Getting UK offshore wind back into fighting shape

UK offshore wind is critical to decarbonise the power sector and reduce exposure to volatile gas markets. There's still a gap between targets and capacity being delivered, but quick policy wins are available to boost the industry.

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About

This analysis considers the pipeline of UK offshore wind farms in development. It looks at the impact of missing the 2030 target on UK gas reliance and plans to decarbonise the power sector. This analysis looks at reforms to the Contracts for Difference (CfD) support scheme, and makes recommendations for delivering capacity at a pace and quantity high enough to meet targets.

Highlights

10 GW

Both this year’s and next year's CfD auction need to procure around 10 GW each to get back on track.

3-5 GW

The next CfD auction is expected to support only 3-5 GW under the current budget, an increase is needed.

630k

Every 1 GW of offshore built could reduce gas consumption by enough to heat 630 thousand homes.

Executive Summary

Three weeks to course correct the UK's offshore wind industry

The UK is currently off track for its offshore wind target, but there is still a chance to correct its course. The new government has until 1st August to set a higher offshore wind budget for this summer's auction.

The Contracts for Difference (CfD) mechanism itself can largely deliver the offshore wind capacity needed to reach the UK's 2030 target without radical redesign, however, getting the next two auctions right will be critical.

Higher auction budgets, support for the supply chain and moving the focus away from competition and onto delivery are all opportunities to deliver the 2030 target.

The stakes are high: the industry needs long term confidence, and every gigawatt of offshore wind below target means greater exposure to expensive fossil fuel imports.

01 20 GW of new offshore wind needed by 2030

The UK has 14.7 GW of installed offshore wind capacity, with another 13.3 GW in construction or committed through secured government support. This leaves a large capacity shortfall of over 20 GW that needs to be delivered by 2030 to meet targets. Although the pipeline of potential projects is more than sufficient for this target, rapid progress is needed to move potential sites into active project deployment.

02 The next offshore wind auction will fall short without intervention

To meet the capacity shortfall, around 10 GW of offshore wind would need to be commissioned from both the 2024 and 2025 CfD auctions. However, only half this total, around 3-5 GW, is projected to be supported through the AR6 auction this year with its current parameters and budget. The most recent auction round (AR5) was held in 2023, but the maximum strike price on offer was too low to attract any offshore wind bids.

03 Boosting the auction budget by 25% would cut the UK's gas import bill

Increasing the AR6 budget by just 25% could deliver an additional 1 GW on top of existing expectations. Every 1 GW of offshore wind installed would displace annual fossil gas consumption by enough to heat 630 thousand homes.

In the longer term, the Contracts for Difference mechanism needs to be evolved, changing focus from competition to moving a large number of sites through development. This could take the form of a single large auction with a preset strike price, or a rolling auction process. Strategic planning to support the sector within the UK can increase the economic benefits of development, such as boosting manufacturing jobs.

The newly elected government has just 3 weeks to boost the budget and make the next auction process a success. Every additional wind turbine built reduces exposure to volatile fossil fuel markets and provides cost competitive power.

Frankie Mayo
Senior UK Energy & Climate Analyst, Ember

The offshore wind capacity gap

Rapid build-out of the offshore wind pipeline needed to reduce gas price risk

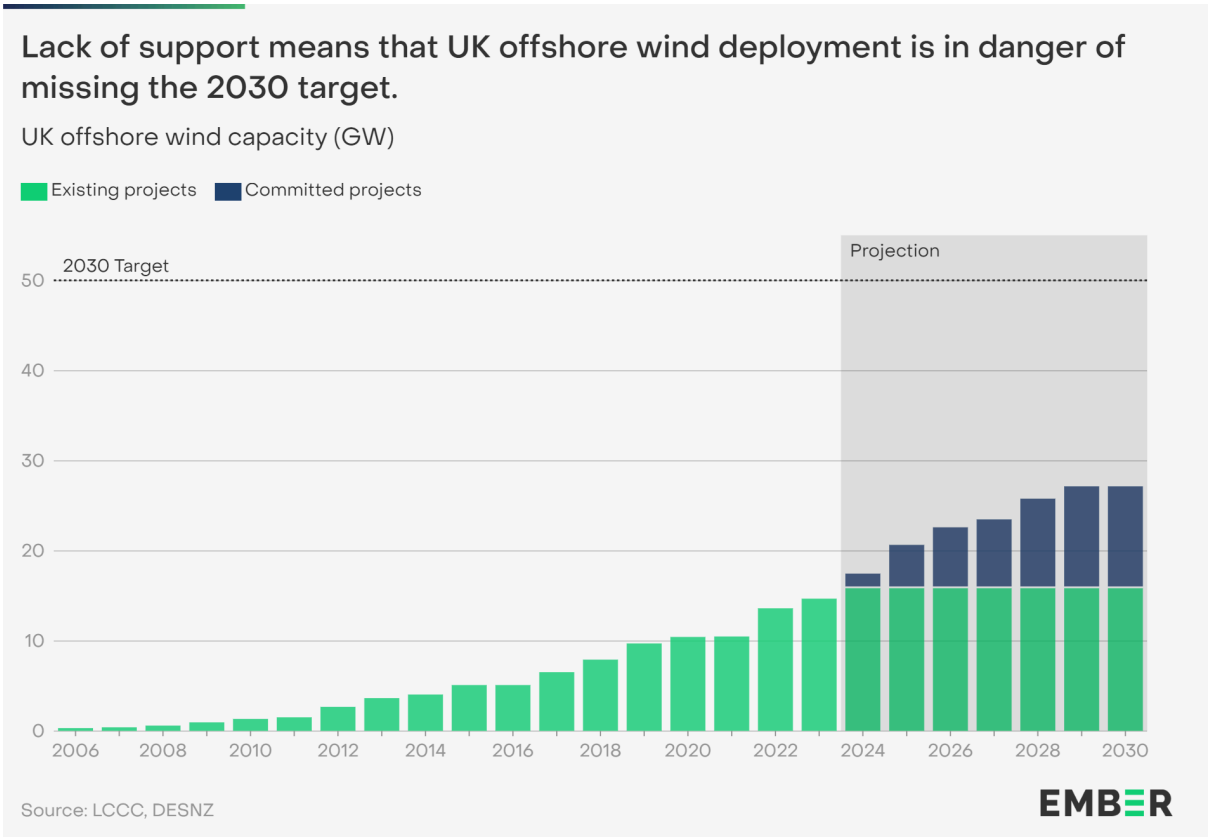
Offshore wind development reduces the UK's reliance on fossil fuel imports, reducing both gas supply risk and price risk. But there's a hefty gap that needs to be rapidly bridged between installed capacity and targets.

Over recent years, spiking gas prices have sent the energy price cap soaring, hitting households and inflation rates hard. While prices are now less punishing, the UK remains exposed to volatile global markets. Reducing the use of fossil fuels for energy is the only permanent protection for this, and offshore wind will play a pivotal part in weaning the UK off gas.

In 2019 the UK government set a target for 50 GW of offshore wind by 2030, including up to5 GW of floating offshore wind, Labour have signalled a desire to increase this to 55 GW plus 5 GW of floating offshore wind. This is unquestionably ambitious, and currently installed capacity leaves a large gap in delivering that by the end of the decade. As one of the prize jewels of the UK's green economy, and a key part of the decarbonisation strategy, offshore wind experienced rapid growth from 2017. However, development has stalled in recent years as policy direction lost clarity. Despite the time lost by this, it is still very possible to course correct and get targets and budgets back on track to protect the UK from reliance on gas.

Offshore wind generation capacity gap creates risk

The current installed offshore wind capacity in the UK is just 14.7 GW, with another 13.3 GW in construction or committed through secured government support. This leaves a large capacity shortfall of around 22 GW that needs to be delivered by 2030 to meet targets. Although the pipeline of potential projects is more than sufficient for this target, rapid progress is needed to move potential sites into active project deployment.



A pivotal 12 months for the UK's wind targets

The fate of the 2030 offshore wind target will likely be revealed in the next 12 months, through the next two wind auctions.

The Contracts for Difference (CfD) scheme is the main support mechanism for renewable power generators and currently the dominant route to market for offshore wind. This will be the critical mechanism through which the offshore wind target is delivered.

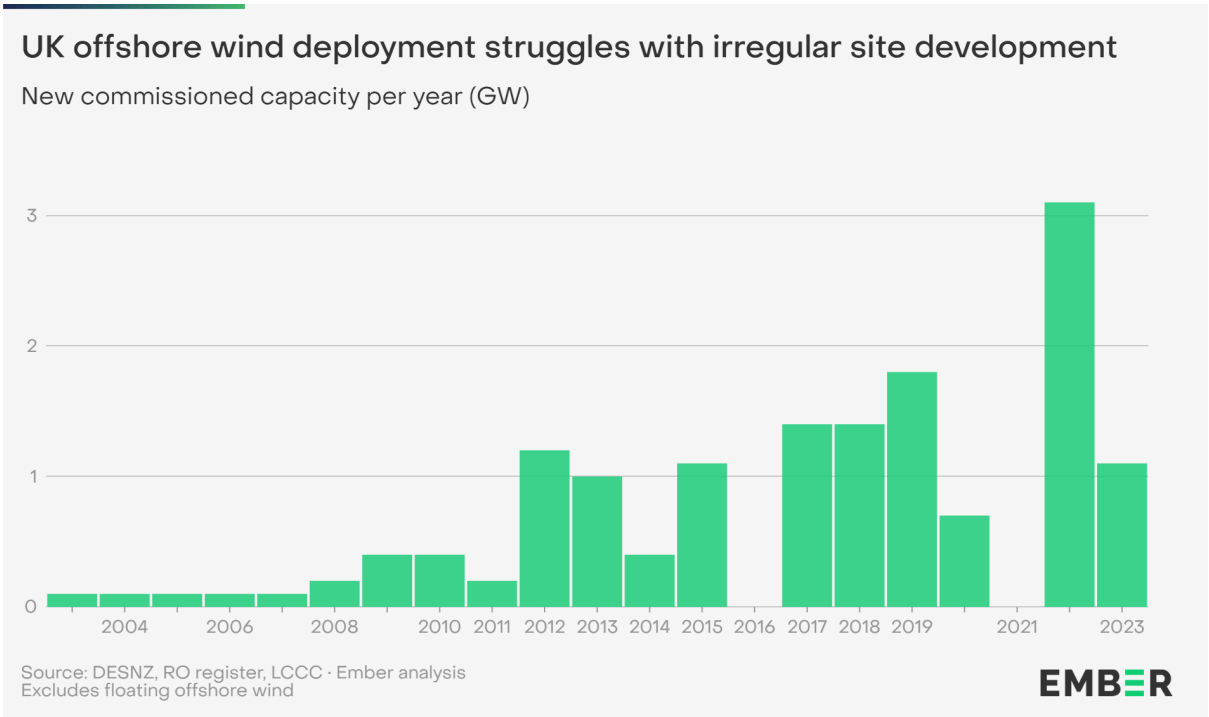
The CfD scheme runs via auction rounds, which set the level of subsidy available to different renewable projects. As the 2030 offshore target nears, the next two auction rounds become the most important for delivering capacity in time. These two are known as the 6th and 7th auction rounds, or AR6 and AR7. The results of AR6 will be published in the summer of 2024, and the parameters for AR7 are due before next spring (2025).

Danger for developers

Since the beginning of the CfD scheme, the financial support sought by generators, known as the strike price, has dramatically reduced for offshore wind. This is now posing a risk to the future of projects.

In under a decade, prices fell from £150/MWh to £37.35/MWh for the offshore wind CfD. This meant lower costs to the consumer, but locked in low returns for generators years ahead of project delivery. Cost rises in the meantime, due to inflationary pressures and high competition for the limited global supply chain, have meant that projects are under real threat. The Norfolk Boreas 1.4 GW wind farm was paused and ultimately sold on, even with CfD support, though there are hopes the new developer will deliver it. New support and structures are desperately needed to keep this industry afloat in the UK.

The limits of the current CfD approach are now showing. The most recent auction round (AR5) was held in 2023, but the maximum strike price on offer was too low to attract any offshore wind bids. A small positive change to the CfD auction was implemented in 2023: auctions now run on a one-year cycle rather than every two years, making the process more agile and avoiding the irregular deployment of previous years. However, larger adjustments are needed to get development back on track over the next two auction rounds in 2024 and 2025.

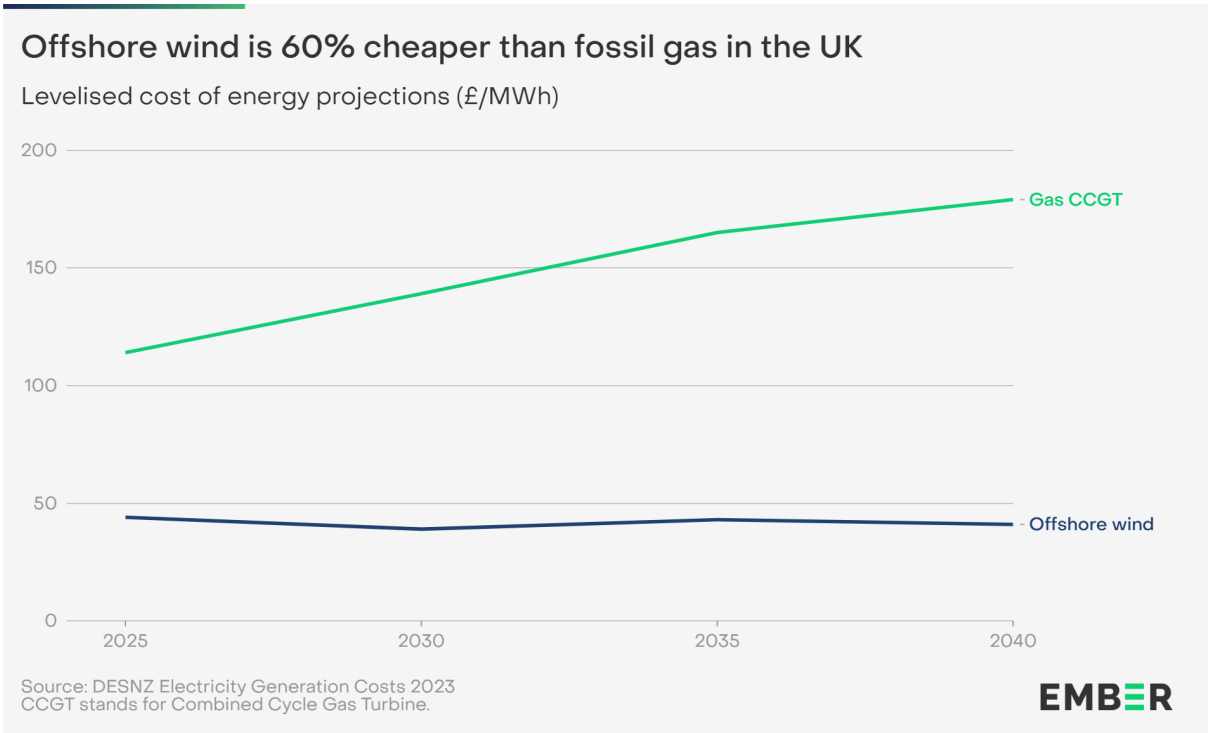


Focus on price misses the point

New offshore wind capacity is now needed at scale, and to be delivered at pace. Failing to address issues with the auction system would have consequences for energy security, keeping the UK exposed to paying for gas imports at unpredictable prices. On average the last two successful auctions, AR3 and AR4, procured 6.4 GW each. If 6.4 GW is procured at both the next two auctions, the UK could miss its 2030 offshore wind target by around 9 GW.

Meeting this gap would displace the equivalent of 12% of total gas imports. Every 1 GW of offshore wind installed would displace annual fossil gas consumption by enough to heat 630 thousand homes.

Offshore wind in the UK already outcompetes gas on levelised cost. UK offshore wind has an overall levelised cost 60% cheaper than fossil gas, and is forecast by the government to improve further to 70% cheaper by 2030. The more of this cheap generation that can be built, the greater its contribution to both reduced energy costs and reduced fossil fuel imports.



The CfD process also reduces consumer exposure to further fossil fuel variability by capping prices generators receive. During the gas crisis, CfD offshore wind farms paid the consumer back £660 million in the 18 months from October 2021. Delivering on targets will mean more protection against future exposure to volatile international gas markets.

With offshore wind already competitive, racing to reduce prices through the typical CfD process jeopardises new projects. A mindset shift will be needed in the approach to offshore wind going forward, focusing less on driving down prices and instead on the opportunities of

sustainably growing the sector at scale. Prioritising scale over further price reductions may involve benchmarking an expected strike price at an appropriate level through a single large auction, or a more continuous rolling auction process. The price at which projects bid also reflects their perception of risk, so further clarity about long term changes to the electricity market should help limit costs. A bold approach would ultimately support a wider industrial strategy, for example supporting the supply chain through the creation of new turbine blade manufacturing sites and port facilities.

Course correction

Getting offshore wind back on track

Offshore wind development can realistically accelerate to deliver on targets, but it will need increased policy support and some new ways of thinking.

What's next for offshore wind?

Policy, not pipeline, holds development back

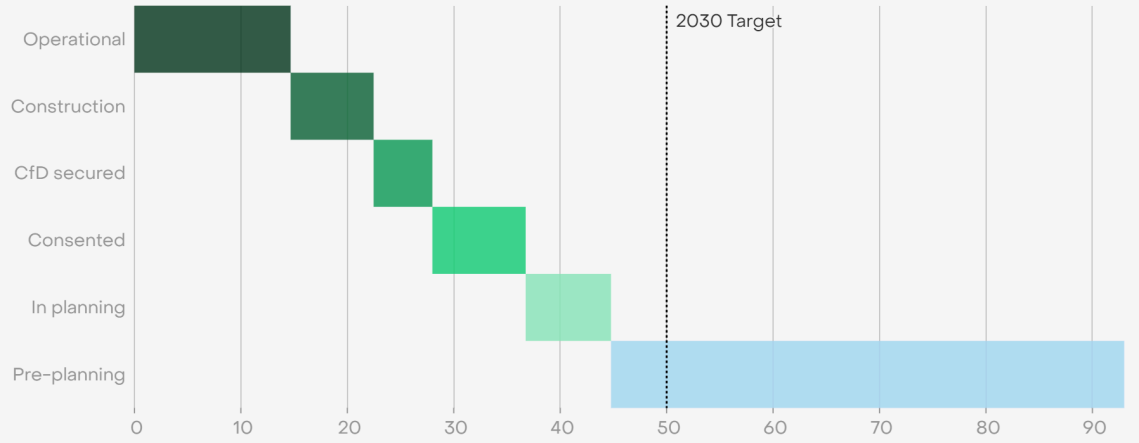
The total pipeline of identified potential sites is not the constraining factor for offshore wind development in the UK. There is up to 93 GW potential capacity, including operational wind farms and those either under construction, committed or in pre-planning from current leasing rounds.

Within this pipeline there can be a slow progression from site identification to the stage where a project is ready to apply for a CfD. However, the largest development issues are costs and policies, not the scale of the pipeline. Improving the commercial reality of projects in development and accelerating the pipeline from identified sites to in-construction projects with increased government support is crucial to improve the health of the industry.

Because of the dominance of the CfD mechanism in supporting new offshore wind farms, the next several auction rounds are largely the focus of the industry looking to recover from the AR5 auction failure.

Enough UK offshore wind in development to meet 2030 targets, but less is ready to begin construction

UK offshore wind pipeline by status (GW)



Source: DESNZ, Crown Estate

AR6 - What is going to happen?

With the current auction budget, AR6 is expected to fall short of what's needed to achieve targets.

Taking into account the operational and committed offshore wind power plants, a gap of around 22 GW remains to be supported across the next auctions. This means that around 10 GW needs to be commissioned from both the 2024 and 2025 CfD auctions. This is close to the 10.2 GW of offshore wind capacity eligible to bid into AR6. Unfortunately, only half this total, around 3-5 GW, is projected to be supported through the AR6 auction with its current parameters and budget, with results expected early September 2024.

Increased AR6 budget needed to support projects in the queue

There is still an opportunity to increase the AR6 budget and support a greater proportion of the pipeline towards development, as others have called for. An underwhelming result in this 2024 auction could potentially be rectified in a future AR7 auction, but this too would need significantly improved parameters and budgets. Depending on the auction bids, increasing the AR6 budget by just 25% could deliver an additional 1 GW on top of existing expectations.

Projects not yet within the planning process need support to be brought forward in time to contribute to the total in AR7. Currently there are only 8 GW of wind farms with planning

permission that are expected to bid into AR7, since they are ineligible for AR6. To accelerate timelines, it will be necessary to increase investor confidence through a successful AR6 auction with a larger budget, and to reduce hurdles to project development including addressing the grid connection approach. In the longer term, this also includes implementing the recommendations of the 2024 Offshore Wind Industrial Growth Plan to grow supply chain capacity. In the near term, an increased budget would be an easily implemented change for AR6 which would immediately provide support for the most shovel-ready wind farms at the front of the pipeline queue.

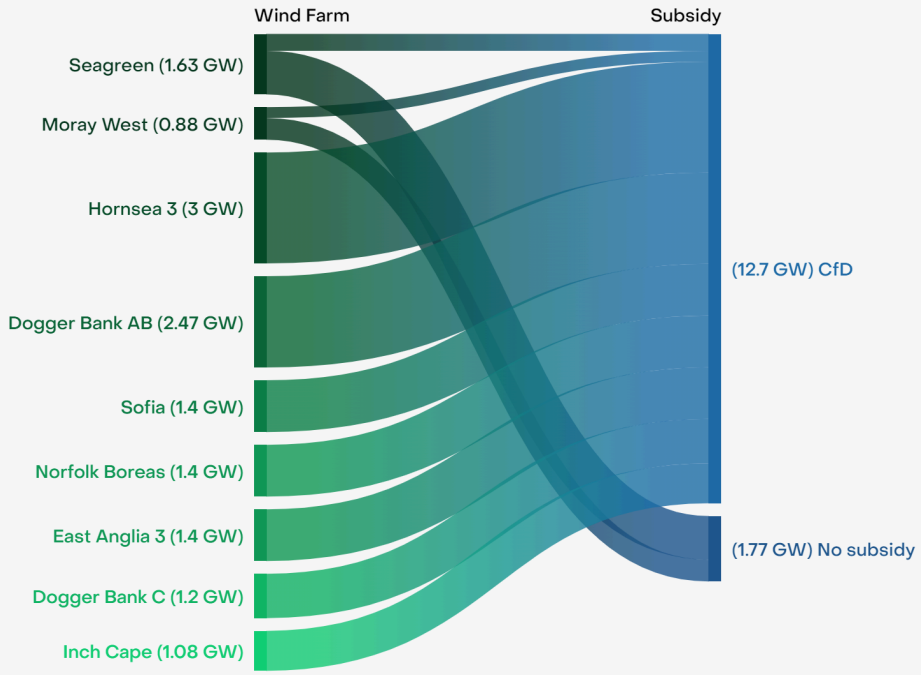
Revenue model innovation shows another way to deploy renewable capacity

Due to low subsidies, high electricity prices, and challenging financing strategies, offshore wind developers are now starting to consider innovative routes to market, outside of the subsidy process. Most CfD auctions to date have supported entire wind farms with a guaranteed price. However, some wind developers are now seeking a range of income streams, partially without subsidies. Recently a new commercial model has therefore arisen, with several developers choosing to put part of the offshore wind farm through the CfD process, and sell the remainder on the wholesale market or to a third party.

Seagreen offshore wind farm built this year demonstrates this method, with Moray West offshore wind farm in development along a similar model. If investors are willing to buy into the slightly riskier approach, it could mean that CfD mechanism and higher strike prices need not be used across the entire pipeline, although they are likely to continue to be the main lever for de-risking projects and supporting further development.

Some UK offshore wind farms now choose to partially forgo subsidies, increasing their price risk

Contracts for Difference subsidy auctions since 2019, by capacity (GW) and chosen revenue scheme



Source: DESNZ, Crown Estate · Ember analysis
'No subsidy' estimates include Power Purchase Agreements with no CfD, and selling on the wholesale market.
Excludes sites under 50 MW.

Recommendations

Immediate action needed to avoid gas price risk

The UK is currently off-track for its offshore wind target. Higher auction budgets, support for the supply chain and moving the focus away from competition and onto scale are all opportunities to deliver the 2030 target.

The CfD mechanism itself can largely deliver the offshore wind capacity needed to reach the UK's 2030 target without radical redesign, however, getting the next two auctions right will be critical. The stakes are high: the industry needs long term confidence, and every gigawatt of offshore wind below the target by 2030 means greater exposure to expensive fossil fuel imports.

The range of changes required speak to the level of uncertainty within the offshore wind industry. However, the tools and innovation needed are not beyond the scope of the structures that are already in place.

Key recommendations

Immediately increase the AR6 Pot 3 budget for offshore wind

Increasing the budget for AR6 is an easy to implement, high impact action. Preliminary analysis suggests that a 25% increase in the offshore wind auction budget (AR6-Pot 3) would deliver over 1 GW of additional eligible capacity, depending on auction parameters and

bids. This approach avoids the need for CfD structural change in the immediate term, and will help move projects at the front of the queue forward to development at a time of great uncertainty in the industry.

Evolve the CfD to prioritise delivery, not a race to the bottom

Although offshore wind is already cheaper than fossil gas, the CfD auction retains a focus on competition, when in reality all of the visible pipeline projects will need to be built out to get the UK offshore wind progress back on track. After AR6 and AR7, the CfD process should change focus to move a large number of sites through development. This could take the form of a single large auction with a preset strike price, or a rolling auction process. This may require exploring profit-sharing mechanisms to both reduce consumer bills and lower the risk of setting the strike price too high in advance. Other changes to reduce risks for projects may limit costs, for example increasing investor clarity over the longer term changes to electricity markets.

Use offshore wind to achieve other policy priorities

In the longer term, strategic planning to support the sector within the UK can increase the economic benefits of development. Implementing the Industrial Growth Plan from the Offshore Wind Growth Partnership for example would improve the resilience of local supply chains and boost manufacturing jobs. Furthermore, developing the pipeline increases energy resilience. The timing of the next energy crisis is unpredictable, but every wind turbine built reduces exposure to volatile fossil fuel markets and provides cost competitive power.

Supporting Materials

Methodology

Fossil fuel imports

The annual generation equivalent of offshore wind is assumed at a capacity factor of 0.41 (Source DUKES Table 6.3) and this generation is modelled to be replaced by high efficiency CCGT fossil gas power generation, with an efficiency of 0.49 (Source DUKES Table 5.10). Domestic gas consumption is modelled at 11.5 MWh per year (Source Ofgem typical values). Gas import figures are sourced from the Department for Energy Security & Net Zero - Energy Trends Table 4.3.

Offshore wind development to date

Data sourced from the Crown Estate, DESNZ and LCCC for CfD results data, the RO register for historic projects and news articles for corporate PPA and revenue stack announcements as these are not recorded in the CfD data.

Offshore wind pipeline

Data sourced from the Crown Estate, from LCCC reports for expected CfD plant commissioning forecasts, and the Renewable Energy Planning Database for those sites in planning without yet applying for a CfD.

Acknowledgements

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Image credit

Geoff Smith / Alamy Stock Photo