OFFSHORE WIND INSIGHT 2026

Opportunities and challenges in the UK's offshore wind market

Acknowledgments

In preparing and publishing this document, OEUK gratefully acknowledges the contribution of members via case studies.

ISBN: 1 903 004 73 2
PUBLISHED BY OEUK

London Office:

OEUK, 2nd Floor, Cannongate House, 62-64 Cannon Street, London EC4N 6AE

Tel: 020 7802 2400 Fax: 020 7802 2401

Aberdeen Office:

4th Floor, Annan House, 33-35 Palmerston Road, Aberdeen, AB11 5QP
Tel: 01224 577250

info@oeuk.org.uk

www.oeuk.org.uk

Contents

List of Abbreviations

Abbreviations	Definitions
ALF	Annual Limit Factor – a regulatory or operational threshold applied annually, often in energy or grid management contexts.
AR	Allocation Round – process by which the UK government awards CfD contracts for renewables.
BAU	Business as usual
BM	Balancing Mechanism – a system used by National Grid to balance supply and demand in real time.
CCS	Carbon Capture and Storage – technology for capturing CO_2 emissions and storing them underground.
CIB	Clean Industry Bonus – support mechanism for UK clean energy industries.
CfD	Contract for Difference – a government scheme providing price certainty to renewable generators.
CSNP	Centralised Strategic Network Plan – NESO's long-term, whole-system transmission plan.
DESNZ	Department for Energy Security and Net Zero – UK government department for energy and net zero transition.
FWC	Fair Work Charter - baseline expectation for job quality in offshore wind
GW	Gigawatt – unit of power equal to one billion watts.
HRA	Habitat Regulations Assessment – an evaluation required to ensure projects do not adversely impact protected habitats.
IGP	Industry Growth Plan – roadmap for investment in Wind supply chain
NESO	National Energy System Operator – responsible for planning and coordinating the UK electricity system.
NWF	National Wealth Fund - UK's £27.8 bn public investment vehicle
OFTO	Offshore Transmission Owner – companies licensed to own and operate offshore transmission assets.
OWGP	Offshore Wind Growth Partnership – UK programme supporting the development of the offshore wind supply chain.
REMA	Review of Electricity Market Arrangements – UK government initiative to reform energy markets.

SSEP	Strategic Spatial Energy Plan
RESP	Regional Energy Strategic Plan: A plan that outlines strategies for energy development and management within a specific region.
RIC	Reduced Required Installed Capacity – The ability of an energy system to maintain security of supply and meet peak demand with a lower total amount of installed generation capacity
RNP	Reform of National Pricing – keeps a single GB electricity price while reforming planning, network charges and system operation
SNIB	Scottish National Investment Bank – financial institution supporting economic development in Scotland.
SRMC	Short-Run Marginal Cost – the cost of producing one more unit of electricity in the short term.
TNUoS	Transmission Network Use of System – charges paid for use of the high voltage transmission network.
TO	Transmission Operator – responsible for operating, maintaining, and developing transmission networks.

Executive Summary

The international wind market continues to consolidate; however, the pipeline decline is less marked than it was in 2024, and global portfolios remain substantial. The sector has seen several lease rounds cancelled and numerous auctions fail, underscoring ongoing imbalances and persistent difficulties in the market.

Against this backdrop, the UK market has shown notable resilience, on track to achieve a total installed capacity of 18.8 GW by the end of 2026. The seventh Allocation Round (AR7) provided a strong signal of government support for the offshore wind sector, with an unprecedented 8.4 GW awarded. Nevertheless, the industry continues to face significant challenges from rising inflation and increasing cost of capital, both compounded by successive global crises, including the Covid-19 pandemic and ongoing conflicts in Ukraine and Iran; however, it is unlikely that conditions will revert to the more favourable pre-pandemic environment soon. As a result, the UK experienced a record number of project cancellations last year, primarily due to elevated development expenditure and limited chances for some projects to meet necessary economic thresholds and win future auctions.

The UK Government has initiated positive reforms to bolster the industry, such as rationalising the grid queue and extending the Contract for Difference (CfD) period to 20 years (extending the price guarantee for project, so project will require a lower CfD strike price). Nonetheless, in the current market climate, it is essential for both the government and industry stakeholders to collaborate for to enhance the competitiveness of the offshore wind industry.

At present, risk allocation across the value chain (Government, Investors Transmission Operators, Developers and Supply chain) remains uneven, with risks often placed on parties ill-equipped to manage them effectively. Poor risk distribution typically leads to higher contingencies and increased insurance premiums, thereby raising overall project costs. For instance, Ofgem should prioritise reforming the Offshore Transmission Owner (OFTO) regime , aiming to minimise uncertainty and reduce unnecessary expenses for offshore developers.

Urgent reform of transmission charges is essential, as its current structure risks undermining the UK's ambitions for offshore wind. At present, it fails to adequately recognise the system-wide benefits provided by Scottish projects with higher capacity factors (higher capacity factors asset requires less balancing). OEUK supports the need for a locational signal; however, transmission charges should be fixed at CfD award to bring predictability. Applying the signal later in the process only results in project cancellations and increased costs for consumers. Any future arrangements should be aligned with Strategic Spatial Energy Plan (SSEP) objectives.

The UK remains a net importer of energy, relying on imports to meet over 40% of total energy demand and 16% of electricity demand in 2025. To strengthen energy security and safeguard domestic industries, the UK should make a strategic commitment to prioritising homegrown energy sources. The UK possesses a world-class supply chain, but this vital asset is at risk due to a lack of comprehensive support for all forms of homegrown energy. Additionally, while this supply chain expertise could significantly benefit the wind sector, support mechanisms, such as the Clean Industry Bonus (CIB), have yet to fully recognise and harness this potential. Addressing these gaps will be essential to ensuring a resilient and competitive UK energy sector.

Recommendations

1. Ensure Continuous and Sustainable Growth in UK Offshore Wind

Target 7GW of offshore wind award at AR8. The UK Government should strike the right balance between CP30, which requires at least 5GW, and the final CfD strike price that should remain competitive compared to the wholesale market and other renewables.

Deliver all planned grid upgrades by 2028 to enable the UK to harness its offshore wind assets and meet the target of at least 43GW installed capacity by 2030. Progress should be tracked against annual milestones, with the National Energy System Operator (NESO) and Transmission Operators held accountable through strengthened licence conditions and mandatory compensation mechanisms for delays. If current progress falls short – at current pace just above 30GW will be completed by 2030 - the Government must intervene with emergency measures to accelerate delivery.

Commit to annual CfD allocation rounds delivering at least 5GW per year from 2026 to 2030, ensuring steady growth of the UK supply chain, long-term economy of scale and avoiding boom-and-bust cycles. Government and NESO must publish a clear pipeline schedule, with contingency plans for under-allocation and specific actions required beyond 2030 to maintain momentum. So, the UK can cement its position as offshore wind leader and start exporting its technology and knowhow.

2. Improve Offshore Wind Competitiveness

Under a regime of high inflation and high interest rates, the UK should seek ways to improve offshore wind competitiveness. The current market is suffering from wrong risk allocation along the value chain, which induces undue risks and contingencies, leading to a higher CfD price.

Accelerating a self-sustaining offshore wind sector through earlier and more effective supply chain engagement. The ambitions of UK and devolved governments for the UK offshore wind sector to be a key pillar of industrial strategy hinge on engagement between project developers and the supply chain, drawing on decades of oil and gas sector expertise. Such engagement should identify and deliver cost effective domestic components and services that help both industrial strategy and provide best value to bill payers through CfD prices.Industry is adopting collaborative contracting and standardised practices to improve delivery certainty, risk allocation and investment confidence. Policy should reinforce, not prescribe, early engagement and consistent contracting, enabling a competitive, self-sustaining market. These approaches are equally relevant for carbon capture and storage (CCS) and hydrogen, where similar supply chain challenges exist. A focus on timely collaboration will accelerate deployment, strengthen UK supply chains, and support net zero ambitions.

Implement a floating wind support package by the end of 2026, focused on reducing costs in key areas such as structural engineering, mooring systems, and supply chain innovation. This should include targeted research and development grants, streamlined permitting for demonstration projects, and CfD ring-fencing for floating wind, aim to halve the levelised cost by 2030.

Introduce multiyear Transmission Network Use of System (TNUoS) charging trajectories and fix elements at the point of CfD by 2027 to provide predictability and stability for investors. Reform the TNUoS regime to ensure an effective locational signal is given at site selection or at the latest at CfD.

Reform the OFTO regime by 2027 with a focus on minimising uncertainty and unnecessary developer costs, including streamlined handover processes, standardised technical requirements, and increased transparency in tendering.

3. System Improvements for Delivery

Establish a central digital platform by 2027, giving real-time visibility of grid capacity, constraints, and queue status, accessible to all stakeholders.

Mandate common data standards and clear visualisation tools for all grid and project data, integrated into the digital platform and supported by NESO and TOs, to enhance transparency and efficiency.

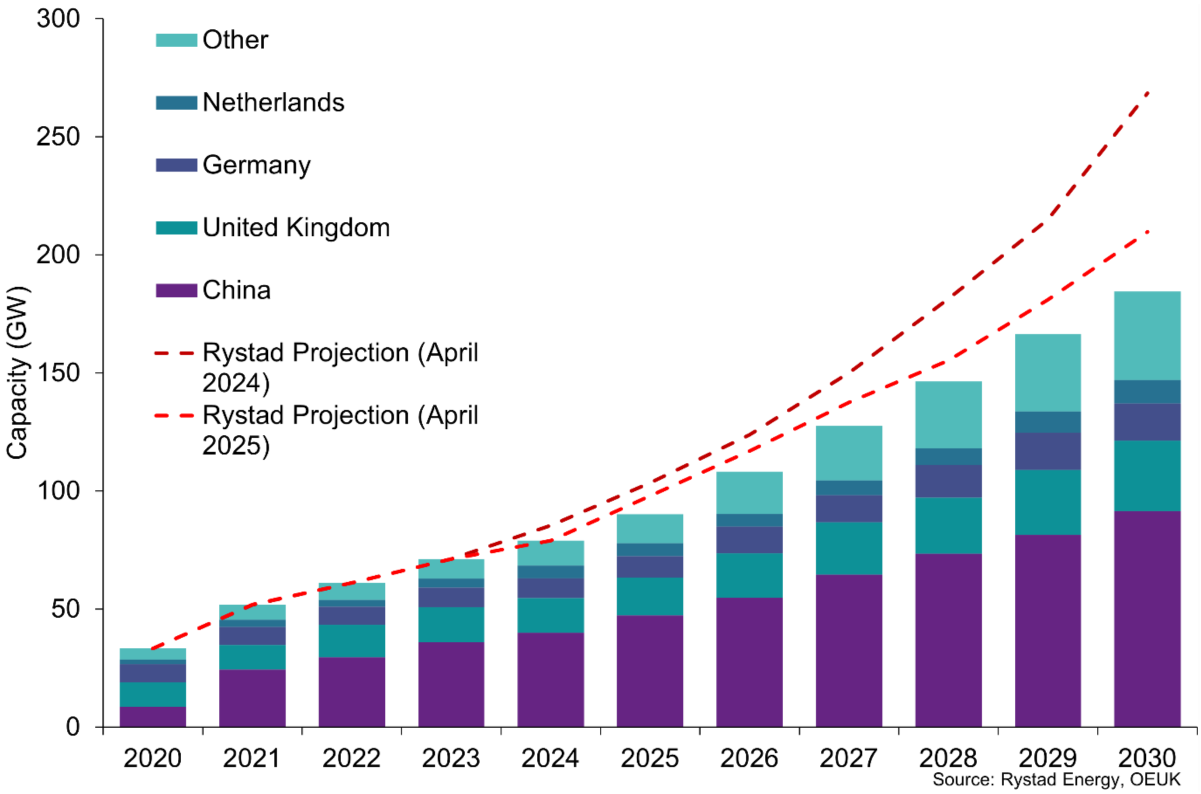
Implement mandatory compensation or liquidated damages for grid delivery delays, drawing on best practice from US, French and Irish models, to incentivise timely completion and provide investor certainty.

Strengthen licence conditions for Transmission Owners (TOs), making them directly accountable for delivery milestones, with penalties for non-compliance and transparent reporting.

Part 1: The Global Market Outlook

The fortunes of the UK energy sector are intimately linked to global economics. This section examines how evolving dynamics in major markets affect the UK. It will also examine what it means for UK project development, the domestic supply chain, and how the broader financial landscape influences investment and delivery.

Figure 1: Historic and future global Installed capacity projection 2020 to 2030

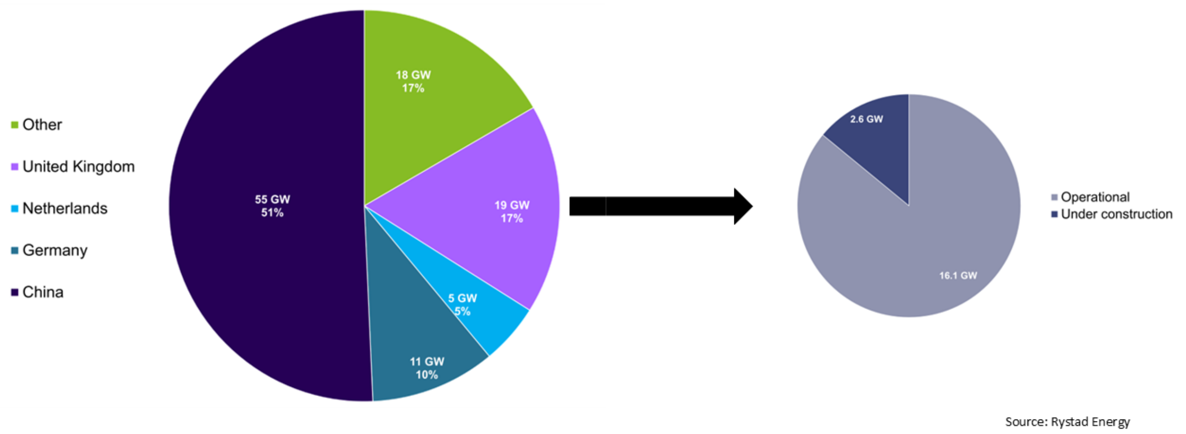


The global capacity of projects was expected to reach approximately 180 GW to 220 GW by 2030 (Rystad Energy and Westwood Energy forecast). The global outlook for 2030 was reduced by 20 GW last year, reflecting the increasing pressures on project delivery. Following a robust final quarter in 2022, Europe, the historic pioneer of the sector, was surpassed by Asia in total operational capacity; as the industry moves through 2026, mainland China continues to underpin this regional dominance. By the end of the decade, Europe and mainland China are expected to remain the primary sector epicentres, collectively accounting for 89% of all global installed capacity.

Mainland China remains the dominant player throughout. Excluding China, the regional breakdown for 2030 attributes approximately 22% to the rest of Europe, 17% to the UK, and 10% to the rest of Asia. Despite project cancellations and uncertainties around some projects, the UK market remains in a strong position, reinforcing its status as a leading global hub for offshore wind investment and long-term energy security.

Regional Delivery and the 2026 Growth Profile

Figure 2: Prediction of Global installed market and UK online capacity in end 2026

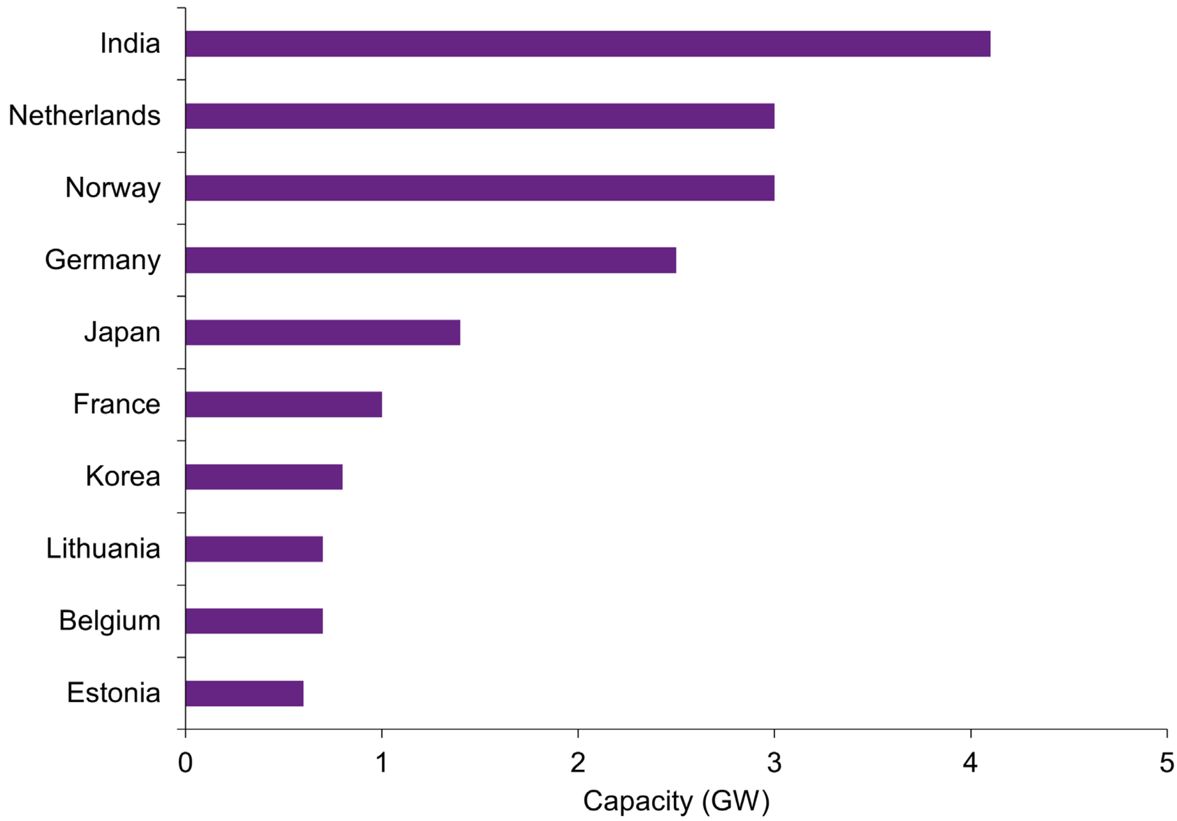


As 2025 concluded, the global sector had achieved just under 110 GW of total installed capacity. Mainland China remains the primary driver of the market, contributing 9 GW of the 13 GW installed capacity for 2025 as developers work to connect projects before the expiry of the current five-year plan. Excluding mainland China, Asia is projected to deliver 1.7 GW, with no new operational capacity expected across the Americas or other regions this year.

Europe maintains its position as the second most active region for deployment, having commissioned approximately 2.1 GW of new capacity. This European progress is underpinned by significant contributions in 2025 from the UK through the Neart na Gaoithe (450 MW) and Moray West (882 MW) projects, alongside the Baltic Eagle (476 MW) and Gode Wind 3 (253 MW) developments in Germany.

2025: A Year of Unsuccessful Tendering

Figure 3: Failed auctions around the world in 2025



Source: Rystad Energy, OEUK

2025 for global offshore wind sector was marred by a series of unsuccessful auctions and lingering cost challenges. Almost 18 GW of capacity stalled due to tender failures, with 8.4 GW occurring in the Q3 across India, France, Germany, and South Korea. This trend continued with a further 3.1 GW of failed auctions, including the 1 GW Nederwiek 1A tender in the Netherlands and the 700 MW offering in Lithuania, failing to attract bids. In Asia, the Japanese government pre-emptively postponed the 1.4 GW Matsumae and Hiyama tender to improve its market attractiveness.

Many governments are now revamping regulations to restore investor confidence. The Netherlands is moving to incorporate CfDs, while Denmark has already finalised its new framework and reopened several North Sea tenders. Industry stakeholders have also warned that without a shift to the Contracts for Difference model, the 2026 German auctions risk repeating the lack of participation seen throughout 2025.

Market Opportunity and Shift

Although the global market in 2025 was overshadowed by unsuccessful tendering rounds, the emergence of new territories shows that the current outlook can be stabilised. Success remains contingent upon a sustainable pace of investment that avoids placing excessive pressure on the existing pipeline or the wider supply chain.

Polish Auction Success and Market Potential

The Polish government concluded its first competitive offshore wind auction on 17 December 2025, awarding over 3.4 GW of capacity to three major projects. The successful Baltyk I, Baltica 9, and Baltic East developments are required to deliver first power within seven years, benefiting from twenty-five years of revenue support.

Winning strike prices ranged from £97.32 (476.88 PLN) to £100.47 (492.32 PLN) per MWh, sitting approximately 5 to 10% above average Polish electricity and just above UK AR7. Economic analysis indicates robust project returns of up to 14%, assuming a 50% capacity factor and standard operational costs. This successful outcome underscores that Poland has a high potential to be a large offshore wind market in Europe in the future, providing a vital benchmark for regional growth and long-term investment stability.

France Launches 10 GW Offshore Wind Mega Tender

France has combined its ninth (AO9) and tenth auctions (AO10) into a single 10 GW mega tender to accelerate its energy transition. This procurement aims to award ten projects, split between 5 GW of fixed bottom and 5 GW of floating technology, across seven maritime zones.

Despite the recent setback where the 1 GW AO7 tender near Oleron failed to attract bids in late 2025 due to low price caps and difficult site conditions, the French government remains supportive. This new auction prioritises European industrial resilience by evaluating environmental performance and cybersecurity alongside price. This approach aligns with the Net Zero Industry Act by favouring European components over non-European sources. With an allocation tariff target below 100 EUR per megawatt hour, the government expects to select winners by early 2027 to reach its goals of 18 GW by 2035 and 45 GW by 2050.

Table 1: Europe Auction pipeline for 2026

Country	Project / Auction name	Capacity (GW)	Mechanism Type	Estimated Award Quarter	Year	Status
UK	Offshore Wind Leasing Round 6	6	Lease	Q3	2027	Planned
Belgium	Northwind Noord	0.7	Lease & Support	Q3	2026	Planned
Germany	N-10.1	2	Lease & Support	Q2	2027	Planned
Germany	N-10.2 (Re-tender)	0.5	Lease & Support	Q2	2027	Planned
Ireland	Phase 2 – Site B	1.3	Lease	Q4	2026	Planned
Finland	EEZ Tender 1		Lease	Q2	2027	TBD
Portugal	Round 1	2	Lease	Q4	2026	Planned
France	AO9/10	10	Support	Q4	2027	Planned
Malta	Floating Wind	0.3	Lease	Q3	2026	Planned
Norway	Vestavind B		Lease	Q1	2027	TBC

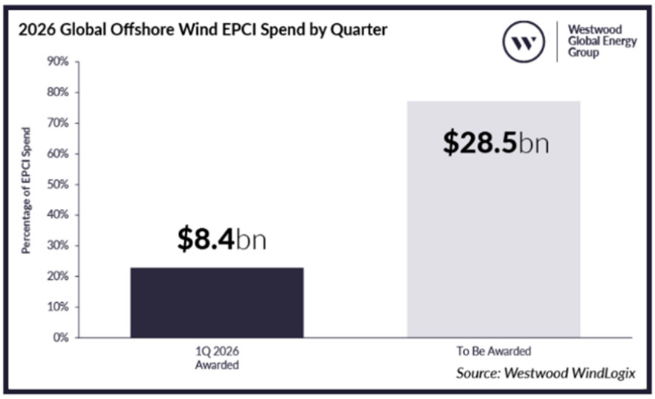
Country	Project / Auction name	Capacity (GW)	Mechanism Type	Estimated Award Quarter	Year	Status
Norway	Vestavind F		Lease	Q1	2027	TBC
Netherlands	IJmuiden Ver Gamma	4	Lease & Support	Q1	2027	Planned
Netherlands	Nederwiek Noord III	4	Lease & Support	Q1	2027	Planned
Netherlands	Nederwiek Zuid B	6	Lease & Support	Q2	2027	Planned

Source: Rystad Energy, Westwood Energy, The Crown Estate, OEUK

Case Study:
Offshore Wind EPCI Investment | Trends and Outlook

Global Offshore Wind EPCI Outlook

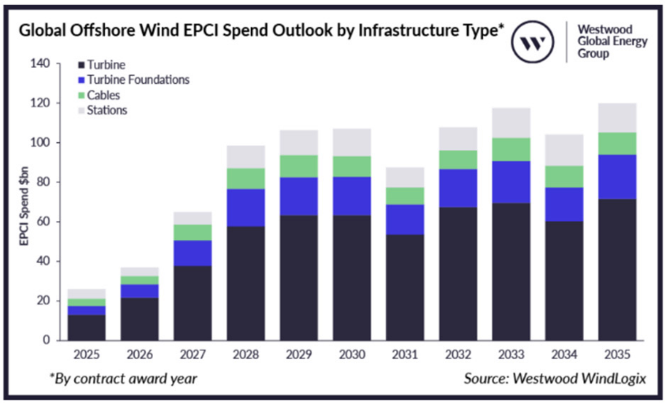
In 2025, the offshore wind sector experienced a slowdown resulting in declines in capacity additions, final investment decisions, and engineering, procurement, construction and installation (EPCI) spend. A total of $26.0bn of offshore EPCI spend was taken in 2025, marking the preceding year as one of the lowest spend years in the offshore wind sector since 2018. Despite this decline, activity is beginning to recover, signalling renewed momentum - $8.4bn of offshore EPCI spend was taken in 1Q 2026, with the UK accounting for the highest amount of spend with a 62% share.



The award of turbine contracts at the Norfolk Vanguard West and East wind farms accounts for the bulk of this UK spend, underpinning the impact of the UK's Contracts for Difference (CfD) Allocation Round 7 (AR7), as these contracts were finalised in a short amount of time after the award of the CfD. Looking beyond the UK market, EPCI spend was evenly split between Mainland China and the Rest of APAC, with each accounting for an 18% share in 1Q; total EPCI spend in 2026 is forecast to reach $37.0bn, with 1Q accounting for 23% of total expenditure.

Scale and Distribution of Offshore Wind EPCI Spend

Looking over the next 5 years, for the period 2026–30, $413.7bn of offshore EPCI spend is projected. The Rest of Europe is anticipated to have a 38% share of this spend, with Mainland China making up 26% and the Rest of APAC accounting for 19%. Finally, the UK will have a 16% share.



EPCI spend is forecast to average $82.7bn in the next 5 years, with 2028 witnessing a sharp rise in spend, attributed to larger project sizes, higher unit costs, and a more concentrated construction pipeline. Out of the total $413.7bn of offshore EPCI spend, 59% is expected to be spent on turbines, followed by 19% on turbine foundations, 12% on stations and 11% on cables. Beyond the next 5 years, spend across the 2031–35 period is expected to remain robust, with annual expenditure consistently exceeding $85bn. This is due to continued leasing activity in the near term, which will support a large-scale project delivery phase in the early 2030s. Although overall spend levels are high, there are notable year-to-year fluctuations during this period, reflecting the cyclical nature of the offshore wind market, with contracted work typically executed in years of lower spend and spend rising once the work has been completed.

Concentration of EPCI Spend

In terms of EPCI spend concentration, the top 10 project owners are forecast to account for more than 40% of total global EPCI expenditure (excluding Mainland China) over the next 5 years, equivalent to approximately $120.4bn. The spend attributed to each project owner reflects their respective equity share in the underlying projects. RWE is forecast to be the largest spender within the top 10, accounting for 22% of total EPCI spend - largely driven by RWE's portfolio of projects awarded Contracts for Difference in the UK's Allocation Round 7, alongside its projects in Germany.

TotalEnergies ranks second, accounting for 19% of total spend, while SSE holds third position with a 14% share of EPCI expenditure. EPCI spend is geographically concentrated, with the UK and Rest of Europe representing most of the investment among these leading project owners. Although RWE, TotalEnergies and Jera Nex bp show partial geographical diversification, they still retain a clear regional focus. CIP is the most geographically diversified owner, with an almost even spread of spend across the UK, Rest of Europe and Rest of APAC. In contrast, several owners, such as PGE and Orlen, remain highly region focused, with the portfolio of both companies being located within their home markets of Poland.

Part 2: The UK Market Outlook

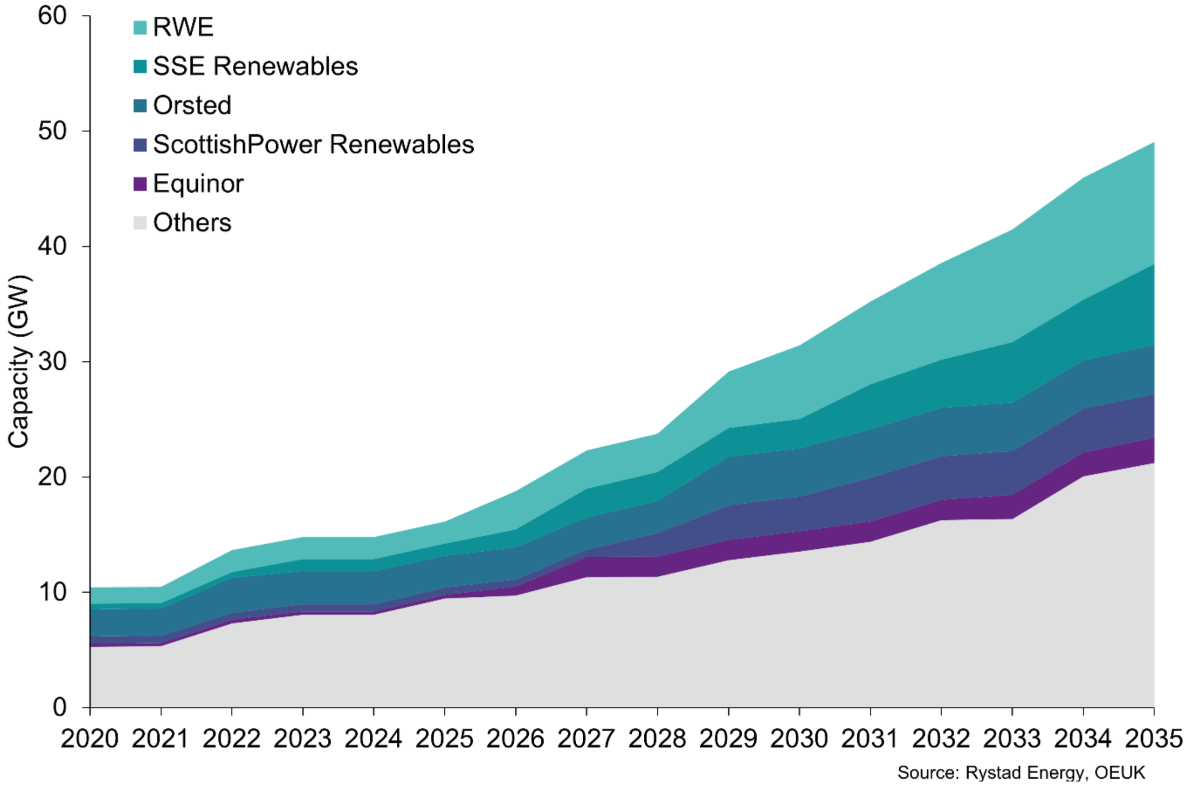
Project Pipeline

Looking at 2026, offshore wind development across the UK Continental Shelf continues at a significant pace, ensuring the UK maintains its position as the world's second largest market by capacity. The country's installed offshore wind capacity is expected to reach around 19 GW by the end of this year, representing about 20 per cent increase from the around 16 GW recorded at the close of 2025. This growth is driven by a surge in commissioning activity as major projects including phases of Dogger Bank (1.2 GW each) and the completion of Neart na Gaoithe (448 MW) and Moray West (882 MW) transition into full operation. While global competition intensifies, particularly from mainland China, the UK remains the epicentre for European offshore wind development.

Key milestones in 2025 included the completion of 45 monopiles for East Anglia Three by the Navantia Windar consortium and the finalisation of foundation installations at all three Dogger Bank sites. Critically, all projects scheduled to come online between 2025 and 2028 have already secured final investment decisions. Additionally, GB Energy has launched its strategy to strengthen domestic industry, specifically targeting the acceleration of floating wind technologies. These developments ensure the UK pipeline remains robust as the market transitions from construction phases to new strategic awards.

Market Share Evolution

Figure 4: RWE will become the UK market leader by 2030



From 2020 to 2025, Ørsted is the number one developer of UK offshore wind projects by equity. While SSE Renewables and RWE remain smaller but steadily expanding participant as its development pipeline begins to scale in late 2020s. Equinor's presence in the market is limited, reflecting its later entry relative to the other leading developers.

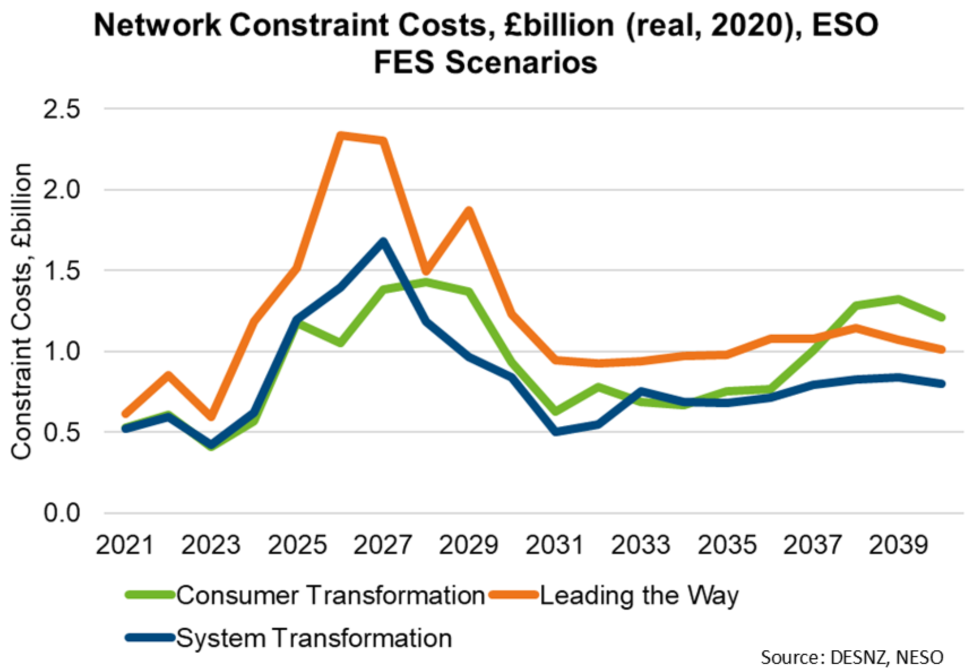
By 2030, differences in market share across the top five developers will become more pronounced. RWE accounts for approximately 20–22% of total capacity, closely followed by SSE Renewables at around 18–20%, consolidating their positions as the two largest developers. Ørsted and ScottishPower Renewables each hold broadly shares of roughly 10–13%, while Equinor represents an estimated 4–6% of total capacity as its portfolio begins to materialise.

By 2035, market concentration among the leading developers will increase further. RWE emerges as the clear market leader, with an estimated 24–26% share of total capacity, while SSE Renewables strengthens its position to around 20–22%. Ørsted and ScottishPower Renewables continue to grow in absolute terms but see their relative market shares stabilise around 10–11%. Equinor's share increases modestly to around 5–6%, indicating gradual consolidation of its position among the top five developers. As highlighted in OEUK's Wind Insight 2025, divestments, mergers and acquisitions are a common feature of the UK offshore wind market. Consequently, current projections are subject to significant evolution as the 2035 horizon approaches. Furthermore, these figures assume that all projects currently within the pipeline will reach full completion in the expected time.

Curtailment

Curtailment remains one of the principal constraints preventing the UK from fully realising the potential of its offshore wind resources. The UK grid was not originally designed to accommodate both a fundamental shift in consumption patterns, driven by the electrification of the economy, and an increasingly decentralised and intermittent generation mix. As a result, despite the scale of planned grid investment, access to offshore wind output for UK consumers will remain constrained in the near to medium term. Moreover, network reinforcement is already translating into higher TNUoS charges, which are undermining the economics of some existing and prospective offshore wind projects.

Figure 5: Constraints cost evolution



Case Study: Offshore Co-location: Scaling an Emerging Solution for Stranded Electrons

Xodus, in association with Subsea7, studied the future integration of energy storage with offshore wind. It identifies co-location as a niche application today that could become a valuable part of the energy system by 2040, helping to reduce curtailment and unlock commercial value.

Rapid offshore wind deployment across Northern Europe is outpacing grid upgrades, creating growing bottlenecks. In 2024, 72 TWh of electricity was curtailed in Europe, at a congestion management cost of €8.9 billion, and this is expected to triple by 2030 without intervention. Current regulatory frameworks, including the UK's CfD model, were not designed with storage in mind and offer limited incentive to store excess power.

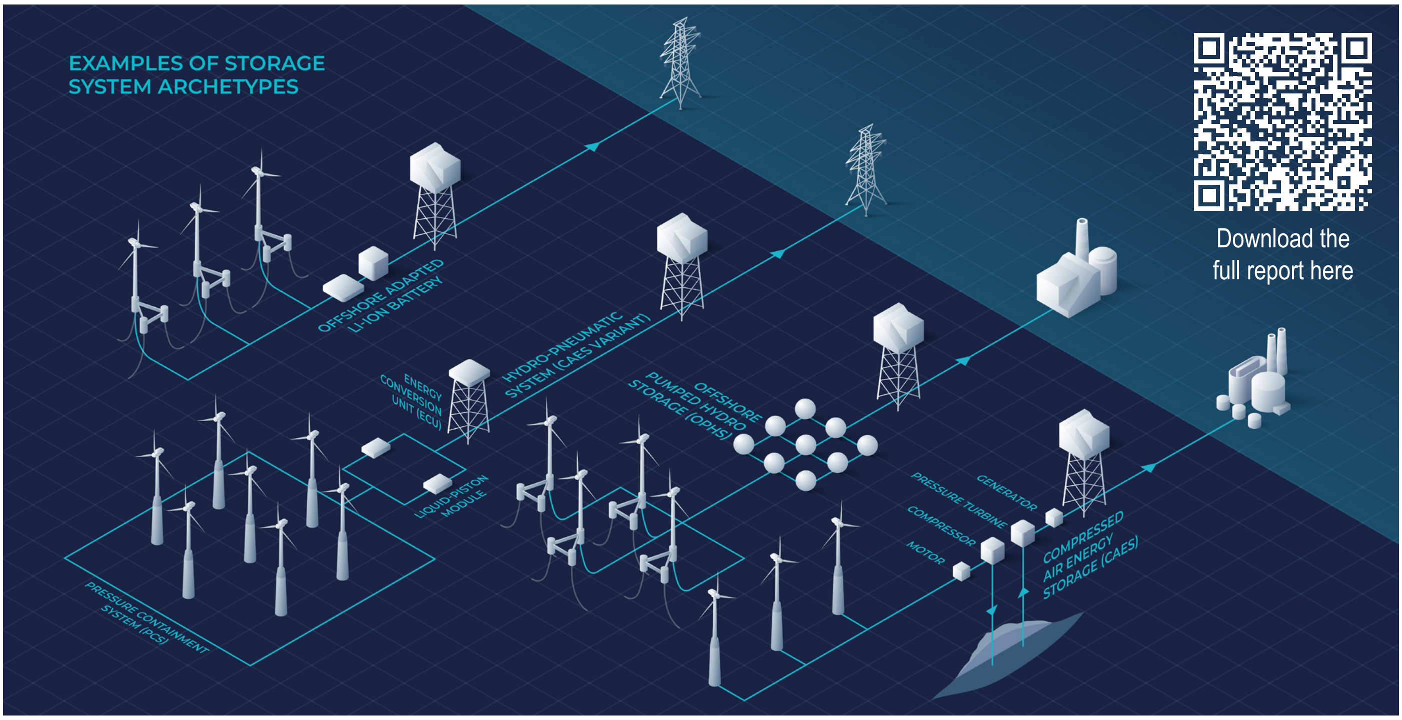
Xodus's report, Behind the Meter, presents offshore co-location as an emerging solution. This involves placing storage systems on the generator side of the transmission boundary so excess generation can be absorbed before it reaches the grid, smoothing output and improving revenue certainty. Xodus used the Levelised Cost of Energy and Storage (LCoE(E+S)) to assess how the technology could develop into a competitive asset class.

The study provides a roadmap for the transition of offshore storage from a niche add-on into core system infrastructure:

- **Curtailment Reduction**: Initial modelling shows that up to 10% curtailment reduction is achievable in the UK today using 4-hour lithium-ion systems.

- **Cost Evolution:** While offshore storage commands a premium today, Xodus projects a 40% reduction in costs by 2040 driven by modular manufacturing.

- **Phased Roadmap:** The study outlines a strategic path to 2040, starting with a "Pilot Phase" to validate technology, leading to a "Utility-Scale Phase" where hybrid wind-plus-storage becomes a mainstream asset.



International collaboration

The UK is engaging in international collaboration to strengthen its position in the offshore wind market and build economy of scale.

The UK is signatory of the Hamburg Declaration that is confirming the Ostend ambition of 300 GW of offshore wind capacity by 2050.

The UK has also entered in a Green Industry Partnership with Norway to collaborate in the development of renewable energy:

In 2025, Associated British Ports (ABP) has launched a port alliance focusing on floating wind.

OEUK is working with stakeholders to foster collaboration between the Celtic Sea neighbours in the UK, France, and Ireland. Taken together, the Hamburg Declaration and the UK–Norway Green Industrial Partnership reflect a deliberate policy choice to situate offshore wind deployment within a broader regional and international framework. Rather than relying solely on domestic market scale, the UK is leveraging cooperation to unlock economies of scale, shared infrastructure solutions and more efficient capital deployment.

This approach is particularly relevant as offshore wind projects grow in size, capital intensity and dependence on network capacity and system coordination. International collaboration supports the case for coordinated planning, the development of hybrid assets and shared grid solutions, while also helping to sustain a competitive UK supply chain in an increasingly globalised market. For the UK, these agreements therefore underpin not only decarbonisation objectives but also industrial strategy, energy security, and long-term competitiveness in offshore wind.

Case Study: Transforming Offshore Wind Training and Innovation at the University of Exeter's VSimulators Facility

As the offshore wind industry particularly Floating Offshore Wind (FLOW) continues rapid global expansion, the need for safer, more efficient, and highly capable training environments is becoming critical. Conventional training struggles to replicate the realities of working on floating structures, where movement, weather, and operational complexity present constant challenges.

The VSimulators facility at the University of Exeter, located at Exeter Science Park, provides a unique, high-fidelity environment designed to meet these demands. Combining advanced virtual reality, a multi-axis motion platform, motion-capture systems, and biomedical sensing, the facility enables realistic replication of offshore conditions within a controlled onshore setting.

Raising Training Standards | Wind turbine technicians can experience vessel motion, platform sway, and turbine interiors before setting foot offshore. This accelerates learning, builds confidence, and reduces exposure to early-stage risk. Complex procedures can be rehearsed repeatedly, developing competence that translates directly to real-world operations.

Enhancing Safety and Preparedness | Safety-critical scenarios such as emergency responses, equipment failures, and adverse weather can be simulated effectively and safely. This prepares teams for decision-making under pressure while enabling organisations to strengthen safety culture and operational resilience.

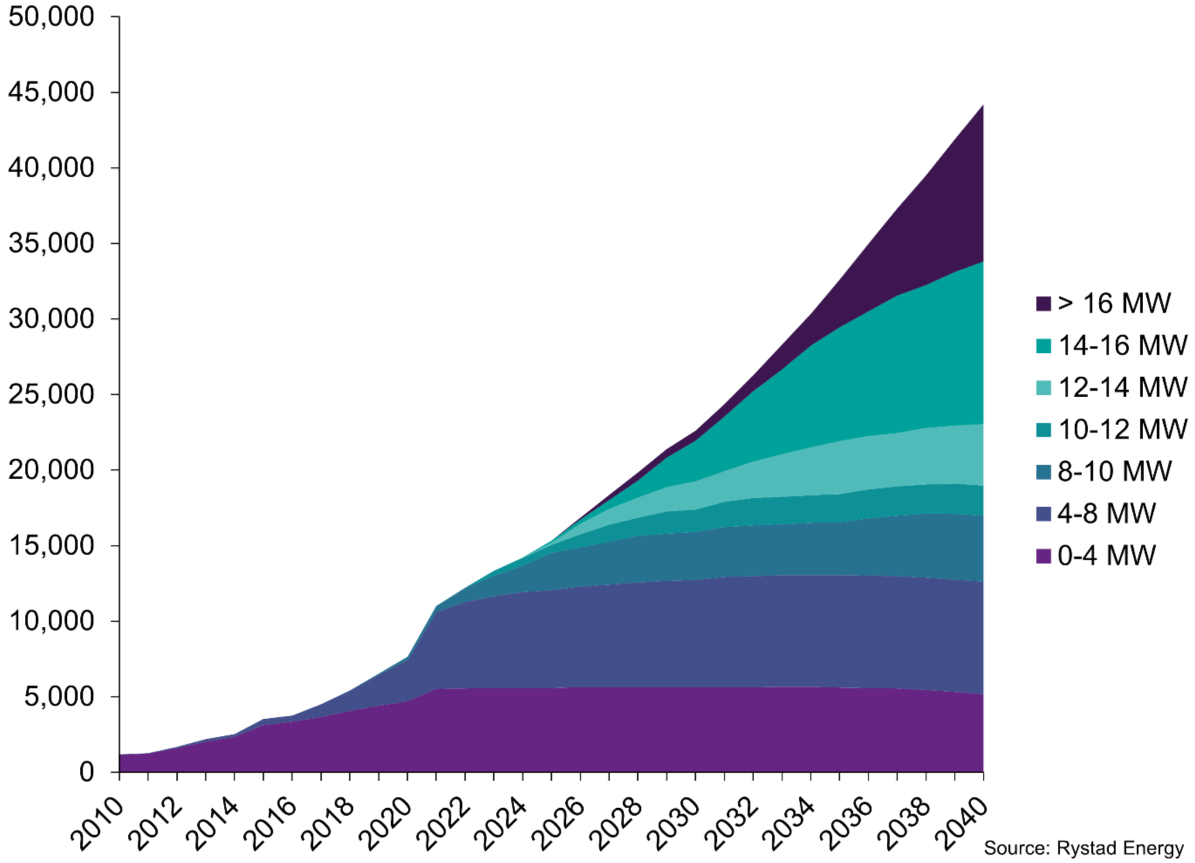
Driving Research and Product Innovation | Through integrated motion capture and biomedical monitoring, VSimulators offers valuable insight into fatigue, balance, cognitive load, and overall human performance. These data-driven insights support the development of improved operating procedures and more intuitive equipment design. Manufacturers and technology developers can trial new tools and interfaces within a realistic yet controlled environment, helping reduce development cycles and ensure products are fit for purpose in demanding offshore settings.

Supporting the Future FLOW Workforce | By combining immersive training, human-centred research, and product-development capability, VSimulators provides a strategic advantage for operators, developers, and the wider supply chain helping the sector build a safer, more capable workforce for the next generation of offshore wind.

The UK Supply Chain

Wind Turbine Size Evolution

Figure 6: Global wind turbine size evolution 2010 to 2040 (Number of turbines)



While the global offshore wind fleet continues to expand rapidly, the industry's focus has shifted away from an ongoing race towards ever-larger turbines and towards a more consolidated technology landscape. Early growth was driven by successive up-scaling, with deployment moving quickly from sub-4 MW turbines to 8-10 MW, and subsequently to 10-12 MW machines throughout the 2010s and early 2020s. From 12MW onward, bigger size turbines are not expected to fully replace previous models.

Further increases in turbine size deliver diminishing returns in terms of economies of scale, cost reduction and risk mitigation. As a result, the market appears to be consolidating around a limited number of proven large-scale platforms, with growing emphasis on standardisation, reliability, supply-chain maturity and execution capability, rather than continued pursuit of incremental size increases.

Case Study:
Simulating Offshore Wind Supply Chain from Port to Installation

ASCO

Haskoning
Enhancing Society Together

Scottish Enterprise

About.

ASCO partnered with Haskoning and Scottish Enterprise to carry out a pioneering simulation project to map the offshore wind supply chain from port operations to on-site installation. The goal was to provide wind developers, ports, and investors with clear, actionable insights to make informed planning decisions and unlock Scotland's offshore wind potential.

Approach.

We combined our logistics expertise and relationships with developers and ports with Haskoning's advanced simulation capabilities. Together, we built a model capable of tracking millions of vessel movements, construction events, and logistics activities across four offshore wind projects over a simulated 10-year period from 2028 to 2038.

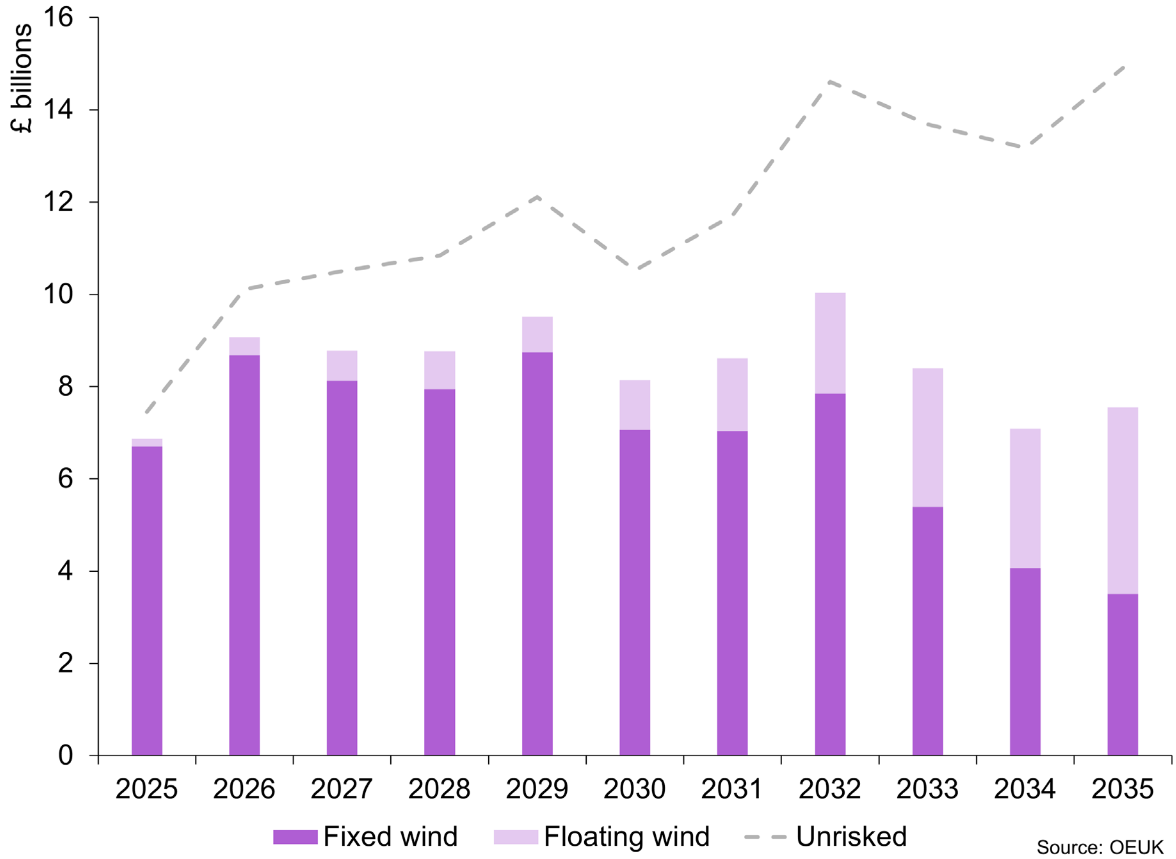
The model allowed us to stress-test multiple port strategies under realistic operational constraints. We consulted with developers and ports to integrate real-world data and sector expertise to ensure the simulation accurately reflected practical limitations, such as port infrastructure, wet storage availability, and integration berth capacity. This approach enabled us to identify potential bottlenecks, assess resilience, and explore logistics strategies well in advance of physical construction.

Impact.

- Port strategy optimisation: The simulation revealed multiple ports could be utilised more effectively than previously thought, reducing reliance on a single "Super Port" and lowering bottleneck risk.
- Bottlenecks identified: Wet storage limitations for floating turbine units and integration berth constraints were flagged, guiding strategic investment decisions.
- Informed decision-making: Developers, ports, and investors now have a robust, evidence-based framework to evaluate logistics and construction timelines under real-world conditions.
- Collaboration enabled: The insights encourage coordinated planning across the Scottish offshore wind sector, helping to avoid delays and inefficiencies.
- Long-term resilience: Stress-testing multiple scenarios allows stakeholders to plan for unpredictable variables such as weather or supply-chain disruption, increasing confidence in project delivery and reducing risk.

The UK Offshore Wind Pipeline

Figure 7: Risked vs. unrisked investment forecast



The unrisked forecast assumes that all projects currently in the pipeline will be delivered. Our risked investment forecast takes account of potential project cancellations, project delays and overall likelihood of projects proceeding.

The UK offshore wind pipeline remains a significant opportunity for the domestic supply chain. However, there is still considerable scope for UK-based suppliers to capture a greater share of this value. OEUK's risked project pipeline indicates that, under current regulatory and fiscal conditions, total capital across offshore wind is expected to reach £86 billion.

Critically, the success of the offshore wind sector is closely linked to the established oil and gas sector, which currently holds an estimated 50% of the skills and supply-chain capabilities required to deliver offshore wind at scale. However, there is a growing risk of "supply chain flight", as companies increasingly seek opportunities overseas in response to the unattractiveness of the domestic investment environment. Safeguarding long-term energy security and delivering a resilient transition will therefore require the UK to prioritise the retention and anchoring of these industrial capabilities and skilled workforces before they are lost to international markets.

Tariff on Steel Imports

The UK Government's March 2026 decision to impose a 50% tariff on steel imports above reduced quotas is expected to affect the energy supply chain by increasing short-term costs and procurement complexity for steel-intensive offshore projects. At the same time, the policy addresses a strategic weakness highlighted by industry analysis: the UK's growing reliance on overseas steel following years of domestic capacity decline. By strengthening domestic production, the approach signals a broader industrial policy shift towards protecting critical supply chains and improving national resilience. For instance, AR8 will allow CIB applications for UK steel manufacturers, to try to incentivise domestic use. Over the longer term, this may support UK-based fabrication yards, contractors and manufacturers by increasing demand for locally produced materials and boosting domestic contract opportunities across energy and infrastructure sectors.

OEUK Supply Chain Investment Task Force

The OEUK Supply Chain Investment Task Force provides strategic oversight, on behalf of the OEUK Board and wider membership, to support the coordination and acceleration of supply-chain investment across the energy system. Reporting directly to the OEUK Board, the Task Force brings together senior industry leaders with responsibility for delivering new energy opportunities.

Current priorities include the development of OEUK Alliance Contracting guidance, oversight of the 2026 update to OEUK's all-energy risked project pipeline, and OEUK-led work with Xodus to establish a UK local-content baseline. This baseline will inform future local-content milestones in areas of strategic supply-chain strength and support assessment of the effectiveness of public finance mechanisms, such as the Clean Industry Bonus.

The Task Force is also focused on unlocking early-stage supply chain finance, working closely with SNIB, the National Wealth Fund and Great British Energy. New for 2026, the Task Force is supporting FLOWEX Mission 5, co-funded with ORE Catapult and Renewable UK, to develop an offshore wind technology and R&D roadmap that will inform future Great British Energy funding priorities.

UK Local Content across the Offshore Wind Lifecycle: Where UK Value Sits for the Supply Chain

Recent studies indicate that around one-third of offshore wind lifetime expenditure is already captured by UK companies, with particularly strong performance in development, environmental and consenting services, engineering, project management, ports and logistics, and long-term operations and maintenance. These strengths reflect a mature and highly capable UK services base that continues to deliver value across the full project lifecycle.

Looking ahead, there is significant scope to increase UK content further as investment in infrastructure and manufacturing capacity comes through. New and planned facilities for turbine blades, monopiles, export cables and port upgrades, alongside targeted policy mechanisms such as the Clean Industry Bonus, are expected to unlock additional domestic value—particularly during the capital-intensive construction phase. Floating offshore wind also presents a growing opportunity, with higher UK participation already evident in early-stage design, integration activities and operations, and further potential as foundation technologies and port capabilities mature.

The findings underline that improving local content is less about starting from scratch and more about building on existing UK strengths, aligning investment with a clear project pipeline, and supporting competitive supply chain growth. With coordinated action across government, developers and suppliers, offshore wind can deliver even greater economic value while continuing to drive decarbonisation at scale.

Case Study: Moray West Debris Clearance Survey

XOCEAN

Ocean data, delivered.

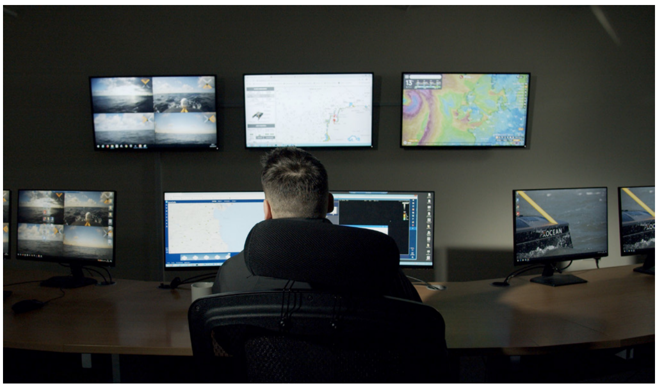
OCEAN WINDS

From March to August 2024, XOCEAN delivered four phased debris clearance surveys at Ocean Winds' Moray West Offshore Wind Farm, providing seabed intelligence between construction windows to maintain programme continuity. Using fully uncrewed, over the horizon USV operations from Buckie Harbour, XOCEAN achieved 100% MBES and backscatter coverage at each monopile location to a 0.5 m object detection threshold, issuing DTMs and object lists within the required 30 day turnaround. Multiple mobilisations and 24/7 Control Room oversight enabled Ocean Winds and contractors to work with current seabed data, supporting safe jack up and construction activity without interruption.

Located on the Smith Bank in the Moray Firth, approximately 22 km offshore, Moray West comprises 60 turbines and 2 offshore substations platforms across 225 km^2 in water depths of 35–52 m. Once complete, the project will generate 882 MW, enough to power more than 1.33 million homes and avoid around 1.1 million tonnes of CO_2 annually.

Challenge | Surveys were required across four discrete phases, aligned to the construction programme and governed by strict milestones to avoid disruption to offshore operations. The scope confirmed water depths around installed monopiles and identified seabed objects or obstructions that could affect jack up positioning and construction activity. Specifications included MBES bathymetry and backscatter across 300 m × 300 m boxes at each monopile location, with 100% coverage and a 0.5 m object detection threshold, with DTMs and object lists required within 30 days of acquisition.

Solution | XOCEAN executed four mobilisations, deploying one USV per phase from Buckie Harbour. Each USV operated fully uncrewed, over the horizon, with command, control and communications maintained via satellite. Operational oversight was provided through XOCEAN's Control Room, with 24/7 monitoring supported by live situational awareness and real time imagery. Key survey capability included NORBIT Winghead MBES and a winch deployed Valeport Swift SVP for sound velocity profiling and multibeam processing compensation. Activities were conducted in accordance with Autonomy Level 2 under the UK Maritime MASS Code, with compliance to relevant IMO instruments.



Results | XOCEAN's multi mobilisation approach ensured Ocean Winds and contractors had current seabed intelligence between construction phases, reducing the risk of programme delays and supporting continuous offshore operations. All phases mobilised within allocated timeframes, with data acquisition completed on schedule and priority deliverables issued to agreed milestones within the required turnaround. XOCEAN also accommodated additional survey requirements within existing mobilisations and provided insight into sediment dynamics at monopile locations. Ocean Winds reported smooth integration of uncrewed operations into project marine policies, with USV activity conducted safely alongside construction and CTV vessels.

.

The UK Supply Chain Support

In addition to the Clean Industry Bonus, the government has committed £1 billion to support the offshore wind supply chain, structured around three core mechanisms:

Industry Growth Plan

The Offshore Wind Industrial Growth Plan (IGP), published in April 2024, sets out a long-term strategy to strengthen the UK's offshore wind supply chain and secure greater economic value from rapid sector expansion.

While the UK has the world's second-largest offshore wind pipeline, increasing global competition and supply-chain constraints risk limiting domestic benefits. The IGP has identified five priority areas: advanced turbine technology; industrialised foundations; future electrical systems and cables; smart environmental services; and next-generation installation and operations.

If successful, the Plan could support around 10,000 additional supply chain jobs and add up to £25 billion of gross value to the UK economy by 2035. The Offshore Wind Growth Partnership (OWGP) acts as the IGP Delivery Body and administers funding. This includes around £300 million committed by offshore wind developers through the OWIC Industrial Growth Fund, targeted at boosting UK manufacturing capacity, innovation and supply chain resilience. It is essential that the existing oil and gas supply chain is given the opportunity to benefit from this fund and leverage its expertise to benefit the offshore wind sector.

Great British Energy

Great British Energy (GB Energy) was established in 2024 by the incoming Labour government as a publicly owned energy company designed to support the expansion of clean power and strengthen domestic supply chains. The government has committed £8.3 billion of capital from the National Wealth Fund over five years to capitalise GB Energy and enable long term, strategic investment across the energy system.

GB Energy has agreed to partner with The Crown Estate to accelerate investment in UK offshore wind, with the potential to leverage up to £60 billion of private sector capital through coordinated development and risk sharing. The company is intended to act as a catalytic investor rather than a direct project developer, crowding in private finance and supporting delivery at scale. For instance, GB Energy has recently joined forces with the National Wealth Fund and the Scottish National Investment Bank to invest in the Pentland Scottish floating wind project.

GB Energy has allocated £300 million specifically for the offshore wind supply chain. In parallel, GB Energy has launched a dedicated floating offshore wind initiative, aimed at supporting the early deployment of floating projects while accelerating cost reduction, supply chain readiness and UK industrial capability. This competition is expected to play a key role in helping the UK retain global leadership in floating wind and transition from demonstration projects to commercial scale.

The Crown Estate

The Crown Estate Act 2025 granted the entity new powers to borrow, as well as greater flexibility in how and where it invests. Until now, it has had to sell assets to generate capital for reinvestment. Getting certainty to borrow through the new Act will free up its cash reserves to further invest, for example, in accelerating the development of offshore wind, science and innovation. It has signposted an additional £400mn over the short to medium term for investment in supply chain infrastructure, manufacturing, research and testing facilities.

ETZ

The ETZ Ltd Supply Chain Challenge Fund (2026/27) provides £3 million to support energy supply-chain companies—primarily from oil and gas—seeking to diversify into energy transition and green industries. It focuses on SMEs, offers capital grants, and supports Scotland's Just Transition objectives.

Devolved government have also put in place their own grant scheme.

Financing the Transition

Most of the offshore wind projects are privately finance. The National Wealth Fund and Scottish National Investment Bank can also contribute to support the project financing.

National Wealth Fund

In October 2024, the UK Infrastructure Bank was reconstituted as the National Wealth Fund (NWF), with a significantly expanded mandate to support the government's growth and clean energy missions and to deliver a more active industrial strategy. In March 2025, the Chancellor issued a formal Statement of Strategic Priorities, setting the NWF's direction for this Parliament.

Under this strategic steer, the NWF has been capitalised with £27.8 billion and tasked with acting as the UK's principal public investor and policy bank, using public capital to crowd in private finance, take on higher risk where markets fall short, and generate a return for taxpayers. The Fund will focus on sectors critical to long-term competitiveness and energy security, including offshore wind, ports, power grids, hydrogen, carbon capture, green steel and advanced manufacturing.

The UK government has explicitly positioned the NWF as a cornerstone of its modern Industrial Strategy, working alongside Great British Energy and The Crown Estate to mobilise more than £100 billion of investment by 2030, accelerate place-based growth across the UK, and strengthen sovereign supply-chain capabilities in clean energy and strategic industries.

Scottish National Investment Bank

The Scottish National Investment Bank (SNIB) was established in 2020 as Scotland's public development bank, with a mandate to provide patient capital to support the transition to a fairer, greener and more productive economy. Operating independently but wholly owned by the Scottish Government, the Bank is designed to take on greater risk and longer investment horizons than commercial finance, while crowding in private investment and delivering long-term economic, social and environmental benefits.

Under its 2024–25 and 2025–26 Investment Strategies, the Bank continues to focus on three core missions: driving the transition to net zero, building communities and promoting innovation. Offshore wind, and in particular floating offshore wind, is identified as a strategic priority, reflecting Scotland's extensive deep-water resource and its ambition to lead the global floating wind market. The Bank has committed close to £200 million across multiple offshore wind and enabling infrastructure investments, leveraging around £700 million of co-investment from private and public partners.

SNIB now plays a growing role alongside Great British Energy, the National Wealth Fund and The Crown Estate in backing early-stage and first-of-a-kind projects, including direct equity investments in floating offshore wind developments. Through this approach, the Bank supports domestic supply-chain development, port and manufacturing infrastructure, and a just transition for Scotland's existing oil and gas workforce, while ensuring commercial discipline and long-term value for the public purse.

Case Study:
Global offshore wind: Financing mechanism shifted in 2025

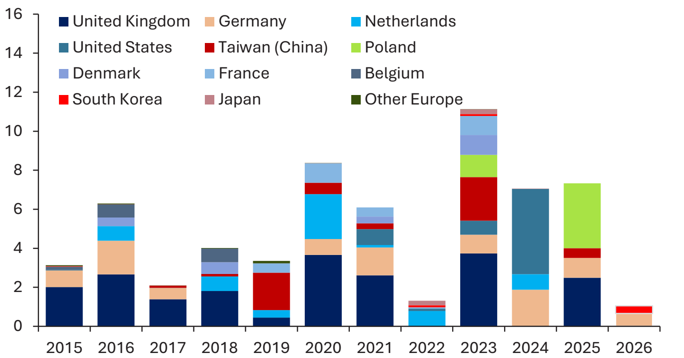
RystadEnergy

Project financing rebounds as Europe dominated global offshore wind FID in 2025

After a period of constrained investment driven by inflation and higher interest rates, offshore wind project financing showed signs of recovery in 2025. While final investment decision (FID) volumes remained below the highs seen in 2023, activity began to stabilise and broaden across markets, supported by improving financing conditions and greater capital discipline. The charts below illustrate both the volume of offshore wind capacity reaching FID by country, and the shifting balance between project finance and corporate finance as developers respond to easing monetary conditions.

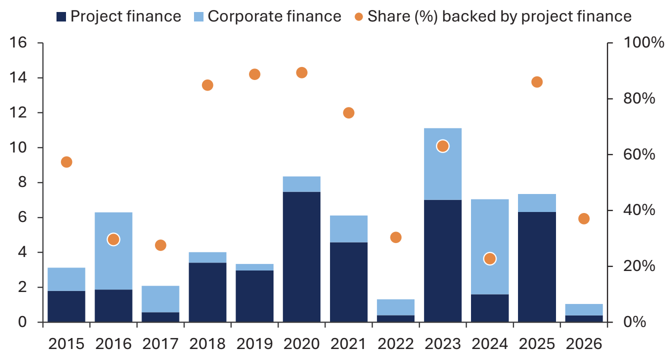
Offshore wind capacity reaching FID by country, global ex. Mainland China and Vietnam

Gigawatts



Offshore wind capacity reaching final investment decision (FID) by type of financing*

Capacity financed in gigawatts (LHS), Share of project financed capacity (RHS)



Offshore wind capacity reaching final investment decision (FID) totalled 7.3 GW in 2025 (global, excluding Mainland China and Vietnam), marking a rebound in project financing activity but still below 2024 levels, when FID volume was dominated by US projects. In 2025, FID activity was more widely distributed, led by a cluster of European markets alongside Taiwan (China), reflecting improving financing conditions and a more selective investment environment. Overall, the data suggests 2025 represented a year of recovery and rebalancing across markets, rather than a return to peak-cycle volumes.

The 2025 rebound was accompanied by a renewed preference for project finance as the dominant financing mechanism for offshore wind reaching FID, reversing the weaker project-finance backdrop seen during the higher interest-rate period. The shift aligns with easing monetary conditions: as central bank rates peaked and began to move lower, the cost of capital started to improve, supporting a return to project-financed structures. While it remains early in the cycle, the trend points toward developers continuing to favour project financing over corporate finance into 2026 as financing conditions stabilise.

Part 3: Regulatory Framework Evolution

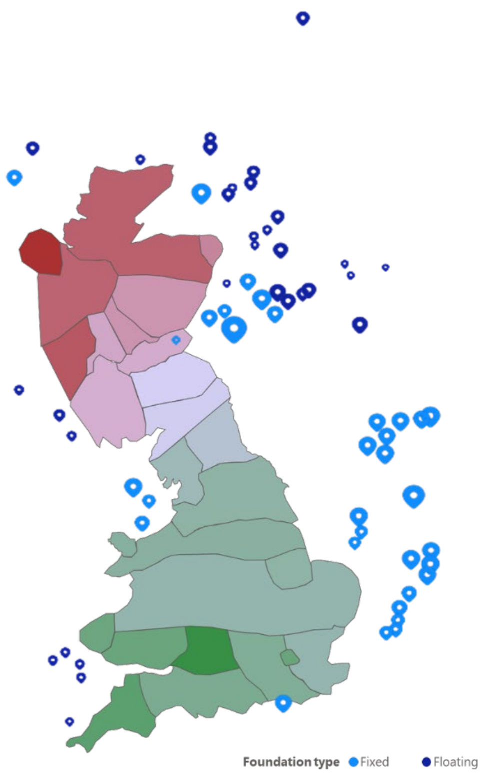
Transmission Network Use of System (TNUoS) Charges

TNUoS charges recover the cost of building, operating and maintaining Great Britain's high voltage transmission network. They apply to both generation and demand users and vary by location, reflecting the cost of transporting electricity to and from different system zones.

In 2026, the role of TNUoS in shaping offshore wind investment has become even more critical. Charges continue to show large regional variation, with Scotland facing the highest tariffs in Great Britain, while southern zones often benefit from neutral or even negative charges. This imbalance affects investment signals, CfD bids, and long-term project competitiveness. This dynamic has long-term consumer impacts: higher Scottish bids can set clearing prices for all UK offshore wind, increasing total consumer costs by £5.6 billion cumulatively from 2025–2050.

In early 2026, NESO published the Final TNUoS Tariffs for 2026/27, confirming significant year-on-year revisions and new Annual Load Factors (ALFs). These tariffs take effect from 1 April 2026 and will shape cost environments for AR8 eligible offshore wind projects and repowering decisions.

Figure 8: Map of TNUoS charge zones and upcoming wind farms



Cap & Floor Discussions and the Ofgem Position

In 2024–25, Ofgem commissioned NESO to explore a temporary cap and floor on wider TNUoS generation charges to stabilise volatility ahead of AR7. Although the workgroup developed detailed proposals aimed at smoothing regional disparities and reducing investment risk, Ofgem ultimately decided not to implement the cap and floor, instead opting for broader network charging reforms under REMA.

A market with fixed income (CfD) but unpredictable cost (TNUoS) is not sustainable, therefore TNUoS needs urgent measures to stabilise the cost and long-term reforms to unlock investment decisions and reduce costs for consumers. Locational signals should be indicative prior to the leasing round and fix at CfD stage. They are inefficient after, damage businesses and increase consumers' cost. Furthermore, the system benefits of higher capacity factors should be recognised and accounted for.

Case Study: Transmission charging as a constraint on Scottish wind investment

OCEAN WINDS

Strategic importance of Scottish wind

Scottish wind generation is fundamental to delivering the UK's Clean Power 2030 ambition, supporting the Just Transition for the energy workforce and associated socio-economic opportunities. Government and National Energy System Operator (NESO) analysis indicates that offshore wind capacity in Scotland must increase by around 160% by 2030, with onshore wind rising by roughly 80%, compared with 2024 levels. Beyond 2030, Future Energy Scenarios consistently show Scotland providing a growing share of GB wide low carbon electricity.

Despite this strategic dependence, current transmission charging arrangements are increasingly misaligned with the scale and location of wind deployment required.

Rapidly rising transmission costs

The cost of operating and expanding the GB transmission network has risen sharply as the system adapts to a renewables led generation mix, following chronic under investment over the past four decades. Total allowed transmission revenue recovered through TNUoS increased from just under £4 billion per year in 2015 to a forecast over £12 billion per year by 2030. While around 85% of these costs are recovered from demand, the allocation of generator charges has become increasingly punitive for Scottish wind projects, leading to projects already being paused and leases handed back.

Escalating and volatile TNUoS charges for wind

Recent forecasts show that TNUoS charges for some Scottish zones are expected to more than double between 2025 and 2030 beyond previously forecasted figures. This escalation applies across technologies, but wind (especially offshore wind in northern Scotland) is disproportionately exposed.

Across the existing Scottish generation fleet, updated forecasts imply a £2.9 billion increase in expected lifetime TNUoS costs relative to reasonable expectations at the time of investment. Wind projects account for a large share of this increase:

- offshore wind represents 24% of installed capacity but accounts for 57% of the increase in TNUoS costs; and
- for many assets, lifetime transmission charges are now 30–40% higher than anticipated at final investment decision.

Illustrative offshore wind example

An illustrative 500 MW offshore wind farm in northern Scotland highlights the scale of change:

- At investment decision in 2016, annual TNUoS charges would have been expected to remain broadly constant at around £8 million per year (2025 prices).
- Under the latest forecasts, charges rise to around £14 million per year by the mid 2020s, before increasing sharply to around £29 million per year by 2029.
- As a result, estimated lifetime TNUoS liabilities increase from around £383 million to approximately £769 million, eroding around £387 million of project value.

By contrast, an equivalent wind project located in southern England would move from near zero charges at investment decision to receiving a TNUoS credit of £5 million pounds per year by the end of the decade, further increasing the bill that must be covered by northern generators and ultimately pushing up consumer bills.

Widening locational disparities
The locational "slope" of TNUoS charges is steepening significantly. By 2030, the range of TNUoS charges within Scotland alone is forecast to exceed the current variation across all Great Britain. This creates a strong disincentive to invest in northern Scottish zones, including areas expected to host a substantial share of future offshore and onshore wind capacity.

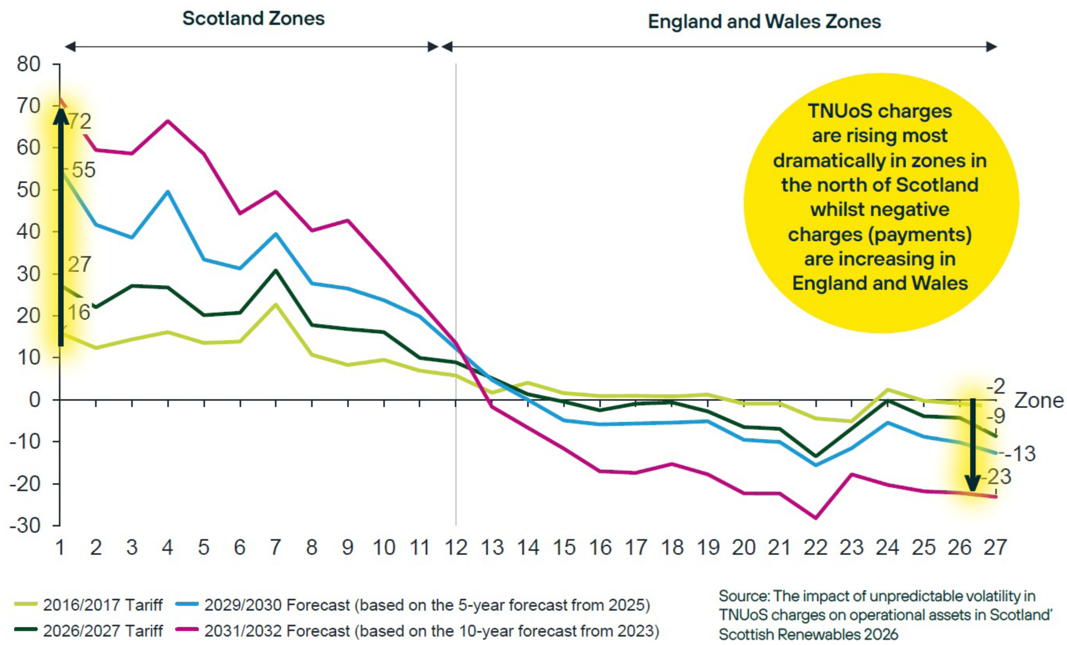
Implications for costs and consumers
Transmission charges feed directly into project economics and consumer outcomes. For a wind farm in northern Scotland:
- the contribution of TNUoS to the levelised cost of energy increased from £3.73/MWh in 2016 to £6.41/MWh by 2025 and is forecast to exceed £14/MWh by 2029; and
- higher and more uncertain transmission costs raise CfD bid prices and have contributed to increased administrative strike prices in recent allocation rounds.

The outcome is higher system costs, despite Scottish wind being among the lowest cost sources of electricity available to the GB system.

Viability risks for operational wind assets
Forecast TNUoS levels create an additional risk for operating wind farms. Illustrative cash flow analysis using 2029 charge forecasts shows that some offshore and onshore wind projects could potentially move into negative operating margins, even where wholesale revenues and CfD support remain in place. This raises the prospect of:
- inefficient early closure of existing wind assets; or
- premature repowering decisions driven by charging pressure rather than optimal system outcomes.

Alignment with strategic planning
NESO's emerging Strategic Spatial Energy Plan (SSEP) and the Centralised Strategic Network Plan (CSNP) aim to define where generation and network investment should take place. However, current TNUoS principles continue to penalise generation in locations identified as strategically essential. For wind, this represents a fundamental inconsistency between planning ambition and charging signals.

Key summary
For Scottish wind, TNUoS has evolved from a secondary operating cost into a material investment risk. Figures throughout the system operator's own forecasts demonstrate that rising and volatile transmission charges are eroding project value, increasing strike prices, and slowing deployment. Without reform, transmission charging is constraining one of the most critical building blocks of the UK's clean power transition.



OFTO Regime and Reform Options

The UK's Offshore Transmission Owner (OFTO) regime was designed for a system built around radial, incremental connections, but the scale and complexity of today's offshore wind ambitions (up to 50 GW by 2030 and potentially over 100 GW by 2050), require a step change in delivery models and coordination. The regime must evolve to support anticipatory investment, multiuser offshore networks, and new categories of "offshore customers", such as INTOG electrification projects, offshore electricity storage, and hydrogen production.

A central challenge is that the existing OFTO model places responsibility on generators for the timely delivery of transmission assets, but future integrated networks require early, coordinated build-out. Delivery risk, unclear grid timelines, and lack of visibility on pipeline sequencing significantly inflate developer risk premiums. Delays in OFTO delivery can leave generation assets stranded, with revenue loss and higher cost of capital. Those risks ultimately translate into higher CfD strike price and therefore cost to consumers.

Ofgem's reform work considers three principal options:

1. Early Competition OFTO Build Model

Under early competition, OFTOs enter before design finalisation and deliver coordinated assets aligned with the Centralised Strategic Network Plan (CSNP). This model could enhance system coordination, cost efficiency, and consumer value. However, key barriers must be resolved, including clear governance, delivery sequencing and tender transparency; mature site conditions and supply chain readiness; robust compensation mechanisms for delays; and balanced risk allocation between generator and OFTO. Without clarity on outage and delay compensation, generator participation and investor appetite would be constrained.

2. Differentiated Framework for Radial vs. Coordinated Assets

Early competition should be optional, with radial assets retaining late competition or generator build approaches to avoid unnecessary process burden. Early competition suits non-radial, multi-user transmission where coordination gains are greatest.

3. Centralised Tendering

A fully centralised approach could support long-term coordination under the CSNP, but risks misalignment with project timelines. Centralised tenders require a phased introduction, strong governance, and must avoid deterring investment at early seabed leasing stages.

Grid Queue Reform

Great Britain's grid connection system has undergone the most significant transformation in its history. By late 2024, the connections queue had swollen to 700–800 GW (all technology), far exceeding the ~200 GW required for net zero by 2050 and more than four times what is needed for Clean Power 2030 (CP30). This backlog, driven by speculative "zombie" applications, slow network upgrades, and misaligned project progression, was blocking the timely deployment of offshore wind and other strategic technologies.

In response, NESO paused new applications in January 2025 and, together with Ofgem, initiated the TMO4+ grid connections reform package, replacing the historic *"first come, first served"* model with a new *"first ready, first needed, first connected"* framework. Under Gate 2, NESO allocates confirmed queue positions, connection points, and connection dates only to projects meeting two tests: Gate 2 readiness criteria (Secure land right, submitted planning application and compliant with readiness criteria M1) and Gate 2 strategic alignment criteria (delivery of CP30, flexibility & system services, NESO's Project Designation Methodology and "Protected status"). Gate 2 created a new pipeline of 283 GW of generation and storage, 99 GW of transmission-connected demand split into two phases: phase 1(2030 – offer in Q1/Q2 2026) and phase 2 (2035 – offer in Q3 2026). Battery storage was heavily reduced due to high speculative volume and oversupply.

Despite this major reform, significant issues remain. The UK is the only mature offshore wind market with no developer protection against grid delays. Developers currently bear 100% of delay risk, including lost revenue and capex overruns. This drives up the cost of capital and, ultimately, the CfD prices paid by consumers. Furthermore, the connection process will benefit from:

- A centralised digital tool providing real-time grid capacity, constraints, and queue status
- Common data standards and clearer visualisation
- Legal mechanisms to allow the sharing of sensitive network data

Review of Electricity Market Arrangements (REMA)

REMA remains the UK's most significant power-market redesign in decades. In a system shifting rapidly from centralised fossil fuel generation to decentralised intermittent renewables, REMA seeks to update wholesale and balancing arrangements so that they remain compatible with decarbonisation, system security and affordability.

NESO estimates £54–58 bn of grid upgrades by 2030 are needed to integrate planned renewable capacity, while demand patterns shift dramatically with electrification. The system will therefore depend increasingly on flexible low-carbon resources, hydrogen-fired power, CCS-enabled gas, long-duration storage and interconnectors, to maintain reliability in a renewable-dominated market.

In July 2025, Government confirmed that REMA will not proceed with zonal pricing, instead pursuing Reformed National Pricing, a model providing greater operability, transparency and efficiency while retaining a single GB wholesale price.

The government has narrowed the design space substantially since the first REMA consultation, but several important options remain under evaluation in 2026. These shape how prices are formed, how renewables interact with flexible generation, and how the system operator manages constraints.

In February 2026, NESO launched a Call for Input on reforming balancing, settlement, and dispatch, based on the "system operability & efficiency" pillar of Reformed National Pricing.

The electricity system is facing mounting operational and cost pressures, primarily driven by rising redispatch volumes caused by transmission congestion. This situation has resulted in historically high levels of balancing actions, making system operation more complex and expensive. Compounding these challenges is insufficient visibility of embedded generation; significant amounts of behind-the-meter and distribution-connected resources remain hidden from NESO, leading to uncertainty and inefficiency in system balancing.

Further distortions arise from conflicting signals between the wholesale market and the Balancing Mechanism. These overlapping incentives encourage strategic behaviours, such as trading close to real-time and responding to NESO's balancing actions in ways that can distort price formation (for example, NIV-chasing). Moreover, the system's current design creates strong, predictable incentives for market participants to engage in "constraint gaming" or inc-dec behaviour, particularly in areas with recurring congestion.

Unless comprehensive balancing and dispatch reforms are implemented, these issues are likely to intensify as more intermittent renewable capacity connects to the grid. Addressing these systemic challenges is essential to ensuring both cost efficiency and system reliability as the market evolves.

Main options for balancing & settlement:

- Shorter settlement periods (15-min or 5-min): sharper signals but large industry-wide transformation and liquidity risks.
- Lower threshold for mandatory BM participation: improves visibility but places burdens on smaller assets.
- Unit-level bidding: improves transparency but greatly increases complexity and risk for intermittent generation.
- Matching traded positions with Final Physical Notifications (FPNs): reduces strategic imbalance but restricts operational flexibility.
- Aligning trading deadlines with Gate Closure: eliminates overlapping signals but increases imbalance risk for renewables.

Main option for Dispatch:

- Self-dispatch (BAU): lowest disruption but increasingly inefficient.
- Reformed self-dispatch: introduces guardrails to reduce infeasible outcomes.
- Hybrid dispatch: earlier SO intervention but creates two-tier rules, liquidity concerns and fairness issues.

- **Central dispatch**: strongest system alignment but high regulatory and implementation risk.

OEUK supports Reformed National Pricing (RNP) as the most credible pathway to evolve the GB electricity market while maintaining a single national price. OEUK argues that rising redispatch costs are primarily driven by structural network constraints and the location of new renewable generation, rather than flaws in wholesale price formation. RNP should therefore focus on proportionate reforms to balance, settlement and dispatch that improve system operability, clarify responsibilities and reduce avoidable costs, while preserving market liquidity and investor confidence. OEUK favours an evolutionary approach to self-dispatch, strong aggregation routes, phased implementation and alignment with European markets, recognising that pricing reform must complement timely network delivery and system-wide planning to unlock large-scale offshore wind deployment.

Clean Industry Bonus (CIB)

CIB is an obligation for wind developers to invest in the supply-chain. Beyond the minimum investment thresholds, CIB provides additional revenue support for offshore and floating wind projects that commit to meaningful, verifiable supply chain investment. Its purpose is to ensure that the "lowest price wins" design of the CfD does not undermine domestic capability, fair work, or sustainability goals. Introduced for AR7, CIB is significantly strengthened for AR8 with new criteria.

The first CIB round closed in April 2025, with developers required to obtain a CIB Statement demonstrating minimum investment thresholds: £100m/GW for fixed bottom and £50m/GW for floating, following either the criteria investment supply chain in the UK deprived area or suppliers aligned with science based targets. After the CfD AR7 award, the resulting CIB budget was £205m. The AR8 CIB round will open

Fair Work Charter & Governance

For CIB AR8, the government made signing the Fair Work Charter (FWC) mandatory for all generators, suppliers, ports and installers named in CIB applications. Signatories must remain compliant through to the issuance of CIB implementation statements.

CIB monitoring guidance for AR7 and AR8 sets out a structured, semi-annual engagement process with DESNZ, covering delivery risks, supplier engagement, milestone tracking and evidence submission. Meetings are framed as collaborative and solution-focused, emphasising transparent delivery rather than penalties. DESNZ will assess progress using RAG ratings, and evidence such as contract extracts or supplier confirmations is required to unlock payments. Job creation remains a primary evaluation metric.

Also, CIB is a positive step in supporting the supply-chain. The current framework underrecognizes the UK supply-chain's existing strengths, such as operations and maintenance (O&M), the offshore services sector, and wider whole of life value chain contributions.

In 2026, the CIB has moved from a narrow procurement add-on to a central pillar of the UK's offshore wind industrial strategy. The next challenge is ensuring AR8 delivers both genuine supply-chain expansion and a workable, investable system for developers.

Contract for Difference (CfD)

CfD AR7 (2025) has undergone its most significant recalibration since AR4, leading to the largest offshore wind capacity to date. AR8 has only incremental improvement compared to AR7, as the government is seeking regulatory stability to achieve CP30.

The AR8 consultation proposes refinements to CfD contract terms ahead to strengthen delivery, reduce costs, and align with wider system reforms. Key changes include permanently restricting rebidding of surrendered capacity, enabling hybrid metering, adjusting FLOW timelines and Reduced Required Installed Capacity (RIC) thresholds, creating a new Other Deep Offshore Wind category, and improving application-stage efficiency through limited NESO corrections. It also tightens Unilateral Commercial Operations Notice (UCON) provisions, excludes Gate 1 grid-offer projects, updates rules on bid visibility, and makes minor technical amendments. Together, these measures aim to reinforce investor confidence and ensure the timely, scalable deployment of low-carbon generation.

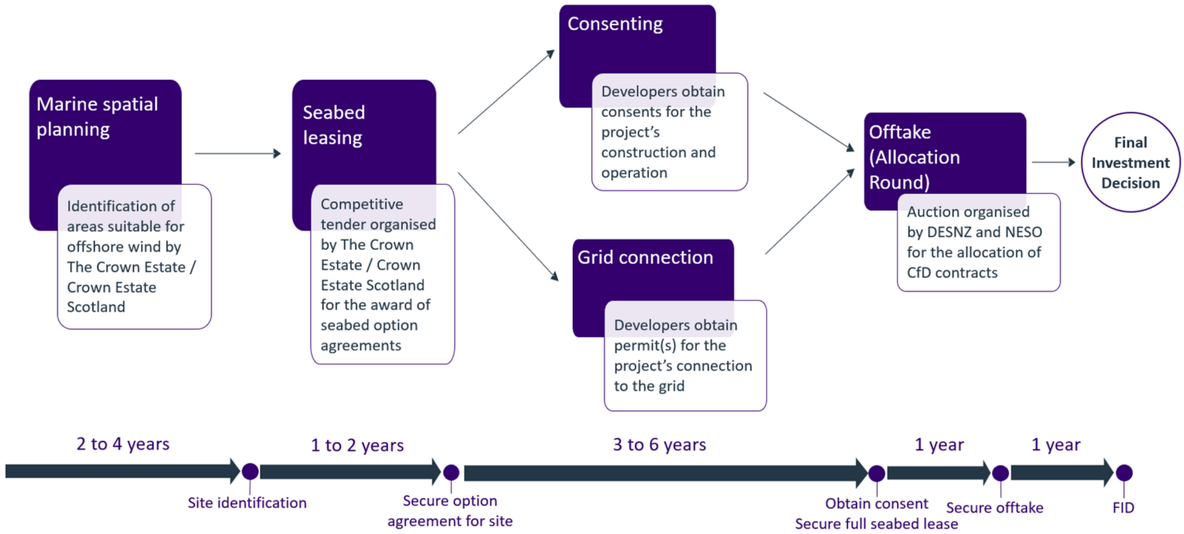
Furthermore, government changes for AR8 allow NESO to correct assessment errors, consider new evidence for non-material mistakes, and refine pending-application rules. These updates aim to improve efficiency, fairness and clarity, introduce project-specific pauses for appeals, and align processes more closely with the Capacity Market while maintaining strict deadlines and applicant responsibilities.

Case Study: UK offshore wind farm development processes guidelines

The regulatory framework that governs the UK's offshore wind market has been a key factor in the ongoing success of the sector.

The framework consists of five key regulatory processes, each designed to enable the large scale delivery of offshore wind. These processes balance environmental protection, market competition, local socio-economic benefits and affordable electricity for consumers. Figure 1 provides an overview of the UK's offshore wind regulatory framework.

Figure 1
The UK's offshore wind regulatory framework.



Marine spatial planning

Marine spatial planning seeks to identify seabed areas suitable for offshore wind development, accounting for environmental, social and technical sensitivities. It considers a range of factors to ensure the areas identified are economically viable for offshore wind development, while aiming to reduce consenting risk by avoiding areas that that are highly sensitive based upon the activity of other marine stakeholders. Offshore wind spatial planning is managed by The Crown Estate in England, Northern Ireland and Wales, and by the Marine Directorate in Scotland. They are informed by a wide range of industry and statutory input gathered through stakeholder engagement and consultation.

Seabed leasing

The seabed areas identified are awarded to developers through competitive seabed leasing rounds. In England, Northern Ireland and Wales, seabed leasing rounds are organised and managed by The Crown Estate. Following a pre-qualification assessment to ensure participants have appropriate experience and resources to deliver offshore wind projects, The Crown Estate awards seabed lease agreements using a clock auction format, with annual fees (in £/MW) a developer is willing to pay for a given site as the sole bidding parameter. In Scotland, seabed leasing rounds are organised and managed by Crown Estate Scotland. For its last two leasing rounds (ScotWind and INTOG), the competitive process was based predominantly on non-price factors which assessed the ability of developer to deliver the proposed offshore wind projects. Seabed lease agreements awarded by The Crown Estate and Crown Estate Scotland grant developers the rights to construct and operate projects over a 60-year period.

Consenting

Following seabed lease award, developers must secure the necessary consents for the project. During this process, developers obtain legal authorisation to construct and operate their project. Consenting involves multiple regulatory bodies which assess the project's environmental and social impacts, based on the project design, surveys conducted by the project developer, and stakeholder engagement. In England and Wales, the Planning Inspectorate is responsible for issuing a Development Consent Order (DCO) which is the key consent. In Northern Ireland, responsibilities are shared between the Northern Ireland Executive's Department of Agriculture, Environment and Rural Affairs and Department for the Economy, as well as local councils. In Scotland, most consents are issued by Scottish Ministers supported by the Scottish Government's Marine Directorate. It typically takes between three and six years for developers to secure all necessary consents, although recent reforms aim to reduce timelines for future projects.

Grid connection

Developers must secure grid connection agreements from the electricity system operator to connect projects to the transmission network. National Energy System Operator (NESO), Great Britain's electricity transmission system operator, is responsible for managing the process in England, Scotland and Wales. System Operator for Northern Ireland (SONI) is responsible for managing the process in Northern Ireland. Grid connection applications are typically made in parallel to the consenting process. After securing their grid connection agreement, developers are responsible for the construction of the export system assets up to the agreed grid connection point. Once the export system assets are built, they are required to be sold to Offshore Transmission Owners (OFTO) through a competitive tender process managed by the Office of Gas and Electricity Markets (Ofgem). This requirement, regulated by the OFTO regime, applies to projects in England, Scotland, and Wales. The OFTOs are responsible for the operation and maintenance of the export system assets in return for a stable revenue stream.

Offtake agreement

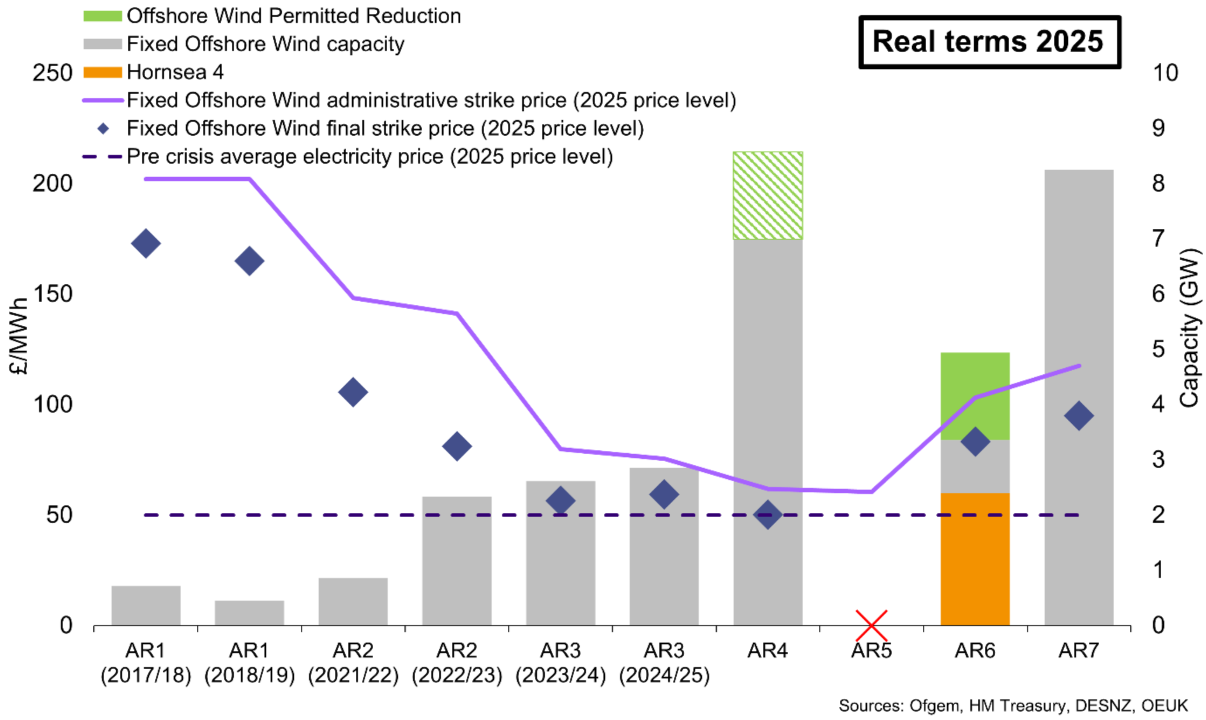
Before reaching final investment decision (FID), developers must secure offtake agreements for the electricity generated by their projects. To provide investors with visibility on revenue, the UK offers a two-way Contract for Difference (CfD) revenue support mechanism. CfDs are awarded to developers through competitive Allocation Rounds. The Department for Energy Security and Net Zero (DESNZ) and NESO manage the Allocation Rounds. During Allocation Rounds, projects compete based on a fixed electricity offtake price, with the lowest bidding projects securing CfDs. The awarded CfDs guarantee successful projects a fixed price per MWh generated over a period of 20 years, after which the project will sell its electricity directly to the wholesale electricity market or through corporate power purchase agreements.

After securing a CfD developers typically reach a FID within a year. It then takes a project around two to three years to be constructed and reach commissioning.

Part 4: AR7 & Clean Power 2030

The UK CfD Allocation Round 7

Figure 9: Offshore wind capacity awarded and auctions strike price



AR7 marked the UK's largest offshore wind CfD award to date, with 8.4 GW of capacity secured across bottom fixed and floating projects. More than 26 GW of projects were eligible to bid, with close to one-third thir awarded, highlighting continued interest in the UK market despite global pressures on offshore wind investment.

The round was dominated by RWE, which secured over 6.9 GW, largely through its Norfolk Vanguard and Dogger Bank South portfolios. SSE Renewables was the other major winner, securing the 1.4 GW Berwick Bank A project. Two floating wind demonstration projects were also successful, namely Erebus (100 MW) and Pentland (92.5 MW), supporting early-stage deployment of floating technology in UK waters.

Strike prices for bottom fixed offshore wind cleared at around £95 per MWh in 2025 prices, representing an increase of around 20 per cent compared with Allocation Round 6. Floating demonstration projects cleared at just over £155 per MWh. The higher price outcomes reflect continued cost pressures, expectations of lower net generation from wake effects in dense deployment zones, and the need to support project economics through the late 2020s. Capacity factors for the awarded projects are expected to be slightly lower than historical averages, reinforcing the importance of higher strike prices toin maintaining investment viability.

The scale of awards was enabled by a doubling of the CfD budget, which exceeded earlier expectations and allowed substantially more capacity to clear than previously anticipated. Delivery timelines for the awarded projects cluster towards the end of the decade, with more than 5 GW targeting first power in 2030 or 2031. The most advanced projects, including the Norfolk Vanguard portfolio, are aiming for first power in 2028 or 2029, helping to underpin a late-decade construction wave.

Geographically, the awards were weighted towards England and Wales, particularly the east coast. Scotland secured Berwick Bank A and a small floating project, but the overall distribution increases pressure on east coast supply chains, installation vessels and manufacturing capacity. Hence the need to keep a certain geographic spread to ensure steady delivery of the offshore wind program.

The AR7 outcome sits against the backdrop of project cancellations elsewhere, including the 2.4 GW Hornsea Four project from the previous round. In this context, AR7 provides a significant boost to confidence, reinforcing the UK's position as one of the world's most active offshore wind markets and helping to stabilise the investment pipeline heading into the 2030s.

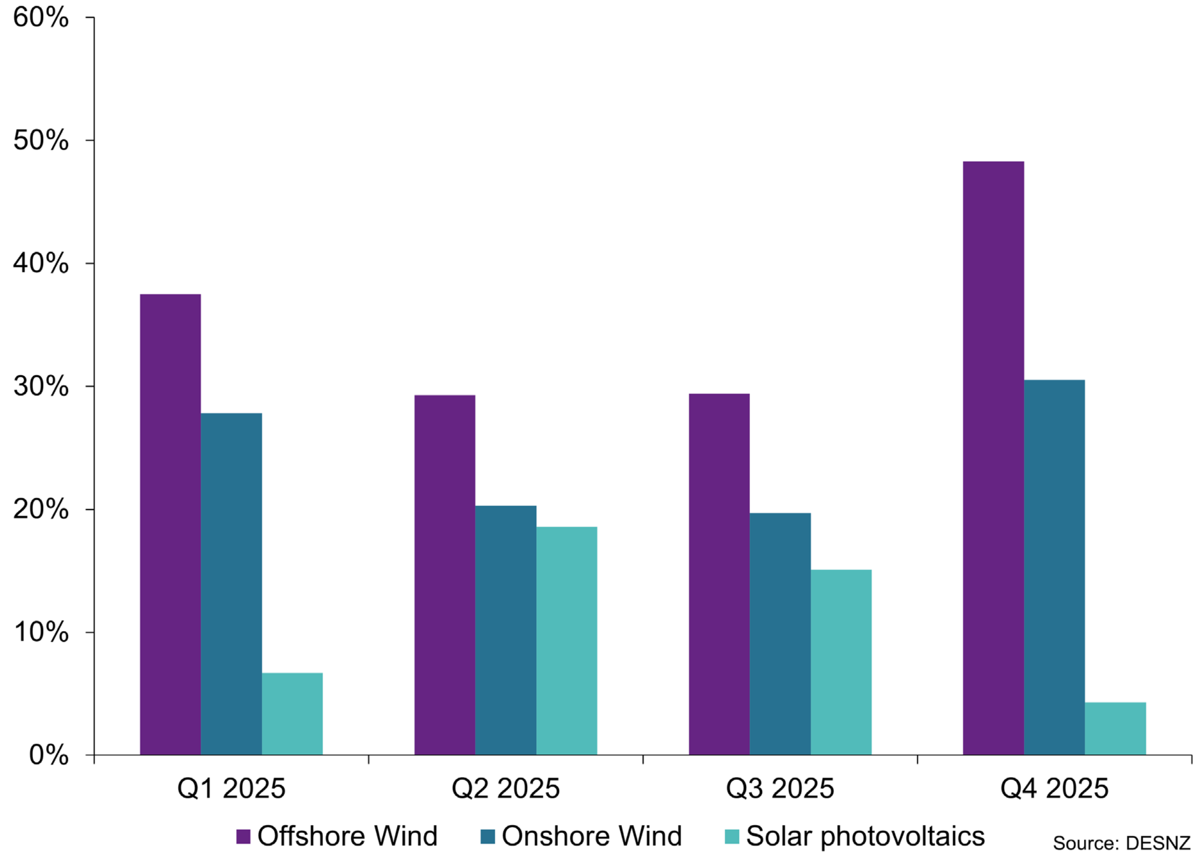
The UK Offshore Wind Efficiency

Table 2: Electricity generated, Installed capacity and Implied load factor for Solar, Onshore and Offshore wind in 2025

Quarter	Technology	Electricity generated (GWh)	Installed capacity (MW)	Implied load factor (per cent)
Q1 2025	Onshore Wind	9720	16161	27.80%
Q1 2025	Offshore Wind	12976	16091	37.50%
Q1 2025	Solar photovoltaics	2821	19789	6.70%
Q2 2025	Onshore Wind	7192	16323	20.30%
Q2 2025	Offshore Wind	10485	16650	29.30%
Q2 2025	Solar photovoltaics	8148	20420	18.60%
Q3 2025	Onshore Wind	7110	16371	19.70%
Q3 2025	Offshore Wind	10829	16650	29.40%
Q3 2025	Solar photovoltaics	6972	21346	15.10%
Q4 2025	Onshore Wind	11055	16438	30.50%
Q4 2025	Offshore Wind	17741	16650	48.30%
Q4 2025	Solar photovoltaics	2055	21736	4.30%

Source: DESNZ

Figure 10: seasonal variability of load factor – Offshore wind is well correlated with winter demand

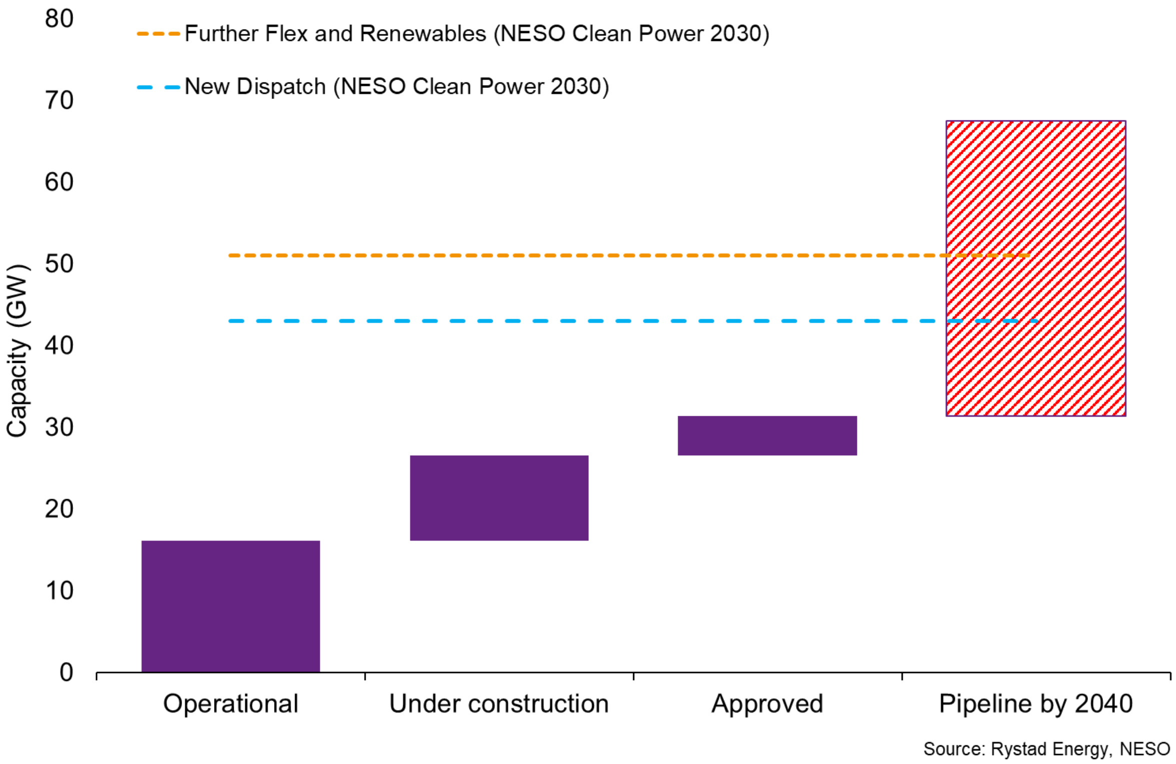


Offshore wind in the UK demonstrates higher operational efficiency than other renewable technologies when electricity output is assessed relative to installed capacity. In the first quarter of 2025, offshore wind generated 12,976 GWh from an installed capacity of around 16.1 GW, implying an average utilisation of around 38% over the quarter. This compares with around 28 per cent for onshore wind, which generated 9,720 GWh from a similar installed capacity of 16.2 GW, and just around 7% for solar photovoltaics, which produced 2,821 GWh despite having a larger installed capacity of nearly 19.8 GW.

Offshore wind's superior utilisation is sustained across the year, with implied load factors of around 29% in both the second and third quarters, even as capacity increased modestly to 16.7 GW. In contrast, solar generation exhibits pronounced seasonal variability, peaking in summer before falling sharply to an implied load factor of around 4% in the fourth quarter, while onshore wind performance weakens through the middle of the year. Notably, offshore wind reaches an implied load factor of over 48% in Q4, significantly outperforming other renewables during winter, when system demand is highest. This consistent conversion of installed capacity into electricity output reflects stronger and more persistent offshore wind resources, larger turbine sizes, and deployment at scale, reinforcing offshore wind's role as one of the most efficient and system-valuable renewable technologies in the UK power mix.

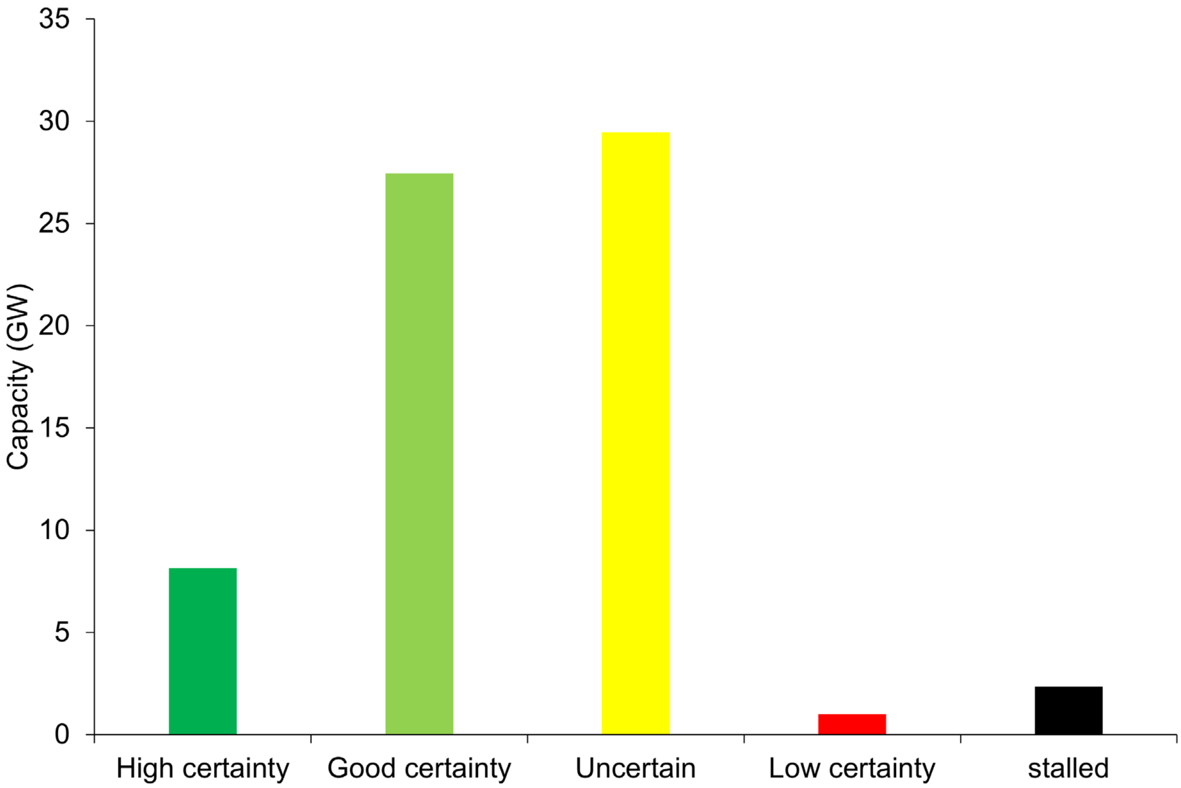
Revisions and Realism: The 2030 Delivery Gap

Figure 11: Offshore Wind pipeline by progress status



The path to 2030 is narrowing as industrial and economic headwinds force a downward revision of global forecasts. Significant project cancellations have impacted the projected installed base, notably with the discontinuation of Hornsea Four in the UK and the failure of multiple projects in Taiwan's Auction Round 3.2 to meet advancement criteria. This trend of market correction is equally evident in the United States, where the 2030 outlook has been recalibrated to just above 6 GW. Crucially, this remaining US pipeline consists almost exclusively of projects that have already reached Final Investment Decision or are currently under construction. For the UK, these global revisions serve as a stark reminder; in an era of capital discipline, only projects with the clearest regulatory pathways and most stable fiscal environments will reach completion.

Figure 12: Pre-CfD risked pipeline by 2040



Source: OEUK

The UK pipeline of potential future projects is weighted towards schemes with good to moderate levels of certainty, although a sizeable share remains subject to material delivery and market risk. Around 27 GW of capacity sits in the good certainty category (light green), reflecting projects that have progressed through development but remain exposed to external factors such as supply chain constraints, financing conditions and cost pressures. A further ~29 GW is classified as uncertain (yellow), indicating a significant reliance on future policy clarity, investment decisions and revenue support mechanisms. This degree of uncertainty presents a potential risk to the market, as projects may be delayed, scaled back or fail to reach final investment decision if enabling conditions do not materialise. From a Net Zero perspective, this uncertainty also matters: while the pipeline points to a strong headline contribution to decarbonisation, only a limited proportion of capacity is currently assessed as high certainty (green), at around 8 GW, meaning that delivery risks could slow the pace of emissions reductions in the absence of timely intervention. Although capacity considered low certainty or stalled is relatively small, its presence highlights the risk of attrition in the outer years of the pipeline, with implications for both long-term investment confidence and the UK's ability to meet its Net Zero targets cost-effectively.

AR8: Getting Closer to CP30 in a Challenging Environment

Despite project cancellations, there will be a large number of contenders for AR8. This should lead to a competitive auction; however, there are many factors that are pushing the strike price upward for AR8 and future rounds:

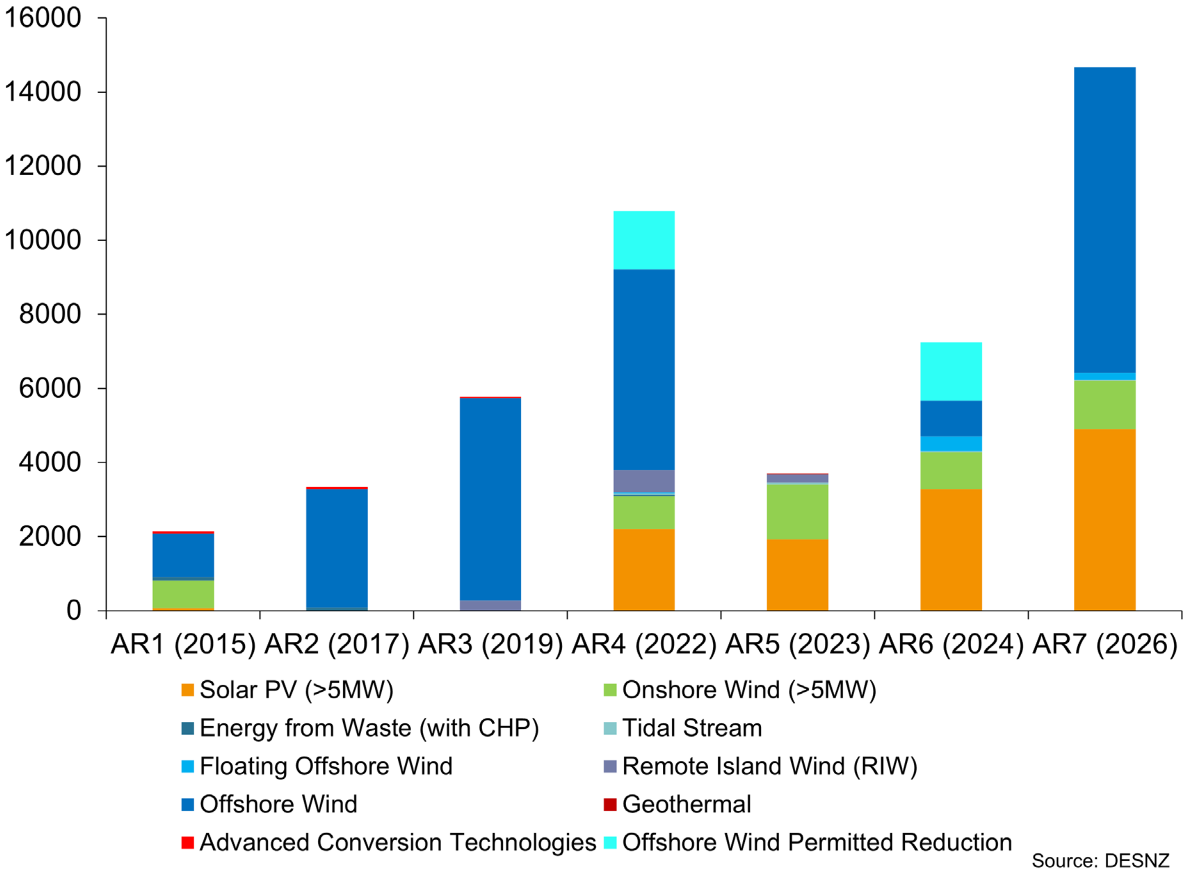
- As seen during the Ukraine war, the war in Iran will push both inflation and cost of capital upward, while they were predicted to ease before the conflict – The actual impact will depend on the length of the conflict; in any case, it introduces an important risk factor for the supply chain cost of AR8 and can put AR7 projects at risk of not reaching FID.
- The lowest-cost opportunities have largely been exhausted. Many of the cheapest projects have already secured Contracts for Difference (CfDs), and the remaining pipeline is unlikely to have delivered meaningful cost reductions over the same period. At the same time, transmission network use of system (TNUoS) charges has emerged as a key swing factor in UK offshore wind, with projects benefiting from low or negative TNUoS more likely to secure CfDs. As a result, future CfD rounds are expected to be dominated by projects facing higher TNUoS charges, placing upward pressure on prices and increasing the urgency of reform.
- As the density of offshore wind increases, the wake effect will become more prevalent. As projects will see their output reduced by the wake effect, the strike price needed to meet their economic threshold must increase.
- Despite the future Crown Estate round in 2027, the UK will eventually run out of prime locations for fixed-bottom offshore wind. Deep wind and floating offshore wind are still emerging technologies that need to scale up fast if we want to see their cost converging toward fixed-bottom.

Due to the above, we expect that the cost of offshore wind will increase in the upcoming round. Hence, industry and government should focus on improving the UK offshore wind competitiveness.

The final strike price is a combination of the project's cost and the actual awarded volume. Therefore, for a given budget, the volume awarded will decrease if the strike price remains the same but costs rise. As a result, if the budget of AR8 remains the same as AR7, OEUK is expecting the awarded volume to be lower for a similar strike price. To remain on track with CP30, the UK government needs to award 5GW of offshore wind. The UK government remains bullish towards offshore wind; therefore, we expected AR8 to be above 7GW with a strike price at a similar level to that of AR7.

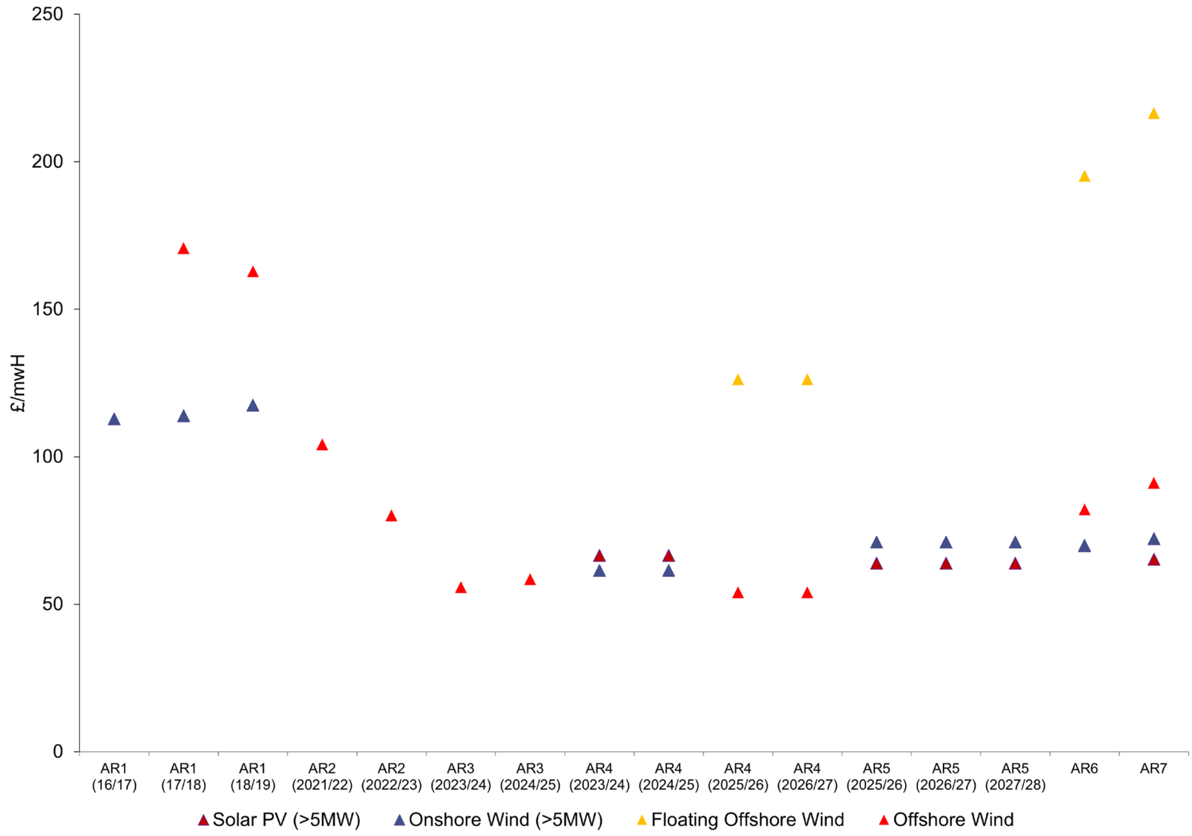
CfD Award Evolution

Figure 13: Total CfD award (capacity) per rounds



CfD allocation rounds have driven both the scale and diversity of low-carbon capacity supported in the UK. Earlier rounds (AR1–AR3) were dominated by offshore wind, reflecting its role as the primary technology underpinning large-scale power sector decarbonisation. From AR4 onwards, the mix broadens markedly, with increasing contributions from solar PV and onshore wind, alongside the introduction of floating offshore wind, tidal stream and remote island wind, signalling progress towards a more diverse renewable portfolio. The sharp uplift in total capacity awarded in AR4 and AR7 highlights the growing ambition of the CfD scheme and its central role in maintaining deployment momentum. However, the variation in volumes across rounds also reflects wider market conditions, including cost pressures and supply-chain constraints, which influence project participation. Overall, the trend underscores the CfD mechanism's importance in enabling delivery at scale, while also demonstrating how technology diversity is increasingly contributing to the UK's longer-term Net Zero objectives.

Figure 14: Auction final strike price per technology in 2024 price level



Source: DESNZ, HM Treasury, DESNZ, OEUK

From AR4 onwards, the CfD strike price outcomes indicate that several renewable technologies have entered a phase of market maturity where further structural cost reductions are limited. Solar and onshore wind prices largely flatten from this point, suggesting both technologies have reached a broadly optimal efficiency level, with learning effects and economies of scale largely realised and only marginal improvements achievable going forward. Offshore wind, which had previously emerged as the most economically competitive large-scale variable renewable following steep cost declines in earlier allocation rounds, shows a more complex trajectory. After reaching its lowest price levels around AR3–AR4, offshore wind strike prices stabilise and then rebound from AR5 onwards, following the failed AR5 round and amid significant inflationary pressures. This shift raises questions over the extent to which offshore wind can continue to drive down costs, as increasing turbine size no longer delivers the same economies of scale and is offset by higher capital costs, supply-chain constraints and increased project risk. While offshore wind remains competitive, the price reset suggests the market is adjusting to underlying cost realities rather than losing discipline, with a growing emphasis on financial viability and deliverability over continued price compression.

Case Study: Project Anemone

The Offshore Wind and Carbon Capture, Utilisation and Storage (CCUS) Co Location Forum was established to support the UK's net zero objectives by enabling more coordinated development of offshore wind and CCUS infrastructure. The forum brings together key stakeholders, including seabed owners, regulators, government departments and industry bodies, to provide a platform for cross sector engagement on shared seabed use. Under the forum, The Crown Estate and Crown Estate Scotland commissioned a number of projects, including Project Anemone to explore how colocation of offshore wind, carbon storage and oil and gas infrastructure could work in practice and to inform consideration of policy and regulatory frameworks for simultaneous offshore operations.

Stage 1 of Project Anemone set out the scope for considering potential colocation of oil and gas, offshore wind and carbon storage developments in the UK offshore environment, in the context of seabed-use planning and the UK's 2050 net zero target. It described relevant regulatory, licensing/leasing and consenting pathways across the three sectors, and summarised how development and operational timelines can interact under regimes overseen by the NSTA, The Crown Estate and Crown Estate Scotland.

Stage 2 of Project Anemone held sector specific workshops (Carbon Storage, Offshore Wind, and Oil & Gas), supported by pre workshop surveys, to support structured discussion of how these activities may coexist in areas where spatial overlap is being considered. Across all workshops, sessions were organised around topic areas including regulatory and consenting processes, licensing/leasing interfaces, technical and operational considerations, approaches to cross sector engagement, and approaches to information exchange.

Across the sector workshops, discussion covered technical considerations and delivery interfaces such as governance arrangements, consenting and project timeline interfaces, the points in project development when spatial overlap becomes relevant, and how roles and decision making are handled where overlaps occur. Cross cutting operational topics included access arrangements, safety management and exclusion zones, and monitoring requirements. Participants also discussed commercial sensitivities, information asymmetries and confidentiality constraints that can affect the timing and content of information exchange, as well as considerations relating to liability, cost allocation and contractual interfaces.

A combined sector workshop then brought the three perspectives together to collate topics raised across sessions and to capture options for further consideration by the Forum.

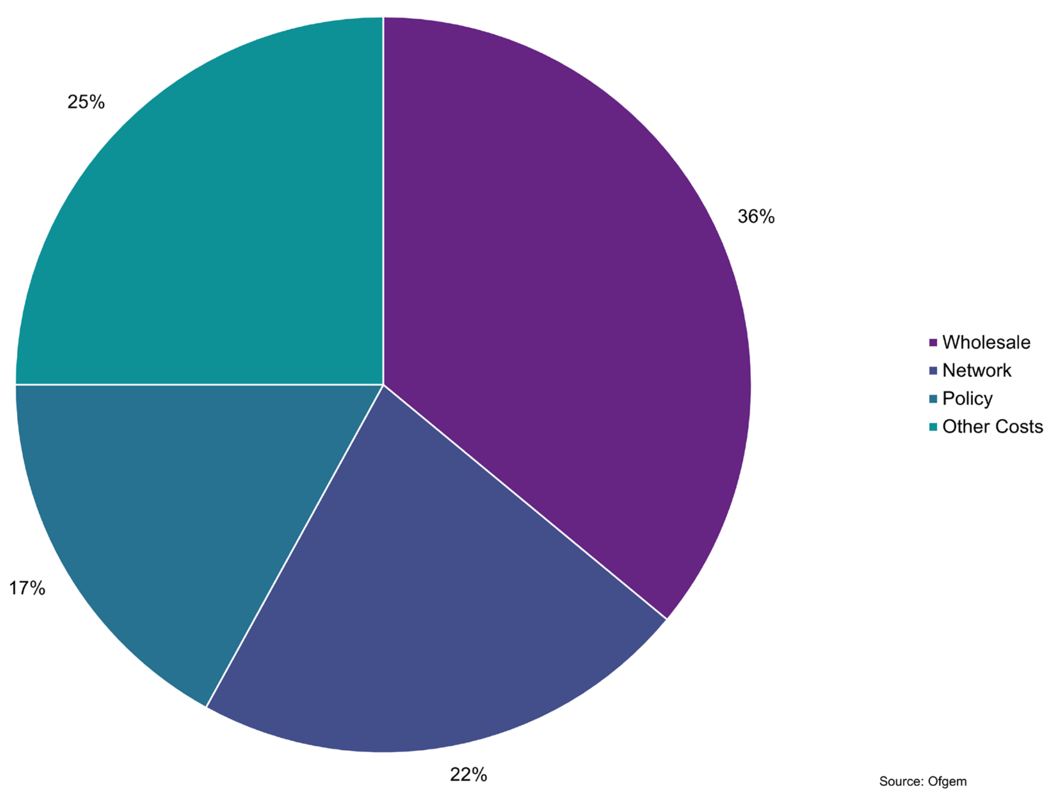
Stage 3 will develop the final publication text for Project Anemone, describing colocation related context, areas of interaction between offshore wind, carbon storage and oil and gas activities, and considerations relevant where overlaps occur. This will be published by the Co Location Forum later this year.

Part 5: Beyond 2030

Electricity Market Evolution

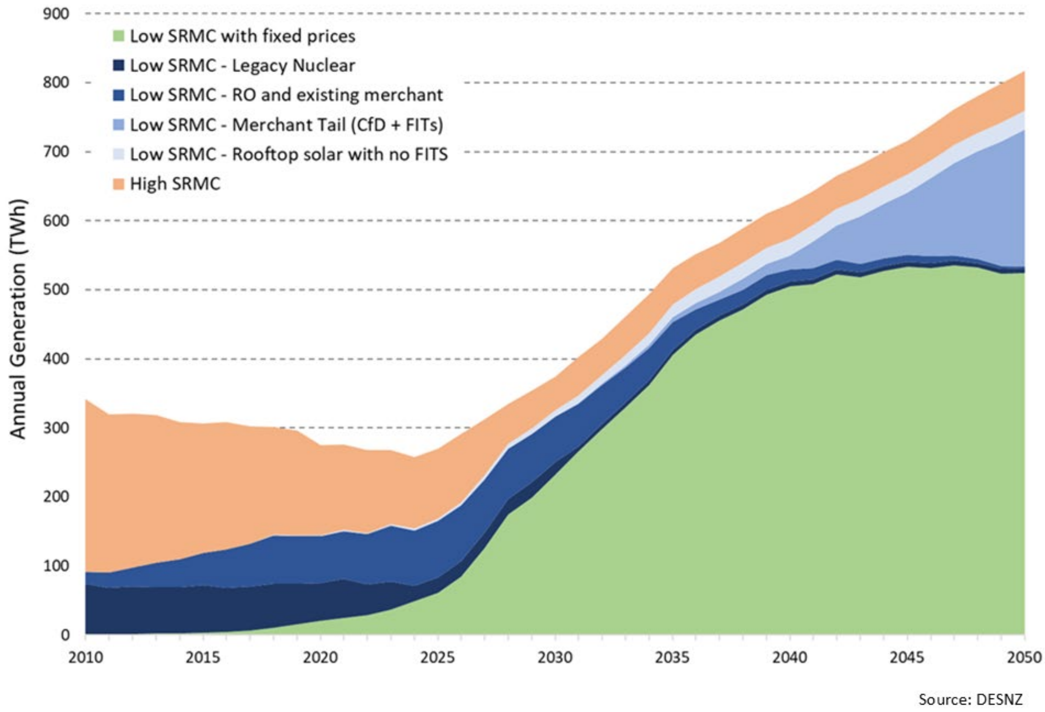
The share of wholesale price is already less than 50% of the final cost to consumers. It is likely to decrease further as the grid upgrade will increase the network charge and a higher level of CfD-supported projects will increase the policy charge. As early as 2030, the electricity market is expected to be dominated by CfD-supported generation. As a result, the wholesale market is likely to experience increased weather-driven volatility, including a greater incidence of negative prices, a pattern already observed in parts of continental Europe.

Figure 15: Wholesale cost accounts for 36% of consumer electricity bills in 2025



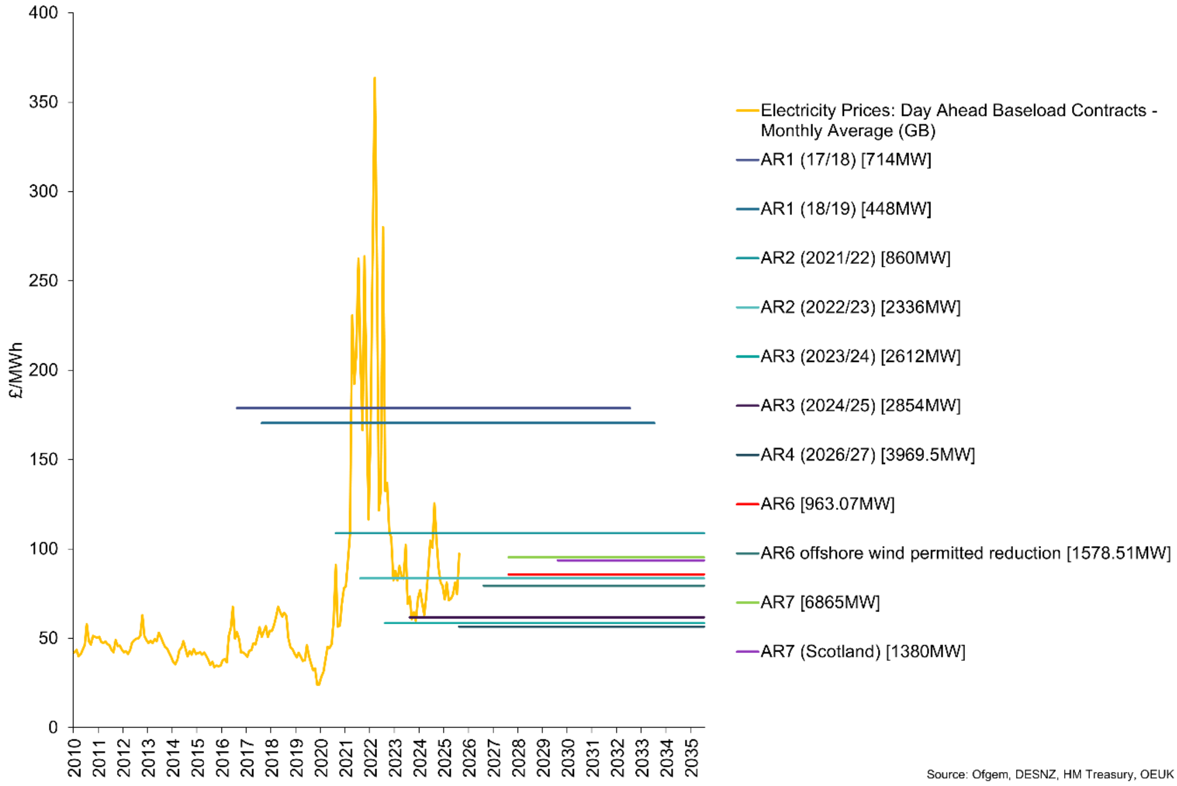
Ofgem's quarterly energy price cap updates, calculated using typical domestic consumption values of 2,700 kWh for electricity, highlight that across electricity bills, wholesale costs accounted for 36% in 2025. The largest components of the costs faced by domestic consumers are wholesale energy costs, policy costs, and network charges. In addition, a range of other direct costs feed into the final bill, including suppliers' core operating costs, smart metering costs, and bad debt allowances, alongside earnings before interest and tax (EBIT), payment method uplifts, and VAT. Over the medium to long-term, wholesale costs are expected to represent a smaller proportion of bills as network, operating and policy costs become the principal price drivers of the final cost borne by consumers.

Figure 16: Power generation by contract types (SRMC: Short-Run Marginal Cost)



The CfD mechanism effectively fixes the price of electricity for a defined period (15 to 20 years since AR7). This provides clear benefits when market prices rise, but can be less favourable when prices fall, as consumers do not fully capture the gains from lower market prices. In this respect, CfDs function as a hedging mechanism for consumers, offering protection against price increases while limiting exposure to periods of low wholesale prices.

Figure 17: offshore wind CfD strike price for each round vs. wholesale price

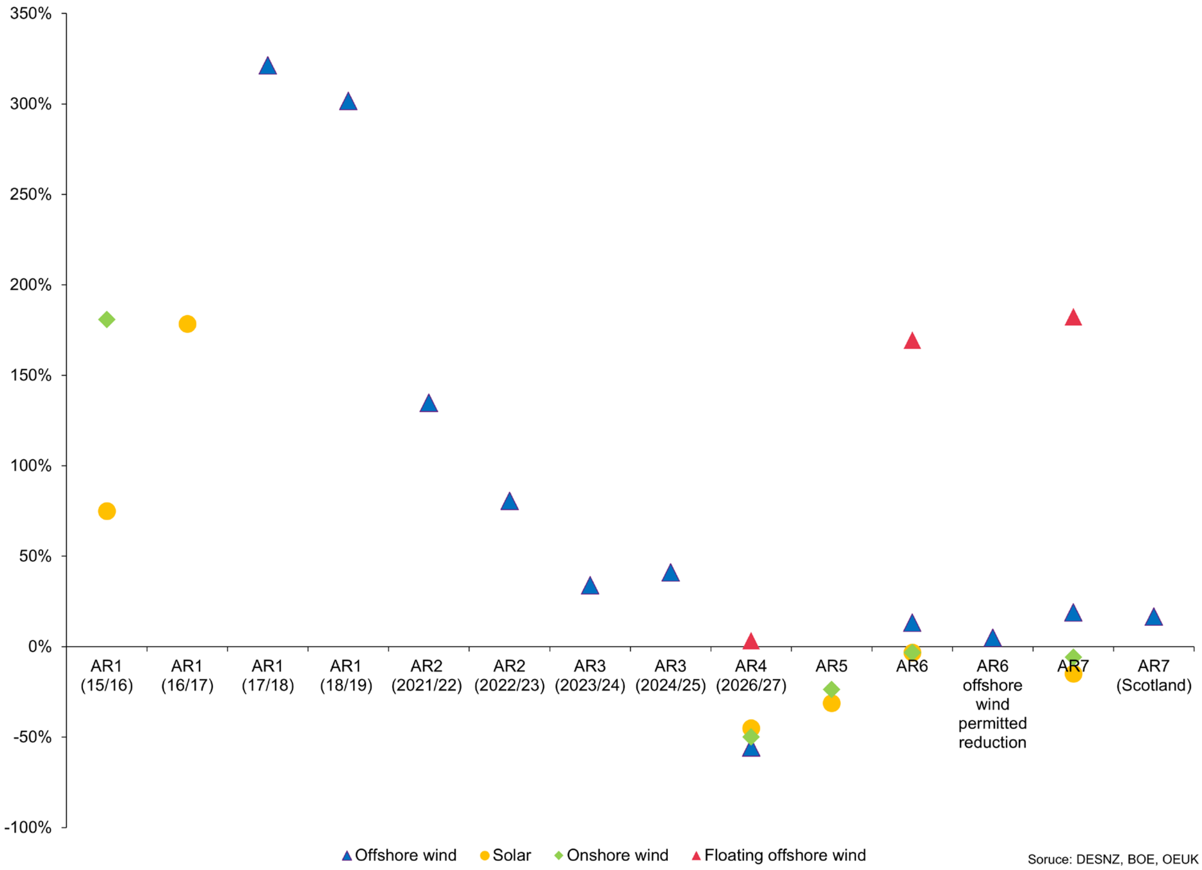


Over the longer term and into the 2050s.the merchant tail of CfD-supported projects is expected to increase progressively. This should benefit end consumers by exposing them more directly to the low marginal costs of renewable generation. However, without a corresponding expansion in energy storage capacity, market volatility is likely to persist. Energy storage plays a critical role as a shock absorber for intermittency-driven volatility.

Improving Offshore Wind Competitiveness

Following the Covid-19 crisis, offshore wind has experienced a reversal in fortunes after several years of sustained cost reductions. While AR4 awards saw offshore wind priced below onshore wind, costs have since risen due to inflationary pressures and a higher cost of capital, exacerbated by geopolitical shocks including the wars in Ukraine and Iran. A return to pre-Covid market conditions now appears unlikely.

Figure 18: spread between wholesale price (as the reference) and renewable energies: solar, onshore wind and offshore wind



The energy transition cannot be achieved through onshore renewables alone. A coordinated approach between government and industry is therefore required to enhance offshore wind competitiveness while strengthening local content. These aims are compatible where underlying market barriers are effectively addressed.

Case Study: Offshore Wind Foundation Life Extension Assessment

DNV

The Challenge | Many early offshore wind farms are approaching or exceeding their original design lives. Unlike oil and gas assets, offshore wind operates in a younger, less prescriptive regulatory environment, requiring stronger evidence-based justification for continued operation. Original design assumptions often no longer reflect operational reality, while improved metocean understanding, turbine control strategies and foundation modelling can affect fatigue life and structural margins. Life extension decisions are also increasingly tied to asset strategy, including decommissioning risk, regulatory uncertainty and cost exposure. Without a structured assessment, owners risk compounding uncertainty across life extension and end-of-life planning.

DNV's Approach | DNV was appointed to assess life extension options for one of the UK's earliest offshore wind farms, supporting decisions on safe operation and long-term asset strategy. The work re-evaluated monopile foundation fatigue life and structural capacity using updated metocean data, a revised basis of design, and rebuilt structural and load models. Aero-elastic turbine models were rebuilt in DNV Bladed to reflect changes in control systems, with load simulations integrated into foundation analyses through DNV's SESAM–Bladed workflow. Delivered in accordance with DNV-ST-0262 Lifetime extension of wind turbines, the assessment provided a robust, auditable framework for demonstrating fitness beyond the original design life.

Results and Value

The study provided the owner with a clear, defensible understanding of remaining foundation life and the key drivers affecting long term structural integrity. Key outcomes included:

- Engineering justification supporting a life extension of at least five years
- Updated fatigue life estimates for monopile foundations and towers, reflecting current site conditions and loading behaviour
- Identification of critical sensitivities to support targeted inspection and risk management
- Structural capacity verification using updated ULS checks aligned with modern standards
- Clear technical recommendations to enable continued safe operation

Strategic Implications

- Life extension assessments provide technical evidence to inform wider lifecycle decisions, including further life extension, repowering or decommissioning.
- Asset owners face growing end of life challenges beyond structural capacity and remaining fatigue life.
- While guidance such as UNCLOS Article 60(3) and OSPAR Decision 98/3 emphasises full removal of seabed infrastructure, debate is increasing over partial removal options, including leaving scour protection in situ.
- Decommissioning activity is set to rise as first generation offshore wind farms reach end of life, particularly in Europe during the 2030s; limited precedent, legacy designs, seabed leasing terms and immature frameworks add uncertainty around cost, risk allocation and reuse, while composite blades remain difficult to recycle at scale.
- Together, these factors mean long-term asset decisions are increasingly shaped by regulatory uncertainty, decommissioning obligations and environmental expectations. DNV supports owners in evaluating trade-offs between late-life pathways to enable informed, evidence-led decision-making.

Strategic Spatial Energy Plan

NESO has an established plan for offshore wind until 2030, the Holistic Network Design (HDN). Beyond 2030, NESO has been tasked to develop the Strategic Spatial Energy Plan (SSEP) that will cover both gas and electricity. The SSEP is becoming the backbone of Great Britain's move towards a fully coordinated, whole system approach to energy planning. Commissioned jointly by the UK, Scottish, and Welsh Governments, the SSEP provides an integrated spatial framework for electricity and hydrogen infrastructure, identifying optimal zones for generation, storage, and network expansion. Its central purpose is to accelerate and optimise the transition toward net zero while ensuring system deliverability, affordability, and societal acceptance.

SSEP development follows a two-year phased methodology, incorporating economic, environmental, societal and technical inputs from a wide range of stakeholders. The modelling architecture evaluates 17 land zones and 19 Crown Estate marine regions, enabling NESO to assess potential buildout pathways for offshore and onshore wind, hydrogen production, storage, interconnection and transmission expansion under different weather, cost and technology scenarios. These zones are used strictly for modelling and do not represent final planning boundaries.

Modelling outputs show that offshore wind remains a cornerstone of all SSEP pathways. Scenarios consistently favour fixed bottom offshore wind to 2040, after which cost convergence with floating wind leads to increased deployment of floating capacity. High offshore wind pathways also require substantial network expansion, highlighting the SSEP's critical interface with the Centralised Strategic Network Plan (CSNP) and the TMO4+ connections reform.

The SSEP integrates hydrogen system planning for the first time. NESO's model includes electrolytic, natural gas-based and biomass-derived hydrogen, spatially optimising production, hydrogen to power, transport and storage across GB. This aligns hydrogen with electricity and gas system planning, avoiding stranded assets and supporting whole system optimisation.

Timeline updates issued in late 2025 confirm that the final SSEP will be delivered in autumn 2027, following refreshed modelling with updated DESNZ datasets. The Secretary of State will recommend the preferred energy pathway in summer 2026, after which NESO will run public consultation and Habitats Regulations Assessment (HRA). Then the preferred pathway will be confirmed. The CSNP and Regional Energy Strategic Plans (RESPs) will follow in 2028.

The SSEP represents a structural shift: from piecemeal project-led expansion to holistic, long-term, cross-vector spatial planning, shaping grid design, seabed leasing, hydrogen investment and the sequencing of offshore wind. As such, SSEP pathway choices in 2026–27 will materially influence AR8–AR10 project viability, network planning cycles, and the UK's trajectory toward 2030 and 2050 energy targets.

Deep Wind: The New Frontier

Future technological developments are expected to fetch wind where it is the strongest and most reliable in the deep ocean at increasingly higher water depths. This would be achieved by pushing the fixed-bottom technology to its depth limits. Ultimately, floating wind, potentially integrated with hydrogen as a transport vector, will access optimal wind quality, thereby reducing system intermittency.

As offshore wind expands into deeper waters, new approaches are emerging to enhance system reliability and harness the full potential of renewable resources. Notably, offshore batteries are increasingly being considered for deployment alongside wind farms. By storing excess electricity generated during periods of high wind and releasing it when demand surges or wind subsides, these battery installations help alleviate intermittency and limit the curtailment of renewable energy. This ensures that the produced energy is utilised more effectively and supports a steadier supply to the grid.

Hydrogen, meanwhile, stands out for its ability to store energy over much longer periods than batteries. When surplus wind power is available, it can be converted into hydrogen via electrolysis and stored for future use, providing a flexible solution for balancing seasonal fluctuations. Moreover, hydrogen offers a strategic advantage in energy transportation: it can be piped or shipped over vast distances at lower cost than subsea electrical cables and is suitable for transcontinental delivery. This dual role, long-term storage and efficient transport, positions hydrogen as a key enabler for integrating offshore wind into a broader, sustainable energy system alongside batteries, which are ideal for short-term balancing and grid stability.

Together, these technologies are shaping the next frontier of offshore energy, ensuring that the transition to renewables is not only accelerated but also optimised for reliability, affordability, and geographic reach. The synergy between floating wind, offshore batteries, and hydrogen production is expected to play a crucial role in overcoming the challenges of intermittency, expanding transmission capacity, and advancing the UK's net zero ambitions.

Case Study:
Act on Insight: 2H Deploys First-of-its-Kind Digital Twin on Kincardine Floating Wind Farm

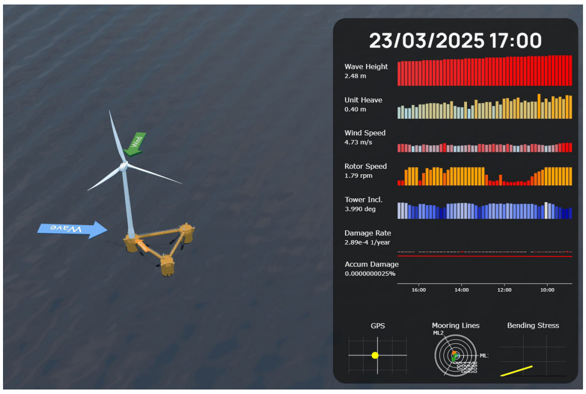
2H, Acteon's Engineering Consultancy has successfully developed and deployed a first-of-its-kind digital twin system to Grupo Cobra on the Kincardine Offshore Wind Farm, one of the world's largest operational floating wind projects.

Located 15km off the coast of Aberdeen, Scotland, the 50MW Kincardine wind farm features five V164-9.5 MW turbines mounted on WindFloat platforms in water depths up to 80 metres.

Challenge
Digital twins are set to become vital forms of technology to help unlock the commercialisation of floating offshore wind. The floating wind industry is still relatively immature, with only a handful of operational farms. This means that established failure rates that exist in other sectors are lacking. At the same time, with approximately 35% of a project's total costs attributed with operation and maintenance (O&M) activities, the financial burden on these prospective projects is expected to be unsustainable.

Solution
To tackle both issues, the industry needs to manage the health of floating wind assets by shifting from the traditional approach of calendar-based, reactive maintenance, to a more innovative philosophy. By pivoting to a data-driven, predictive approach enabled by digital twin technology, the industry has the ability to optimise maintenance frequencies, integrate a mechanism for asset life extension, and dramatically reduce costs.

The digital twin, developed by 2H, uses sophisticated machine learning algorithms to replicate and analyse the structural response of the floating turbines under real-world conditions. Seamlessly integrated with monitoring systems developed by UTEC, Acteon's Geo-services business line, the twin delivers calibrated real-time insights in tower fatigue, mooring line and power cable loading.



The powerful intelligence into the structural response of the asset enables early detection of anomalies and allows for inspection and maintenance planning to be streamlined, ultimately reducing OPEX and increasing safety.

The project was executed between 2H and the client, Grupo Cobra. "With eighty per cent of the world's offshore wind resources in deep waters, floating turbines open new opportunities to harness clean energy," said Juan Antonio López, O&M Manager at Grupo Cobra. "Acteon's work gives us invaluable insights into asset performance, helping us improve future floating wind projects."

With digital twins emerging as a game-changing tool for asset management and predictive maintenance, 2H's deployment of the technology at Kincardine is serving as a blueprint for the next wave of floating wind developments, showcasing the type of pioneering technology needed to enable the global energy transition to be taken to the next level.

Learn more:
https://acteon.com/insights/blog/ai-enabled-digital-twins-for-cost-effective-offshore-wind-farms

Case Study: Deepwater Wind

Net Zero Technology Centre

Technology Driving Transition

The majority of the UK's practical offshore wind resource sits in waters more than 60m deep, beyond the technical limit of fixed offshore wind foundations. Yet, the current cost of floating wind remains high, with Allocation Round 7 seeing prices of £216.49/MWh compared to £90.91/MWh on average for fixed wind. High CAPEX costs contribute on average 52% of LCOE, with foundations, moorings and anchors a major driver, contributing 35% of this cost.

Existing floating wind designs are characterised by a standard steel semi-submersible, weighing 3,000–5,000 tonnes, requiring specialist fabrication, deep-draught ports, and costly dynamic cable systems.

Deepwater hybrid or fixed substructures have emerged in recent years to address these challenges, combining the features and benefits of fixed and floating designs. For AR8, the Government proposes to define 'Other Deepwater Offshore Wind' as: '…mounted on foundations supported by any combination of buoyancy, support-structure transferring loads to seabed through a rigid structure within water column, and/or slender tensile embers/moorings…'

With 77% of the current UK floating pipeline located in areas of 60-120m where deepwater hybrid technology could be deployed, this could enable a step-change in the future of offshore wind in the UK:

- **Reduced weight and material consumption** - replacing large buoyant volumes with structural restraint, these designs dramatically cut the steel content versus semi-submersibles and other traditional designs, reducing CAPEX
- **Industrialisation through local, modular manufacturing** - standardised, modular fabrication with a low-footprint enable local manufacturing at UK ports and quaysides, providing high-quality jobs in the supply chain
- **Reduced turbine motion** – non-floating designs significantly reduce wave-induced turbine motion, reducing stresses on turbine components and increasing power production

New designs are emerging across the world. For example, AWC Tech and OSI's FTLP+ in Scotland, Marine Power Systems' PelaFlex GS in Wales, and Entrion Wind's FRP and Wison New Energies w.BT in the USA and China respectively.

However, hurdles remain to reach commercial deployment. Unlike semi-submersibles — towed cheaply to site by standard tugs — tethered deepwater fixed designs require more complex installation sequences. Offshore heavy lifting is required using jack-up vessels capable of operating in deeper water — vessels that are currently limited to approximately 80m and not yet widely available in sufficient numbers for commercial-scale deployment.

And with any innovation, lenders and insurers will require test and demonstration project data before these designs can be considered commercially bankable. Achieving the necessary technology readiness level represents significant investment.

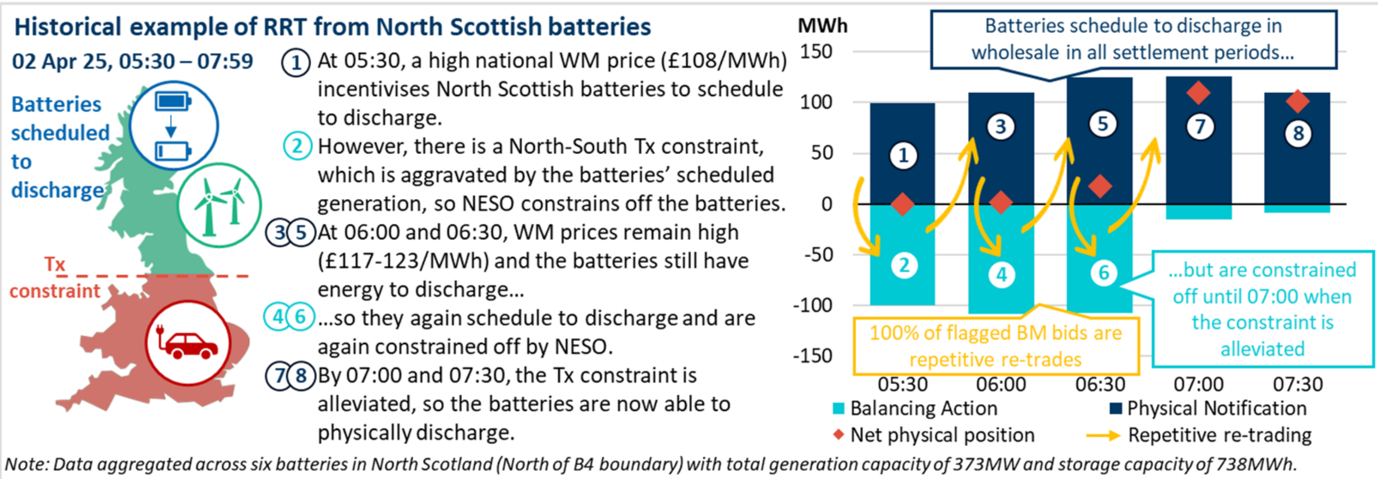
Test and demonstration is an immediate area of focus for deepwater wind:

- **FLOWEX** - joint government-industry body developing a Deepwater and Floating Wind Innovation Roadmap to align innovation programmes
- **GB Energy Deepwater Wind Commercialisation Programme** — launched as part of the £1 billion Engineering Energy UK programme, addressing integration challenges and funding for foundation technology
- **Deepwind** – EMEC is developing a national floating wind test site in Orkney
- **Deepwater Wind Hub** – led by ORE Catapult and NZTC, enabling deployment of emerging substructures at a test and demonstration site alongside supply chain support, innovation and manufacturing

With world-class deepwater resources, a strong supply chain with transferable capabilities, and a maturing innovation ecosystem, the UK has the opportunity to lead the global commercialisation of deepwater wind.

Case Study:
Wind, Unwind, Rewind: Is storage delivering for the wind industry?

Storage assets are incentivised by national price signals to engage in "repetitive re-trading"
Energy storage is being rapidly deployed in GB to support Net Zero and help manage intermittency of wind. In principle, storage has significant potential to help absorb excess wind when needed but may not always do so in practice. National price signals often incentivise storage to engage in "repetitive re-trading" or "RRT": buying and selling power for the same period across wholesale market and balancing mechanism without changing their state of charge, and do so repetitively across consecutive periods, at a cost to consumers.[1]



RRT is material: >65% of flagged BM bid volumes for Northern batteries are merely "re-trades"
FTI Consulting first identifed this "flip-flopping" issue in 2024. At the time we found that 59% of flagged BM bids for four Northern batteries merely unwound the batteries' wholesale position (over Apr-Sept 2024).[2] Our latest analysis, using Apr 2025-Mar 2026 data, finds that this figure has since increased to 65% for our original sample, and 68% when we extend the sample to also include two new-build batteries. RRT therefore remains a very material feature of electricity markets in GB. NESO estimates RRT behaviour cost consumers £136.3m from November 2024 to October 2025.[3] Without appropriate reform, additional storage in some locations may not support wind integration as intended, and could instead drive higher consumer costs.

If policy makers choose to intervene, this could materially impact how storage is operated. Potential reforms (all of which remain highly uncertain) could include BM pricing reforms, non-firm access and hybrid dispatch. Our modelling indicates that all three reforms could materially reduce expected storage net revenues – by 27%, 43% and 92% respectively for a hypothetical storage asset located in central GB (with directionally similar results for storage assets further North and South).[4] Reforms are key to how storage can most efficiently complement the wind industry. These will need to strike a balance between ensuring storage assets deliver their intended benefits, while preserving investability of storage as a major source of flexibility in a renewables-led system.

[1] Can battery 'flip-flopping' be solved under national pricing?, Utility Week, March 2026.
[2] The Curious Case of Batteries Flip-Flopping in the BM, FTI Consulting, December 2024.
[3] Reformed National Pricing: Balancing, Settlement and Dispatch Call for Input, NESO, February 2026.
[4] GB electricity storage – what's on the policy horizon, Panel Discussion, FTI Consulting X WinES, March 2026.

Notes

Working together, we are a driving force of the UK's energy security and net zero ambitions. Our innovative companies, people and communities add value to the UK economy.

Join us today and help strengthen the UK offshore energy industry and your business.

membership@OEUK.org.uk

OEUK.org.uk

info@OEUK.org.uk

@OEUK_

Offshore Energies UK