Forecasting through uncertainty: the long-term outlook for offshore wind

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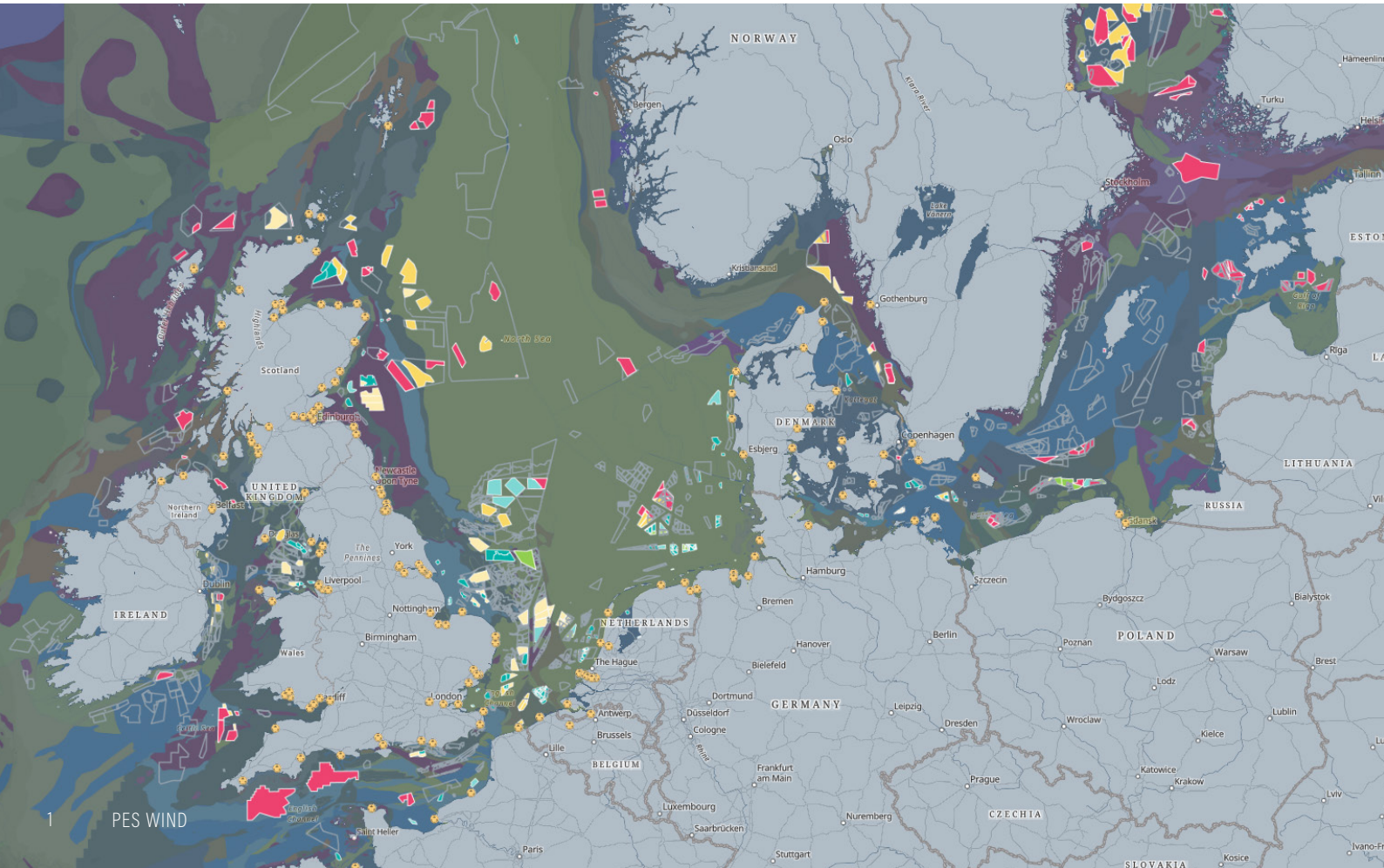
Despite recent cancellations, rising costs and political uncertainty, offshore wind's long-term trajectory remains one of growth. Looking beyond short-term headlines, robust data and long-range forecasting reveal how policy, supply chains and market strategy will shape the sector's path to 2040.

Offshore wind has faced its share of volatility. Headlines in the past two years have focused on cancelled projects, spiralling costs, under-subscribed auctions and geopolitical pressures. Some have raised existential questions. But the technology is essential to meet net zero goals and the long-term outlook is stronger than headlines suggest.

Across Europe and Asia, planned auctions have attracted low or zero bids, while in the US, developers have written down billions. However, this is not the whole story. Around the world, governments are raising targets, expanding development plans and shifting strategy around offtake and investment. Despite short-term turbulence, offshore wind remains on a trajectory of growth.

Reactive market analysis is not enough to drive or understand this momentum. News has 24-hour cycles. Political terms are measured in years. An offshore wind farm typically has a 30 to 40-year life cycle from concept to decommissioning. Developers, suppliers, investors and policymakers need a credible long-term view that explains not only what is happening, but why, how and what will



happen next. At TGS | 4C, we forecast global outlooks to 2040 to capture these structural trends and contextualise the headlines within the broader story.

Several key factors currently shape the sector's long-term trajectory:

Leasing and market strategy

In 2025, around 17 GW of site awards were secured worldwide. This is a far cry from the average of 75 GW leased annually between 2022 and 2024, a stark but arguably necessary illustration of the need to adapt strategies.

The same year saw many auctions undersubscribed, reflecting developer decisions to concentrate pipelines, focus on key established markets and derisk investment decisions.

And governments have listened. After receiving no bids for pre-examined sites in the 2025 auction and following industry calls to urgently reform the tender framework, the German government has pushed two site auctions back to 2027. This enables the government to consult with industry and recalibrate.

Good data is vital when siting offshore wind. But, as the German example shows, even a fully derisked site is not in itself enough. Other data is increasingly significant as developers become more risk averse.

Recent events in the US have shown that a wind-positive government can see its targets, tax incentives and investment opportunities challenged or undone when the next incumbents do not share the approach. However, the reverse is also true: a wind-hostile government can rarely guarantee its approach will continue beyond its time in office.

The US pipeline is undeniably diminished and strategic priorities in Europe have shifted away from that market. But beyond the headlines, the US has a developed regime, state-level support and a sizeable pipeline, including nearly 6 GW in the construction phase. Wind has also been legally challenged, and federal support withdrawn or stalled, in the US before. Taking a longer-term view, the picture becomes less black and white.

At TGS | 4C, we factor in potential delays and anticipate developer interest based on regulatory environment, supply chain readiness and investment priorities. Long-term analysis can contextualise auction announcements and enable credible forecasting for how much capacity can go ahead, where and when.

Taking the long-term view, there is a clear message: behind the noise, the structural drivers of offshore wind, energy security and decarbonisation, endure. Fluctuations in leasing reflect not structural decline but a sector adjusting to new realities and a need for the conversation to change.

Policy, permitting and offtake

In the long term, the need for offshore wind is widely recognised, but in the short term, it is heavily politicised.

Energy security is a priority for multiple governments and international blocs, requiring at-scale domestic renewable electricity. To this end, governments across Europe and Asia Pacific have set ambitious medium- and long-term targets for offshore wind. But grid infrastructure tends to lag, auction frameworks have not always adapted to spiralling costs and still the deadlines tick closer.

Strong targets can drive momentum, but they need to be backed up by data, investment, and policy. Over the past three years, mismatched targets and frameworks have been a key challenge and one that is being faced.

Denmark, where the first commercial offshore wind farm was commissioned in 1991, has been a model market. Numerous roadmaps are modelled on Denmark's specific policies and regimes. However, the conditions in one successful framework are not always best for new markets, or even for the market itself.

Denmark pioneered zero-subsidy offshore wind, but by 2024, the economics no longer supported it. Rising capital costs, price volatility, and rigid timelines meant developers could not participate. When the tender collapsed, the government moved to redesign it, adding two-way contracts-for-difference (CfDs) and more realistic scheduling to the 2025 relaunch. The January 2026 Investment

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Pact, signed by nine countries at the North Sea Summit, commits to two-sided CfDs as the standard auction design, a clear effort to learn from the past.

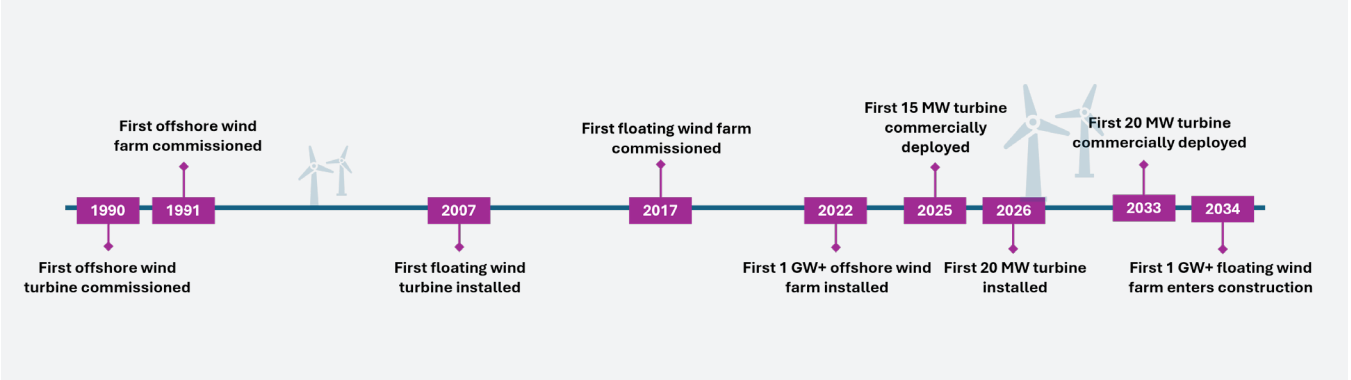
The markets progressing fastest are those where auctions, permitting, grid planning and offtake frameworks are designed holistically. Malta's ongoing offshore wind tender, for example, offers a long-term CfD combined with government funded transmission infrastructure, directly addressing bankability. Offshore wind does not struggle from lack of ambition. It struggles when the machinery behind ambition fails to keep pace.

Supply chain capacity

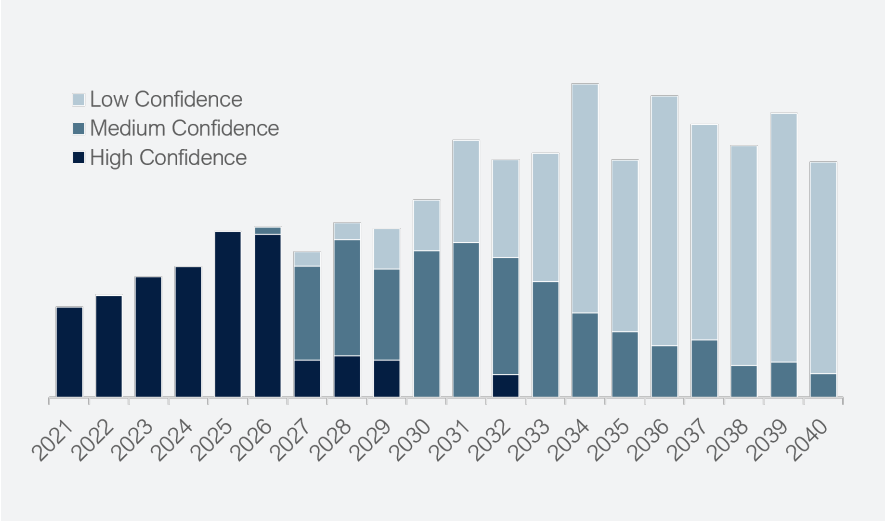
Five years ago, conversations around offshore wind were significantly more bullish than they are today. Suppliers' order books swelled with sometimes unrealistic delivery timelines.

This had a dual effect of driving up prices and creating bottlenecks, exacerbated by the fallouts of COVID-19, the conflict in Ukraine and subsequent issues as investment failed to keep up with demand and LCoE rose well beyond that anticipated in offtake agreements. With Europe's New Offshore Wind Deal pledging to reduce LCoE by 30% by 2030, actions need to be informed.

A recent present and future analysis report from TGS | 4C, which examines key



Milestones: past, present, and future



Forecast global capacity, by year and confidence

infrastructure to 2040, identified significant shortfalls in HVDC subsea cable supply as soon as 2027, particularly outside China. Offshore substations, grid upgrades, and interconnectors face similar pressures. These problems cannot be solved by strategic delays; they require investment.

Floating wind is another area where early enthusiasm and subsequent setbacks have made the picture look, in turn, rosier and bleaker than the reality. The truth: floating wind is needed and the more delays and setbacks global pipelines face, the stronger the case is for scaling technology in deeper waters. However, given the wide range of site conditions and a lack of coordination, standardised floating wind technology is not on the immediate horizon.

Pre-commercial projects need to move forward with proper investment and proper market intelligence. TGS | 4C is tracking over 130 foundation concepts, observing trends, and relating these trends to site and market data. While a simple search will tell you that semi-submersible foundations are dominant, a closer look at the data reveals that as many designs are needed as there are sites, making a clear case for more coordination and dialogue in site selection and supply chain development.

Another key challenge is port readiness. As turbine sizes increase, marshalling space must increase too, and few ports globally can accommodate 15 to 20 MW turbines. With floating wind, which largely needs to be assembled quayside, depths and cranage are significant factors. Detailed insights into port capabilities need to be married to development timelines and strategic plans. It is not enough to identify suitable ports or build to external targets, without contextualising the data, forecasting capabilities, and building realistic investment plans.

With 17 years' experience tracking every level of the lifecycle, we understand how long building a wind farm takes. Floating wind is taking longer than some anticipated to commercialise, but comparing multiple factors in dialogue, we can measure market attractiveness for floating wind and plot a future trajectory. The pipeline is only one factor in the UK's position as the most attractive market for floating wind: also important are technical potential, political ambition, supply chain readiness and regulatory support.

Long-term supply and demand analysis provides clarity on pressure points and reduces the risk of unexpected bottlenecks.

Intelligence matters

Cost inflation, policy friction, and supply chain strain have disrupted the industry's early 2020s momentum. However, none of these issues is insurmountable and none changes the fundamental drivers of offshore wind's long-term importance.

Nations and regions need domestic industries, resilient supply chains and energy independence.

Offshore wind, with its scale, maturity, and global footprint, is uniquely positioned to deliver. But success depends on taking the long view. Targets must be matched by workable policies, realistic auctions and long-term supply chain planning.

Data and long-term forecasting, not headlines or political points, must guide these decisions. The promise of offshore wind is not diminished by today's challenges. It is defined by how we respond to them.

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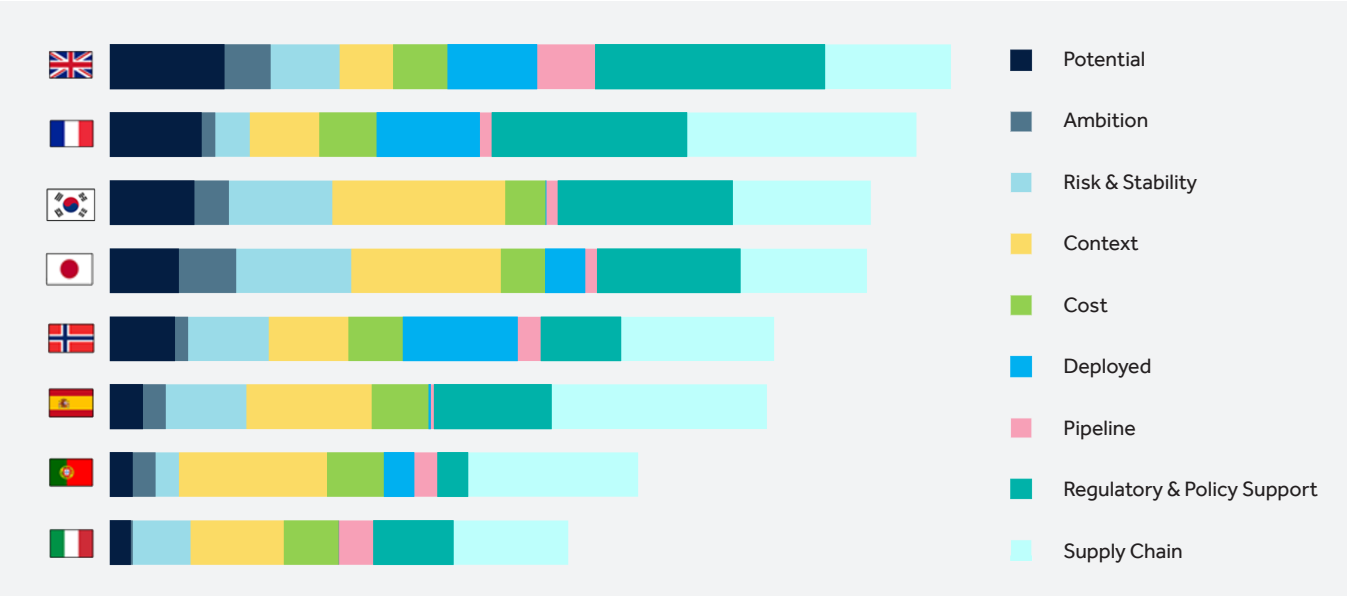

The UK, France, and South Korea currently rank as the most attractive floating wind markets. TGS | 4C's floating wind market attractiveness index, December 2025