

Insight paper

OVO Energy Ltd

REGOs and Decarbonisation

April 2023



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1 Introduction from OVO Energy

OVO Energy was launched in 2009 with a mission to make energy cheaper, greener and simpler. Since then it has grown to a community of over four million customers. In 2019, OVO launched Plan Zero, a strategy that sets targets on reaching net zero by 2035, supporting its most vulnerable customers and delivering on its promise to be the decarbonisation partner for its customers and their homes.

In support of its net zero target, OVO has developed numerous products and services to help customers cut their bills and reduce their carbon footprint. These include the UK's first type of use tariff for EVs, an award winning energy tracker available to all customers and time of use tariffs such as Power Move and Shift and Save, which encourage customers to use energy at times when the grid is greener.

OVO launched 100% renewable electricity across all its tariffs in 2020, backed by UK Renewable Energy Guarantee of Origin certificates (REGOs). This decision was made after listening to customers who wanted to signal their desire for a net zero future.

Recognising that the journey to net zero is constantly evolving, the company continues to invest in the market leading technology, customer service operations and digital products to help members cut their carbon emissions.

Pairing this with their value of doing the right thing for customers and the climate, OVO wanted to explore whether selling 100% renewable electricity tariffs is truly impactful from a decarbonisation perspective and clear to customers.

OVO commissioned Cornwall Insight to conduct research into the efficacy of REGOs in the energy transition. Demand side signalling (purchasing green tariffs), should have some effect on the growth in supply (additional renewable energy generation on the grid) to work correctly. Without a clear link between supply and demand, it calls into question the validity of green tariffs backed by REGOs.

With the continued rollout of smart meters and the fast paced development of innovative type and time of use tariffs, the role of traditional green tariffs backed by REGOs needs to be explored.

This report centres on examining the following question:

Has trading in REGOs provided an effective incentive for investment in new renewable electricity generation in GB, and will it in the future?



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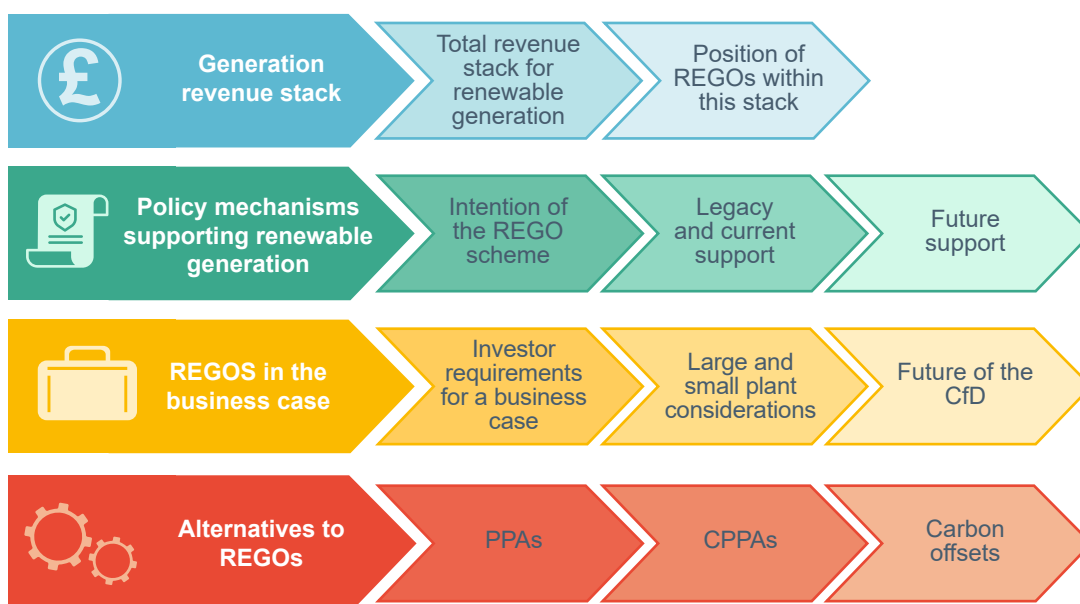
2 Executive Summary

2.1 Process and findings

Though this is not the original intention of the REGO scheme, REGOs have increasingly become seen as a mechanism to provide support to increase the build-out of renewable generation in GB. This report therefore examines the question “*has trading in REGOs provided an effective incentive for investment in new renewable electricity generation in GB, and will it in future?*”

We have looked at this through the lens of the use of REGOs as part of a business case for a renewable asset. This viewpoint will allow us to examine the question posed effectively. Figure 1 sets out our process.

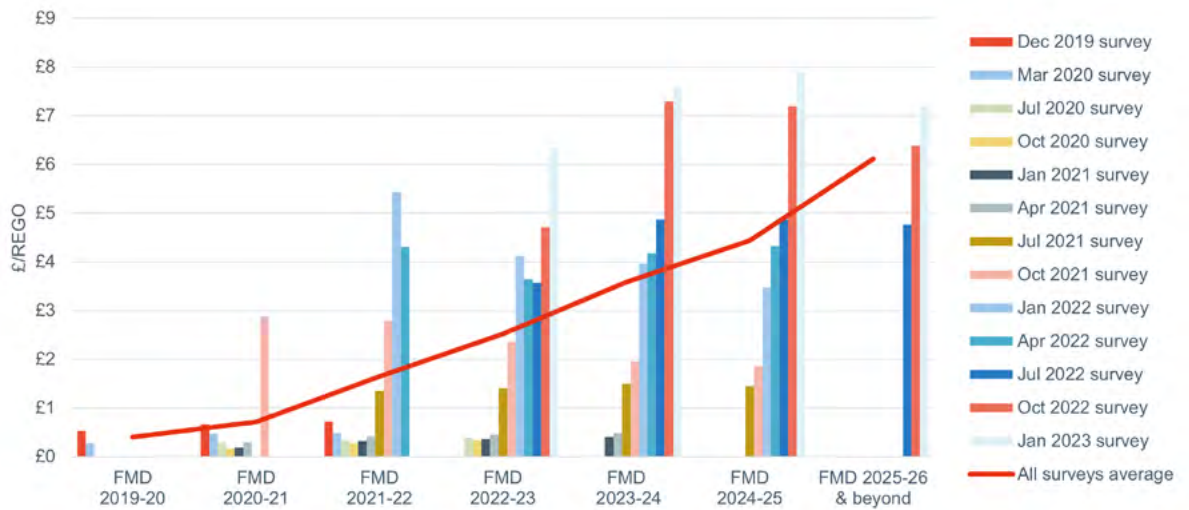
Figure 1: Process of our review



We found that:

- REGOs form a small part of the total revenue stack for renewable generators. Historically, their prices have been so low that many generators do not charge offtakers for REGOs in their Power Purchase Agreements (PPAs) – they are simply bundled with no value ascribed
- REGO prices have increased in recent years, and we forecast them to remain at current levels, but this is subject to three areas of potential legislative reform which may result significant changes to REGO prices: falling to historic levels; increasing dramatically; or rising at some times of day and year, while falling at other times
- Figure 2 shows REGO pricing over a seven-year period, highlighting the increases in prices seen since 2019

Figure 2: REGO prices, Cornwall Insight surveys, December 2019 to January 2023



Source: Cornwall Insight

Note that not all Fuel Mix Disclosure (FMD) years were covered in all surveys

- Investors are in the most part only willing to consider certain revenue streams for their assets, preferring revenues which have lower volatility and higher guaranteed levels. Subsidy revenue is the highest preference, and many debt providers will not lend at viable rates in the absence of these guaranteed revenues
 - REGO prices are not considered sufficiently secure to support a business case
 - We note that currently it is not additional revenues which are being sought from subsidy mechanisms, but a security or guarantee of revenue which enables an investment
- Policy subsidy mechanisms have underpinned almost all renewables generation in GB, with a small number of small merchant (unsubsidised) plant being commissioned only in the last 4-5 years, making up <5% of the renewable generation mix by capacity. Most existing renewable generation is subsidised by the Renewables Obligation (RO), the Feed-in Tariff (FiT), or Contracts for Difference (CfD), with the CfD scheme expected to subsidise the majority of future renewable generation, according to current analysis
 - We also noted that there is no official statement that the REGO scheme, or the European Guarantee of Origin (GoO) scheme on which it is based, is intended to bring forth additional renewable generation. While there are provisions in these schemes for trading certificates, the purpose of the schemes is to track renewable electricity, not to provide additional revenue streams to it

- In almost all circumstances, investors do not factor REGOs into their business cases, not considering these a viable revenue stream
 - The exception is investors considering future allocation rounds of the CfD, who are in some cases believed to be factoring REGOs into revenues (at a significant discount to trading prices due to uncertainty on long-term value), in order to provide bids into these auctions on the most competitive basis possible
 - However, we note that due to the structure of these auctions, which have hit capacity-based caps rather than cost-based caps, a fall in costs is not able to increase the amount of renewable generation which is awarded CfDs and therefore expected to be built
 - Given the pipeline of new renewable generation projects in development, we expect this to continue to be the case
- Regarding REGO alternatives, we first note that – legislatively – there is currently no alternative to REGOs for electricity sourced from the public networks, with regards to the Fuel Mix Disclosures which suppliers are required to publish. These provide a basis for corporate reporting of Scope 2 emissions from electricity, as well as Scope 3 emissions from electricity suppliers. Carbon offsets can be used to account for emissions as well, but good-practice guidance recommends this for residual emissions only
 - Power Purchase Agreements (PPAs) often come bundled with REGOs and can provide a long-term stable route to acquiring REGOs, as well as wholesale electricity. The pricing paradigm has historically been to offer this power at a discount to rates on the Day Ahead markets, with the level of this discount varying according to market conditions
 - PPAs are currently seen as a way to access power at a cheaper rate than short-term trading on the Day Ahead market, and to provide guaranteed access to power for the period of the arrangement. This is of benefit to many energy suppliers, but particularly to smaller and/or new entrant suppliers, despite the costs of engaging in the PPA market
 - Corporate PPAs (CPPAs) are a way for end-users – usually large corporates – to contract directly with generation to obtain power, and to stabilise the wholesale power price which they will pay. However, we note again that CPPAs typically include REGOs, and consumers cannot claim in emissions reporting to be using “green” energy if REGOs were to be sold to another party
 - Carbon offset markets are growing rapidly, but there remain questions on what constitutes a “good quality” certificate, in terms of longevity and permanence of removal, additionality, and avoidance of wider societal harms. Several suppliers are using offsets in green gas tariffs

2.2 Conclusions

In conclusion, we have found that for renewable generation currently in operation or under development, REGOs were not a factor in the business case. Some investors are considering the REGO as part of the revenue stack for investment in new build generation, factored in at a steep discount to its present trading value.

If we accept that investors are ascribing a notional value to REGOs when they submit their offers for support under the CfD scheme, the certificates are acting to lower the cost of the CfD scheme to GB consumers slightly. However, costs to consumers are increased by the cost of REGOs, which are being purchased by suppliers, with this additional REGO cost much higher than the potential CfD cost saving. REGOs are also not increasing the amount of renewable generation capacity which will be added to the electricity system. Further, as the cost of REGOs increases, the overall cost to GB consumers has increased, and consumers are already paying towards the costs of supporting existing renewables, through policy levies on their electricity bills.

The majority of REGO trading has, therefore, had little impact on the development of the current GB renewables fleet, and trading in REGOs is not expected to drive additional renewable generation buildout in the future.

We have presented a summary of the cost of various carbon emissions reduction methods in Figure 3. These should not be regarded as directly comparable, but – with some caveats – can be useful in considering the cost of schemes.

For the FiT, we present the [headline](#) tariff rate for electricity exports from generation commissioned after 1 August 2012; generators will also be receiving a generation rate, which varies depending on technology and date of commissioning, and the size of the asset. This adds significantly to the cost of the scheme per MWh.

For the RO, we present the 2022-23 scheme year buy-out rate, which is the cost to suppliers of not presenting certificates, but instead paying into the ROC recycle fund. Suppliers buying certificates from generators and presenting these to the regulator will receive a share of this fund, reducing their total costs to discharge their obligation; note that generators receive wholesale income in addition to certificate income.

CfD costs are based on the total scheme costs [forecast](#) by the Low Carbon Contracts Company (LCCC). The structure of the CfD means that, with current high wholesale costs, the low carbon electricity generated by CfD generators is reducing the cost of consumers bills.

Carbon offset certificate costs are based on the results of Cornwall Insight's Green Certificates Survey, a quarterly survey of green certificate prices, and are anecdotal. Direct Air capture prices are based on Climeworks' media reports and [commercial offering](#).

Finally, REGO prices are also based on our Q3-2022 Green Certificates Survey.

Figure 3: Summary of costs of carbon emissions reductions, by scheme

Measure	Cost per MWh (£)	Cost per tCO ₂ e (£)
FiT (export rate, 2022-23)	£59.99	£12.00
RO (2022-23 buyout rate)	£50.80	£10.16
CfD (2022-23 LCCC forecast)	-£107.17	-£21.43
Carbon offset certificates (2022 prices)	£1.00-1.50	£5.00-7.50
Direct Air Carbon Capture (Climeworks)	£120.00-180.00	£600.00-900.00
REGOs (2022 prices)	£4.00-5.00	N/A

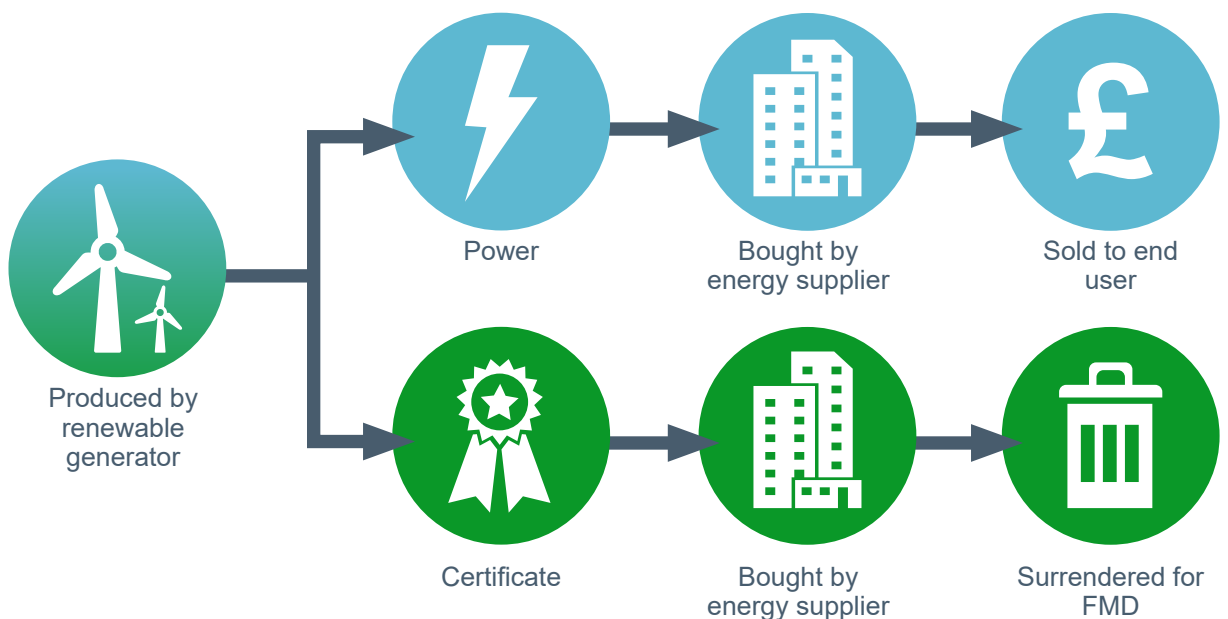
Source: Cornwall Insight

3 Introduction to REGOs

The Renewable Energy Guarantee of Origin, or REGO, scheme is a method of tracking renewable electricity from generator to end-user. Eligible renewable generators which have accredited to the scheme are awarded one REGO certificate for each MWh of electricity produced. These certificates can be purchased by electricity suppliers to surrender in the [Fuel Mix Disclosure](#) (FMD) process, in order to demonstrate the source of power which has been supplied to their customers. In the absence of REGOs, suppliers must report the “default fuel mix”, which is calculated by BEIS on the basis of the total generation mix in GB, minus the generation for which REGOs were issued.

The REGO is completely separate from the electricity which it is issued alongside, and can be freely traded. However, it carries the full “green” properties of the power, and the electricity itself does not carry any green attributes, as shown in Figure 4. REGOs have therefore become the key instrument underpinning “green” electricity tariffs in GB, as the only legislatively-supported tracker from generator to consumer.

Figure 4: REGO production and surrender flow



Source: Cornwall Insight

In GB, around 200mn renewable energy certificates were surrendered in the 2021-22 FMD year. At average spot market prices for the year, as seen in CI’s quarterly Green Certificates Survey, these certificates would be worth £328mn, though we note that most REGOs are not traded on spot markets at these prices. We forecast certificate demand rising to 223TWh in 2022-23 FMD. At the spot prices seen in the most recent survey, which have risen to around £6.34/REGO, the cost of these certificates would be over £1.4bn.

Though average REGO costs for suppliers are likely to be below these prices, this is a not insubstantial value added to electricity bills in GB. Suppliers will naturally be recovering the costs of these certificates from customers, in one way or another. Due to the structural changes to certificate markets discussed in section 4.3, these price increases are thought likely to be sustained for the foreseeable future.

Increasingly, parties from energy suppliers, to charities, to end-users, and including [government](#) are questioning whether REGOs are offering value for money to consumers in terms of providing meaningful decarbonisation, or if REGOs are enabling “greenwashing” and not providing sufficient clarity to consumers on the impact which their decisions to select a certain energy supplier or electricity tariff are offering to carbon emissions in GB.



4 Revenues for renewable generation

4.1 Renewable generation revenue stack

There are a number of energy market costs and revenues which investors will consider when deciding to invest in a renewable generation project. These are set out in Figure 5 below, which includes revenue proportions from each stream for a merchant generator (which has no subsidy revenue), an RO-subsidised generator (which receives some subsidy revenue and some market revenue), and a generator subsidised by either the FiT or CfD (which receives only subsidy revenue). These proportions are based on CI research and our understanding of the value-stack available to renewable generators; the exact amount will depend on the technology, location, connection voltage and business model of the individual generator. The final investment decision will be taken on the basis of the investor believing that the project will be able to deliver the sought returns, from the revenues available to it.

Figure 5: Renewable generation revenue stack

Revenue	Description	Proportion
Wholesale energy sales	Sale of electricity to offtakers, usually energy suppliers but also corporate end-users. This is priced in a number of ways, including fixed prices, fixed prices with an allowance for inflation, or – most commonly for small renewable generation – with reference to the GB Day-Ahead market price	80-100% (merchant) 45-50% (RO) 0% (FiT/ CfD)
Subsidy	Several mechanisms remain in place in GB for extant renewable generators, including: the Feed-in Tariff (FiT), which pays a fixed rate for energy generation and export; the Renewables Obligation (RO), which provided a certificate and required suppliers to purchase these, providing a variable top-up to revenues. The Contracts for Difference (CfD) scheme is the only scheme still open to new generation. It tops up or reduces generator income from a wholesale reference price to an agreed level, in the expectation that the generator will be able to secure rates at or near wholesale market rates for the power it produces.	0% (merchant) 45-50% (RO) 80-95% (FiT/ CfD)
Network charging	Network charges for generators, particularly those in the south and east of England, can in some cases be negative, and provide revenue to generators	0-10%
Balancing Mechanism	Paid to generators called on by the Electricity System Operator (ESO) to increase or reduce output, to help keep the GB system in balance	0-10%
Ancillary service	Paid to generators providing various services to ESO to manage system frequency or provide short-term changes to balancing	0-10%
REGO sales	Sale of REGO certificates to suppliers wishing to use these for Fuel Mix Disclosure purposes, to evidence purchase of renewable electricity. This allows corporate customers to reduce their Scope 2 emissions, and electricity suppliers to reduce their Scope 3 emissions as well as to market electricity tariffs as green	<1%

Source: Cornwall Insight

Note that revenue shares are approximate, and vary by type and location of generator

While all of these elements are considered by investors, not all are given equal weighting in building a business case. Most investors are looking to secure a base level of revenue for a project which is sufficient to pay the costs of the capital invested in it, and some revenue lines are not considered sufficiently stable to underpin an investment. This is discussed further in section 5.

4.2 Historic and current REGO prices

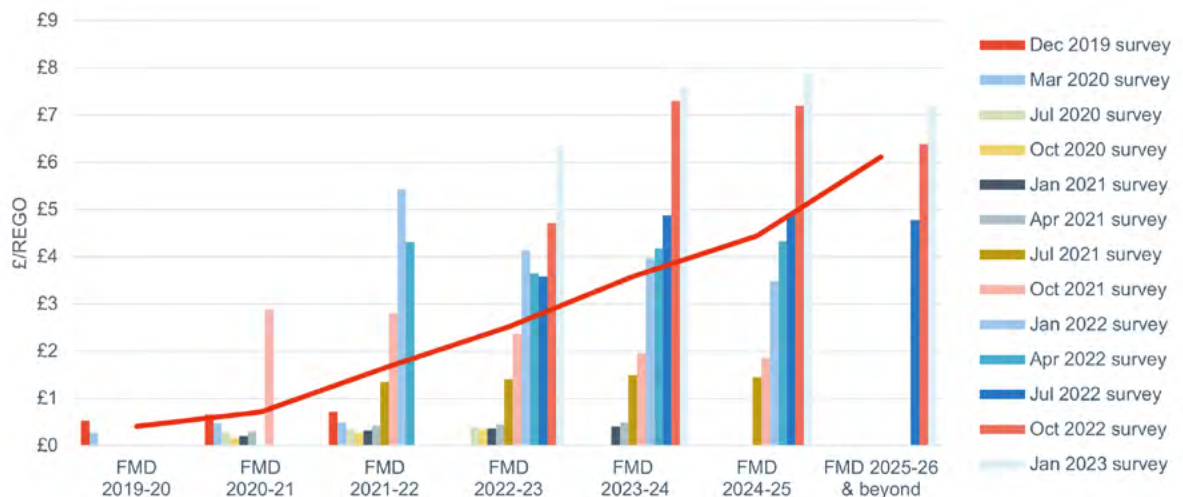
Cornwall Insight has conducted a quarterly REGO pricing survey since December 2019. Prior to this point, REGOs are believed to have had a value around £0.20/REGO, though many historic PPAs expected REGOs to be transferred at zero benefit to the generator. The results of our surveys are set out in Figure 6 below, and show a steady trend of increasing prices to date, with prices ranging from £0.20/REGO to highs over £7/REGO.

We have also collected pricing from marketplaces: Renewable Exchange and e-Power. These online marketplaces have seen similar trends to our survey, with prices rising from the largely nominal value of £0.20/MWh to current values around £4/MWh.

Key drivers for changes in prices appear to be availability (supply versus demand), the amount of time to the end of the Fuel Mix Disclosure (FMD) year, and the technology which has produced the REGO. The first two of these points are linked, with prices tending to rise or fall sharply towards the end of an FMD year, depending on whether the volumes of certificates available to meet demand are sufficient or not.

With regards to technologies, the trend is for unfuelled technologies such as solar, wind and hydro to see higher values – up to 66% higher, though more commonly around 25-33% higher – than fuelled technologies such as biomass, energy from waste and landfill gas.

Figure 6: REGO prices, CI surveys, December 2019 to October 2022

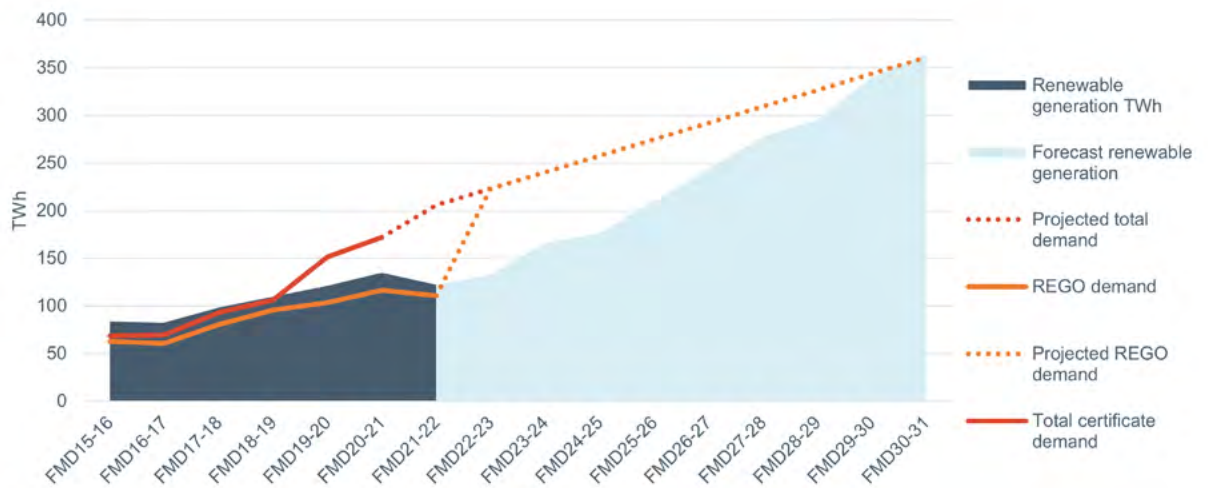


Source: Cornwall Insight

4.3 Future REGO prices

The market sentiment appears to be for prices to continue at current levels. Demand for REGOs remains strong, despite high energy costs and market exit of some suppliers which were purchasing volumes of REGOs. The [supply of Guarantee of Origin certificates](#) from the continent was cut off by BEIS in September 2022, as no reciprocity agreements could be reached with the EU allowing GB REGOs to be traded into Europe following Brexit. Import will be banned from April 2023. This is expected to leave the GB REGO market very tight for the remainder of the decade, as shown in Figure 7. Most traders expect this to deliver REGO pricing at current levels for the foreseeable future.

Figure 7: Historic and future REGO supply and demand



Source: Cornwall Insight, from Cornwall Insight and BEIS data
 Total Certificate demand includes REGOs and GoOs

We also note BEIS's outstanding response to the 2021 greenwashing consultation, [Designing a Framework for Transparency of Carbon Content in Energy Products](#). There have been two new governments since this consultation was held, as well as the launch of broader market reform through the [Review of Electricity Market Arrangements](#), so it is possible that no response will be issued, but this could signal upcoming fundamental reform to REGO markets.

5 Decision factors for investors

There are a range of revenues which investors consider when building a business case for a project. Investing in renewable generation is fundamentally different to many investments, because most of the costs are paid up-front, and then the saleable commodity is produced at almost zero marginal cost for the lifetime of the asset. This means that it is difficult to change the characteristics of the project over the lifetime to account for changing market conditions, and increases the risk of investment.

There are many different types of investor and each will have different criteria, but in general, those looking to invest in renewable generation are banks, infrastructure investors and pension funds. These parties charge low rates to borrow capital, but are seeking very stable investments:

- Long-term, stable returns
- Assets which retain value over their lifetimes
- High certainty that projects will deliver
- Low construction and technology risk

These characteristics mean that, for the majority of the many billions of pounds of funding which will be needed to transition the UK economy to a net zero footing, providing stability of returns is the most crucial factor in securing an investment.

5.1 Large-scale plant

CfD subsidy revenue, set in an auction operated by National Grid and backed by the government, is seen by investors as a guarantee of the set level of revenue and is the most investable of revenues. Until the late 2010s, there was no renewable generation built in GB which was not in receipt of some form of subsidy revenue – before the CfD, the FiT and RO provided this revenue. Through most of the period, investors were seeking subsidy revenues to bridge the “missing money” gap between the costs of renewable generation and the revenues available in the market. More recently, since the third allocation round (AR3) of the CfD, the missing money problem has diminished due to falls in the construction and operational costs of renewable generation technologies. The key aspect investors are looking for is now stability of revenue and a guarantee that revenue will be available at the required level over the payback term of the asset. This has been signalled by CfD auctions outturn prices which are not out of line with average wholesale market prices but which, due to the nature of the scheme, do not evidence the volatility of market prices.

Some investors have become comfortable with merchant wholesale market revenues as a substitute for subsidy revenues. While initially all GB renewable generation did receive some form of subsidy, [Energiekontor](#) reached financial close on the Witherwick II 8.2MW wind farm in 2018, the first merchant wind farm. The first merchant solar array opened in September 2017, built by [Anesco](#). It is a 10MW solar array with 6MW of battery storage. This is in large part due to the perceived decline in other project risks – particularly technology and construction risk – and the emergence of a large number of developers willing to deliver the early stages of

project development at their own risk, reducing the remaining risk at the point of large capital investment and making it easier for investors to back projects.

Nonetheless, the amount of merchant plant operating (and expected to be developed) is dwarfed by the volumes of subsidised renewable generation plant. This is indicative of the unwillingness of investors to consider revenues other than government-backed subsidy for the development of large-scale plant in GB.

5.2 Small-scale plant

The business case for smaller generation, in this case under 5MW but especially under 500kW, particularly when this is located behind-the-meter alongside an end-user, is more flexible than for large plant. The lower requirement for capital and potential for higher unit revenues¹ also supports these simpler investment decisions. It is possible that REGOs would be considered alongside other revenues for investors in this type of small-scale plant.

We therefore consider the level of revenue which is available. Figure 8 compares the price of REGOs with contemporary wholesale prices. This highlights the minimal contribution which REGOs can make to the business case for renewable generation. Though the REGO value has increased, the highest REGO price, as a percentage of the contemporary wholesale price, is 3.0%. This revenue contribution is immaterial in the overall revenue stack, even if REGOs were to be factored in at full prices.

Figure 8: Comparison of wholesale (average year-ahead and forecasts) and REGO pricing (CI survey), £/MWh, 2019-2022



Source: Cornwall Insight data

¹ The value of BtM generation is often thought about in terms of avoided import to the site. As the retail tariff includes non-commodity costs, it is typically higher than the wholesale price which could be earned by generators exporting the energy which they produce.



Where generation is located behind the meter, the business case usually depends on consuming the electricity generated on-site and thus avoided imports of electricity. This can provide higher returns, as retail electricity prices are typically higher than wholesale prices, which helps to compensate for lower economies of scale (behind the meter plant is typically much smaller than front-of-meter plant) and additional installation costs (for example, the costs of roof-mount solar arrays).

However, this does mean that the REGOs which could be generated alongside electricity produced will also be consumed onsite, and therefore are not considered as a revenue stream. It does allow the host end-user to compare against a green electricity tariff rather than a brown one, but this is in many cases no different in terms of price, as green tariffs are now the default for many suppliers.

6 Policy support for renewable generation

6.1 The intention of the REGO scheme

There is a general perception that the REGO mechanism is in some way designed to support the build of additional renewable generation – effectively acting as an additional subsidy for renewable generators. This has been seen in media articles on REGOs and “greenwashing”, and BEIS’s 2021 consultation [Designing a Framework for Transparency of Carbon Content in Energy Products](#) also suggests that consumers link REGO-backed green tariffs with increased renewable generation.

However, a review of the legislation does not indicate that this is the case. The REGO scheme was instituted as a result of [Article 5 of Directive 2001/77/EC of the European Parliament and of the Council](#). This explains that:

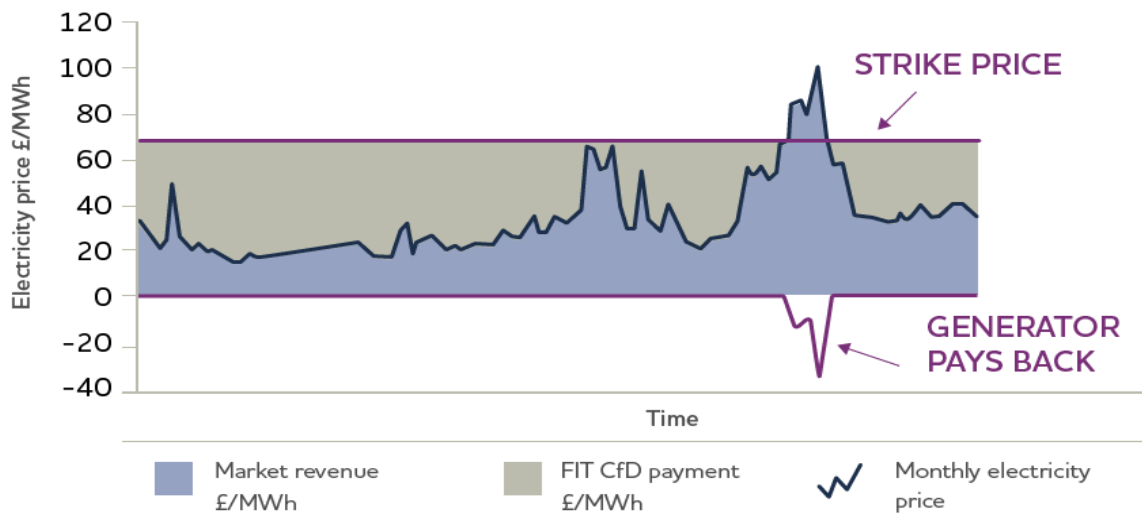
“Member States shall, not later than 27 October 2003, ensure that the origin of electricity produced from renewable energy sources can be guaranteed as such within the meaning of this Directive according to objective, transparent and nondiscriminatory criteria laid down by each Member State. They shall ensure that a guarantee of origin is issued to this effect in response to a request.”

The Article goes on to set out the requirements for Guarantees of Origin, but does not specify that these are to be regarded as an income stream or support mechanism. They are specifically separated from Article 4 of the same document, which does discuss support schemes. Neither the UK’s original [REGO legislation](#), issued to ensure compliance with this, nor the [2010 update](#) to this, include in the body of the text or guidance documents any intention for REGOs to provide revenue to support new generation buildout.

While it is not the intention of legislation to explain the purpose of the rules being put into place, the legislation indicates that the scheme is intended to track and monitor the transfer of electricity across the industry and to the customer, rather than to support the development of new generation. The REGO scheme is therefore, from a certain point of view, doing exactly what it was originally intended to do – though not what it is expected to do in current interpretations.

6.2 Existing mechanisms

The current mechanism for subsidy support of renewable generation in GB is the Feed-in Tariff Contracts for Difference (CfD) mechanism. This is an auction system, with auctions held roughly bi-annually since 2016. Auctions are cleared on a “pay-as-clear” basis by technology, which means that all successful sites in a technology are awarded the same strike price.

Figure 9: CfD explanation diagram


Source: UK Government White Paper, July 2011, licensed under the Open Government License v1.0

Source: UK Government

In auctions, pre-accredited in-development renewable generation sites compete to set a “strike price” for power. This strike price will then be the price which the generator earns, per MWh of electricity exported to the public network. The generator is awarded a subsidy equal to the difference between the “reference price”² and this strike price, multiplied by the number of units exported. When the reference price is below the strike price, the generator receives money; when the reference price is above the strike price, the generator pays back money. Generators are expected to contract in the market to sell the power they generate, though there is no requirement to do so. Strike prices are agreed for 15 years, increase annually with inflation, and are also adjusted to protect generators from changes to industry charges including Balancing charges and Transmission charges.

When implemented as intended, these elements result in a very stable income for the generator, as almost all risk to an ongoing project is mitigated. This has enabled a large capacity of generation to be built under the CfD – around 5.5GW was awarded across AR1 and AR2, with around the same again in AR3 and nearly 10.8GW under AR4 for a total of 22GW of generation capacity. Allocation rounds will be held yearly, up from a previous bi-annual plan. AR4 of the CfD saw the return of onshore wind and solar generation to the mechanism, and these technologies, along with offshore wind, have won most of the capacity awarded.

² *Reference prices* are published by the LCCC, and are set differently for dispatchable/ baseload and intermittent technologies. Baseload is set based on the traded volume weighted average price, set for the season ahead, while intermittent is set based on the GB Day Ahead Hourly Price.



The CfD has been recognised for its success in delivering large volumes of new generation capacity to the market – the bulk of new generation built since the inception of the scheme has been CfD-funded – and in creating competitive pressures which succeeded in driving down the strike prices awarded to successful applicants.

6.3 Future mechanisms

The CfD will remain the flagship support scheme for generation in GB for the foreseeable future, particularly noting that it is currently providing a net saving to GB electricity consumers. The main change expected is to deliver more frequent auctions – annual instead of every other year.

This was announced in the [British Energy Security Strategy](#), published in April 2022. This document was issued as a response to soaring gas and electricity prices driven largely by global geo-political factors including the impacts of economic unlocking following the Covid-19 pandemic and the Russian invasion of Ukraine. It focuses on reducing the UK's dependence on energy imports by increasing domestic energy production, mostly from wind, solar and nuclear resources, and storage of this energy in the form of hydrogen. It sets out the intention to hold CfD auctions in 2023, 2024 and 2025, and we expect that this will be continued for at least the remainder of the decade.

In addition to the delivery of annual CfD auctions, the 2030 target for low carbon hydrogen production capacity was doubled from 5GW to 10GW, an intention to reduce offshore wind planning horizons from four years to one and to improve planning conditions for onshore wind where the local community is supportive, and to build a pipeline of eight new nuclear reactors using direct government support.

7 REGOs as part of a business case

7.1 Merchant and small-scale renewable generation

Our understanding is that no existing generation has been built which factored in the value of REGOs to the business case. For the majority of historic projects, built under the RO, the offtake terms set under PPAs agreed that there was no value to REGOs, providing that this topic could be re-visited when a REGO market emerged.

Further, we understand that many FiT-subsidised generators, which are sized 5MW or smaller, never accredited to receive REGOs. This is particularly true of small domestic rooftop arrays, of which there are around 900,000 in GB, and which output an average of 3-4MWh/year of which half is assumed to be exported. The administrative effort of registering for REGOs and then arranging the sale of these did not – and, despite increasing REGO prices, continues to not – make economic sense for the potential returns in the range of perhaps £8-20/year to a household.

It is also not clear that even larger FiT-subsidised assets have registered, or that all RO-subsidised generators have registered for REGOs and are trading these. Our data, presented above in Figure 7, suggests that the volume of renewable generation in GB in 2021-22 was 10% higher than the volume of REGOs which were issued³.

The factors point to a recognition that REGOs simply are not valued by investors as a viable, investible, revenue stream, and suggest that REGOs are not fulfilling a role of supporting the build of additional renewable generation in GB.

7.2 Future CfD rounds

From discussions held with developers structuring their bids for allocation rounds beyond AR4 (auctions to be held 2023 onwards), we understand that some developers are factoring the value of REGOs into their bidding strategies. This is a reflection of the highly competitive nature of the CfD, which encourages generators to reduce the strike prices which they bid as much as possible to increase their chances of success.

We understand that this allowance is around £1/REGO. This price is a proxy used by investors and is heavily discounted from the current price point due to several risk factors:

- That prices will fall from current levels, due either to waning demand for certificates, or to unexpectedly large increases in generation of certificates
- That the scheme will be reformed to permit sale of REGOs to Europe, and import of GoOs from Europe, with the expected outcome that there would be a large net import of GoOs and therefore lower value for REGOs
- That the scheme will be replaced by government, possibly through the [BEIS greenwashing review](#) or through the [Review of Electricity Market Arrangements](#), fundamentally changing the value of REGOs

³ BEIS [recognises](#) 2.7% of the residual fuel mix as arising from renewables in reflection of this generation which is not issued with REGOs.

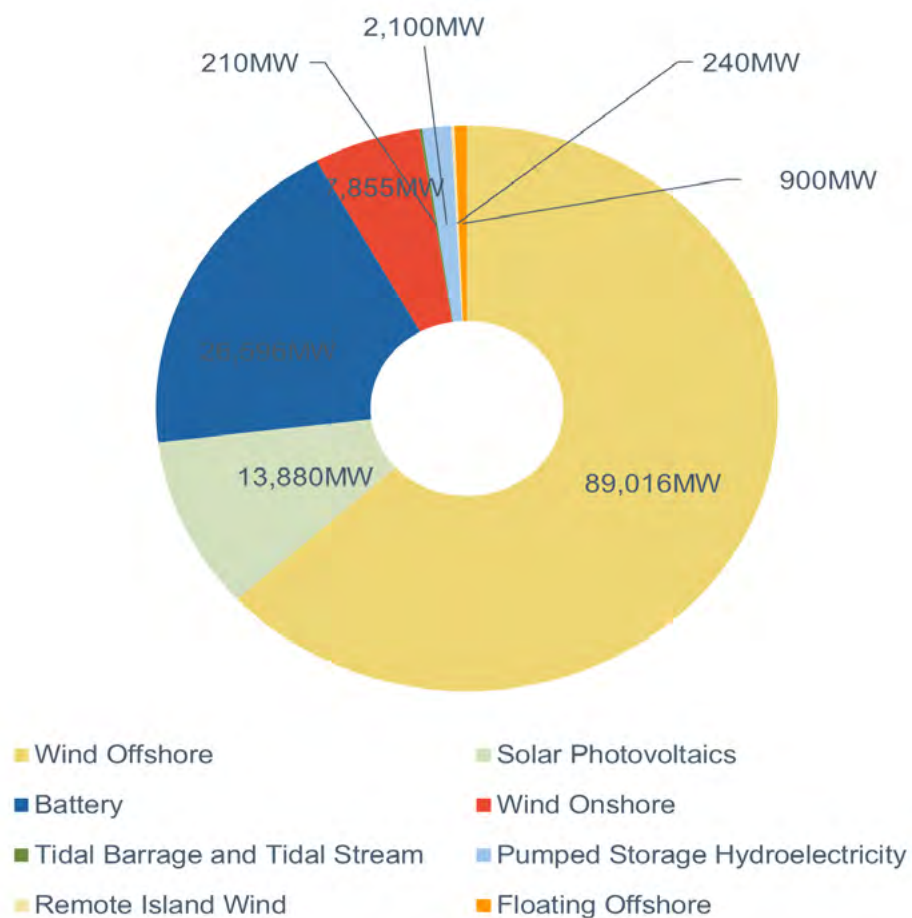
This allowance has the potential to reduce the cost of CfD generation from solar and wind assets to GB consumers by £1/MWh.

However, we also note that, in AR3 (2019) onwards, the CfD is capped in two ways: maxima against the total spend in each auction, and maxima in the total amount of capacity awarded, by technology. In AR3 and AR4, due to the low prices bid by auction participants the capacity maxima were reached, rather than the budget maxima. Looking at the pipeline of projects which are in the process of obtaining planning permission and other requirements to entry AR5 and subsequent auctions, we believe that this will also be the case going forward.

Figure 10 shows the capacity in development with, for example, 65 offshore wind sites averaging 1,260MW each, is sufficient to fill the next 11 years of CfD auctions at 7GW per auction.

This means that it is unlikely that reduction in strike prices will deliver additional generation to the GB system through the CfD.

Figure 10: Sites in “scoping” status in CI Renewable Energy Planning Database report, Q3-22



8 Alternatives to REGOs

In this section, we discuss three key alternatives to REGOs: suppliers contracting directly with renewable generators to offtake generation with Power Purchase Agreements (PPAs), end-users contracting directly with generators to offtake generation with Corporate (PPAs), and the carbon offset markets.

We note that – in order to be considered “green” for fuel mix disclosure or for Scope 2 & Scope 3 emissions reporting – both PPAs and CPPAs must still be accompanied by REGO certificates. The contract alone is not considered sufficient and is an additional measure, not a replacement.

8.1 Power Purchase Agreements

The PPA is an offtake contract between a generator and a supplier, originally for all of the output of the plant⁴. The contract, which can be anything from six months to around 15 years in duration, would set the price for power and for any other revenues which the generator might expect to earn. This includes embedded benefits – extra value derived by connecting generation to the distribution rather than the transmission system – and certificate values. The supplier also takes on balancing risk for the generator.

Price is usually expressed as a percentage of value retention, with the wholesale element being priced against GB Day Ahead Hourly markets. This percentage varies, according factors including the level of competition in the market, the duration of the contract, the type and location of generation, but until recently was typically in the range 92-97% for deals up to five years⁵.

PPAs first gained market prominence during the period of the Renewables Obligation (RO) subsidy. This subsidy provided accredited generators with a certificate (ROC) for each MWh of renewable power produced. These certificates had a value to energy suppliers, and were an additional tradable commodity alongside the power produced. However, the scheme did not provide a guaranteed route to market for wholesale power, in the way that the other main contemporaneous subsidy scheme, the Feed-in Tariff, had done.

This resulted in a large number of commissioning generators which were not large or sophisticated enough to efficiently trade power exports out to the market for the best price, and which needed a simple route to market – the PPA. At the same time, suppliers were becoming increasingly conscious of the need to secure green power, and these contracts provided long-term access to REGO certificates when there was no liquid market in these, and further often priced these certificates at zero.

Subsequent to the emergence of a REGO market over the last four or five years, some PPAs now include a price for REGOs, though this market remains less liquid

⁴ More recently, PPAs for a share of generation output have been seen, though they continue to be less common.

⁵ The wholesale energy price crisis has affected value retention significantly, with retention now around 80% for PPAs up to five years in length.

and transparent than equivalent power markets and agreement on prices for REGO is consequentially difficult. We are aware that most generators have not re-visited contracts to re-negotiate on REGO prices, and consequentially many REGOs are being transferred at zero value.

However, despite the direct nature of this contract and the fact that it brings green power into the supplier's portfolio, PPAs alone do not change the fuel mix disclosure which suppliers are required to issue. This is bound in the REGO, rather than this wholesale power contract.

8.2 Corporate Power Purchase Agreement

CPPAs are the direct purchase of power by an end-user from a generator. They were pioneered in the US by large technology companies including Google, Amazon and Apple, though have now spread to all sectors. Unlike the PPA, the price is usually fixed at contract commencement, at a level expressed in £/MWh. This may include an element of annual inflation, but many do not, as a higher initial price which declines in Real terms is more attractive to generators. Our research indicates that two years ago, average prices were around £40/MWh, this has since increased to £50/MWh or even £60/MWh, for contracts up to five years in duration.

There are several types of CPPA, with the most important being:

- **Direct** – under this structure, the generator provides power to the end-user's consumption profile directly. This arrangement is facilitated by an energy supplier, which undertakes all central industry system requirements such as the payment of network charges and policy levies, and also provides balancing services to the two principal parties. The costs of this, plus a service fee, will be passed to parties
 - While the supplier will manage balancing (sale of excess generation and/or purchase of shortfalls), there are financial benefits to aligning the generation and consumption portfolios
 - REGO certificates can be passed from the generator to the end-user to "green" the power
- **Virtual** – under this structure, no power is actually transferred from generator to end-user. Instead, the two parties agree a price. Power is then sold to and bought from markets by the generator and end-user respectively, with a financial transaction reconciling the price to the agreed level in a manner similar to a CfD contract
 - This indirect structure means that no supplier is required to be part of the arrangement, though the end-user must be on a contract type permitting it to trade in a suitable way
 - We also note that there is no obligation on the end-user to consume power or even trade power at the same times as the generator produces it, though it may be financially exposed if it does not
 - REGO certificates can still be transferred between parties to "green" the power

Both types of contract are for wholesale power, and may be bundled with certificates. Many corporates securing CPPAs will look to contract with new generation, rather than existing generation, and therefore support the build of additional renewables. However, in order to support these investments, contract tenures will need to be in the range of 15 years to support the business case for the generator. Institutional investors will therefore only accept the corporates with the strongest credit ratings to underpin these contracts. Large blue-chips like Google and Microsoft are able to deliver this and support new generation, but most corporates cannot and, if signing CPPAs, will be contracting mostly with generators with existing subsidies, which have exited their subsidy periods and paid off the asset.

However, as noted above, from a legal point of view the “green” aspect of the wholesale power is carried in the REGO, not the wholesale power itself. While these wholesale contracts are considered to be superior to REGO purchase for Corporate Social Responsibility (CSR) and Environmental, Social and Corporate Governance (ESG) viewpoints, they are in addition to, not in place of, REGO purchase.

8.3 Carbon offset markets

Carbon offsets are certificates which accredit an avoidance of or reduction in carbon emissions, usually expressed in tonnes of CO₂ equivalent. There are a wide range of schemes, based all over the world, and little consensus on what the best schemes are. Some which are considered “good quality” include the Voluntary Gold Standard, Verified Carbon Standard, UK Woodland Carbon Code, UK Peatland Code, and Clean Development Mechanism.

Carbon removal schemes, which extract carbon from the atmosphere and store it, are also emerging. They are, however, much more expensive than other solutions: for example, Climeworks offers [permanent carbon sequestration](#) for £900/tCO₂e or £180/MWh to UK households and businesses, though the cost of a large-scale deal is thought to be as much as a third lower.

While pricing is very opaque our regular survey, discussed in section 4.2, asks participants about carbon offsets. Respondents reported that prices ranged between £2.50/tCO₂e and over £20.00/tCO₂e, with a modal response £5.00-7.50/tCO₂e or roughly £1.00-1.50/MWh⁶.

In GB, some suppliers use carbon offset certificates as part of their green gas strategies. As the green gas market is very short and green gas certificates are not readily available, suppliers will use a share of green gas, alongside a share of carbon offset, to provide carbon neutral gas. One example is British Gas, which offers a [green gas tariff](#) with 10% green gas, plus 90% carbon offset certificates.

⁶ 2021 average carbon intensity of grid electricity was 198g/kWh, so one MWh of electricity resulted in 0.198t of emissions, and a certificate would therefore cover around 5MWh.

We note that there is currently no official state-sponsored green gas certificate⁷, no legislative requirement to publish a gas mix disclosure, and no plans to put these in place. This means that suppliers can be more flexible in how they provide information to customers on their gas mix, compared to the information which they are required to publish for their electricity mix.

Some Greenhouse Gas Protocol [guidance](#) suggests that corporations are permitted to use carbon offsets to mitigate their Scope 2 emissions. However, this is intended as a secondary measure, to deal with remaining emissions following reduction of consumption and purchase of renewable energy; the Science Based Targets initiative [suggests that](#) carbon credits should not be used to meet science-based targets, only to counterbalance residual unabated emissions following achievement of long-term targets. In GB, this means that electricity purchase should be primarily certified by REGOs.

⁷ There are two prominent gas green certification schemes, which have been recognised by BEIS for some purposes, but these are not legislatively-backed schemes, having been set up and operated by industry parties for commercial reasons.



9 Glossary

Acronym	Term	Definition
AR	Allocation Round	A set of auctions to award contracts to renewable generators under the CfD. The ascending clock auction allocates strike prices to generators by commissioning year and technology class.
CfD	Contract for Difference	The current government mechanism for subsidising renewable power generation. Has run four allocation rounds to date, providing support for around 22GW of generation, as prices which – in the latest auction – are not out of line with usual wholesale prices. Was bi-annual, moving to annual from 2023. Generators have their income fixed to a “strike price”, which is compared to a reference price to set extra income or a requirement to pay back earnings.
CPPA	Corporate Power Purchase Agreement	A contract between a generator and an end-user, usually a large corporate, to sell power directly, or to fix the price of power via a financial mechanism. Can be used by the largest corporates to underpin the construction of new renewable generation.
DAM	Day-Ahead Market	The most liquid GB market for power trading, where generators, suppliers and traders exchange power. Provides a useful index for understanding power prices, and is used in PPA contracts to price contracts against, as well as to set the reference price for intermittent CfD generators.
FiT	Feed-in Tariff	A closed government mechanism for subsidising renewable generation, which continues to operate for accredited generators. These plant are provided a payment for each MWh of power generated, and a further payment for power exported to the grid.
GB	Great Britain	The electricity systems of England, Wales and Scotland form a single market, with common rules, regulations and operations. The Northern Irish electricity system is distinct from this, forming part of the All-Ireland system and operating under different rules and its own codes and regulators.
	Generator	A producer of electrical power
GoO	Guarantee of Origin	The generic EU scheme for certifying the environmental credentials of a MWh of renewable power. REGOs are the GB implementation.
GHG	Greenhouse Gas Protocol	International regulations, adopted by the UK government, setting out how emissions should be reported by governments and companies. Include three emission Scopes, depending on how emissions are produced.
kWh	Kilowatt hour	A unit of power, commonly used to express prices for energy tariffs.
MWh	Megawatt hour	1,000kWh. A unit of power, commonly used to express prices for wholesale energy.
	Offtaker	A purchaser of electrical power, either for re-sale to end-users (suppliers), or for their own use (end-users)
PPA	Power Purchase Agreement	A contract between a generator and a supplier to offtake power, setting a value for the power and attendant characteristics, often including REGOs, over a set term. The value is often expressed in terms of a discount to the GB Day Ahead market price.
REGO	Renewable Energy Guarantee of Origin	A certificate which carries the environmental credentials of a MWh of renewable power. It is traded separately from the power itself, and the power carries no environmental aspects without the REGO.
RO	Renewables Obligation	A closed government mechanism for subsidising renewable generation, which continues to operate for accredited generators. These plant are provided a certificate (ROC) for each MWh of output, and suppliers and obligated to buy and surrender these, providing additional revenue to generators.
	Scope 1 emissions	Emissions produced by an organisation’s direct activities, for example burning fossil fuels onsite to produce heat
	Scope 2 emissions	Emissions produced by the production of purchased energy which the organisation makes use of, for example the emissions produced by burning fossil fuels to generate electricity which the company then consumes
	Scope 3 emissions	Emissions produced by the value chain of the organisation, whether upstream or downstream, for example, resulting from goods or services sold by the company. Outside of the direct control of the organisation

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