EMEC

DeepWind

NATIONAL DEEPWATER WIND TEST SITE

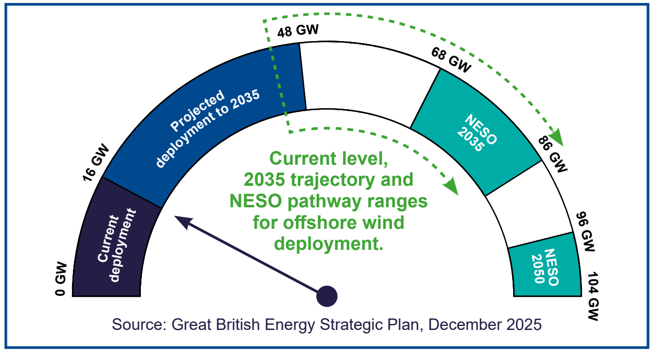
PROJECT SCOPE

THE DEEPWATER WIND OPPORTUNITY

The UK stands at the cusp of a transformative era for the offshore wind industry, having set highly ambitious goals for offshore wind deployment with a pipeline of >48 GW of floating projects already announced.

In Scotland, the recent ScotWind and INTOG leasing rounds committed 19 GW and 5 GW of floating offshore wind (FOW) capacity, respectively. Meanwhile, in the Celtic Sea, The Crown Estate is offering 4.5 GW of FOW capacity in upcoming leasing round 5. This is to be operational by 2035 with an ultimate target to achieve 24 GW of operational capacity by 2045.

Across the UK, this accumulates to a pipeline of more than 48 GW of FOW by 2050, notwithstanding any new rounds yet to be announced.

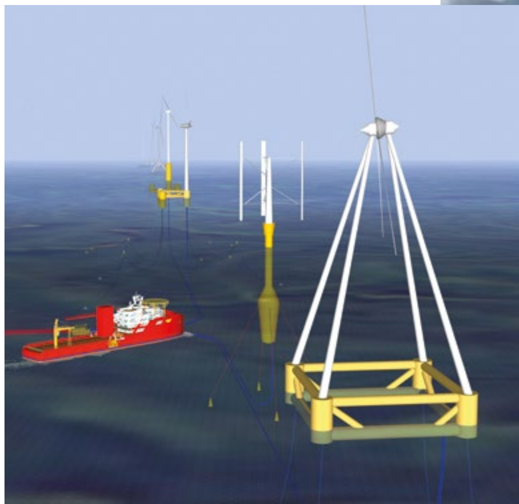


Source: Great British Energy Strategic Plan, December 2025

It is crucial that these targets are met to keep the UK on track with government targets to be a net zero nation by 2050 (or 2045 for Scotland).

The Climate Change Committee estimates the UK will need to install 125 GW of offshore wind by 2050 to achieve a balanced net zero pathway, with the majority reliant on new floating technologies.

For perspective, the current operational offshore wind capacity in the UK is around 16 GW, almost all of which has fixed bottom foundations.



THE NEED TO PROVE AND DE-RISK

Despite this extensive project pipeline, floating and deepwater wind is still an immature industry. The majority of project developers have little or no floating or deepwater wind experience, and none of the technologies being proposed have been deployed and proven at the scales required.

The scale and speed of deployment needed to meet the UK's targets requires rapid progression of the deepwater supply chain to commercial scale projects, but it is folly to rush on at pace if the technology is insufficiently proven in the environment into which it will be deployed.

The UK is fortunate to benefit from consistent high wind speeds due to its geographical position at the end of a long fetch over the North Atlantic, with the North Sea to the east.

Whilst this creates consistent strong winds for power generation all around the country, the energetic wave and wind conditions are a challenging environment for floating structures to operate in. As a result, floating platforms, turbines, cables, mooring systems and other components will all need to be proven in these harsh conditions before they can be deployed confidently at scale into these challenging conditions.

16 GW 2025

Current offshore wind capacity in the UK, almost all of which has fixed bottom foundations

125 GW 2050

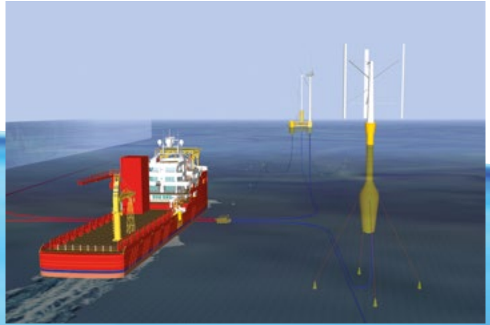
Required installation of offshore wind to achieve a balanced net zero pathway

New technologies will typically be required to demonstrate a minimum of 8,000 hours of normal operations in a representative environment (i.e. at full scale and in real world conditions) to satisfy certification bodies. This is essential to avoid an expensive and limiting "prototypical" insurance basis from underwriters. Without full scale testing, project certification becomes much more challenging.

Insurance and certification are both vital to ensuring final investment in a project. The increased level of confidence in projects proven by adequate testing will help keep insurance premiums realistic and the cost of capital affordable. This will then translate into valuable reductions in levelised cost of energy (LCOE), which is highly sensitive to cost of capital, thereby maintaining competitiveness for developers and reducing the cost of clean energy to government and consumers in future CfD auctions.

There is currently a diverse landscape of floating platform designs and EMEC anticipates at least 15–20 different floater designs successfully coming to market in the decades ahead.

These technologies will be developed simultaneously and in competition with one another, testing and proving in real sea conditions will not only enable progression towards bankability, but promote a clearer picture of the advantages of each design to better inform technology selection decisions.

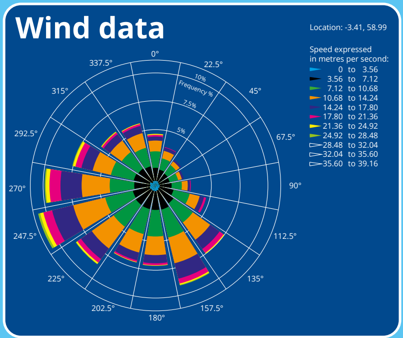


EMEC's proposed deepwater wind test site will provide developers with the opportunity to better understand technical, safety and environmental risks.

Through testing of the planned transport, installation, commissioning and operational processes in a low consequence environment, the test centre will ultimately lead to highly optimised technologies and safe practices being developed.

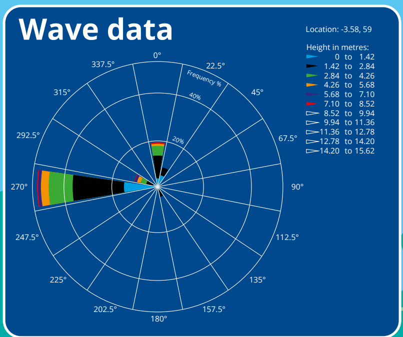
Introducing DeepWind

An optimal site has been selected for the DeepWind test site located 20 km to the west of Orkney. The site is 22-24 km from the entrance to Scapa Flow, a strategic offshore wind operations and maintenance (O&M) hub.



The 30-year average wind speed at the site is 10.7 m/s (24 mph) with a significant directionality spread, but key components from the west southwest and south southeast (i.e. perpendicular and parallel to the site).

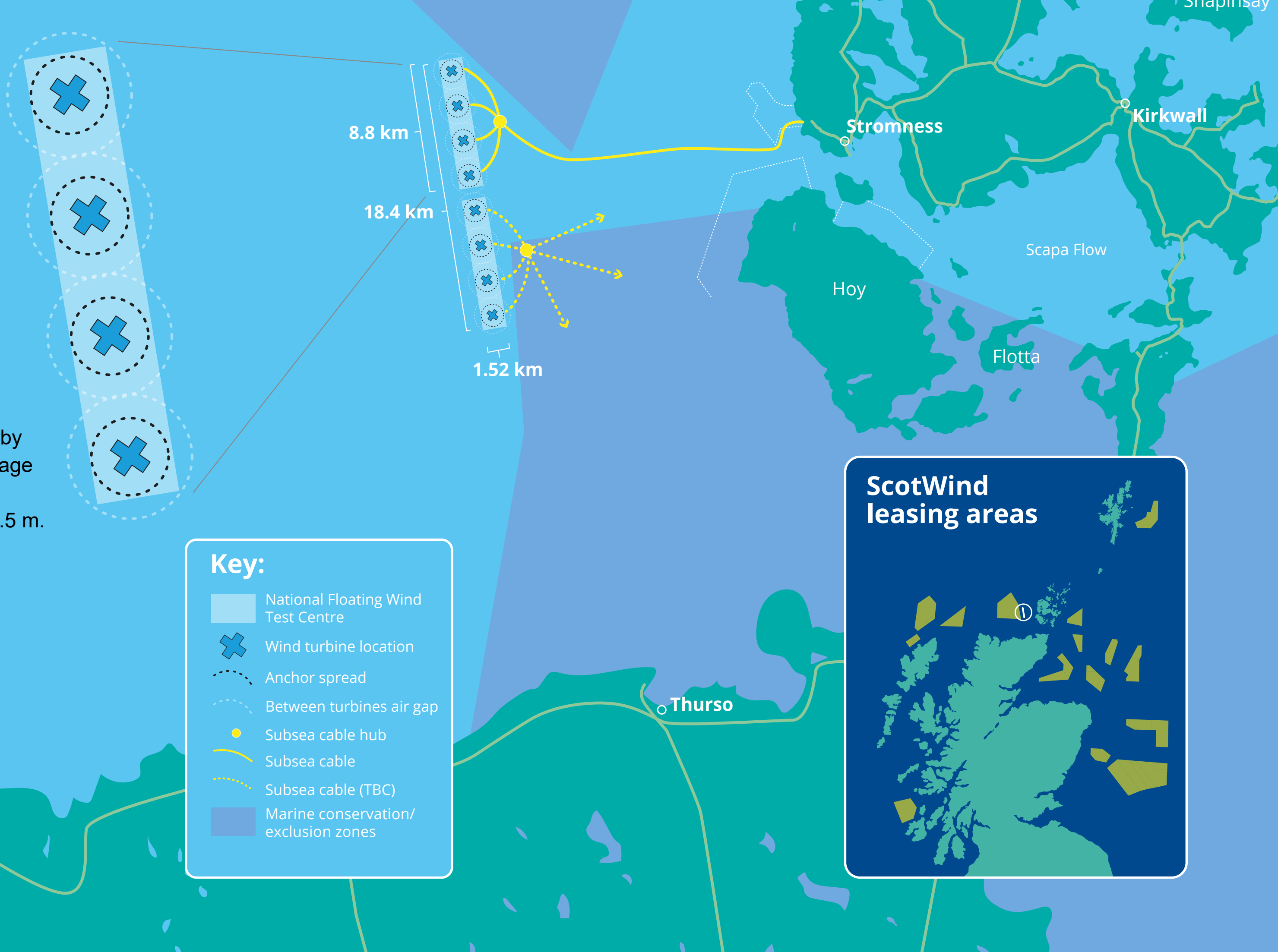
There are powerful wave conditions at the site, with a strong directionality from the west. Measured data from EMEC's nearby Billia Croo wave energy test site indicates that the 5-year average significant wave height (H_s) is ~2.3 m whilst the theoretical 100-year maximum wave height (H_{max}) is a challenging ~21.5 m.



The plan is to develop the test site in two phases, each providing space for four berths capable of hosting wind turbines of up to 350 m tip height, so up to a maximum of 20-25 MW rated power.

The first phase will have a grid connection capacity of 60 MW, to be connected by 2029. The second phase would be developed as and when the demand for it has been demonstrated with phase 1.

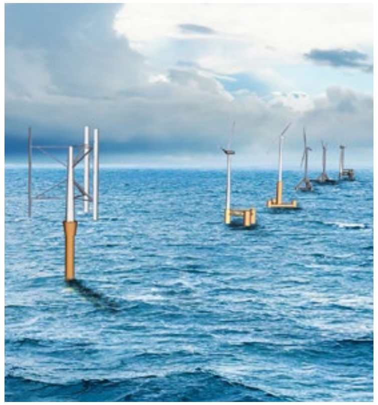
Water depth across the site varies between 85-100 m, closely matching that of many ScotWind and INTOG floating wind sites and allowing many different floater designs and anchor and mooring systems to be tested at the one site.

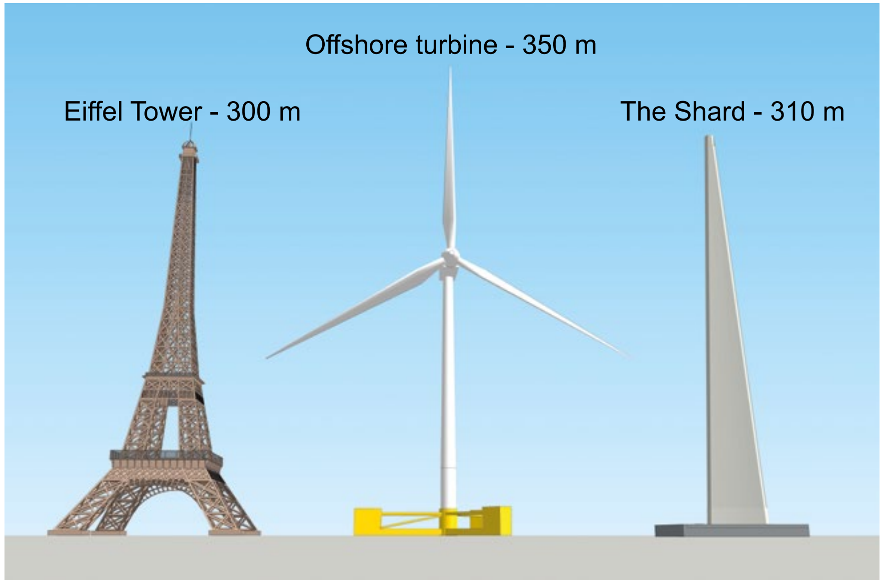


LAYOUT AND CONFIGURATION

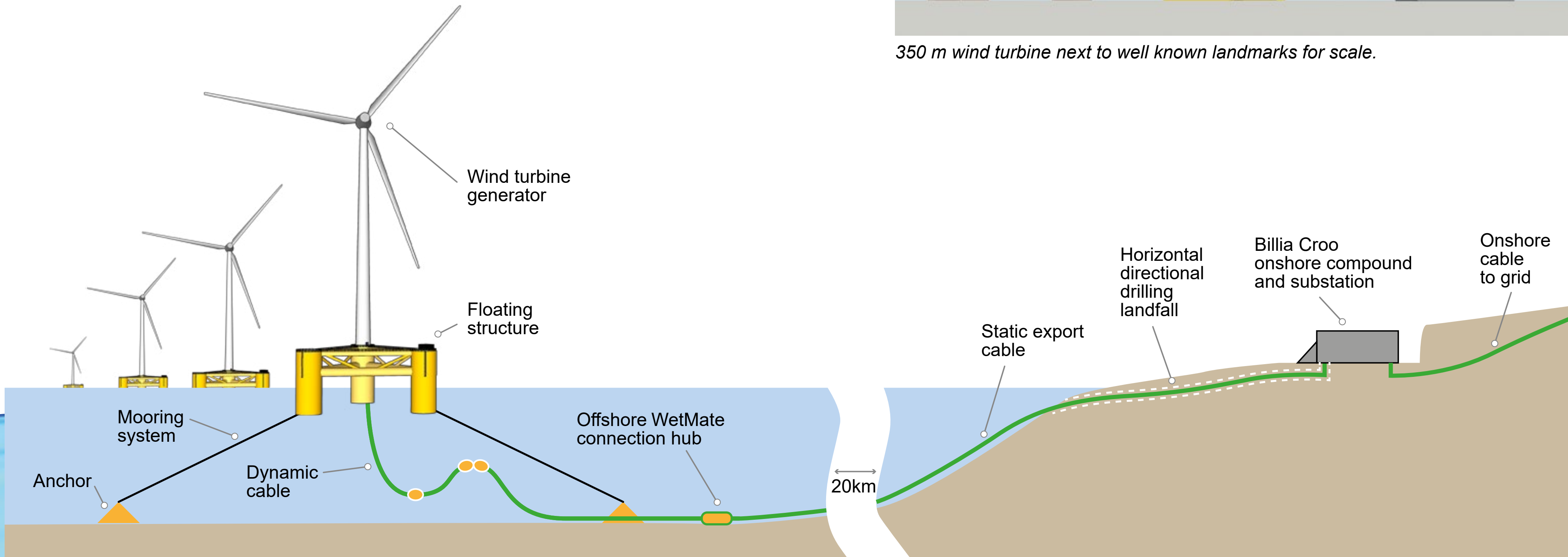
The location, layout and configuration of the DeepWind test site has been carefully tailored to the demands of the deepwater market, based on engagement that EMEC has conducted since 2020. This ensures that industry technical needs will be met and demand for berths should be significant.

EMEC's provision of physical infrastructure ends at the subsea connection hub. Developers will be required to supply their own 66 kV dynamic export cable, to be connected to EMEC's subsea hub using a work-class ROV. Ideally, this will be sourced and available locally, facilitated by EMEC's well-established connections with the local supply chain.





350 m wind turbine next to well known landmarks for scale.



Schematic diagram indicating the anticipated electrical infrastructure.

DEEPWIND BENEFITS

The DeepWind deepwater wind test site offers industry significant benefits over testing prototype technologies at other project sites.

PRE-CONSENTED GRID-CONNECTED TEST CENTRE INFRASTRUCTURE

- Removal of primary consenting risk and associated lead times
- Removal of grid connection risk and lead times
- Removal of bottlenecks and lead times in site survey data collection
- No need to complete complex cable routing and onshore connection activities
- Avoidance of bottlenecks in cable supply
- Potential for site-wide CFD to guarantee revenue-support during testing

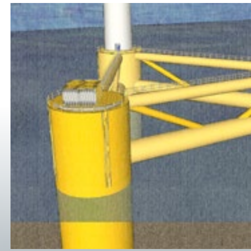
VALUABLE BENEFITS OF REAL-WORLD TESTING AND PROVING

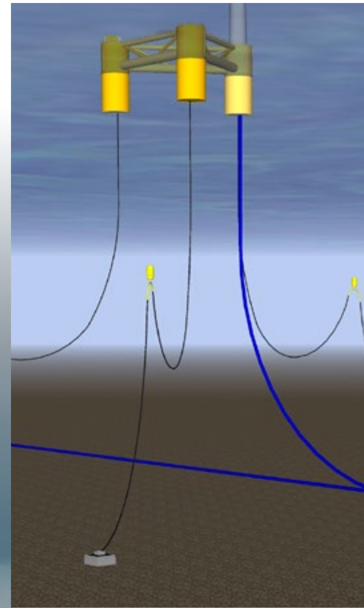
- Trialing of a range of concepts for downselection and optimisation
- Sufficient duration of testing (accumulation of operational hours) in relevant real sea conditions to satisfy certification and insurance requirements
- Facilitate project certification providing investor and lender confidence
- Enable building of more mature supply chain with direct experience of installation and operations and maintenance (O&M) including towing, ballasting, mooring connections and anchor handling
- Best practice for consenting and technology verification in real world conditions

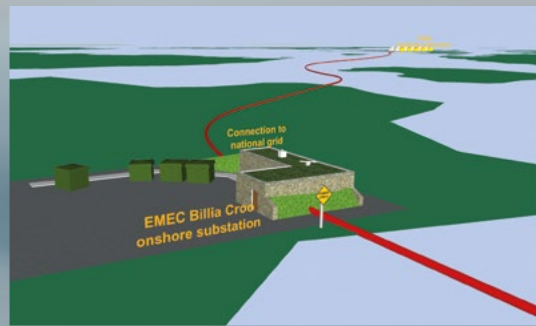
IT IS FOLLY TO RUSH ON AT PACE IF THE TECHNOLOGY IS INSUFFICIENTLY PROVEN IN THE ENVIRONMENT INTO WHICH IT WILL BE DEPLOYED

OPPORTUNITY TO DEVELOP AND REFINE TECHNOLOGIES AND ESTABLISH INDUSTRY BEST PRACTICE

- Identification of serial defects requiring correction
- O&M strategy refinement, including tow to port strategies
- Substructure design optimisation
- Wind turbine generator integration and interfacing risks
- Cable hook-up complexities
- Challenging conditions for design, installation and O&M
- Predicting installation cost and schedule overruns by reducing uncertainty in activity durations
- Unforeseen challenges with equipment previously untested at full scale
- Addressing knowledge and experience gaps in O&M, installation, supply chain and procurement





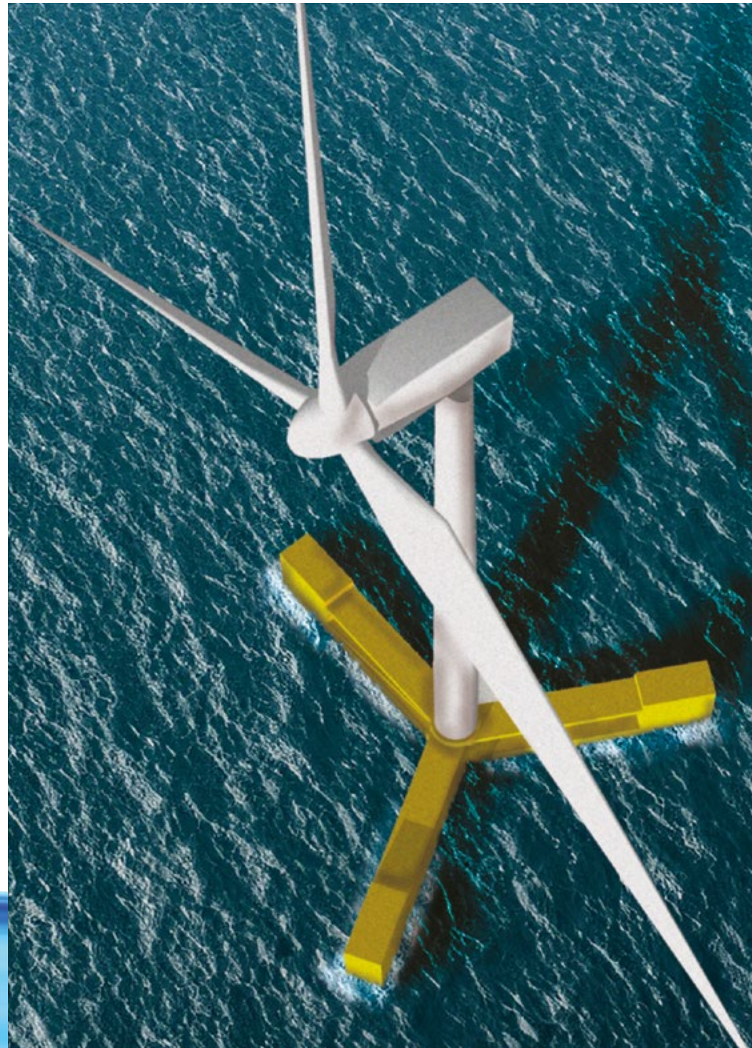


INDUSTRY ENGAGEMENT

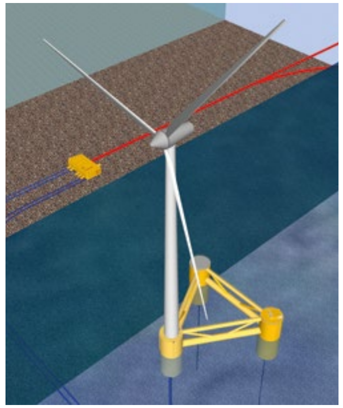
Securing customers for the berths from the outset will be essential to maximise the return on investment and mitigate the investment risk for the test site's key stakeholders.

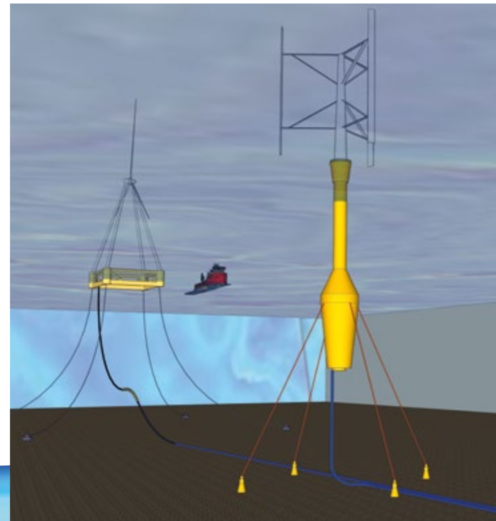
EMEC's proactive approach to engaging with the floating and deepwater wind community over the past four years has developed a strong pipeline of potential clients.

Letters of support have been secured from more than 15 developers and potential partners, with several of these progressing to more advanced negotiations.



EMEC HAS A STRONG PIPELINE OF POTENTIAL CLIENTS





DEVELOPMENT TIMELINE

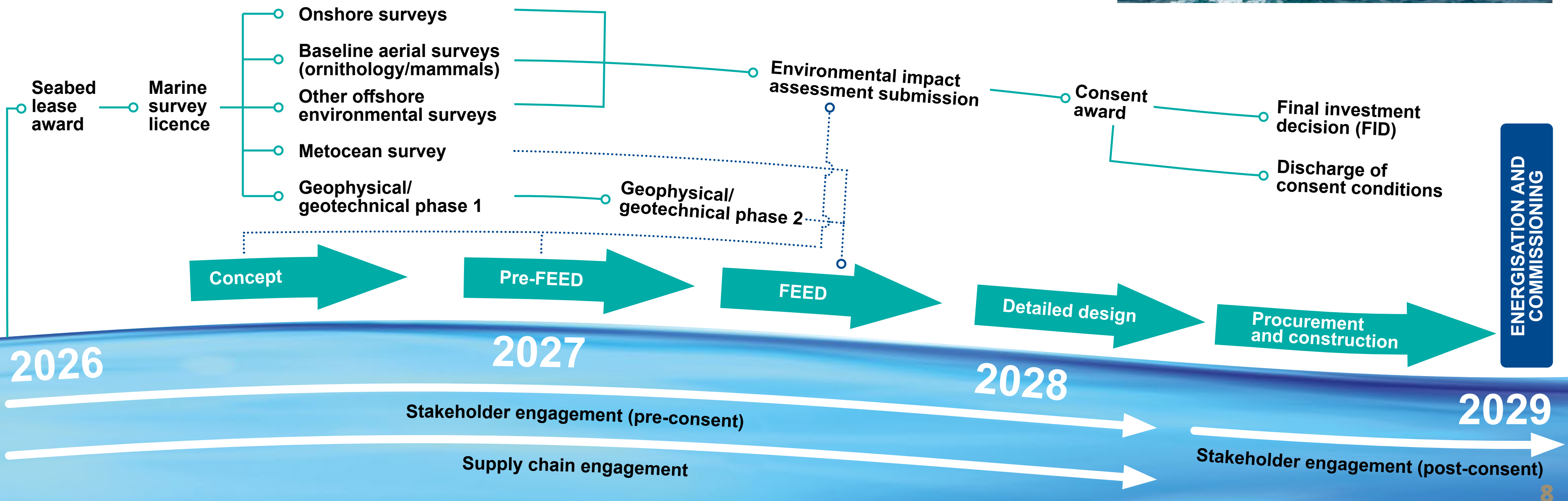
EMEC has already completed significant milestones in project development, including progressing a 60 MW grid connection, which enables the timeline to align with the UK's deepwater wind market progression.

The leading commercial-scale deepwater wind projects have grid connection agreements earmarked for 2031, with the greater majority coming online at least several years after this, and possibly not until the late 2030s.

EMEC is progressing a grid connection with a target of 2029, providing a meaningful period for testing activities to be completed in time to inform the detail design and delivery of the main tranche of commercial scale projects from 2035 through to 2050 and beyond. This 'second wave' of deepwater projects is likely to be based on more efficient and optimised technologies than the earliest projects, and so will be more reliant on first class testing and proving to ensure certification, insurability and bankability.

This strategic advantage places EMEC in a prime position to support the surge in deepwater wind deployment in the UK. An alternative test centre starting from scratch in the UK would be unable to secure a grid connection in time, thus not being able to support the bulk of commercial-scale projects.

In addition to grid connection, EMEC has initiated site investigations, having completed the SLVIA (Seascape, Landscape, and Visual Impact Assessment). The electrical design is well advanced, encompassing final site location, offshore hub cable routing, onshore substation planning, and onshore cable to the main grid connection point.



COSTINGS

2026 Initial funding package	2027 Surveys and consenting	2028 Engineering and procurement	2029 Installation and commissioning
• Consenting and survey strategies including engagement and data sharing • Survey procurement • 1 x client sign-up **STAGE GATE 1** • Seabed lease **STAGE GATE 2**	• Completion of environmental and technical surveys • Preparation of consent application **STAGE GATE 3** • 2 x client sign-up • Consent submission **STAGE GATE 4**	• Consent award **STAGE GATE 5** • Technical designs employer requirements • Supplier and contractor engagement and selection • 1 x client sign-up **STAGE GATE 6** • Final investment decision (FID) for the centre **STAGE GATE 7** • Delivery of assets • Installation starts onshore **STAGE GATE 8**	• Completion of installation activities • Commissioning • First power • COD **STAGE GATE 9**
~£500 K	**~£3 M**	**~£31 M**	**~£54 M**

WIDER BENEFITS

Full scale testing will greatly reduce costs for developers when it comes to insuring and certifying their projects.

An independent cost assessment conducted by OWC determined that, for a 1 GW floating wind farm, a 1% reduction in the cost of capital had an 11.3% reduction in LCOE. This will improve competitiveness of CfD bids, leading to potential savings of hundreds of millions of pounds per year for the UK government and the general public.

The formation of a national deepwater wind test centre will foster the creation of thousands of skilled jobs in Scotland and the UK. Independent analysis by BiGGAR Economics concluded that the proposed demonstration site has the potential to generate £690 million gross value add to the UK economy, £442 million of which will accrue in Scotland.

The study also anticipates the facility will create 4,160 new jobs in the UK during its expected 25-year lifetime.

£442 MILLION
gross value add to Scotland

£690 MILLION
gross value add to UK economy

4,160 JOBS
over 25 year lifetime

EMEC

+44 (0)1856 852060
info@emec.org.uk

emec.org.uk

The Charles Clouston Building, ORIC, Back Road,
Stromness, Orkney, KW16 3AW