The Drivers for Offshore Wind

A presentation by Charles Rattray

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COP COPENHAGEN OFFSHORE PARTNERS

new zealand wind energy association

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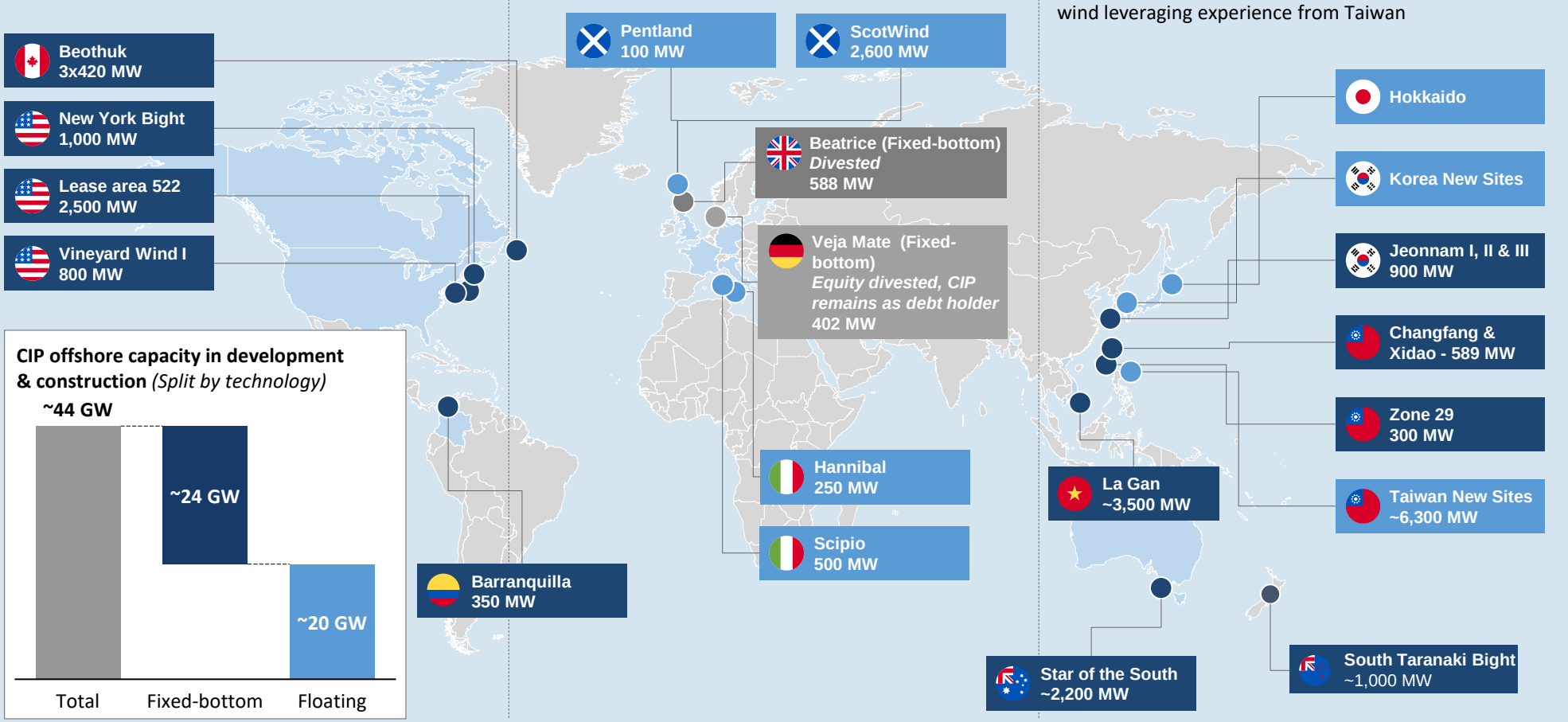
World map of selected CIP offshore activities

Fixed-bottom in development/construction **Floating** in development

North America
Large-scale fixed-bottom offshore on US east coast and Canada and floating offshore on US west coast

Europe
Focus on floating wind demonstrations followed by utility-scale projects in new and existing EU markets

APAC
Combination of large-scale fixed-bottom and floating offshore wind in several new key markets for offshore wind leveraging experience from Taiwan



CIP offshore capacity in development & construction *(Split by technology)*

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CIP offshore experience – case studies

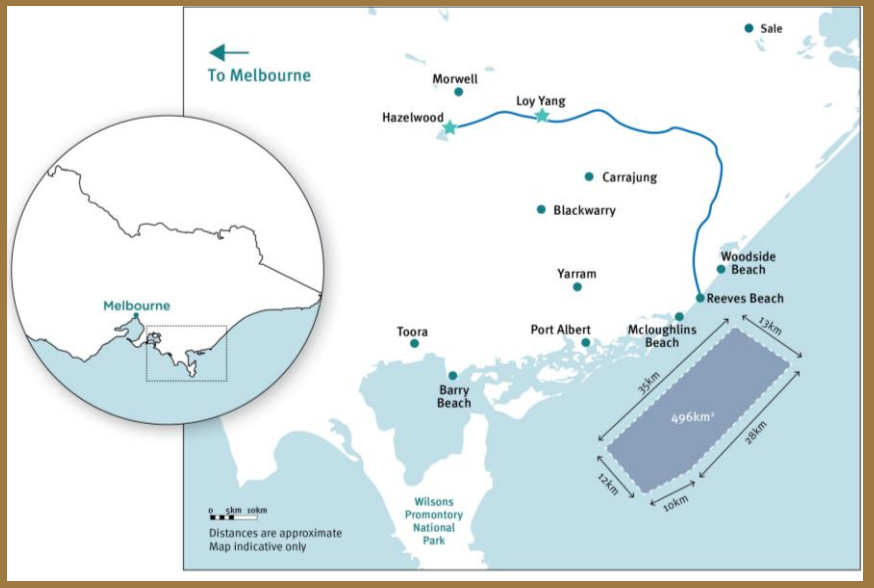
Vineyard (US)

The **USA's first commercial-scale offshore wind farm**, Vineyard Wind is a 50/50 joint venture between CIP and Avangrid Renewables. Construction is now underway to deliver the 800MW project off the coast of Martha's Vineyard and is expected to deliver **energy savings of USD 1.4 billion** in the first 20 years of operation and **cut annual carbon emissions by more than 1.6 million tonnes**.

Using 84 of GE's massive Haliade-X wind turbines, the largest, most powerful wind turbine in the world, Vineyard Wind will create over 800 MW of power for Massachusetts. (www.clean-energy.thebusinessdownload.com/vineyard-wind/)

Star of the South (Australia)

Australia's first and most progressed offshore wind development, Star of the South has been the driving force behind the establishment of Australia's new regulatory framework for offshore wind. With the closure of coal-fired generation, Star of the South is central to enabling the **Gippsland region's economic transition** and has **recently secured AUD 19.5 million in Victorian Government investment.**



If developed to its full potential, Star of the South would generate up to 2.2 GW of new capacity, powering around 1.2 million homes across Victoria.(www.staroftheSouth.com.au/)

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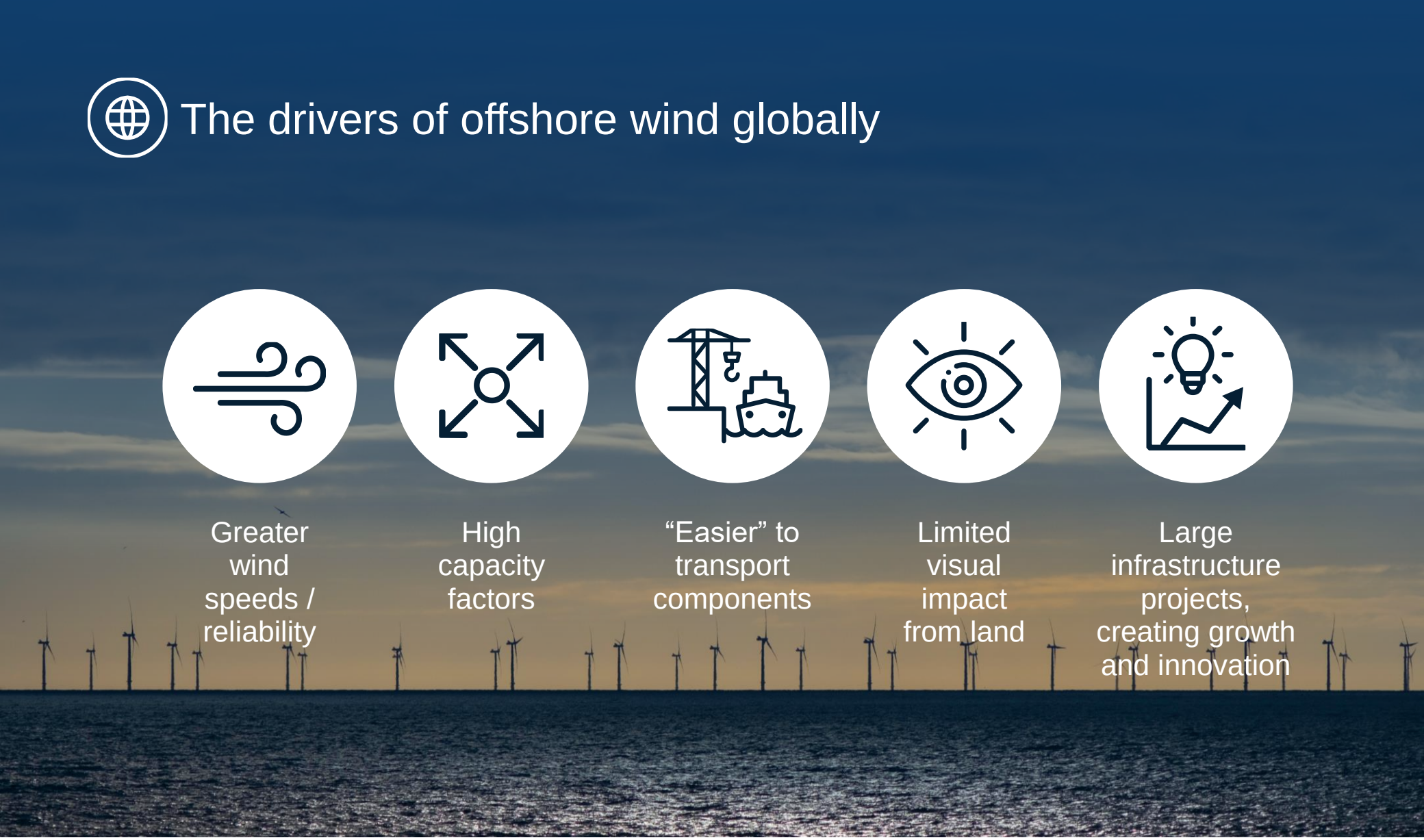
The drivers of offshore wind globally



- Greater wind speeds / reliability
- High capacity factors
- “Easier” to transport components
- Limited visual impact from land
- Large infrastructure projects, creating growth and innovation

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Offshore wind commitments around the globe

Offshore wind energy plays a crucial role in reducing the world's reliance on fossil fuels and decarbonising the energy sector

European Union
300 GW by 2050

Denmark, Netherlands, Germany, Belgium
150 GW by 2050

China
60 GW between 2021-2025

United kingdom
50 GW by 2030

USA
30 GW by 2030

Vietnam
54 GW by 2045

Japan
30-45 GW by 2040

South Korea
12 GW by 2030

Australia-Victoria
9 GW by 2040

New Zealand
100% RE by 2030
net-zero by 2050

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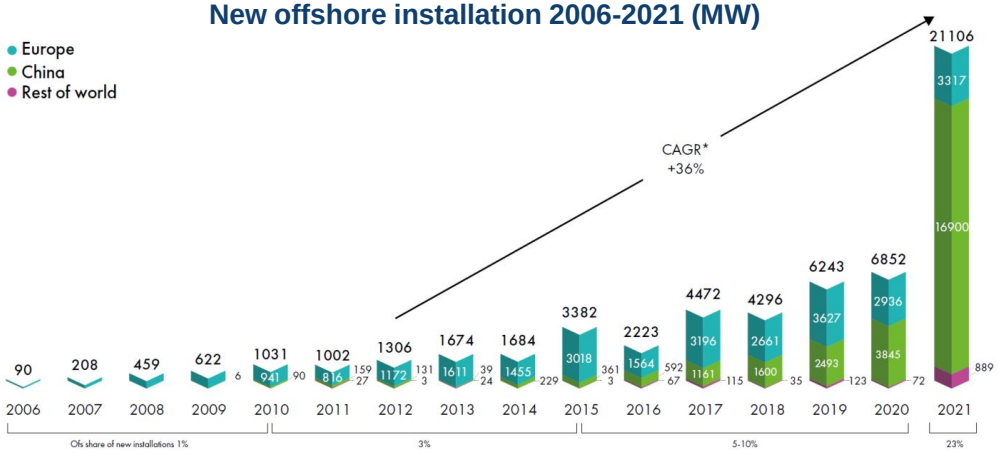
Significant and fast growth expected within offshore wind

- APAC is expected to account for an increasing share of installed offshore wind capacity in the future

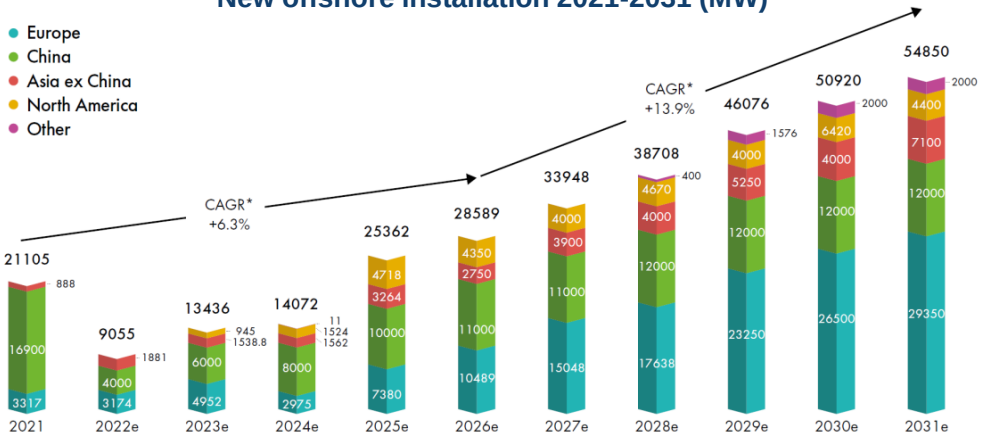
New offshore installation 2006-2021 (MW)



2021 was a record-breaking year for the industry…

… yet the transition has only just begun

New offshore installation 2021-2031 (MW)



Source: GWEC Market Intelligence, June 2022

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Main Challenges for the Supply Chain

Increase in material costs

- Exposure to geopolitical dependencies, commodity price cycles, logistics bottlenecks and trade barriers
- 90% of offshore wind turbine is steel. Last two years, steel prices have increased by 50%
- 60% increase in price of copper for cabling and electrics

Increase in Logistical Costs

- Delivery timescales of some key components to increase from five weeks to 50 weeks
- Freight costs have also risen: Spot rates for a 40-foot ocean freight container from Asia to the US reached a record high 10 times higher than rates just a few years ago.

Local Content Requirements

- In growing markets like South Korea, Japan, Taiwan and Vietnam there are differing expectations on local content.
- For example, Taiwan has set localisation requirements for 2026/2027 at 60 per cent (excluding some of the products and services that Taiwanese supply chain could likely not provide by that time)

Ports and Vessels

- Offshore Wind requires very specific port infrastructure and investment is needed now.
- Investments needed in new vessels and equipment to successfully install larger turbines.
- Vessel capacity could be a potential barrier in the future.

Energy Transition is dependent on well-functioning and competitive industrial supply chains and access to raw materials and components

Source: GWEC Market Intelligence, June 2022

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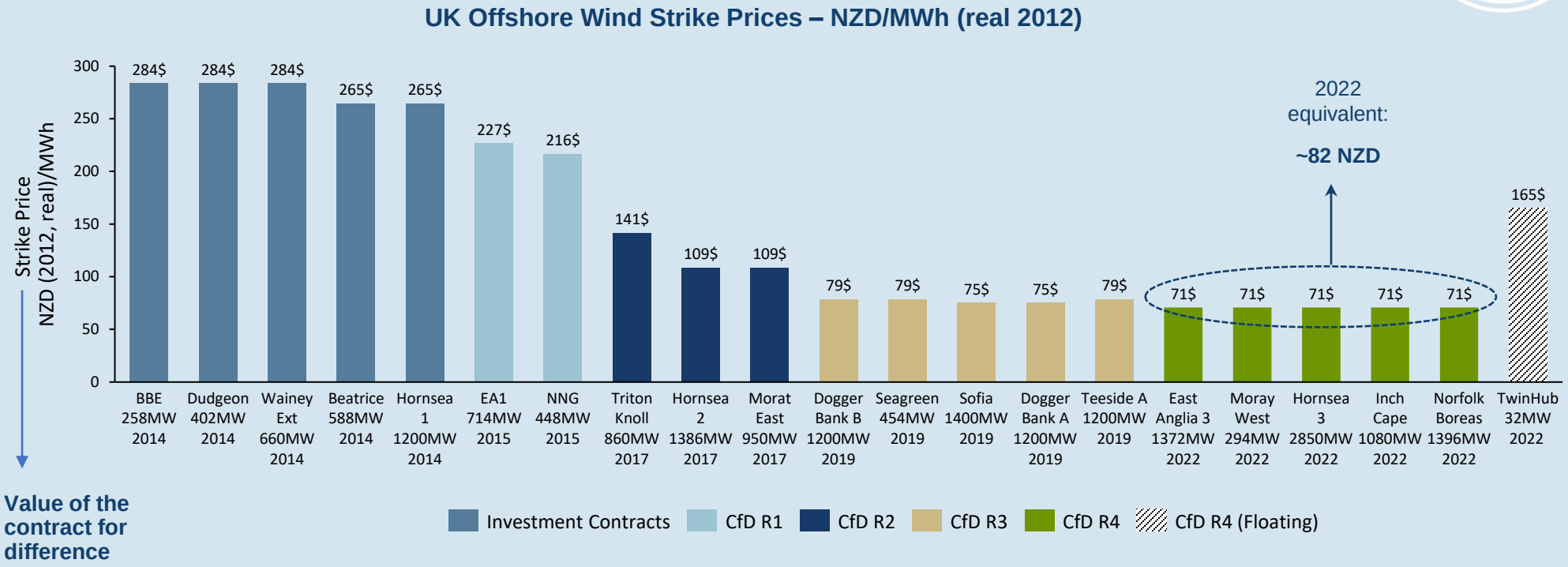
Cost reduction

The price of UK offshore wind has come down by three quarters since 2014



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The drivers of offshore wind in New Zealand

Drive transition to reliable renewable energy

Reduced need for expensive firming and transmission investments

Generate power when daily demand is high

Less constrained by land availability

Large-scale solution to increased power demand

Enable a ‘just transition’ with jobs for oil and gas workforce

Contribute to local economies and skills

Improved social licence and less impact on communities

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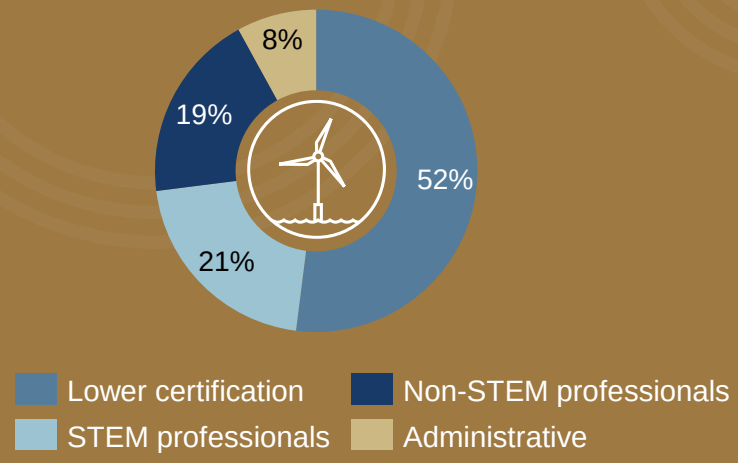
Local job creation and growth

An opportunity for O&G industry workers in New Zealand

- Taranaki has been the home of the oil industry for more than a century.
- About 4,500 people are employed directly in the oil and gas exploration industry in NZ, the bulk of which is based in Taranaki.
- Offshore wind energy can play a significant role in a 'just transition' and could be an important source of alternative employment for Taranaki's existing offshore oil and gas workforce, with a strong occupational match between industries[1].
- For reference, operation and maintenance activities for a 1 GW offshore wind project would employ 150 to 200 workers annually[2]
- 32% of renewable energy jobs are held by women[3] – the offshore wind industry is committed to enable equal employment opportunities for all

We are working on a detailed capability mapping for New Zealand – the results will soon be available

Occupational patterns and skill levels for offshore wind[3]



Note / source: 1) Blue Economy Cooperative Research Centre (Australia) – over 60 per cent of occupations have at least some skills overlap between offshore wind, and oil and gas; 2) 0.21 FTE/MW for O&M employment in IRENA (2018) Offshore wind investment, policies and job creation 3) IRENA, Renewable Energy and Jobs Annual Review 2021

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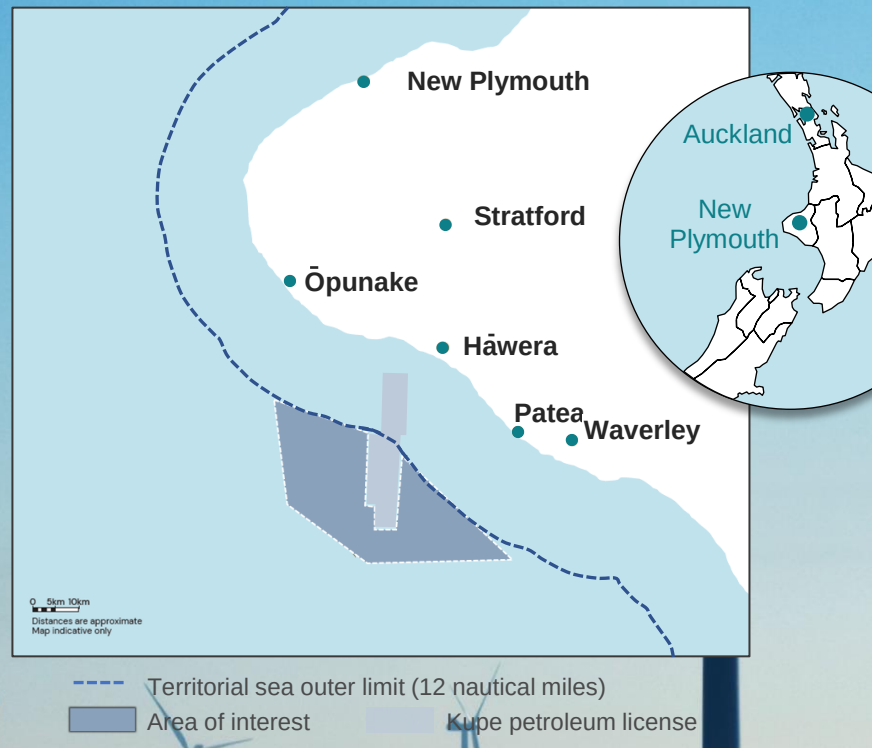
About Taranaki Offshore Wind

Aotearoa's first offshore wind project

- 25-40km off the coast of South Taranaki
- Up to 1GW installed capacity in the first stage (option of a second stage for a total capacity of 2GW)
- World-class offshore wind resources, with gross capacity factor exceeding 60%
- Up to 70 offshore wind turbines
- Transmission cables connecting to the grid in South Taranaki
- Ports to support construction and operation



Delivering offshore wind by 2030

We are at the start of our feasibility investigations and are committed to working with the community to deliver greatest benefit to local communities, minimise impacts on other industries and activities, and protect the environment.

Feasibility and investigations

2 years

Environmental assessments and approvals

2 to 3 years

Construction and commissioning

3 to 4 years

Operation and Maintenance

25 to 35 years

Decommissioning or repowering

2 to 3 years

2022

2030

- Stakeholder and Iwi engagement
- Industry capability mapping
- Environmental surveys scoping
- Aviation Initial Assessment
- Wind and wave monitoring to commence
- Wind power correlation studies
- Preliminary O&M and construction harbour assessments
- Grid studies and power flow modelling

Clear investment support and a defined regulatory pathway can support power being delivered by the end of the decade, supporting New Zealand's commitment of 100% renewable energy by 2030.

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Thank You

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