Hurdling to Net Zero:

Overcoming the Obstacles for Renewable Deployment & Investment

September 2024

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Weightmans

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Contents

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Getting to grips with the intricacies embedded in the energy market can be a daunting task. There is a wealth of information online to help you keep up to date with the latest developments, but finding what you are looking for and understanding the impact to your business can be tough. That's where Cornwall Insight can help, by providing independent and trusted expertise.

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About Weightmans

Weightmans is delighted to have worked with Cornwall Insight to produce this timely report on the challenges currently faced by renewable energy developers and investors in the UK.

With the UK's commitment to reach net zero by 2050, and the new government's target of a decarbonised power sector by 2030 (an advance of five years on the previous government's 2035 target), the UK is going to need significantly more renewable energy capacity to be brought online over the coming years. This is going to be a challenging task. While the UK has a large pipeline of renewable energy projects, the key will be turning that pipeline into delivered projects.

This report examines some of the obstacles faced by those seeking to develop and finance renewables projects in the UK and looks at some of the ways in which the path to delivery can be unblocked. It is an opportune time to be focusing on this topic, and we hope that this report provides some useful insights and guidance for those who read it.

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Our national energy team works closely with organisations across the energy sector, including project developers, large utilities, investors, funders, new energy services companies, local authorities, waste companies, and major energy consumers.

We have a deep understanding of this fast-moving sector, including the complex regulatory framework, and have notable expertise in energy generation projects, energy storage projects, low-carbon heating projects, decarbonisation projects, energy-from-waste projects, and the waste and resources sector. Our dedicated national team of renewables, decarbonisation, and sustainability lawyers are experts in their field, and have the capabilities and strength in depth to facilitate the delivery of renewables projects across the full range of technologies.

Sustainability is at the core of our business, and we have recently received a Platinum award from Ecovadis, placing us in the 1% of professional services businesses in the UK for ESG. We are ambitious about sharing our knowledge and improving the sustainability impact of our clients.

Please get in touch and we should be happy to assist you with your energy project needs.

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- Simon Hartley, Partner (Property Litigation) at Weightmans
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Executive Summary

Since 1990 the UK has seen a more than 50% reduction in carbon emissions across the economy, with a substantial proportion of that driven by the falling emissions from the power sector. However, to achieve the previous target of a net zero power sector by 2035 (as part of the transition to a net zero economy by 2050) the former government estimated that there will need to be an additional investment of £275-375bn in new capacity and an average annual renewable deployment of 7-9.8GW.[1] The current pipeline of renewable projects (from scoping to under construction) stands at >540GW,[2] which is more than enough to meet the estimate of required capacity, but there are multiple challenges to ensuring the realisation of this pipeline in time to meet the new target of a 2030 net zero power system:

- Macroeconomic headwinds – high inflation and interest rates over the last two years have reduced the risk-free rate of return and restricted investment in renewable projects. This has been compounded by the introduction of subsidy support schemes and incentives in other major global economies, potentially drawing more mobile capital away from the UK.
- Planning permission – the previous de facto ban on onshore wind in England, and the 50MW threshold for solar where planning consent changes from the local planning authority to the Secretary of State have been two key issues restricting the development of onshore renewables in the UK. Additionally, resourcing constraints at the local authority level are acting to significantly lengthen the timelines for project development.
- Grid connections – grid connection queues are widely considered one of the largest barriers to new renewable projects, with congested queues resulting in many projects being issued with connection dates over a decade in the future alongside high reinforcement costs or curtailment reports for their connection.
- Securing a route to market – despite an increase in secured renewable capacity in the sixth allocation round of the Contracts for Difference (CfD) scheme, compared to the fifth allocation round, concerns over the impacts of unrealistic reference prices and other future reforms mean that alternative routes to market are becoming increasingly important. Securing a route to market through either subsidy support or merchant financing is an additional complexity for new renewables projects to tackle.

In this report, in addition to outlining these barriers to the deployment and investment in UK renewables, we discuss a series of actions that can be taken by the new government, industry bodies, and market participants to help regain and maintain momentum in the transition to net zero:

- Policy certainty and clarity – transparency and consistency of policy direction from the new government, particularly around market reform, is crucial to maintaining investor and developer confidence in the UK energy market.
- Continuation of grid connection reform – the recent policy announcements and grid connection reform processes from government, Ofgem, and the Electricity System Operator (ESO) are steps in the right direction, but it will be important that focus and

[1] DESNZ
[2] Cornwall Insight - Renewables Pipeline Tracker

momentum are maintained to ensure there is a meaningful change to grid connection queues.

- Reform of the planning process – alongside the recent removal of the de facto ban on onshore wind in England, the proposed revision to the planning thresholds for solar could also help speed up the deployment of onshore renewables.
- Diversity of routes to market – optimisation across a diverse range of routes to market can help renewable projects overcome some of the challenges they would ordinarily face when securing a specific route to market, with greater sensitivity analysis of different scenarios important to account for the increased uncertainties in project delivery.
- Co-location – co-locating new assets with existing projects can speed up grid connections and save on costs associated with land and infrastructure. However, co-location also requires careful managing and optimising across the revenue stacks for the different assets.
- Resilience of operational strategy – despite the reforms to the grid connection queues, it is unlikely that an immediate reduction in connection times will occur and so it is important that renewable developers build resilience into their operational strategy, particularly around options for leasing and contract extensions.

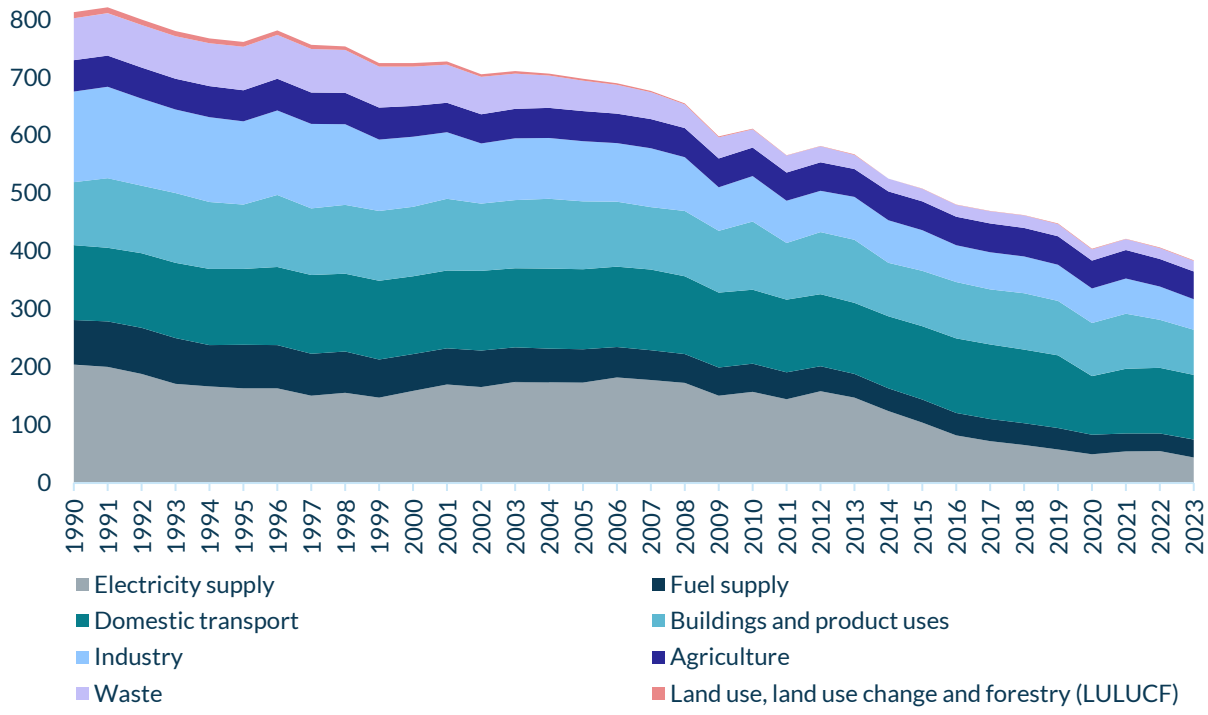
Despite the positive steps already being taken to encourage the deployment and investment in UK renewables there is no single panacea which will immediately overcome all the hurdles outlined in this report. Developing and investing in renewables will remain a complex and involved process but there are a range of actions that the government, industry bodies, and market participants can take to alleviate the headwinds experienced by the sector in recent years.

Transitioning to Net Zero

Progress and the Road Ahead

As part of the 2008 Climate Change Act,[3] the UK committed to an 80% reduction in carbon emissions across the economy, relative to a 1990 baseline. In June 2019 this was upgraded to a legally binding target to achieve a net zero economy by 2050.[4] In 2023, territorial greenhouse gas emissions for the UK were 52.7% lower[5] than 1990, with the majority of this reduction driven by falling emissions within the power sector (Figure 1). The fall in power sector carbon emissions has been driven by the changing fuel mix for electricity generation, alongside greater efficiencies due to technological improvements and a decline in energy intensive industries. The changing fuel mix has seen a decline in the contribution of coal fired power, from >65% of electricity generation in 1990 to <2% in 2023, and a concurrent increase in the contribution from nuclear and renewables, from 22% in 1990 to >56% in 2023.[6]

Figure 1: UK territorial greenhouse gas emissions 1990-2023 ($MtCO_2e$)



Source: DESNZ

However, despite the substantial increase in renewable capacity over the last three decades, from ~1.3GW in 1990 to ~53.5GW in 2022,[7] the former government estimated that achieving the target of a decarbonised power sector by 2035 will require 140-174GW of renewable capacity, a 150-200% increase on the current levels.[8] Additionally, as more intermittent

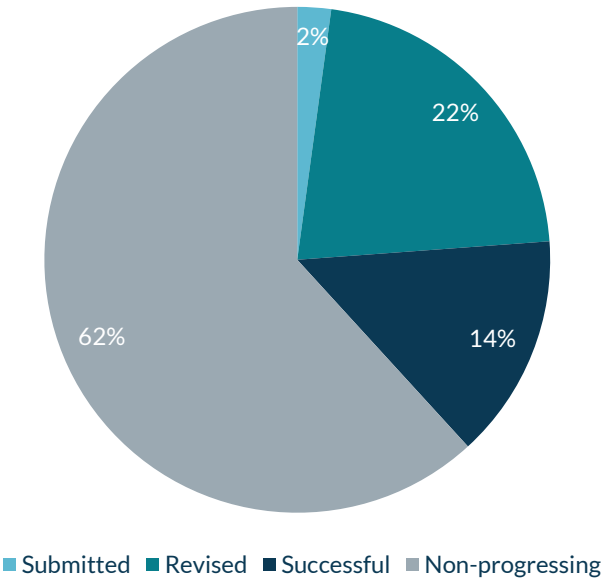
[3] legislation.gov.uk
[4] legislation.gov.uk
[5] DESNZ
[6] DESNZ
[7] DESNZ
[8] DESNZ

renewables are added to the system there is also a growing need for flexibility services, with battery storage assets forecast to play a major role in this.

Meeting the targets of a decarbonised power system by 2035, or earlier, and a net zero economy by 2050 will clearly require a substantial increase in the pace and volume of renewable capacity brought online. The former government estimate of renewable capacity required to meet the 2035 target will require an average build out of 7-9.8GW each year. This rate of deployment will also require significant levels of investment, with the former government estimating that £275-375bn investment in new capacity is going to be needed.[9] With the new government targeting a decarbonised power sector five years earlier, by 2030, this estimated rate of renewable capacity and investment growth has only increased.

Notwithstanding the scale of the challenge, Cornwall Insight's Q124 Renewables Pipeline Tracker[10] indicates that the current total pipeline (from projects at the scoping stage through to those under construction) for renewables stands at ~547GW. While this highlights the level of opportunity for growing the UK's renewable capacity, from 2018 to 2023 only 14% of pipeline projects have been successfully progressed through the planning process (Figure 2). If applied to the current viable pipeline, then only ~76.5GW of projects would be successfully developed.

Figure 2: Status of renewables projects 2018-23



Source: Cornwall Insight – Renewables Pipeline Tracker

In this report we consider some of the major obstacles to the continued growth of renewable deployment and investment in the UK such as macroeconomic conditions, grid connections and planning permission, and securing routes to market, alongside a discussion of how developers and investors can overcome these barriers and keep the UK on the path to net zero.

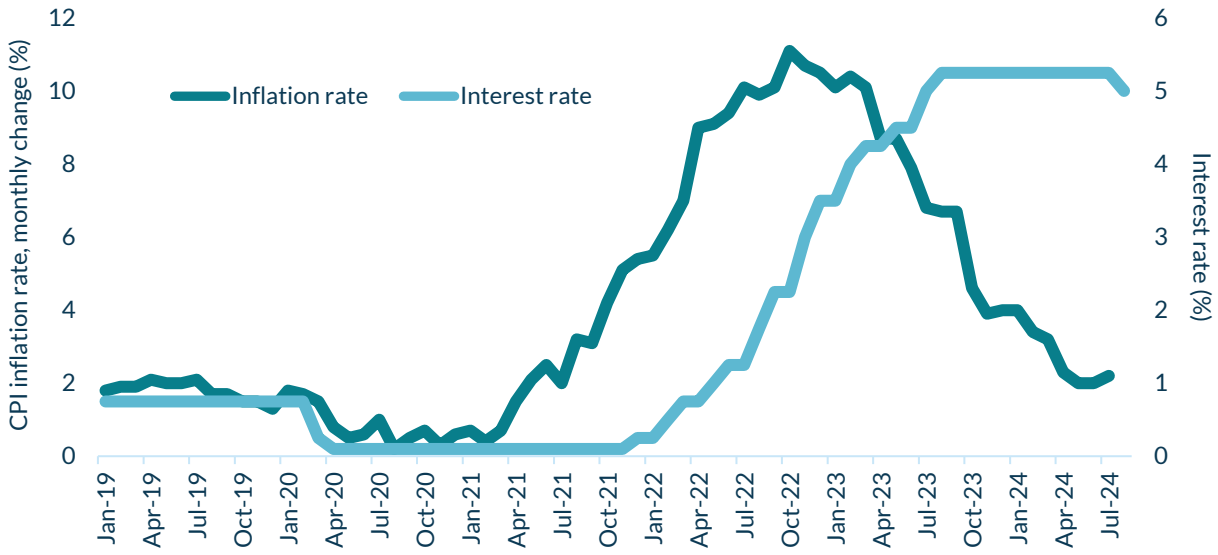
Challenging Macroeconomic Backdrop

Over the last two to three years there has been a significant shift in macroeconomic conditions, with volatility in wholesale gas and power prices feeding through to high inflation and interest rates across major global economies. UK inflation peaked at 11.1% in October 2022 before decreasing to 2% by May 2024 and interest rates dropped slightly to 5% in August 2024, having been at 5.25% since August 2023 (Figure 3). Despite the recent falls in inflation and interest rates, higher prices and the reduced ability to borrow have placed significant pressures on the UK economy over the last two years and restricted investment

[9] DESNZ
[10] Cornwall Insight - Renewables Pipeline Tracker

into low-carbon technologies. Stefan Agopsowicz, Head of Energy at Blackfinch, highlighted that high interest rates had meant that "while developers and investors entered the period with a strong pipeline of existing projects, the higher rates made it harder to beat the risk-free rate of return by enough of a margin to justify investment in some newer projects, resulting in reduced transaction activity for renewables over the last two years. Blackfinch's priority is protecting the retail investor capital they manage and ensuring they achieve the expected outcomes form the investment in their energy portfolio." However, Agopsowicz added that, with inflation back around 2% and interest rates starting to fall, even without an imminent return to pre-2022 macroeconomic conditions, investor confidence should improve.

Figure 3: UK inflation and interest rates January 2019 to August 2024



Source: ONS, Bank of England

Alongside high interest rates there is a tight labour market in the UK, with an unemployment rate of 4.4% in March to May 2024,[11] the highest level since mid-2021. To further compound this, many of those seeking employment do not have the necessary skills to fill key vacancies in the net zero economy, with Rafael Curado-Moliní Álvarez, Head of Growth, UK at Sonnedix, highlighting that the skills and resourcing shortage is a key issue across the sector. The Climate Change Committee, in a May 2023 report,[12] recommended that net zero training should be implemented across educational institutions and workplaces to give current and future workers the ability to secure jobs in the growing green economy.

Increased International Competition

These challenging macroeconomic conditions have not been unique to the UK, with interest rates also exceeding 4.5% in other major global jurisdictions such as the US[13] and EU.[14] However, as capital has become more limited and expensive, these other major economies have implemented a series of schemes to continue to attract and support investment in net zero. These include the US' Inflation Reduction Act (IRA) and the EU's Green Deal Industrial

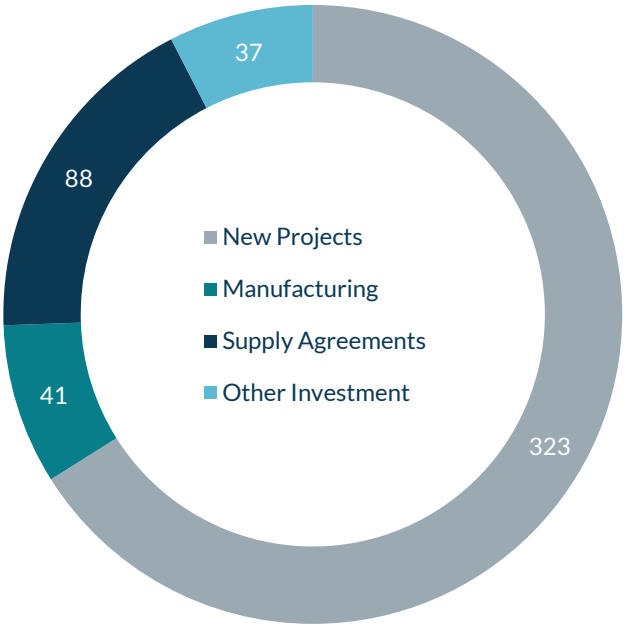
[11] ONS
[12] CCC
[13] US Federal Reserve
[14] European Central Bank

Plan (GDIP), which take different approaches, but both increase the risk of mobile capital offshoring from the UK. Indeed, the greater attractiveness of other international markets compared to the UK for investment was a key factor behind the three-place drop for the UK in EY's November 2023 Renewable Energy Country Attractiveness Index (RECAI).[15]

The IRA was signed into law on 16 August 2022 and commits up to $369bn until 2032 through a wide array of tax credits, grants, and loans with the stated aims of accelerating investment and deployment of clean energy, lowering consumer energy bills, reducing carbon emissions, strengthening supply chains for net zero technologies and critical raw minerals, lowering inflation, and creating new jobs and upskilling the workforce.[16] Additionally, many of the credits and bonuses available under the IRA require certain domestic content requirements to be met. The scale of the support available under the IRA and the longevity of the scheme provide invaluable certainty to developers and investors, encouraging a significant level of investment and deployment of renewable assets in the US since implementation (Figure 4), with ~320GW of new clean power capacity announced since August 2022. The domestic content requirements to access the full value of many of the credits have also encouraged the relocation of more mobile capital and investment to the US.

In contrast to the IRA, the GDIP focuses less on providing subsidy support and more on incentivising net zero investment and domestic supply chains through regulatory reforms to clarify and speed up the deployment of clean energy technologies.[17] The GDIP is underpinned by four pillars (Box 1), with much of the reform encompassed by the Net Zero Industry Act,[18] proposed on 16 March 2023.

Figure 4: Announced investment ($bn) in clean technologies since 16 August 2022



Source: American Clean Power

To counter the increased competition from other jurisdictions, 2023 saw several key developments from the former UK Government, including the Energy Act[19] and the 2023 Autumn Statement.[20] The Energy Act provides a foundational piece of legislation to enable the development of future frameworks in the energy sector, with the previous government estimating that it could help leverage up to £100bn in private investment in energy infrastructure and create up to 480,000 jobs by 2030. Legislation within the Energy Act covers a range of areas across the sector

[15] EY
[16] The White House
[17] European Commission
[18] European Commission
[19] legislation.gov.uk
[20] HM Treasury

Box 1: The four pillars of the EU GDIP

Pillar 1: With a goal to create a "predictable and simplified regulatory environment", the Net Zero Industry Act and Critical Raw Materials Act are proposed alongside electricity market reform and the development of "regulatory sandboxes" for rapid development of net zero technologies.

Pillar 2: Aimed at speeding up investment and financing for clean technology production in Europe. The EU will accelerate deployment of funding from current programmes; "step up" new funding for net zero; propose an adaptation to State Aid rules until 2025; and incentivise further private investment through the Capital Markets Union.

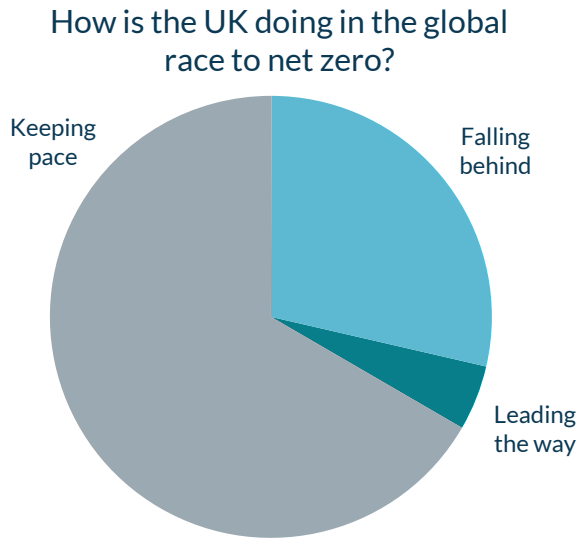
Pillar 3: In order to expand and upskill the labour force for net zero the EU is working with Member States to "set targets and indicators to monitor supply and demand in skills and jobs" for the net zero transition.

Pillar 4: In light of "unfair and coercive practises" in global markets the EU will continue to support the World Trade Organisation, advance Free Trade Agreements, and develop new tools to level the playing field and create resilient supply chains for net zero materials and technologies.

from nuclear and offshore wind to consumer protections and grid infrastructure. Building upon the Energy Act, the 2023 Autumn Statement introduced a number of measures for directly funding or stimulating further investment in the UK's low-carbon economy. Among the 110 measures announced as part of the Autumn Statement some of the key actions were:

- The intention to remove planning and connection constraints to "halve the time to build new grid infrastructure to seven years" and allow projects to connect to the transmission grid sooner.
- The creation of a new £960mn Green Industries Growth Accelerator (GIGA) to support investment in UK manufacturing. The GIGA will focus on developing domestic supply chains for the carbon capture usage and storage, hydrogen, offshore wind, nuclear, and electricity networks sectors.
- An exemption from the Energy Generator Levy, a windfall tax on non-gas electricity generators, for new projects and expansions to existing projects "for which the substantive decision to proceed is made on or after 22 November 2023".

Figure 5: Poll responses from 21 participants



Source: Cornwall Insight

Several of these areas, particularly around planning permission and grid connections, will be touched upon in more detail in future chapters. However, market experts[21] believe that these policy frameworks, while far from a panacea for the challenges to the UK's deployment and investment in renewables, do allow the UK to at least keep pace with other major global economies in the race to attract the necessary capital for the net zero transition (Figure 5). This positivity is supported by Nick Fothergill, Partner at Weightmans, who highlighted that, with "some question marks over the future direction of US policy, and the new UK Government sending some very positive signals on green investment, there is still a lot to play for in terms of attracting new capital".

[21] A poll of attendees was conducted as part of a joint Cornwall Insight and Weightmans webinar on the challenges to renewable deployment and investment held on 23 May 2024.

Locating and Connecting

Of the various challenges to developing UK renewables, the most often cited by those within the industry are the problems around securing planning permission and a grid connection for a project. In this chapter we will discuss the challenges in both areas alongside some of the latest policy developments to help combat these issues and some of the future considerations.

Planning Permission

Getting the planning permission for a new onshore renewable asset is one of the first challenges faced by developers. Liam Kelly, Chief Operating Officer at Green Switch Capital, noted that there are two main issues around planning consent, the first being "negative public opinion at the local level to developments", and the second the "under resourcing of local authorities". In the case of the latter an industry source highlighted that projects are facing delays of three to five years beyond the stated timelines for the planning process, significantly elongating the timelines required to develop a renewable project.

Planning has been a particular issue for onshore wind in England, where the previous government changes to the National Planning Policy Framework (NPPF) in 2015 and 2016 placed a de facto ban on new wind farms. In 2015, the former government introduced requirements for proposed new wind farms to be located in a suitable area and have the backing of the local community.[22] This was followed in 2016 by the additional requirement that the decision on all English onshore wind farms was made by the local planning authority[23] rather than by the Secretary of State, as is the case for other major infrastructure projects (e.g., solar farms >50MW). The impact of these changes can be seen in the annual installed onshore wind capacity in England and Scotland since 2011 (Figure 6), with the drop off in installed capacity in England lagging the legislation changes by a couple of years due to projects that had reached construction phase still coming through. Since the start of 2020 only 4.2MW of capacity has come online in England, compared with 110MW in Scotland and Wales over the same time frame.

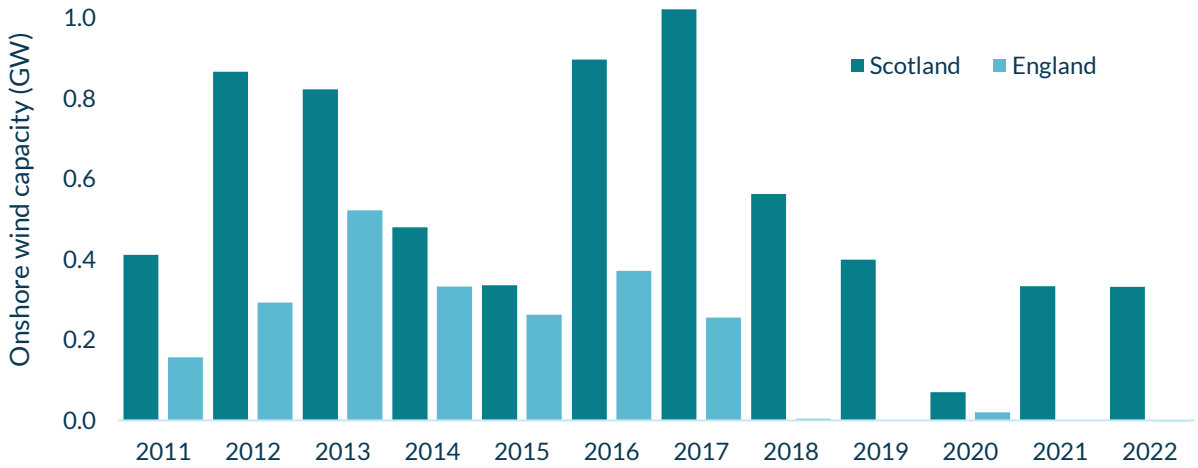
In September 2023,[24] the former government updated these policies to increase the ways in which suitable locations for new wind farms could be identified rather than solely through an area's development plan. The former government also updated the policies for replacing existing wind turbines so that they no longer face the same requirements as new turbines. However, many market participants have argued that these changes did not go far enough,[25] and that the planning policy for onshore wind in England should be brought in line with other local infrastructure projects.

Alongside the recent challenges for onshore wind in England, an industry source noted the difficulties associated with the current 50MW threshold at which solar projects change from having planning permission covered by the Town and Country Planning Act (TCPA), and therefore under the remit of the local planning authority (projects <50MW), to being considered a nationally significant infrastructure project (NSIP) requiring development

[22] UK Parliament
[23] legislation.gov.uk
[24] UK Parliament
[25] RenewableUK

consent from the Secretary of State (projects >50MW). They outlined that this change significantly increases the associated costs for planning, from <5% of the capital expenditure of a project to around 15-20%, and therefore can "completely destroy the business model for solar projects between 50MW and 150MW".

Figure 6: Installed annual onshore wind capacity in Scotland and England 2011-22



Source: DESNZ

Following the 2024 General Election, the new government has updated the NPPF to remove the de facto ban on English onshore wind. On 8 July 2024 the new government removed the 2015 caveats for onshore wind from the NPPF so that onshore wind will now be treated equivalently to other energy developments,[26] with Nick Fothergill (Weightmans) noting that this sends both a "quick and positive signal on the direction of travel". Additionally, on 30 July 2024, the new government published a consultation on proposed revisions to the NPPF. These revisions include the reintegration of onshore wind into the NSIP regime and amending the MW threshold at which projects move from being covered by the TCPA to being covered by NSIP, with the proposed NSIP threshold being moved to 100MW for onshore wind and 150MW for solar.

In addition to the challenges around planning consent, Simon Hartley, Partner (Property Litigation) at Weightmans, highlighted that "assembling the land needed for energy projects often gives rise to legal issues." The system is currently largely reliant on voluntary negotiation to acquire the necessary land for new infrastructure on a freehold or leasehold basis, with rights to compulsorily purchase property, such as through statutory wayleaves under the Electricity Act 1989 or development consent orders for NSIPs, considered an option of last resort. As a result, Simon Hartley (Weightmans) noted that "the land assembly process is slow and too often results in important elements of the power system relying on uncertain legal rights."

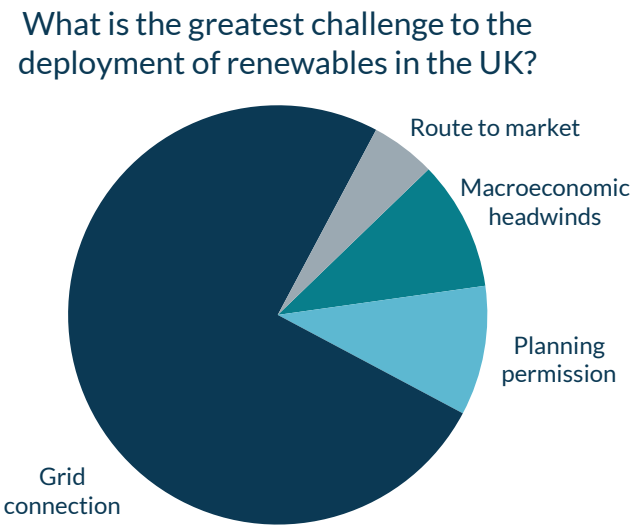
Grid Connections

Getting a timely grid connection for a new renewable project is regarded by market experts[27] as the biggest current challenge to the continued rollout of renewables in the UK (Figure 7).

[26] DESNZ
[27] A poll of attendees was conducted as part of a joint Cornwall Insight and Weightmans webinar on the challenges to renewable deployment and investment held on 23 May 2024.

This is highlighted by National Grid Electricity Transmission's Research Assistant tool, where none of the listed sites are offering transmission network connection dates before 2033.[28] Not only are new projects facing significant delays to access a grid connection, but even those projects already in the queue are seeing minimal progress. As shown in Figure 2, analysis of Cornwall Insight's Q423 Renewables Pipeline Tracker[29] indicates that >60% of projects in the pipeline have not seen any change in their developmental status between 2018 and 2023.

Figure 7: Poll responses from 20 participants



Source: Cornwall Insight

In addition to the long grid connection timelines, Liam Kelly (Green Switch Capital) mentioned concerns around the curtailment reports issued to developers, which are based on "hypothetical situations which are very unlikely to ever come to pass". Kelly added that these reports are therefore hampering investment by presenting an overly negative picture of the level of generation that a specific project will be able to deliver.

The issues with grid connection timelines and a congested grid connection queue are well documented and in the last year there has been a renewed focus from the ESO, government, and Ofgem on measures to overcome them. Primary amongst these is the Connections Action Plan (CAP) from the previous government and Ofgem, announced in November 2023.[30] The CAP aims to build upon the actions already underway in the ESO's five-point plan[31] to accelerate transmission connections and the Energy Networks Association's three-step plan[32] to reduce distribution connection timescales, which together are estimated by the ESO to deliver benefits for ~100GW of projects. A series of key actions are set out under the CAP, across six main areas, to be taken in both the short and long-term to speed up connection to the grid:

- Raise entry requirements – implementing more stringent requirements for connection applications and reducing the attractiveness of holding network capacity to reduce the number of speculative applications that are contributing to queue congestion.
- Remove stalled projects – allowing the ESO to remove projects that are slow progressing or stalled, so-called 'zombie' projects, to facilitate viable projects connecting sooner.
- Better utilise existing network capacity – more efficient utilisation of existing network infrastructure could reduce the cost and time needed to build new infrastructure, allowing earlier connection.

[28] National Grid Electricity Transmission
[29] Cornwall Insight - Renewables Pipeline Tracker
[30] DESNZ, Ofgem
[31] National Grid ESO
[32] ENA

- Better allocate available network capacity – changing the allocation process from 'first come first served' to 'first ready, first connected'.
- Improve data and processes and sharpen obligations and incentives – make the connection process more efficient and user-friendly through increased transparency and accessibility of data alongside a review of the regulatory framework of obligations and incentives covering timely connection delivery and customer service.
- Develop longer term connections process models – ensuring that the reform of the connections process is aligned with centralised network planning and future-proofed for future initiatives (e.g., the Review of Electricity Market Arrangements (REMA)).

In response to the CAP, the ESO has proposed updates to the options being taken forward under phase three of its GB Connection Reform programme,[33] building on its December 2023 Final Recommendations Report.[34] In this report the ESO had set out a 'First Ready, First Connected' process, referred to as Target Model Option 4 (TMO4), which applied two 'gates' or stages for new transmission connected projects (Box 2). The first of these gates (Gate 1) would provide indicative connection dates and offers for projects. The second gate (Gate 2) would then be used to determine queue position, connection date, and connection point for projects that meet the Gate 2 criteria.

For distribution connected projects it is expected that Distribution Network Operators (DNOs) will undertake the criteria checks and specify to the ESO which projects have met Gate 2 criteria. The ESO will then provide the DNOs with details of the transmission impact of these projects. The alignment of ESO and DNO grid connection processes is therefore going to be a crucial variable going forward, with more clarity still required for developers.

Box 2: ESO grid connection stages

Gate 1: Projects would be required to have a Letter of Authority. A Gate 1 offer would contain an indicative connection offer with no confirmed works, costs, or location but also no User Commitment or Queue Management milestones.

Gate 1 'Holding Area': Projects which have accepted the Gate 1 offer but not yet applied for Gate 2. Projects can remain in the holding area for three years without accepting a Gate 2 offer before being removed.

Gate 2: Projects would need to evidence that they have land rights and commit to submitting planning permission within 1-2 years of accepting a Gate 2 offer. A Gate 2 offer would include a connection date, works, costs, and location alongside the application of the User Commitment and Queue Management milestones. Projects would be assigned a queue position and a duplication check will be conducted to ensure that the land is not being used by other projects which have accepted a Gate 2 offer.

Gate 2 'Holding Area': Projects which have accepted a Gate 2 offer but are not yet connected. Queue Management milestones and land rights requirements will be applied to check projects remain on track with their development and connection.

[33] National Grid ESO
[34] National Grid ESO

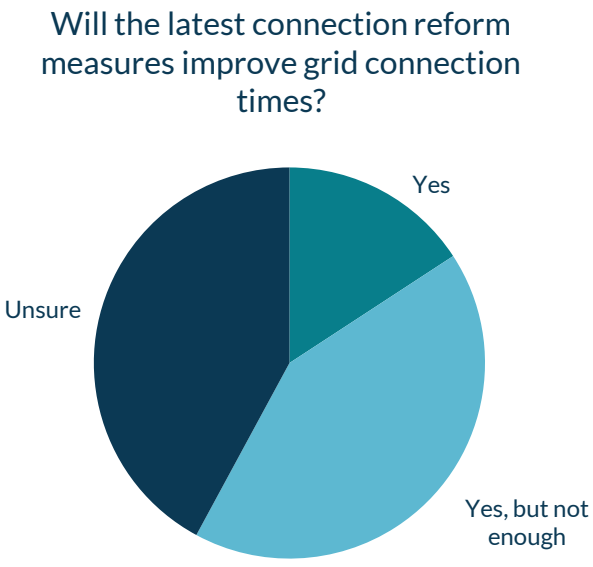
The ESO's update to TMO4, now referred to as TMO4+, proposes to apply the Gate 2 criteria to projects within the existing queue and not just new applications, with only the projects with a Gate 2 offer given a confirmed queue position, connection point, and connection date. The ESO estimates that by applying the Gate 2 criteria to existing projects, there is the potential to reduce the current queue by over half. The application of new criteria to existing queued projects is believed by the ESO to be necessary as otherwise the existing queue would need to be cleared before the benefits of the connection reform process could be felt.

Market experts[35] have responded fairly positively to the connections process reforms announced by the former government, Ofgem, and the ESO, although over 80% are either unsure how successful the reforms will be or do not believe that they will go far enough in improving grid connection challenges (Figure 8). The potential that these reforms do not go far enough was echoed by the Environmental Audit Committee (EAC) in a May 2024 publication,[36] where they highlighted that since the announcement of the reforms there has been no immediate impact on grid connection times, with the queue markedly lengthening. The EAC calls for continued monitoring and streamlining of the measures being introduced to ensure they remain fit for purpose, alongside the authorisation of experienced third parties to build connections to increase the range of provider options for developers looking to connect to the grid.

Similarly, Francis Mann, Senior Government Affairs Manager, Northern Europe at Lightsource bp, mentioned that while the large number of recent announcements related to reform of the grid connections process is a positive sign, there is so much going on that it is not clear what will be prioritised or how focus can be maintained. Nick Fothergill (Weightmans) added that "it is too early to tell how effective the changes will be" and that "the question will be how quickly and how far these changes can have an impact on the actual delivery of projects".

In addition to the broad scale policy announcements to streamline the grid connections queue, Liam Kelly (Green Switch Capital) highlighted that there are also issues around resourcing and clarity of communication from the grid operators, with developers often receiving inconsistent messaging around queue position, curtailment etc. This call for greater transparency is also echoed by a recent report from Octopus Energy, End the gridlock: One year on,[37] which calls for the connections process to be both open-source and self-serve, providing the data and tools for developers to conduct their own network analysis.

Figure 8: Poll responses from 19 participants



Source: Cornwall Insight

[35] A poll of attendees was conducted as part of a joint Cornwall Insight and Weightmans webinar on the challenges to renewable deployment and investment held on 23 May 2024.
[36] UK Parliament
[37] Octopus Energy

Routes to Market

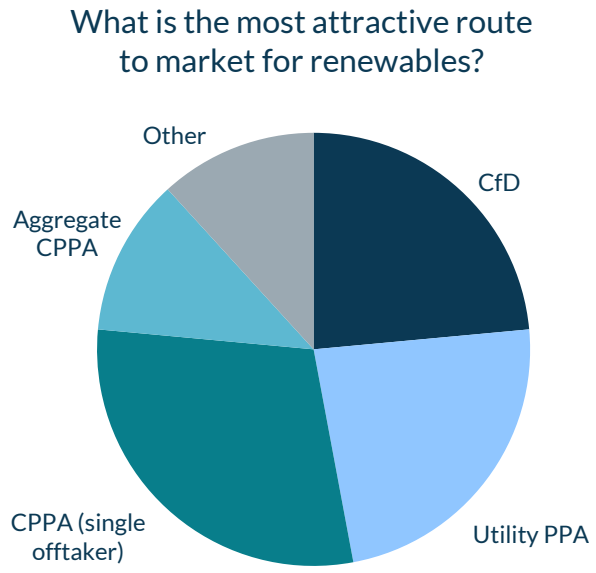
Alongside the challenges presented by getting planning permission and a timely grid connection for UK renewables, another key challenge to building an investment business case is securing a route to market. Historically the majority of new renewable generation has relied on subsidy support, with the CfD support scheme the only such mechanism still open to new generation capacity. Other than the CfD there is also growing interest in more merchant routes to market, such as power purchase agreements (PPAs) – either as corporate PPAs (CPPAs) or utility PPAs – with market experts[38] fairly evenly split over which of the various routes to market they view as the most attractive for new renewables developments (Figure 9).

Subsidy Support

The CfD scheme, since being established in 2014, has facilitated investment in 39GW of renewable energy, with 6.4GW of that currently operational. As such, the CfD has been largely successful over the last decade, with Mark Jones, Senior Business Developer – GES UK at Q ENERGY, stating that it will remain a crucial route to market for many projects given the volatility in the market over the last two years and for financing purposes. However, as outlined, the rate of renewable deployment needs to increase in order to meet net zero targets, so the question is whether the CfD is suitable to facilitate this acceleration?

Indeed, in the fifth allocation round (AR5) for the CfD, there was a significant drop off in the secured capacity (Figure 10). While this drop was mostly from AR5 not securing any new offshore wind capacity, other technologies, with the exception of onshore wind, also secured less capacity during AR5 than AR4. The failure to secure any offshore wind capacity in AR5 has been attributed to the administrative strike price (ASP) – the maximum strike price a project can receive – not being set sufficiently high to account for inflation and interest rates and the impact these have had on supply chain and renewable development costs. Even for technologies that did secure capacity under AR5, the strike price for successful projects was either at the ASP, in the case of solar, or only very slightly below it, in the case of onshore wind.

Figure 9: Poll responses from 17 participants



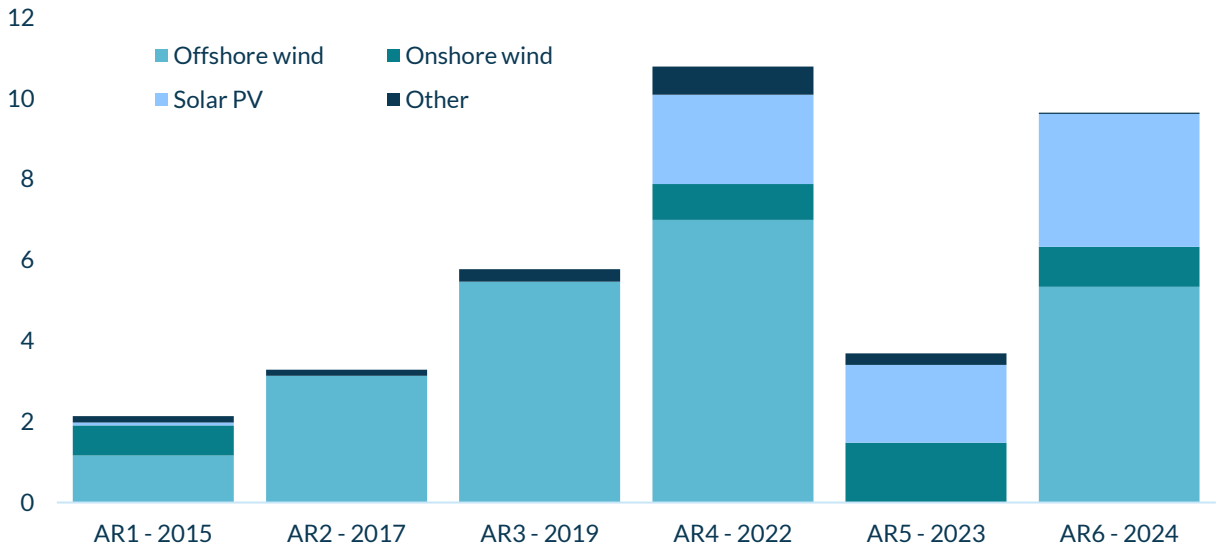
Source: Cornwall Insight

Following the results of AR5, the former UK Government instigated a series of short-term changes ahead of AR6 to regather momentum in the deployment rate of renewables. Key amongst these was a substantial increase in the ASPs

[38] A poll of attendees was conducted as part of a joint Cornwall Insight and Weightmans webinar on the challenges to renewable deployment and investment held on 23 May 2024.

across all technologies (66% for offshore wind, 30% increase for solar, and 21% increase for onshore wind) to hopefully make them more reflective of the macroeconomic conditions, and therefore encourage developers to participate, as well as a considerable increase in the overall budget, to >£1bn in total,[39] with the new government further increasing the budget on 31 July 2024.[40] Additionally, the former government published a more detailed discussion of the ASP-setting methodology,[41] including the assumption changes made to better align the evidence base with the volatile macroeconomic conditions, to increase the transparency of the methodology for developers and investors. For AR6, the former government also separated back out offshore wind into its own 'pot', so it is not competing for the same budget as solar and onshore wind, as was the case in AR5.

Figure 10: CfD contracted capacity (GW) by technology, AR1-AR6



Source: DESNZ

While the increases to the ASPs and budget for AR6 were broadly welcomed by the industry, concerns remained around the reference prices, used in the auction as a proxy for future market prices. The lower the reference price, the greater the assumed cost of the CfD 'top-up' for each project, and therefore the greater the share of the budget that each project requires. The steep reduction in reference prices across the delivery years of AR6[42] thereby act to offset some of the benefits from the high budget, creating additional uncertainty for market participants. This rapid decline in reference prices across the next decade seems difficult to justify given the other ongoing pressures on electricity market wholesale prices.

The results for AR6 (Figure 10), published on 3 September 2024,[43] represented a significant improvement on AR5, with 9.6GW of new capacity across a record 131 projects securing contracts, including 4.9GW of offshore wind and 3.3GW of solar. With offshore wind projects again successful in the CfD and a record amount of solar capacity secured, AR6 can broadly be considered a success. Additionally, strike prices for all successful projects cleared between 17 and 35% below the ASPs, demonstrating the importance of competitive auctions in driving the

[39] DESNZ
[40] DESNZ
[41] DESNZ
[42] DESNZ
[43] DESNZ

cost-effective rollout of renewables. Despite the clear positives in the AR6 results, the contracted capacity is still significantly below the levels needed to meet the new government's 2030 net zero power target. This is especially true for onshore wind, where <1GW of new capacity was secured in AR6, a reduction on the volumes secured in AR5.

Alongside the short-term changes made ahead of AR6 to help boost the attractiveness of the CfD scheme to investors and developers, there are also a range of longer term reforms being proposed. One such reform is the inclusion of Sustainable Industry Rewards (SIRs) for AR7 to AR9.[44] SIRs would provide additional revenue to support with development and capital expenditure related to domestic supply chains for offshore wind and floating offshore wind projects that are intending to enter the CfD. The framework for the SIRs is still being drafted but provisionally SIR applications will be assessed against and rewarded for: reducing the footprint of supply chains by bringing them closer to deployment zones, concentrating supply chain growth in socio-economically deprived areas of the UK, and increasing the sustainability of supply chains. However, Francis Mann (Lightsource bp) raised concerns over the use of the CfD scheme to help resolve supply chain issues and the risk of overburdening the scheme. Mann suggested that separate "targeted policies for specific sectors would be more effective than bolting additional components onto existing schemes".

In addition to the SIRs, the former government also proposed a range of further reforms to the CfD through the REMA program. These different reforms are discussed in detail in Cornwall Insight's July 2023 paper, REMA: Reform to support Mass Low Carbon Power,[45] and are aimed at encouraging the operation of CfD assets to be better aligned with system needs and ensuring the CfD remains fit for purpose in the future. While these changes may provide a benefit in the long-term, it is crucial that in the short to medium-term uncertainty is minimised for developers and investors.

Alongside the various reforms proposed under REMA, Mark Jones (Q ENERGY) suggested that requiring developers to place some money on the table for a CfD contract could provide sufficient financial penalty for non-delivery of projects, and thereby encourage bids that are realistic and reduce the chance of projects bidding in too low and then being unable to sign or deliver on their CfD contract.

Merchant Routes to Market

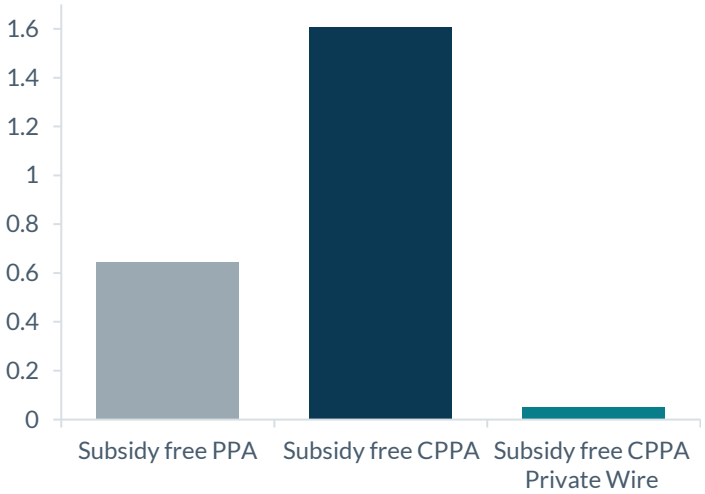
While the CfD is likely to remain a key route to market for many projects going forward, there is an increasing number of assets exploring the potential of merchant routes to market, particularly through utility PPAs or CPPAs. Cornwall Insight's August 2024 Renewables PPA Market Share Report[46] indicates that, in the two years up to August 2024, ~61% (1.9GW) of the capacity that publicly announced the signing of PPA deals were subsidy free. This brought the announced subsidy free PPA capacity to ~4.1GW since August 2019. Although this growth in subsidy free PPAs is seen in both utility PPAs and CPPAs, it is the latter that makes up the majority of subsidy free capacity (Figure 11).

CPPAs have seen particularly strong growth recently, with over a third (0.99GW) of the total announced CPPA capacity since August 2019 (2.7GW) signing deals in the year up to July

[44] DESNZ
[45] Cornwall Insight - REMA: Reform to support Mass Low Carbon Power
[46] Cornwall Insight - Renewables PPA Market Share Report

2024. This growing interest in CPPAs reflects the importance for businesses of showcasing their commitment to green credentials, with Patricia Grinyer, Partner (Banking and Finance) at Weightmans, highlighting that there has been increasing scrutiny on traditional banks and funders from stakeholders, customers, and the public on the matter of renewables. This comes against a background of increasing concern and scepticism around the use of Renewable Energy Guarantees of Origin (REGO) certificates to prove 'greenness'. Nick Fothergill (Weightmans) noted that in addition to the importance of green credentials there is also an "attraction for many businesses in being able to have long-term power price certainty".

Figure 11: Cumulative subsidy free capacity (GW), September 2021 – August 2024

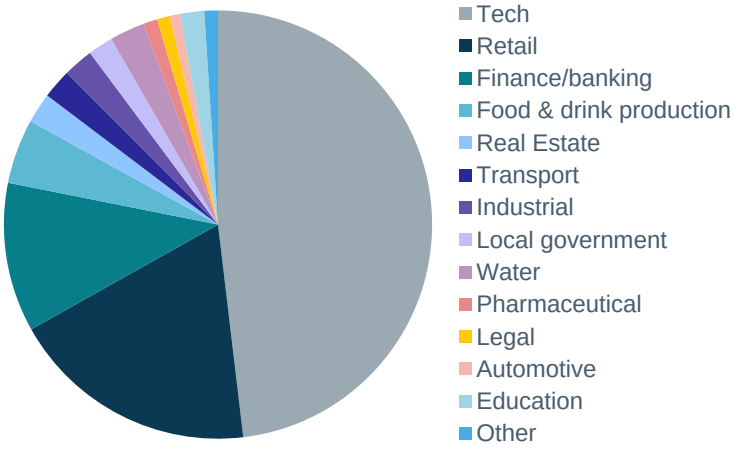


Source: Cornwall Insight – Renewables PPA Market Share Report

Existing CPPAs are contracted with businesses across a broad range of sectors, showcasing the value across the economy, although >75% are contracted with companies in the tech, retail, and finance/banking sectors (Figure 12). The market interest in CPPAs, alongside the increased budget for AR6 of the CfD, were listed as key reasons behind the improved ranking for the UK in EY's June 2024 RECAI.[47]

While these recent market trends indicate that CPPAs are likely to be a key merchant route to market for renewable assets, securing a CPPA is not without its challenges. One of these is the complexity of the contract, which often results in a lengthy negotiation period with John Puddephatt, Head of Long Term PPA Origination at Statkraft, noting that, although there is some standardisation, the contract still often needs some renegotiation each time. Puddephatt added that, with this negotiation often taking six to 12 months, only to then potentially fall through, many generators can be reluctant to take the risk and can be reluctant to commit and will instead try to keep other options open.

Figure 12: Cumulative CPPA capacity since August 2019 by sector



Source: Cornwall Insight – Renewables PPA Market Share Report

While generators could take the risk and start construction before later contracting with an offtaker, this is complicated, and Stefan Agopsowicz (Blackfinch) noted that many corporate offtaker businesses had only been interested in projects for

[47] EY

which they could be involved at the pre-construction phase and therefore demonstrate additionality. Agopsowicz added that this created the further challenge of negotiating back-to-back contracts with both the corporate offtaker and the engineering, procurement, and construction provider.

Mark Jones (Q ENERGY) noted that this can be further complicated if grid connection delays postpone the delivery of power to the corporate offtaker and impact their hedging position with potential liquidated damage claims for the developer. However, Stefan Agopsowicz (Blackfinch) stated that they are now starting to see an increase in the number of corporate offtakers willing to contract with projects in early operations, as well as increasing availability of longer-term utility PPAs on terms competitive with those offered by corporates.

Another challenge is aligning the demand from corporates for predictable power supply against the inherently intermittent nature of renewable generation. John Puddephatt (Statkraft) highlighted that offtakers could be willing to bear the risk of matching generation against business demand in return for a premium that covers the expected costs of doing so. However, Puddephatt also noted that there is not the pool of corporates interested in this, or able to move quickly enough to make this business model work effectively in the UK at present.

Given the long-term nature of CPPA contracts, they are almost exclusively reserved for larger organisations with greater creditworthiness. This has restricted the potential for smaller businesses to get involved in the CPPA space and could therefore limit the number of suitable offtakers in the future. The concept of aggregated CPPAs, where a series of smaller businesses combine together as offtaker, has been touted for some time as a way to overcome this challenge, often with an organisation acting as the middleman between the generator and the corporate offtakers. Having multiple offtakers could help generators hedge against the credit risk of each individual business, however it could also potentially increase the complexity of the contract, particularly around where risk lies. As a result, despite this being proposed as a potential alternative for single offtaker CPPAs, there remains very few examples of this actually being pursued in the market.

Christine Rishton, Principal Associate at Weightmans, cautioned that "agreeing terms between a generator and multiple smaller offtakers that offers the same degree of comfort that a generator would expect from a standard CPPA with a single large offtaker" presents a significant challenge. Rishton added that the concept that "the risk is mitigated or hedged by the presence of multiple smaller offtakers is somewhat of a myth if it cannot be adequately and sensibly apportioned between them in a way that provides the same level of comfort as is given by a single, large offtaker".

Mark Jones (Q ENERGY) highlighted that engagement and desire at the top level of businesses is also an indispensable prerequisite for both single offtaker and aggregate CPPAs. The importance of buy-in and support from the executive and board level was also emphasised in Cornwall Insight's October 2023 report, "Corporate decarbonisation: What shapes success?",[48] where this senior level commitment was identified as a crucial factor across a broad range of sectors.

[48] Cornwall Insight - Corporate decarbonisation: What shapes success?

Overcoming the Challenges

Despite the strong progress made to date towards a net zero economy, there are clearly still a range of significant hurdles to the continued investment in and deployment of renewables. In this report we have considered the challenges associated with tight macroeconomic conditions and increased international competition, securing planning permission, grid connection queues, and securing a route to market. The impact of these challenges differs by sector and technology, but they are all important considerations for renewable investors and developers (Figure 7), with maintained focus from the new government, industry bodies, developers, and investors needed to tackle and overcome them.

What Could Government and Industry Bodies Do?

There are a range of potential actions that the new government and industry bodies such as Ofgem and the ESO can take to help overcome some of the challenges outlined in this report:

1. Provide policy certainty and clarity for investors. It is important, particularly with regards to REMA, that a clear direction is given by the new government around future market design options being pursued. Alessandra De Zottis, Senior Government and Regulatory Engagement Manager at Sonnedix, emphasised that clarity and certainty are especially important around the more revolutionary aspects of REMA, such as the potential introduction of zonal locational pricing. Nick Fothergill (Weightmans) highlighted that if the new government can "promote the feeling that the UK is a stable, long-term investment environment for renewables" then it will encourage more private capital investment. Fothergill added that key to this will be "taking a consistent approach, avoiding shocks, and not rowing back on previous commitments and messaging".

2. Continue the grid connection reform process. Policies such as the CAP and GB Connection Reform programme are already underway and signal positive intent from the former and new governments, Ofgem, and the ESO, but it remains to be seen whether these changes will have a material impact on connection queue timelines. Maintaining focus and momentum will be crucial to ensuring that there is a meaningful change in the grid connection queues, with Alessandra De Zottis (Sonnedix) mentioning that whilst the changes being implemented are "a positive step forwards" it is "important that 'zombie' projects are cleared from the queue to allow other projects to reach the milestones and reduce the administrative burden".

   Enforcement of the milestones is also important for discouraging more speculative projects from congesting the queue, with Rafael Curado-Moliní Álvarez (Sonnedix) suggesting that if "grid offers and contracts were terminated for projects not meeting the milestones and any bonds or securities were forfeited" then it would "make prospective developers think very carefully about applying for, and keeping, a grid offer for a project alive". However, he added that project developers also need some flexibility, for instance, projects should be allowed to postpone their milestone dates in return for submitting additional securities in situations where developers are dependent on third parties. With many developers and investors reliant upon specialist consultants and contractors to

advise on project viability and support on delivery in line with any milestones, Daniel Barchet, Partner (Construction) at Weightmans, noted that "the construction supply chain will have 'skin in the game' and collaboration and careful consideration of risk appointment will therefore be needed to get sufficient support from construction suppliers without hoisting too much risk upon them."

3. Reform the planning process. The recent removal of the de facto ban on new onshore wind in England could help encourage increased capacity rollout. Mark Jones (Q ENERGY) highlighted that relaxed constraints could allow for more small-scale projects (e.g., single 7MW turbines connected at 11kV with a 5MVA export capacity), which could help grow the sector without risking as much negative public perception. Jones added that it might need a small scale CfD pot to support financing, but onshore wind is more easily deployable than solar PV in built up non-residential areas, close to demand sources and therefore providing positive locational benefits.

   On the solar side, allowing solar projects to take advantage of the fast track process for NSIPs and the proposed revisions to the planning permission MW threshold could both allow for more, and faster, solar deployment. An industry source proposed that the latter would particularly help increase the number of solar developments in the "Goldilocks zone between 50 and 150MW that communities can more easily accept". However, raising the MW planning threshold will also need to be accompanied by greater resourcing and training at the local authority level, alongside stricter guidance on what grounds projects can be refused.

What Could Developers and Investors Do?

Alongside the actions that new government and industry bodies can take to overcome some of the challenges discussed in this report, there are also a series of actions that developers and investors can take:

1. Explore diverse routes to market. Increasing the diversity of strategies for route to market presents an opportunity to fine tune projects, with John Puddephatt (Statkraft) highlighting that optimisation across the CfD scheme, CPPAs, and utility PPAs is an increasingly important area for developing new renewable projects. As part of this, it is important that the contractual positions between investors and developers clearly allocate where risks lie in terms of non-delivery and that new projects carry out a broader range of alternative scenario and sensitivity analysis to account for the greater uncertainties around project delivery now than in the past. Stefan Agopsowicz (Blackfinch) added that greater focus on the cost of capital and capital budgeting when deciding where to invest money in the renewables sector can also help investors adapt to challenging market conditions.

2. Co-location of projects. Co-locating a new generation or storage asset with an existing one can provide a quicker connection to the grid as well as potentially saving on costs associated with land and infrastructure. The benefits and challenges to co-location are outlined in the "Co-location, co-location, co-location" [49] report by Cornwall Insight (in collaboration with Weightmans) and the "Making the most of renewables: the role of

[49] Cornwall Insight - Co-location, co-location, co-location

onshore co-location in accelerating an integrated energy system"[50] report by RenewableUK. Alongside the benefits already outlined, co-location can also allow for more efficient and optimised use of an existing connection, particularly when considering the co-location of battery storage with existing solar sites. However, one of the main challenges for co-located assets is managing and optimising across the business cases for the different assets as part of the overall revenue stack, with Nick Fothergill (Weightmans) having reinforced that co-location is "a bespoke solution" and each project "must be analysed on its own merits".

3. Increase the resilience of operational strategies. It is likely that, even with the ongoing work from industry bodies, there will not be an immediate reduction in grid connection queue congestion and timelines. As such, it is important for market participants to adapt their operational strategies to account for this, particularly with regards to how developers design their option to lease and extension rights on that option. Mark Jones (Q ENERGY) emphasised that not all landowners will necessarily be prepared to accept the longer timeframes required, especially in more urban areas, and so developers may also need to consider other ways to secure the land to ensure they can make use of a secured grid offer.

Overall, there are a series of measures that can be taken both by the new government, industry bodies, and market participants that can help to incentivise the investment in, and development of, UK renewables and speed up the deployment of the capacity required to meet net zero targets. Despite the positive steps already being taken to encourage the deployment and investment in UK renewables there is no fix-all panacea to the hurdles outlined in this report and it is unlikely that there will be a sudden step change in deployment rates, with any improvement expected to be more gradual. Therefore clarity and certainty over future policy direction will remain a key factor in building and maintaining momentum and confidence for market participants.

[50] RenewableUK - Making the most of renewables: the role of onshore co-location in accelerating an integral energy system

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