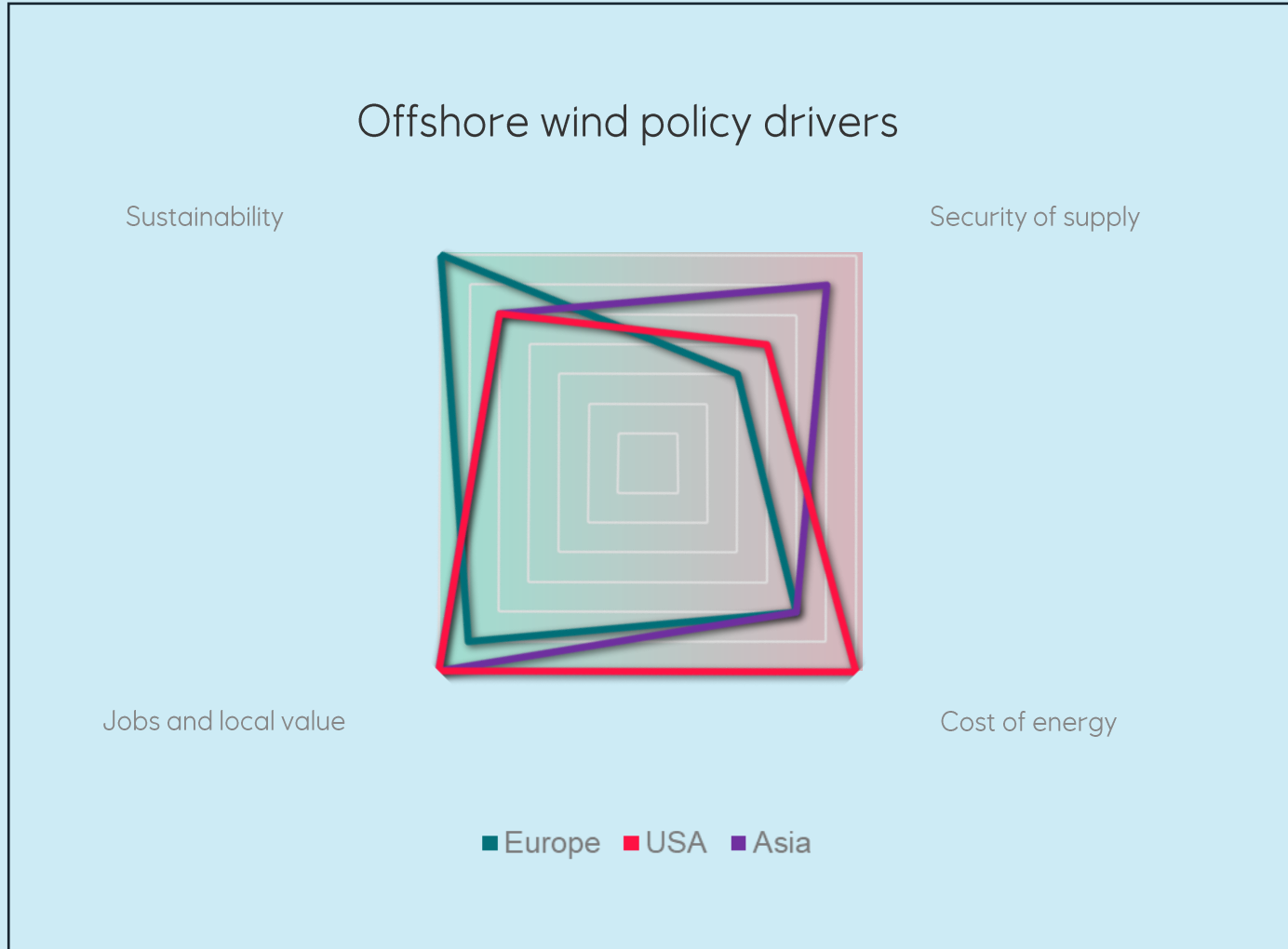


# Shaping the future of energy





# Government policy is crucial for offshore wind success....



- Volume ambition, policy credibility
- Role of industry vs government
- Clear framework
- Local content requirements
- Co-existence

# Further developing the North Sea

## An industrial plan for a European energy center

**3,9**  
Million boe/d  
Oil and gas production

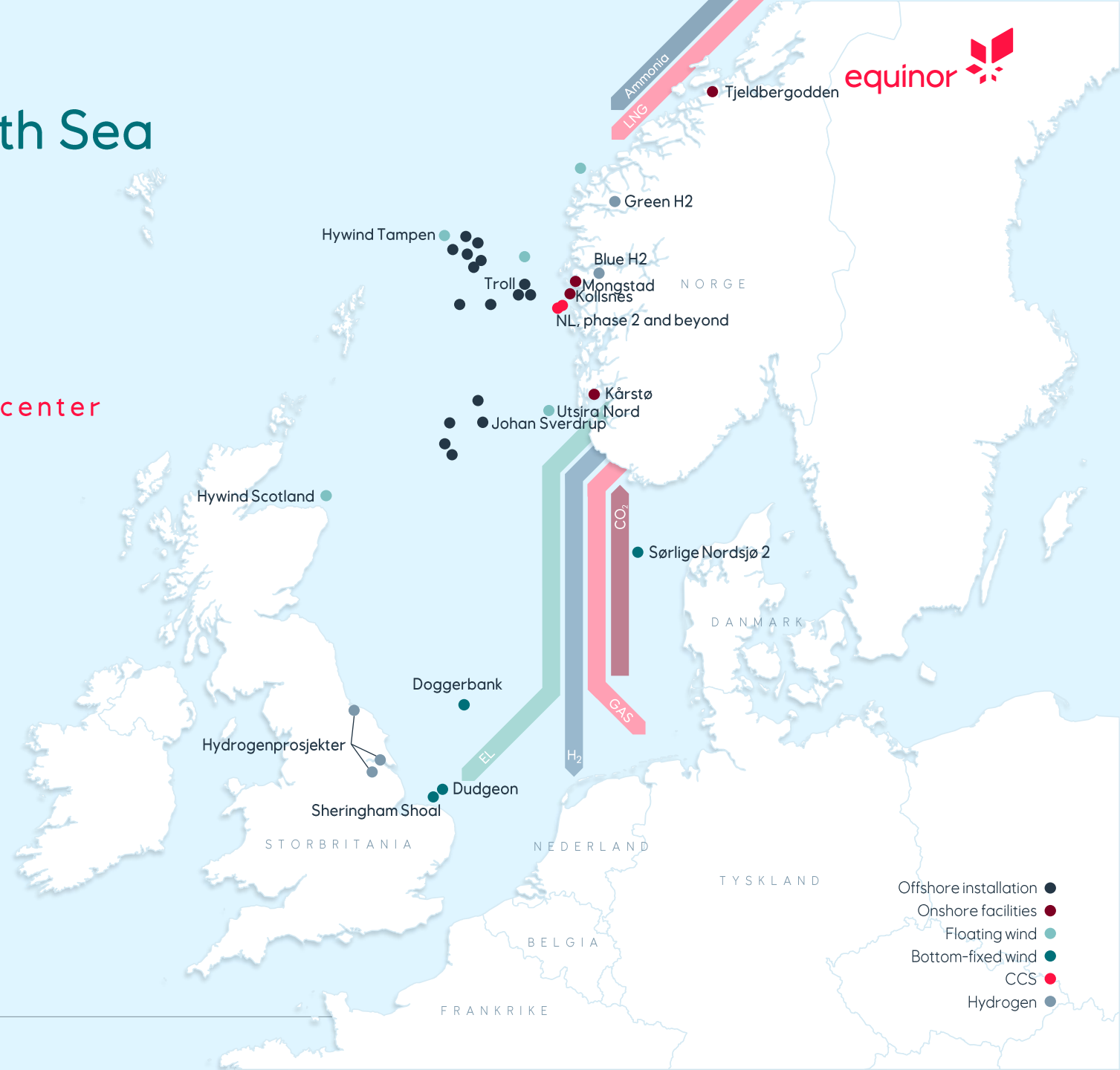
**50-100**  
kboe/d  
Export of LNG

**6,5**  
GW  
Bottom-fixed wind

**3,5**  
GW  
Floating wind

**40**  
Million ton/year  
CCS storage capacity

**2**  
GW  
Hydrogen

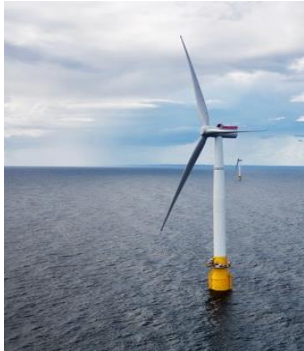


- Offshore installation ●
- Onshore facilities ●
- Floating wind ●
- Bottom-fixed wind ●
- CCS ●
- Hydrogen ●

# Stepping up floating wind to become a competitive source of energy



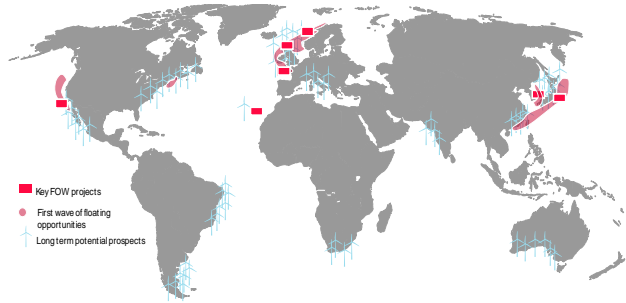
Hywind demo  
2.3 MW



Hywind  
Scotland  
30 MW



Hywind  
Tampen  
88 MW



Next floating  
wind project  
200- 500MW

Utility scale  
project  
~500-1000MW



Fully  
commercial  
technology  
40-60  
EUR/MWh

## Long-term vision

- Utility generation
- Power export
- Island states
- O&G integration
- Power-to-Gas (H<sub>2</sub>)

Technology development

Cost reduction

Industrialization

● 2009 — 2017 — 2022 — 2023-25 — 2026-30 — 2030+ →





Thanks for you attention

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