UK GBC
Together for a better built environment

ADVANCING NET ZERO

Please note, the content of this guidance document was current at the time of publication. Given the evolving nature of research on net zero carbon buildings, some information may have since been superseded. Please visit the following page to access the latest UKGBC guidance on net zero carbon buildings: **https://www.ukgbc.org/ukgbc-work/net-zero-carbon-buildings-framework**

# Renewable Energy Procurement & Carbon Offsetting

## Guidance for net zero carbon buildings

MARCH 2021

**ADVANCING NET ZERO PROGRAMME PARTNERS**

Lead Partner:

REDEVCO FOUNDATION

Programme Partners:

bam

Berkeley Group

GROSVENOR

HOARE LEA

JLL

To access the latest UKGBC guidance on net zero carbon buildings, please visit
https://www.ukgbc.org/ukgbc-work/net-zero-carbon-buildings-framework/


**TASK GROUP SUPPORTERS:**

BBP BETTER BUILDINGS PARTNERSHIP
BPF
CIBSE
energy institute
IEMA Transforming the world to sustainability
Passivhaus Trust
REA RENEWABLE ENERGY ASSOCIATION
RIBA
RICS
SUSTAINABLE ENERGY ASSOCIATION

**SPECIAL THANKS TO:**

UKGBC would like to specifically thank Emma Andrews of Burges Salmon LLP for her author contributions to Appendix C2 on Power Purchasing Agreements.

Burges Salmon




# Contents


Foreword 4

Introduction 6

Guidance overview 10

Section 1: Fossil fuel use in net zero buildings 12

Section 2: Renewable Electricity Procurement 14

Section 3: Carbon Accounting 22

Section 4: Carbon Offsetting 26

Section 5: Future guidance development 32

Appendix A: NZCB – Construction Minimum Reporting Template 33

Appendix B: NZCB – Operational Minimum Reporting Template 35

Appendix C: Supporting information 37
C1: Green gas 38
C2: Renewable electricity 40
C3: Carbon Accounting 54
C4: Carbon Offsetting 58

Abbreviations 64

Glossary 65

References 67

Acknowledgements 68

# Foreword

It is almost two years to the day since UKGBC published the Framework Definition for Net Zero Carbon Buildings. In that short space of time, the concept has gathered more traction than we could ever have predicted or indeed hoped for.  In my foreword to that report, I highlighted that tighter standards and targets would need to be developed over time to ensure that definitions of net zero carbon buildings remain credible and robust in rapidly changing marketplaces.

This latest Guidance on Renewable Energy Procurement and Carbon Offsetting provides much needed clarity on these two critical aspects of the definition for net zero carbon buildings – while recognising that designing for reductions in whole life carbon and improvements in energy efficiency are the most important steps to prioritise in decarbonising buildings. The importance of the principles put forward in this guidance to evaluate the quality of renewable energy procurement routes, to calculate the residual emissions to be offset, and to offset those residual emissions in a meaningful way, is paramount to ensure the credibility of any net zero carbon building claims. Indeed, the fact that this guidance is a marked, but necessary departure from business as usual itself indicates how complex the issues are, and how nascent the industry's understanding of what is ultimately required to achieve net zero carbon outcomes.

It is important to recognise that the guidance issued herein is specific to the UK market and context, albeit the principles are universal. At the time of writing, the lack of availability and transparency in the renewable energy marketplace limits the ability of property and construction firms to achieve genuinely net zero carbon buildings through renewable energy generation and procurement alone (i.e. without offsets). For this reason, we have put forward within this guidance a new proposed methodology to measure and be held accountable for carbon emissions associated with energy procured based on whether it is additional, and therefore provides genuine emission reductions for the building.

We expect that, over time, the renewable energy procurement market will continue to evolve – both to meet growing demand, and to more accurately account for time-of-use emissions. Similarly, the responsible use of carbon offsets to compensate for unavoidable emissions, whether in construction or in operation, is important in the transition towards a fully decarbonised sector. We therefore highlight that acceptable parameters of net zero carbon buildings today may no longer be acceptable in five or ten years' time.

As with all our work at UKGBC, I hope that this guidance provides a valuable contribution to the emerging discipline of net zero carbon buildings, and that it triggers further debate and feedback. I am especially keen to ensure that UKGBC shines a light on genuine best practices in the industry, and correspondingly highlights the pitfalls that must be avoided to prevent misleading green claims from making headlines.

After all, we want to be absolutely sure that net zero carbon building efforts make a tangible difference to the net zero transition and do all that they can to avoid runaway climate change.

**Julie Hirigoyen**
Chief Executive, UKGBC

# Introduction

This guidance seeks to provide clarity on the procurement of high quality renewable energy and carbon offsets for net zero buildings and organisations in the UK. It offers a consistent set of principles and metrics to help guide the built environment transition to a state of net zero that is aligned with limiting global warming to 1.5 degrees.

This resource has been made freely available for building developers, designers, owners, occupiers, and policy makers to inform their decarbonisation trajectories. Given the complexities of certain elements, it will be of most use to energy procurement, facility management and sustainability professionals within these organisations.

## NET ZERO CARBON BUILDINGS

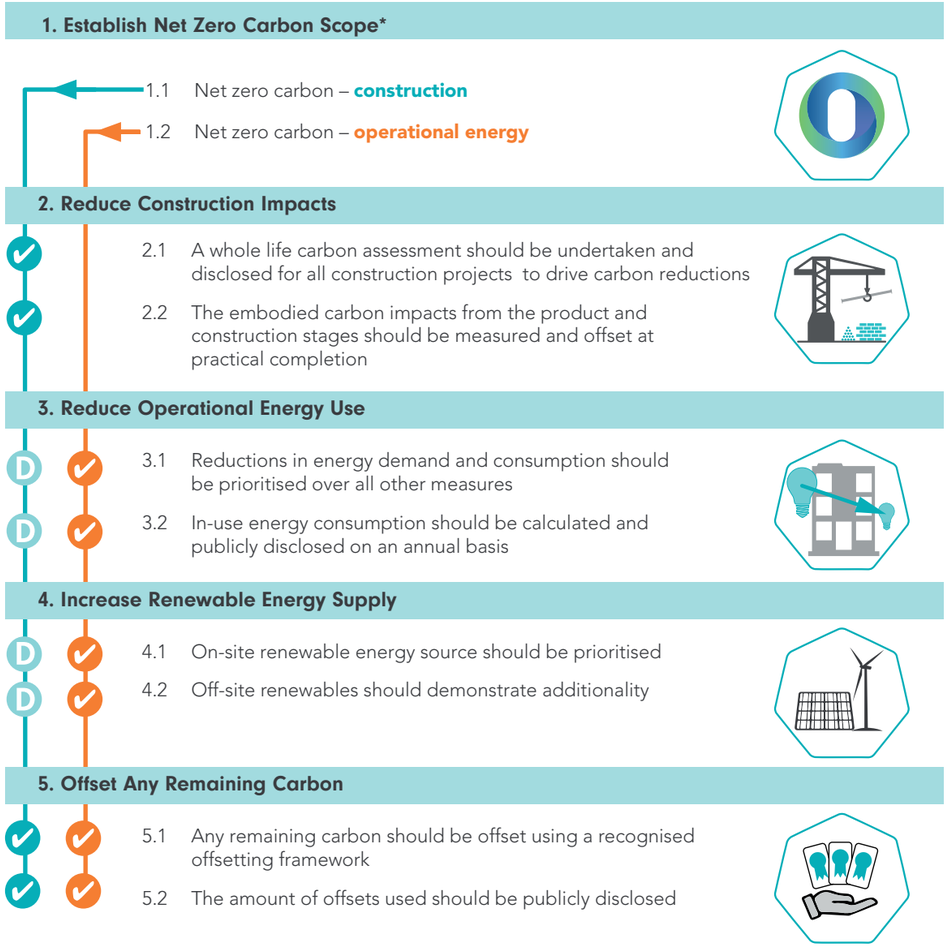
In April 2019, UKGBC published Net Zero Carbon Buildings (NZCB): A Framework Definition, which provides the built environment industry clarity on how to achieve net zero carbon buildings in both construction and in operation. The framework encourages reductions in whole life carbon and improvements in energy efficiency as the most important steps in decarbonising buildings. However, it also recognises that the procurement of renewable energy and carbon offsets must play a role in a building's transition to a state of net zero emissions.

As part of the ongoing development of the NZCB Framework Definition, UKGBC convened an industry task group in July 2020 to develop further guidance on the procurement of high quality renewable energy and the offsetting of any outstanding carbon balance. The task group consisted of 22 organisations across the built environment value chain and 10 supporting trade associations, professional institutions, and non-profit organisations.

The task group developed initial draft proposals for the guidance, which were then issued for consultation in October 2020. Feedback responses were received from across the value chain through an online survey consultation and two engagement workshops. These included responses ranging from developers, to academia, to carbon offset providers. For full transparency, a summary of the initial proposals and feedback received has been made available alongside this report. The consultation feedback was reviewed with the task group and recommended changes incorporated within this publication.

**Figure 1: Development timescale of the guidance**


**Figure 2: Steps to achieving a Net Zero Carbon Building**




D New buildings and major refurbishments targeting net zero carbon for construction should be designed to achieve net zero carbon for operational energy by considering these principles.

* Please also note, a further scope for net zero whole life carbon (1.3) will be developed in the future.

## APPLICABILITY OF THIS GUIDANCE

This guidance is intended to be relevant to all building types, sizes, and ownership scopes where annual public disclosure of energy use, generation and carbon offsets is possible. This enables the guidance to be applied consistently to achieve large-scale uptake of net zero carbon buildings. As per the NZCB Framework Definition, there is a strong emphasis on acting now and continuing to improve performance over time.

In all instances, the building developer, owner, or occupier seeking to achieve net zero carbon should do so over the greatest amount of building area that they have influence or direct control over. It is recognised that this does not necessarily equate to having ownership of the energy procurement, but that this does not preclude accountability for the carbon emissions resulting from the building's energy consumption. For example, tenants may not have direct control over their energy procurement, but the expectation is that they will actively engage with their landlord to influence the procurement choice and offset the associated carbon emissions from their energy consumption.

This guidance provides a set of principles to be used to evaluate the quality of renewable energy procurement routes, and how to ascertain the residual emissions to be offset. It should be used to progressively transition buildings towards outcomes that are compatible with a 1.5 degrees aligned, net zero society.

**Any building wishing to claim alignment with the Net Zero Carbon Buildings Framework Definition, either for construction or operation, must comply with this guidance.**

### APPLICABILITY TO HOMES

Central to any credible net zero claims is the public disclosure of *how* net zero carbon has been achieved and the extent to which the principles have been followed. For 'net zero carbon – construction', the disclosure should demonstrate that the building has been designed to increase renewable energy supply in line with this guidance, and to offset any residual emissions arising from the construction.

For 'net zero carbon – operational energy', it is recognised that the annual public disclosure of energy use, renewable generation and carbon offsets is currently more suited to commercial buildings than for individual homes. This is due to the limited penetration of energy monitoring systems in domestic properties and privacy issues with the use of energy data. Until these barriers can be resolved, and there is widespread measurement of in-use energy performance, it is expected that net zero carbon for operational energy is mainly suited to homes where energy consumption can be reported on an aggregated basis. This includes at a development-level, where the energy of individual homes is totalled for that development, or at a building-level in the private or social rented sectors where energy is required to be reported.

UKGBC's forthcoming large-scale residential cost evaluation study will explore the opportunities and challenges in delivering net zero carbon homes in construction and in operation. The focus will be on homes at lower densities, including individual houses. Please refer to the Section 5: Future guidance development of this report for additional detail.

### APPLICABILITY TO ORGANISATIONS

Organisations are increasingly developing their own net zero carbon pathways and commitments, which aim to achieve a level of carbon abatement that is consistent with limiting global warming to 1.5 degrees. In many cases, the procurement and use of renewable energy has a significant role to play. Existing initiatives, such as RE100 and the GHG Protocol Scope 2 Guidance already provide advice on divesting away from fossil fuels to cleaner procurement, and the market instruments available to support this.

This UKGBC guidance compliments these existing initiatives but provides further clarity and direction on procurement specific to the UK market and context. This relates to common issues around the lack of 'additionality' in the procurement of renewable energy, for which the guidance provides an approach to minimise risks of inadvertent greenwashing and its associated unintended consequences. It similarly highlights the differences between international carbon offsets and domestic carbon units, and how these can respectively be used to account for unavoidable emissions.

It is also recognised that organisations may seek to develop their energy procurement and carbon offsetting strategies beyond a single building or portfolio, i.e., with oversight of a proportion or all the organisation's activities. Although this guidance has been developed primarily to support those using the NZCB Framework Definition, much of the information contained in this report will be applicable to broader organisational net zero strategies.



## JOURNEY TOWARDS NET ZERO CARBON BUILDINGS

This guidance is one of a growing suite of documents published to supplement the NZCB Framework Definition, and to aid users in their journey towards net zero buildings.

Achieving net zero that is compatible with a 1.5 degrees society will require continuous improvements over the coming decades, and this will necessitate additional resources and guidance to be developed to ensure buildings and organisations can progress towards this aim at the rate and level required. This will be guided by industry's response to scientific advancements, market changes, practical design and commercial experiences, and innovations in technology.

The Advancing Net Zero webpage contains a full list of resources currently available and will be consistently updated over time. This will include reference to any upcoming guidance in development, such as those listed in Section 5: Future guidance development. Buildings seeking to achieve net zero in construction and in operation should ensure alignment with the available guidance and their requirements, such as the Net zero carbon: energy performance targets of offices paper, at the time of their claims. Independently verified net zero claims will be listed on the Verifying Net Zero Carbon Buildings webpage.

For removal of doubt, where there is any uncertainty in requirements, the most recent guidance takes precedence. For example, this guidance on Renewable Energy Procurement & Carbon Offsetting supersedes the information contained within the equivalent sections of the April 2019 version of the NZCB Framework Definition.

# Guidance overview

This guidance has been structured around four key sections:

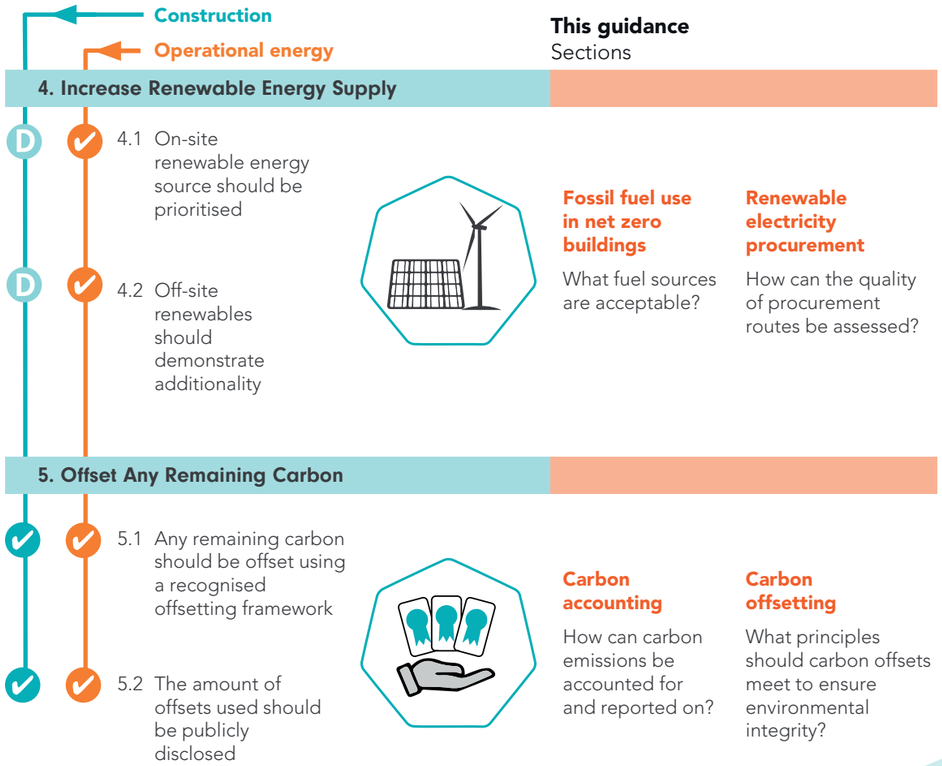
- Fossil fuel use in net zero buildings
- Renewable electricity procurement
- Carbon accounting
- Carbon offsetting

These directly relate to Steps 4 and 5 of the NZCB Framework Definition, as indicated in Figure 3.

Within each section, there is a set of **technical requirements** which outlines the approach to be followed, the **rationale** for such and, where relevant, any **future considerations** that may impact future updates to the guidance. Each section also includes background information to aid the user in understanding the current UK context and market limitations; these are largely contained within Appendix C and are clearly hyperlinked with the associated section.

Public disclosure is required throughout the NZCB Framework Definition to demonstrate the achievement of a net zero carbon building. As a result, an updated minimum reporting template for both construction and operation is provided within Appendix A and Appendix B.

**Figure 3: Guidance overview and how each report section relates to the NZCB Framework Definition**




# Section 1:
# Fossil fuel use in net zero buildings

**Fossil fuel combustion must be actively discouraged to promote a more rapid net zero trajectory and to prevent costly retrofitting at a later date.**

## TECHNICAL REQUIREMENTS

The following technical requirements apply to all net zero carbon buildings:

**Table 1**: New build – fuel source requirements

| New build |
|---|
| **1.** Heating, hot water and cooking should not be powered using fossil fuel as the primary energy source |
| **2.** All new builds shall have energy systems compatible with being powered from renewable energy sources |

**Table 2**: Existing build – fuel source requirements

| Existing build |
|---|
| **1.** Fossil fuel as the primary energy source for heating, hot water and cooking should be phased out by the next respective system replacement cycle |
| **2.** All existing buildings shall have energy systems compatible with being powered from renewable energy sources by their next system replacement cycle |
| **3.** Replacement of fossil fuel systems with a low carbon alternative in existing buildings may require extensive retrofit beyond central plant including improvements in fabric performance. Where replacement is not immediately feasible, a clear trajectory plan shall be set out showing how fossil fuels will be phased out by the next system replacement. |

Fossil fuel combustion for both new buildings and existing buildings (after next system replacement cycle) may only be employed as the primary energy source in situations where it can be demonstrated that there is no other viable alternative or where the choice of heat source is beyond the operational control of the organisation or consumer.

**The associated carbon emissions resulting from fossil fuel use must be clearly disclosed and offset to achieve a net zero balance.**

Example allowable exemptions include:

a. Where connection to a new or existing District Energy network scheme is unavoidable, e.g., where buildings are required to connect due to local planning policy. Networks should have an agreed decarbonisation plan published outlining details of the transition.

b. Commercial and non-commercial kitchens that have specific cooking requirements, such as cultural or religious considerations

Similarly, note that fossil fuel back-up generators are permitted provided they are for back-up only (i.e. do not regularly operate for longer than planned) and are not used for revenue generating activities such as short-term operating reserve (STOR) or similar arrangements.

## RATIONALE

Direct building $CO_2$ emissions accounted for 17% of total UK GHG emissions in 2017, which results primarily from the use of fossil fuels for heating. Around 75% of the UK's heating demand in buildings is met by natural gas, 8% by oil, with the remaining 12% largely from electricity[1]. Modelling for the Climate Change Committee (CCC) has outlined that natural gas heating must all but be eliminated for the UK to meet its net zero target by 2050[2].

New buildings have been highlighted as the most straightforward building stock to decarbonise; the CCC has recommended that by 2025 at the latest, no new homes should be connected to the gas grid. However, new buildings only account for a small proportion of the challenge; approximately 80% of buildings that will be operating in 2050 have already been built.[3] This means the energy efficiency of the existing stock must rapidly improve and it must transition to non-fossil fuel based heating.

In recognition of the uncertainties around the decarbonisation of heat, including the need to ensure public acceptance and supply chain capacity for any technology or heat source, buildings are only required to demonstrate that the primary energy source is non-fossil fuel based. Alternative fuel sources include renewable electricity and certified sustainable biomethane. Refer to Section 2 and Appendix C1 for further details relating to the respective fuel sources.

# Section 2:
# Renewable Electricity Procurement

**The quality of electricity procurement is determined by whether:**

1. **there is exclusive ownership of the energy attribute**
2. **it is renewable sourced energy and**
3. **critically, it provides credible additionality**

## TECHNICAL REQUIREMENTS – GENERAL

The quality of the renewable electricity procurement is to be defined by the three principles provided in Table 3. This applies to all net zero carbon buildings:

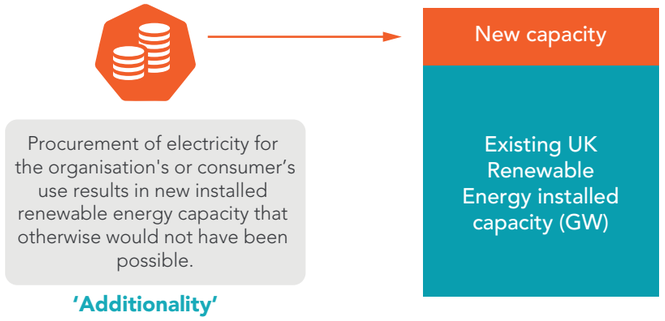
**Table 3**: Principles defining the quality of electricity procurement

| Principle | Definition | Source |
|---|---|---|
| **1. Energy Attribute** | Exclusive ownership and claims of the energy attributes of the renewable electricity generated, either through onsite self-generation and consumption or via Renewable Energy Guarantees of Origins certificates (REGOs).<br><br>Each Renewable Energy Guarantees of Origins (REGO) certificate represents the 'energy attribute', i.e., the zero GHG emissions, associated with 1MWh of renewable energy generated.<br><br>REGO certificates must be retired on the Renewables and CHP Register to prevent double counting of the energy attribute elsewhere. | Adapted from: RE100 Making credible renewable electricity usage claims |
| **2. Renewable Sourced** | Renewable non-fossil fuel energy sources, that is, wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.[1] | The Electricity (Guarantees of Origin of Electricity Produced from Renewable Energy Sources) Regulations 2003 |
| **3. Additionality** | The principle of additionality applies when an organisation / consumer installs, self-generates and consumes renewable energy from their own facilities, or closes an electricity purchasing contract that contributes to the construction of new renewable energy facilities.<br><br>Projects that comply with the principle of additionality result in real and verifiable emission reduction or emission avoidance for the organisation / consumer, as their direct effect is to increase renewable energy generation. | RE-Source Introduction to Corporate Sourcing of Renewable Electricity in Europe |

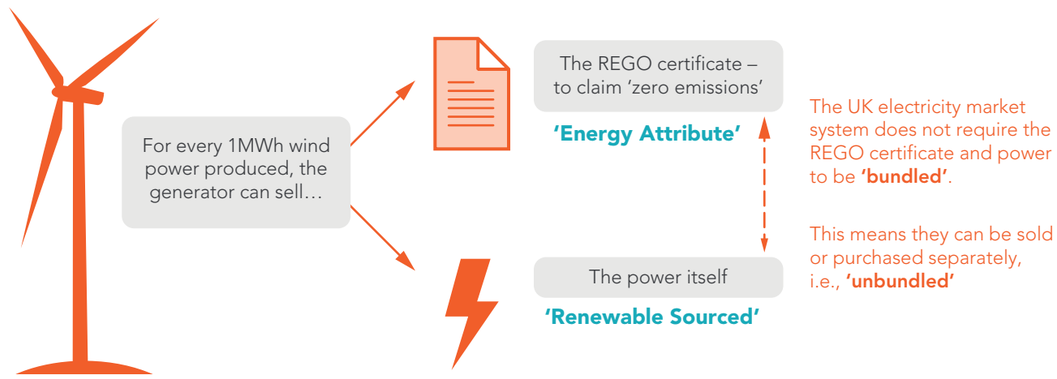
1 Note that the Renewable Sourced definition is directly linked to the Electricity Regulations 2003; organisations and consumers are responsible for ensuring their energy source(s) are in line with any future changes to the legislation.

**Figure 4**: Illustrative explanation of the three principles used to determine the quality of renewable energy procurement

**'Additionality'**




**Difference between 'Energy Attribute' and 'Renewable Sourced'**




Tables 4-7 demonstrate how these principles can practically be applied to the electricity procurement routes commonly available in the UK market. This is intended to provide a high-level summary; it does not capture the variations in how close a specific procurement route might meet the principle, only whether it does or not. For example, it does not distinguish between a supplier that procures 10% of its electricity supply via Power Purchasing Agreements (PPAs) with a renewable generator, to another that procures 50%.

Refer to Appendix C2 for further details of the procurement routes, including an overview of PPA structures, the electricity market system and role of REGOs, and variations in green tariff offerings.

Note that Table 5-7 are only indicative of the common models. For example, if a PPA with a subsidised renewable generator can demonstrate that the revenue stream contributed by the consumers underpins the financial model, i.e., that it is a decisive factor in the decision for the generator to build, or for a funder to lend, then that would demonstrate additionality. There will also, undoubtedly, be other procurement routes that are not listed or have specific circumstances that mean they do not fit in any of the common models. Organisations and consumers are encouraged to use Table 4 and supporting information within the Appendix C2 to assess the quality of their specific procurement options for use in their net zero claims.

**Table 4**: How to assess electricity procurement routes using the three principles

| | Energy Attribute | Renewable Sourced | Additionality |
|---|---|---|---|
| ✓ | On-site generated and consumed, or ownership of the REGO certificates | 100% Renewable Sourced electricity | Provides additionality now |
| | | | Provides additionality in the future |
| ✗ | Not on-site generated and consumed, and no ownership of the REGO certificates | Mix of Renewable Sourced and Fossil Fuel generated electricity | Does not provide additionality |

For clarity:

- 'On-site' relates to instances where the renewable energy system is fitted to the building and integrated with its mechanical and electrical systems, is located next to the building on the same LV/HV network or connected by a private wire from an adjacent site. Any associated REGO certificates that may be generated should not be sold to a third-party if the power has been consumed on-site.

- 'Ownership' of the REGO certificates relates to instances where the certificates have been retired on behalf of the consumer / organisation, or by the supplier for their green tariff products.

**Table 5**: Common renewable electricity procurement routes that meet the three principles

| Renewable electricity procurement routes: | | Energy Attribute | Renewable Sourced | Additionality |
|---|---|---|---|---|
| On-site | Owned (e.g. PVs) | ✓ | ✓ | ✓ now |
| | PPA – w/New unsubsidised renewable generation (inc. private wire) | ✓ | ✓ | ✓ now |
| Off-site | PPA – w/New unsubsidised renewable generation | ✓ | ✓ | ✓ now |
| | Green tariff from supplier with 100% Renewable Sourced tariffs only – 'high quality green tariffs' | ✓ | ✓ | ✓ future |

At the time of publication, only three UK suppliers have been recognised by Ofgem to provide additionality: Ecotricity, Good Energy and Green Energy. These suppliers have been shown to provide additionality to an extent that is materially greater than that which is bought about as a result of subsidies, obligations or other mandatory mechanisms. As a result, they have all been awarded derogation from the default tariff cap[2] which will remain in force for the duration of the cap to the end of 2023, pending energy market reviews.

It is expected that there will be an increase in suppliers providing additionality moving forward; any supplier that can demonstrate that they meet the three principles can be considered to provide a 'high quality green tariff' product.

2 The energy price cap is updated every six months to reflect the latest costs to supply gas and electricity to consumers; suppliers cannot set prices above the level set by Ofgem. This is to ensure the price charged to consumers is fair, and any savings are passed on by suppliers. Suppliers awarded derogation from the price cap have been shown to provide additionality, i.e., it contributes towards the construction of new renewable generation facilities. Note that organisations and consumers are responsible for ensuring any claims on green tariff products reflect any future changes or updates to Ofgem's derogation decisions.



**Table 6**: Common renewable electricity procurement routes that partially meet the three principles

| Renewable electricity procurement routes: | | Energy Attribute | Renewable Sourced | Additionality |
|---|---|---|---|---|
| Off-site | PPA – w/New subsidised or existing renewable generation | ✓ | ✓ | ✗ |
| | Green tariff from all other suppliers – 'low quality green tariffs' | ✓ | ✗ | ✗ |
| | UK REGOs only (unbundled) | ✓ | N/A | ✗ |

Ofgem has previously stated that they do not have sufficient evidence that other UK suppliers '*provide additional environmental benefit beyond existing renewable generation*' through their green tariff offerings.[4] These suppliers depend, to varying extents, on securing unbundled REGOs to support their green tariff offering, rather than necessarily purchasing renewable sourced power itself. In 2020, REGO certificates were priced between 20-50p per certificate.[5] In practice this means that suppliers could purchase fossil fuel power but sell it as a green tariff or 100% renewable energy if supported by an equivalent amount of REGO certificates.

**Table 7**: Other non-renewable electricity routes that are commonly used that do not meet the principles

| Other electricity procurement routes | | Energy Attribute | Renewable Sourced | Additionality |
|---|---|---|---|---|
| Off-site | PPA – w/ fossil fuel generator | ✗ | ✗ | ✗ |
| | Standard tariff from any supplier | ✗ | ✗ | ✗ |

Organisations and consumers should prioritise divesting away from these procurement routes that do not provide any environmental benefit, to routes that offer additional zero emissions, renewable sourced electricity. Table 7 routes are not compatible with any net zero claims.

## TECHNICAL REQUIREMENTS – APPLYING THE NZCB FRAMEWORK DEFINITION

The NZCB Framework Definition clearly states that on-site measures take priority, as this both supports an increase in total UK supply of renewable sourced electricity whilst simultaneously reducing demand on the grid. This can then be supplemented by off-site measures that demonstrate additionality.

Based on this, only procurement routes listed within Table 5 meet these two statements. However, it is acknowledged that market limitations currently restrict more widespread uptake of these routes; as a result, it is recognised that many buildings and organisations may not immediately be able to achieve this and will require a staged transition to progressively improve the quality of their renewable electricity procurement.

As a result, routes that partially meet the principles, as listed in Table 6, are permissible providing the corresponding electricity consumption is compensated for through carbon offsets, calculated using location-based emission factors. This is as summarised in Tables 8, 9 and 10 which expand on the permissible procurement routes with specific requirements to demonstrate compliance with net zero claims. Note that procurement routes that only *partially* meets the three principles will be phased out of the NZCB Framework Definition in due course. Consequently, buildings seeking to 'future-proof' their net zero credentials should incrementally increase the quality of their overall procurement mix at each procurement cycle opportunity going forward.

Note that additionality can be claimed for the lifespan of on-site owned generators, or for the length of the procurement agreement for PPAs if the original closing of the purchasing contract demonstrated additionality. For example, a building that is supplied electricity through a 10-year PPA with a new, unsubsidised generator can claim additionality for Years 1 – 10.

**Figure 5: NZCB Framework Definition: Increase Renewable Energy Supply**

**4. Increase Renewable Energy Supply**

D ✔ 4.1 On-site renewable energy source should be prioritised

D ✔ 4.2 Off-site renewables should demonstrate additionality

**Table 8: Renewable electricity procurement requirements for net zero carbon buildings claims**

| For 'net zero carbon – in operation' claims: |
|---|
| **1.** The building's overall procurement mix shall only consist of routes provided in Table 9 and 10[3] |
| **2.** Buildings should demonstrate that a share of their overall procurement mix provides additionality, (e.g., as per routes listed in Table 9), with the overall aim of increasing this share to 100% |
| **3.** Where this is not currently feasible, the rationale shall be publicly disclosed with an action plan of how additionality will be secured for at least a share of the mix by the next procurement cycle opportunity |
| **4.** The annual electricity consumption (kWh), the breakdown of the overall procurement mix by route (kWh,%) and the associated reporting requirements per route (as per Table 9 and 10) shall be publicly disclosed. |

Note that **unbundled REGOs** can only be utilised by organisations or consumers that do not currently have operational control over their energy procurement, although they are still required to disclose an action plan of how they will seek to influence towards higher quality routes in advance of future procurement cycles. For example, a tenant without control over their energy procurement would be expected to actively engage their landlord on potential procurement choices. The associated carbon emissions from their energy consumption shall also be offset through an approved carbon standard.

Refer to Appendix B for the Minimum Reporting Template, which contains the above indicators. Example procurement mixes that do or do not meet these requirements have been provided in Appendix C2 as supporting guidance.

3 Or any other routes not listed that fully or partially meet the three principles

**Table 9**: Renewable electricity procurement routes that meet all three principles, with onsite measures taking priority – requirements to align with the NZCB Framework Definition

| | | Key principles | | | To align with the NZCB Framework Definition | |
|---|---|---|---|---|---|---|
| **Renewable electricity procurement routes:** | | **Energy Attribute** | **Renewable Sourced** | **Additionality** | **Reporting required** | **Carbon offsetting required** |
| On-site | Owned (e.g., rooftop PVs) | ✓ | ✓ | ✓ now | Renewable electricity generation metered and annually disclosed | No carbon offsetting required<br><br>Zero emissions can be claimed through use of market-based factors |
| | PPA – w/New unsubsidised (inc. private wire) | ✓ | ✓ | ✓ now | Generator name, location and PPA length. Renewables and CHP Register REGO entry confirming retirement of certificates on behalf of the consumer | |
| Off-site | PPA – w/New unsubsidised | ✓ | ✓ | ✓ now | | |
| | Green tariff from supplier with 100% Renewable Sourced tariffs only – 'high quality green tariffs' | ✓ | ✓ | ✓ future | Supplier and tariff name | |

**Table 10**: Renewable electricity procurement routes that partially meet the principles – requirements to align with the NZCB Framework Definition

| | | Key principles | | | To align with the NZCB Framework Definition | |
|---|---|---|---|---|---|---|
| **Renewable electricity procurement routes:** | | **Energy Attribute** | **Renewable Sourced** | **Additionality** | **Reporting required** | **Carbon offsetting required** |
| Off-site | PPA – w/New subsidised | ✓ | ✓ | ✗ | Generator name, location and PPA length. Renewables and CHP Register REGO entry confirming retirement of certificates on behalf of the consumer | Carbon offsetting required<br><br>Residual emissions must be calculated using location-based factors |
| | Green tariff from all other suppliers – 'low quality green tariffs' | ✓ | ✗ | ✗ | Supplier and tariff name. Where readily available the % that is Renewable Sourced through self-generation or via PPAs | |
| | For organisations or consumers that have no control over their energy procurement only | | | | | |
| | UK REGOs only (unbundled) | ✓ | N/A | ✗ | Renewables and CHP Register REGO entry confirming retirement of certificates on behalf of the consumer | |

## RATIONALE

Net zero compatible pathways as modelled by the CCC and the National Grid's Future Energy Scenarios 2020 have all highlighted the importance of the grid rapidly decarbonising to reach net zero by 2050. The latter suggests that net zero emissions by the power sector can be achieved by 2033[6], which will require significant investment in additional renewable electricity generation.

However, as noted by the CCC, in most cases within the UK, the procurement of renewable electricity has a limited impact on emission reductions for the building or for the national grid.[7] This is resulting from the lack of additionality; most forms of procurement today do not lead to increased renewable electricity generation but are instead secured through renewable electricity that already exists or are supported through subsidies such as Contracts for Difference. The lack of transparency over green tariffs, specifically around market ability to 'unbundle' the REGO certificate from the power, can mislead organisations and consumers into believing their actions are supporting active decarbonisation when they have been shown not to.

Organisations and consumers need to be able to play an active role in the UK's transition to net zero, including through their procurement choices. Both BEIS and Ofgem has recognised the need to remove market distortions and ensure consumers receive transparent and accurate information about the environmental impact of their energy choices.[8] In particular, Ofgem has noted that it is 'critical that consumers can trust that tariffs marketed as green will in fact make the expected positive impact for the planet', such as through stimulating additional investment in renewable generation. [9]

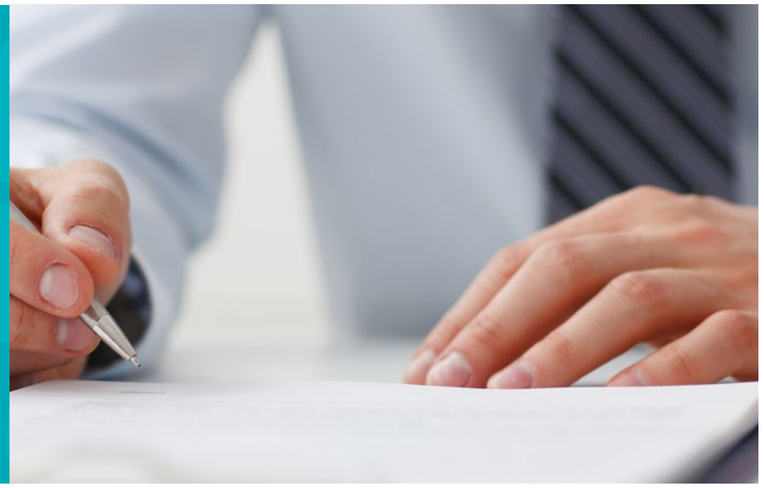
The Framework Definition requirement for public disclosure will help provide greater transparency in the market, and in turn highlight the increasing consumer demand for genuine green products to electricity suppliers, investors, and landlords.

## FUTURE CONSIDERATIONS

A future timescale will be developed for phasing out the use of procurement routes that only partially meet the three principles. The intention is that no carbon offsetting will be required for operational energy in due course. This will be based on ongoing reviews of any electricity market reforms and competitiveness of further green products, such as multi-PPAs. This may include collating a central list of green tariff suppliers that provide additionality.

# Section 3: Carbon Accounting

**The residual carbon balance that must be offset should reflect active procurement choices that contribute towards emissions reductions, and those that do not.**



## TECHNICAL REQUIREMENTS

The following technical requirements apply to all buildings:

**Table 11**: Carbon accounting requirements for net zero carbon – operational energy claims

| For 'net zero carbon – in operation' claims: |
|---|
| 1. The residual carbon balance that must be offset shall be calculated using the NZCB Framework Definition approach as provided in Table 12. |
| 2. To ensure alignment with broader organisational reporting commitments, this shall also be supported by a standardised dual location- and market-based reporting. |

For clarity, the NZCB Framework Definition is a new accounting approach which has been developed specifically to address the concerns around the additionality of renewable electricity procurement within the UK. This is to be supported by dual reporting as per the GHG Protocol Scope 2 guidance.

Refer to Appendix B for the Minimum Reporting Template and Appendix C3 for further details on methodology, including what the residual fuel mix factor represents.

### GROSS AND NET EMISSIONS

Renewable generation shall only be exported when the generation cannot either be immediately used or stored. Buildings shall report the avoided emissions from exported generation separately to the gross scope 1 and 2 emissions. The net balance can then be calculated to provide the residual carbon emissions. The NZCB Framework Definition figure shall be used as the balance to offset. Refer to Appendix B for the Minimum Reporting Template, and Appendix C3 for an example calculation.

Exported renewable generation can be used to account for operational fossil fuel consumption if converted to equivalent carbon emissions savings but cannot be used to account for embodied carbon emissions.

To minimise risk of double counting, buildings that export >1MWh on an annual basis that is used to account for either electricity or fossil fuel consumption in the *net* emissions calculation shall ensure that the equivalent MWh of REGO certificates associated to the renewable power is generated and retired. This prevents the associated zero emissions being claimed by both the building and national grid.

**Table 12**: Carbon Accounting – emission factors to use. Note that zero emission for onsite owned or private wire generation is based on no associated REGO certificates being generated and sold by the consumer as a separate revenue source.

| Energy component | | GHG Protocol Scope 2 | | NZCB Framework Definition approach |
|---|---|---|---|---|
| | | Location-based | Market-based | |
| **Table 9:** Renewable electricity procurement routes aligned with the three principles | Private wire | Zero emissions | | Zero emissions |
| | Grid distributed | UK Government GHG Conversion Factors for Company Reporting | Zero emissions based on REGO certificates | Zero emissions based on REGO certificates **(market-based)** |
| **Table 10:** Renewable electricity procurement routes partially aligned with the principles | | UK Government GHG Conversion Factors for Company Reporting | Zero emissions based on REGO certificates | UK Government GHG Conversion Factors for Company Reporting **(location-based)** |

| Energy component | | GHG Protocol Scope 1 | NZCB Framework Definition approach |
|---|---|---|---|
| **Table 9:** Renewable electricity procurement routes aligned with the three principles | Onsite owned | Zero emissions | Zero emissions |
| Green gas (Refer to Appendix C1) | | UK Government GHG Conversion Factors for Company Reporting | **If additional with green gas certificates:** GHG emission rate as per the certificates. **Otherwise:** UK Government GHG Conversion Factors for Company Reporting |
| Fossil fuel | | UK Government GHG Conversion Factors for Company Reporting | UK Government GHG Conversion Factors for Company Reporting |

*Additional reporting for net emissions calculation:*

| Energy component | UK Environmental Reporting Guidelines | NZCB Framework Definition approach |
|---|---|---|
| Exported renewable generation (avoided emissions) | UK Government GHG Conversion Factors for Company Reporting | Residual fuel mix factor, from **market-based method** (Refer to Appendix C3) |

## RATIONALE

The GHG Protocol Scope 2 guidelines state that organisations with operations in the UK should report scope 2 emissions in two ways: location-based and market-based. Dual reporting should be carried out by organisations, regardless of whether they have purchased any green products. This will help provide a more accurate reflection of the overall carbon impacts, minimise the inherent double counting claims and better support the development of energy storage and flexibility strategies.

However, there are two key challenges in applying these accounting methods:

- The location-based method reflects the grid-average emission factors; it does not account for any active purchasing choices an organisation makes, including if they procure additional, renewable electricity. This means it is impossible for organisations to achieve net zero in their scope 2 emissions without carbon offsets until the grid is completely decarbonised. The alternative is for a building to meet its entire electricity demand from onsite self-generation (scope 1), which would be highly challenging for the vast majority of buildings.

- The market-based method reflects the GHG emissions associated with the procurement choices a consumer or organisation makes regarding its electricity supplier or products. This is tracked through contractual instruments, such as REGOs, which in effect allows any procurement matched by REGOs to claim zero emissions. Using the market-based method is problematic within the UK as the current REGO system does not require procurement routes to demonstrate additionality, and so it can therefore be misrepresentative of an organisation's impact. This approach does not guarantee a causal relationship between the organisation's procurement and a reduction in emissions even if it procures 100% REGO-backed renewable electricity (e.g., low quality green tariffs). It is also widely acknowledged that even with the expected increase in REGO value, the structure of the system will never provide prices high enough to stimulate new generation on its own.[10]

Given this, a third methodology, the NZCB Framework approach, was developed to ensure that those procuring additional renewable energy can benefit from the zero emissions – and similarly, to ensure that those that do not are required to offset the associated consumption. This helps provide greater transparency over procurement choices, particularly with green tariffs. It will aid organisations and consumers in transitioning their energy requirements to generators and suppliers that demonstrate additionality, creating a positive model for contributing towards system-wide decarbonisation. Similarly, it will help send a clear signal to existing suppliers that there is a demand for additional and bundled renewable electricity.

It should be noted that the NZCB Framework Definition approach should only be used in the context of net zero carbon building claims; it does not impact organisational-scale reporting commitments which should be treated separately. These would typically require the use of just location-based, or dual reporting – for example, the UK Environmental Reporting Guidelines only mandates the location-based approach. Refer to Appendix C3 for details.

Further to this, exported renewable electricity can no longer account for embodied carbon emissions. This is to address concerns relating to:

- How a building, at the point of completion, can reasonably be held accountable for making a claim that upfront carbon emissions are zero if it relies on many years of future over-supply of renewable electricity – particularly if ownership of the building transfers

- The timeframe and impact of when embodied carbon is emitted vs when it is compensated for

- The risk of double counting the carbon savings, e.g., if the building claims against embodied carbon but still sells the excess to the national grid as zero emissions energy

Buildings that expect to consistently export renewable generation to the national grid should consider incorporating energy storage as part of their procurement strategy. This will help reduce demand on the electricity grid and minimise exports at times when electricity supply exceeds demand.

## FUTURE CONSIDERATIONS

Time-of-use emissions factors will see a significant overhaul of current market mechanisms and carbon accounting as per the existing GHG Protocol Scope 2 guidelines. Organisations and consumers should also increasingly seek to operate on, and not just procure, renewable energy which will require greater emphasis on storage and flexibility strategies moving forward. Energy market reforms may also occur, specifically with the REGO system, which is part of the EU's Renewable Energy Directive, following the exit of the UK from the European Union.

The green gas market will evolve, with both the GHG Protocol and UK Environmental Reporting Guidelines set to provide additional guidance on the use and accounting of grid-injected biomethane and green gas certificates.

# Section 4: Carbon Offsetting

**Carbon offsetting presents an opportunity, beyond emission reductions, to develop a broader value proposition that is aligned to long-term business strategies and/or supports the UK and global transition to net zero.**

## TECHNICAL REQUIREMENTS – CARBON OFFSET PRINCIPLES

**Carbon offset credits** must meet the following principles. These safeguard the environmental integrity, or 'quality' of the carbon offset credit:

**Table 13**: Carbon offsets principles

| Principle | Definition | Source |
|---|---|---|
| **1. Real** | All emission reductions and removals and the project activities that generate them are to be proven to have actually taken place. Carbon credits must only have been issued from the project after the emissions reduction has taken place. | Adapted from: ICROA, SEI & GHG Institute |
| **2. Avoid leakage** | The project must demonstrate that it has accounted for the indirect effects of the project on emissions, otherwise known as 'leakage'. Leakage is when the carbon saving made at a project / location / time increases emissions elsewhere. An assessment must be made of any effects from the project whether upstream or downstream. | Adapted from: UK Gov, SEI & GHG Institute |
| **3. Measurable** | All emission reductions and removals are to be quantifiable using recognised measurement tools against a credible emissions baseline. The project must seek to avoid overestimation of emission reductions through adjustments for uncertainty and leakage. | Adapted from: ICROA, SEI & GHG Institute |
| **4. Permanence** | Carbon credits are to represent permanent emission reductions and removals. Where projects carry a risk of reversibility, at minimum, adequate safeguards are to be in place to ensure that the risk is minimised and that, should any reversal occur, a mechanism is in place that guarantees the reductions or removals are replaced or compensated. | ICROA |
| **5. Additional** | Projects must demonstrate that (1) the project could not take place without the carbon finance from selling credits and (2) project-based emission reductions or removals are additional to what would have occurred if the project had not been carried out.<br><br>The project must not be required by legislation or be used to demonstrate compliance against legally binding targets. | Adapted from: ICROA, UK Gov |
| **6. Independently verified** | The project must receive independent verification. The verifier must be an accredited and recognised independent third party. Purchasers of credits should also ensure that robust, independent validation and verification procedures were in place to check projects were implemented according to the methodology and subsequently monitored to ensure that emission reductions were properly measured | UK Gov |
| **7. Unique** | No more than one carbon credit can be associated with a single emission reduction or removal of one (1) metric ton of carbon dioxide equivalent ($CO_2e$).<br><br>A publicly-available registry must be used to register, track and permanently retire credits on behalf of the organisations / consumer to avoid double counting or double selling. Projects must not be double counted against another policy or mandatory targets. | ICROA, UK Gov |
| **8. Avoid social and environmental harms** | For a project to produce high quality offset credits, it should not significantly contribute to social and environmental harms. | SEI & GHG Institute |

Carbon offsets can be procured via existing offsetting standards that have clear and transparent governance, encapsulated by having requirements and procedures for ensuring the environmental integrity of the carbon credits as per Table 13.

Organisations and consumers should refer to the International Carbon Reduction & Offsets Alliance (ICROA) for a list of permitted offset standards. This includes international standards such as the Gold Standard and the Verified Carbon Standard.

### DOMESTIC CARBON STANDARDS

Domestic carbon standards that are government-approved are also permissible under the NZCB Framework. These are as listed by the UK Environmental Reporting Guidelines (ERG) and currently include the Woodland Carbon Code (WCC) and the Peatland Code. Note that only ex-post credits that are verified carbon sequestration can account for residual emissions, i.e., Pending Issuance Units (PIU) from the WCC are not permissible for any net zero claims.

Note that domestic standards are treated slightly differently in the UK Environmental Reporting Guidelines[11]; this is in part due to ongoing discussions on how domestic carbon offsets are to be considered within the context of the Paris Agreement and UK's Nationally Determined Contributions. For clarity, domestic carbon offsets should be reported separately to international carbon credits. This is in line with the UK Environmental Reporting Guidelines. Refer to Appendix B for the Minimum Reporting Template and Appendix C4 for further information on international and domestic carbon standards.

## TECHNICAL REQUIREMENTS – CARBON OFFSET APPROACH

### MINIMUM REQUIREMENT

**Table 14**: Minimum carbon offsetting requirements for net zero carbon buildings

| For net zero carbon buildings claims: |
|---|
| **1.** Residual carbon emissions from construction or operation shall be offset through an approved international or domestic carbon standard |
| **2.** The registry entry for the carbon offset credits or units shall be provided, confirming retirement on behalf of the organisation or consumer, the number of credits retired, type and location of the project and the date and reason for retirement. |

The frequency for the procurement of offsets shall be as follows:

- For 'net zero carbon – construction', offsets shall be commensurate with the carbon impacts determined at practical completion. Exported renewable energy generated cannot be used to account for embodied carbon; refer to Section 3: Carbon Accounting for further details.
- For 'net zero carbon – operational energy', offsets shall be commensurate with the carbon impacts determined annually. Carbon emissions from electricity consumption shall be calculated using the relevant emission factors as listed within Table 12.

There is no requirement on the type of carbon offset projects that can be funded, although this will be reviewed as per the Future Considerations. Project types can vary both in activity and in scale; common examples include forestry and land use, fuel switching and energy efficiency projects. Organisations and consumers may also want to consider projects that also generate 'co-benefits', i.e., social, and environmental benefits beyond GHG reductions.

### LEADERSHIP APPROACH: TRANSITION FUND

Organisations and consumers seeking to demonstrate leadership can consider taking a transition fund approach. The core premise of this approach is to release funds to further support the transition to net zero, i.e., for projects that cannot reasonably be termed a carbon offset credit or carbon unit but still have significant carbon reduction value.

It is recommended that the carbon price is at least equal to the HM Treasury Green Book non-traded central scenario.[12] For 2021, this is priced at £70/$tCO_2$.

The remainder of the transition fund can be spent on any type of project that contributes towards the transition of net zero. These do not need to meet the principles listed in Table 13, nor be verified through an approved carbon standard. Refer to Figure 7 for how the transition fund can be spent and the recommended reporting.

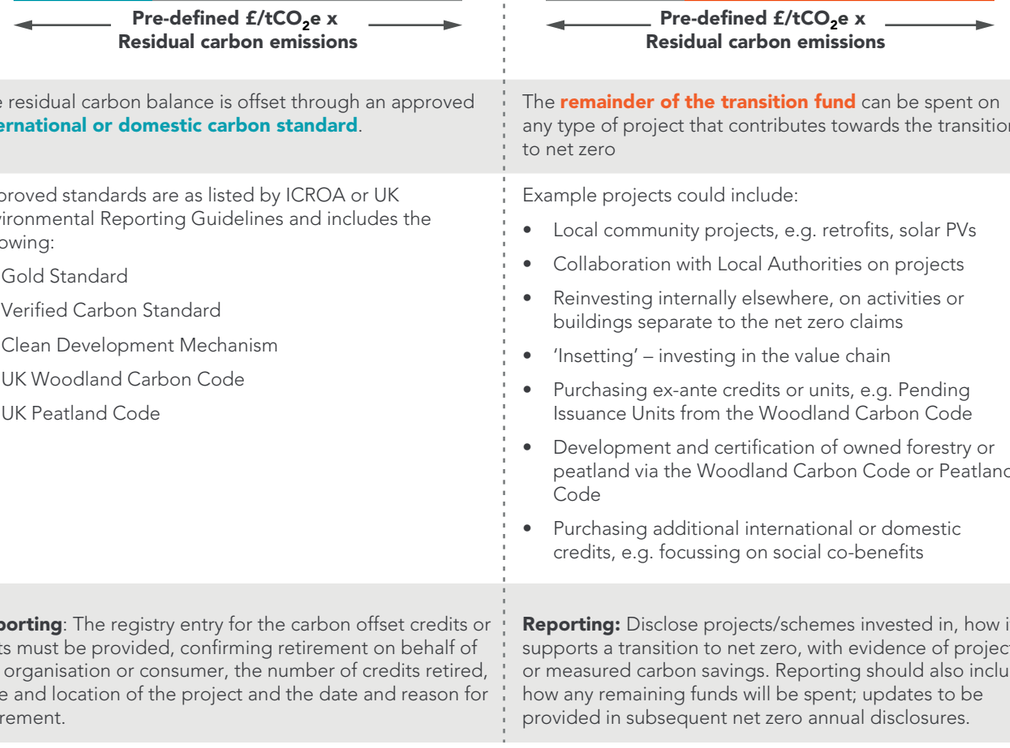
The frequency for the procurement of offsets should be as follows:

- For net zero carbon – construction, at practical completion
- For net zero carbon – operational energy, the **proportion commensurate with the residual carbon impacts that is accounted for through an approved carbon standard** shall be disclosed annually.

  For accountability and transparency, the **remainder of the transition fund** should be spent within three years of the applicable net zero claim. A brief narrative on how this fund will or has been spent should be provided within the annual disclosures as per Figure 7.

**Figure 6**: Leadership carbon offset approach: Transition Fund


**Figure 7**: Transition Fund – example expenditures and recommended reporting



## RATIONALE

Whilst the emphasis remains firmly on reducing emissions as a priority step, initiatives such as WorldGBC's Net Zero Carbon Buildings Commitment and Science Based Targets recognise that carbon offsets can play a critical role in the transition towards a state of net zero emissions.

The transition fund has been recommended as the leadership approach in recognition that most sectors will need to reduce emissions close to zero without offsetting in order to meet the UK's net zero target.[13] As a result, it is critical to unlock further funds to help minimise the absolute $CO_2$ emitted on an annual basis, and in turn, minimise the need for offsetting in the first instance.

The recommended carbon price for such an approach is linked to the HMT Green Book to provide a credible, time-dependent valuation of carbon that is aligned to the Paris Agreement and specific to the UK context. For 2021, this is £70/$tCO_2$, which aligns with the minimum USD $40-80 per metric ton that the Carbon Pricing Leadership Coalition / World Bank estimates to be necessary to achieve the global goals of the Paris Agreement.[14]

This is in comparison to the average price per metric ton of $CO_2$ saved of USD $1.40 – $4.90 in 2019 (depending on project type) through carbon offset projects.[15] Average prices of voluntary offsets have historically remained well below average prices in compliance markets across the world, and significantly lower than the World Bank estimate. Despite the expected future growth in the market, the significant surplus of credits available for purchasing to comparatively low demand has kept current prices low.

## FUTURE CONSIDERATIONS

There is no requirement on the type of carbon offset projects that can be funded, although this will be reviewed in line with market developments. Key considerations are:

- The ratification of Article 6 of the Paris Agreement will see significant changes to global dynamics in the compliance and voluntary offset market. This includes establishing how double counting concerns will be addressed to ensure that a carbon offset credit that is bought and claimed by a voluntary buyer is not then counted within a country's Nationally Determined Contributions (NDCs). Conversely, this form of double counting could also become the norm.
- The development of innovative and new technologies for abating residual emissions through the voluntary offsets market, to help minimise the demand on GHG removals in the transition to 1.5 degrees net zero
- The development of carbon removal and long-lived storage options, beyond existing afforestation and land-based projects – including studies that explore how finite global capacity for GHG removals are, and how this relates to the scale of unavoidable emissions per sector

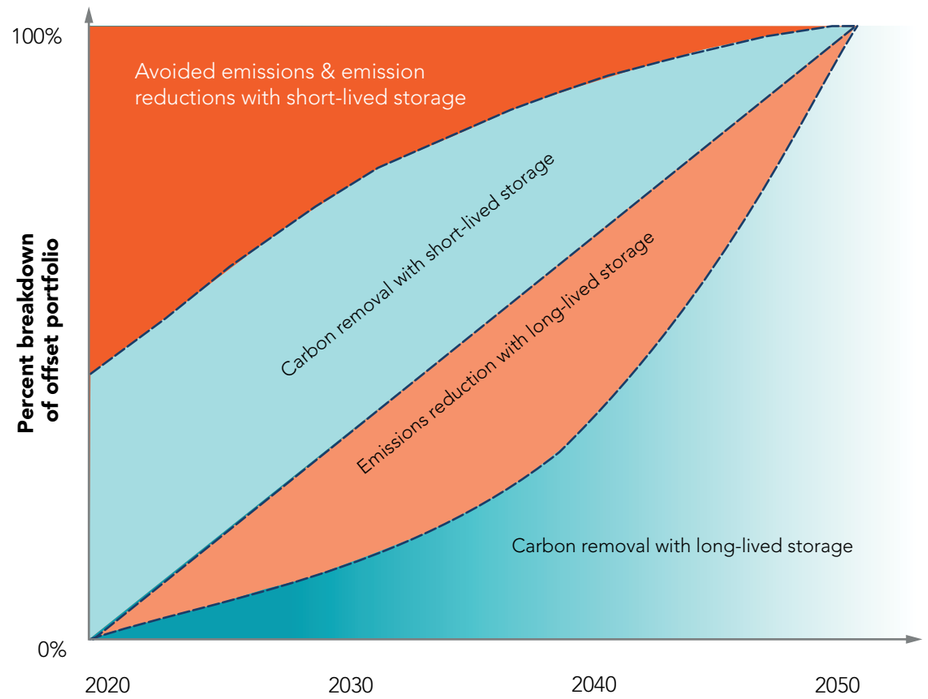
Pending these developments, it is expected that organisations and consumers will follow a net zero aligned transition as illustrated in Figure 8, and within the Oxford Principles for Net Zero Aligned Carbon. This entails organisations to increasingly shift towards carbon removals and long-lived storage options for unavoidable emissions once they are available.

### Local planning requirements

A number of Local Planning Authorities (LPAs) have planning requirements for new developments to be built to a net zero carbon standard. This typically requires developers to make a cash-in-lieu contribution to the LPA's carbon offset fund to account for any shortfall in achieving net zero carbon developments. This is generally applicable to regulated energy only, and is an upfront payment secured through section 106 agreements.

Local planning requirements and the NZCB Framework Definition should be treated as separate and distinct mechanisms for driving decarbonisation in the built environment. The timescales and purpose behind the respective carbon offset funds differ. Buildings seeking 'net zero carbon – operational energy' using the Framework Definition require 12 months of in-use, measured consumption data prior to verification. Carbon offset payments are levied on an annual occupation basis on the polluter. Planning requirements, however, may be a combination of approaches, either based on modelled design or post-construction performance. Carbon payments are based on a 30 year lifetime of the building and are levied as a one-off, on the developer, as part of the planning process.

**Figure 8: Example net zero aligned offsets portfolio; reproduced from the Oxford Principles for Net Zero Aligned Carbon**



# Section 5:
# Future Guidance Development

A revised edition of the NZCB Framework Definition will be published to outline more clearly the interlinks between the suite of supporting guidance. This will be supported by the development of additional resources and guidance to aid organisations and consumers in their transition towards net zero carbon buildings that are compatible with a 1.5 degrees society. Future guidance development to support the definition will include, but is not limited to:

## NET ZERO VERIFICATION

UKGBC plans to support the development of a verification mechanism to provide the market greater clarity on what can be considered a net zero carbon building. Such a mechanism is likely to build on existing reporting and certification schemes to avoid further complicating energy and carbon reporting. This would necessitate a cross-industry collaboration with other relevant industry bodies to reflect different avenues for achieving net zero buildings.

## LARGE-SCALE RESIDENTIAL COST EVALUATION STUDY

A cost evaluation study to explore the design, cost and planning implications of delivering a large-scale housing development that aspires to meet net zero carbon ambitions. This will include examining options for low carbon site infrastructure, residential design changes to reach net zero performance targets (including individual houses, low-rise apartments), and associated initiatives to ensure the development is net zero when in operation.

## NET ZERO WHOLE LIFE CARBON (WLC) ROADMAP

UKGBC is developing a Net Zero Whole Life Carbon Roadmap, for launch at COP26, that plots the built environment decarbonisation transition in the UK. This multi-stakeholder initiative aims to demarcate clear sector-based actions and targets, as well as build widespread industry buy-in for the identified pathway.





# Appendix A: NZCB – Construction Minimum Reporting Template

These minimum reporting requirements align with the RICS Professional Statement 'Whole life carbon assessment for the built environment'

| | | | | |
|---|---|---|---|---|
| Date of assessment | Date of assessment completion | | | |
| Verified by | Verifier name and organisation | | | |
| Project type | New build or refurbishment of existing structure | | | |
| Assessment objective | Brief assessment purpose statement | | | |
| Project location | Full address | | | |
| Date of project completion | Anticipated date of practical completion | | | |
| Property type | Residential, public/civic, retail, office, infrastructure, etc.<br>State planning use class | | | |
| Building description | No. of storeys, structural frame, façade type, basement?, brief description of associated external areas and any ancillary structures | | | |
| Size | NIA, GIA, volume, etc. | | | |
| Project design life | In years | | | |
| Assessment scope | Building parts and life stages/modules included | | | |
| Assessment stage | Design stage at which the assessment has been conducted at | | | |
| Data sources | List all data sources used in the assessment including building information and carbon data sources | | | |
| **Building elements coverage** | **#** | **Building parts/element groups** | **Building elements** | **Coverage (%)** |
| | 0 | Facilitating works | 0.1 Temporary/Enabling works/Preliminaries<br>0.2 Specialist groundworks | |
| | 1 | Substructure | 1.1 Substructure | |
| | 2 | Substructure | 2.1 Frame<br>2.2 Upper floors incl. balconies<br>2.3 Roof<br>2.4 Stairs and ramps | |
| | | Superstructure | 2.5 External Walls<br>2.6 Windows and External Doors | |
| | | Superstructure | 2.7 Internal Walls and Partitions<br>2.8 Internal Doors | |
| | 3 | Finishes | 3.1 Wall finishes<br>3.2 Floor finishes<br>3.3 Ceiling finishes | |
| | 4 | Fittings, furnishings and equipment (FF&E) | Building-related<br>Non-building-related | |
| | 5 | Building services / MEP | 5.1–5.14 Building-related services<br>Non-building-related | |
| | 6 | Prefabricated Buildings and Building Units | 6.1 Prefabricated Buildings and Building Units | |
| | 7 | Work to Existing Building | 7.1 Minor Demolition and Alteration Works | |
| | 8 | External works | 8.1 Site preparation works<br>8.2 Roads, Paths, Pavings and Surfacings<br>8.3 Soft landscaping, Planting and Irrigation Systems<br>8.4 Fencing, Railings and Walls<br>8.5 External fixtures<br>8.6 External drainage<br>8.7 External Services<br>8.8 Minor Building Works and Ancillary Buildings | |
| Assumptions and scenarios | List all assumptions and scenarios used in the assessment including brief justifications | | | |

## EMBODIED CARBON

| Indicator | Amount |
|---|---|
| Total embodied carbon ($tCO_2e$ & $kgCO_2e/m^2$) from construction (modules A1 to A5 of EN15978) at practical completion | |
| Total embodied carbon offset ($tCO_2e$) at practical completion | |
| Net embodied carbon ($tCO_2e$) at practical completion | 0 (only when verified) |

## OFFSETS

| Carbon offset approach used | Minimum / Leadership: Transition Fund |
|---|---|
| International carbon offset standard used, amount and type of offset credit procured<br>Registry link | |
| Domestic carbon unit standard used, amount and type of offset unit procured<br>Registry link | |
| Weighted average cost per tonne of $CO_2e$ for carbon credits/units bought | |
| Transition Fund – carbon price, cost per tonne of $CO_2e$ (if applicable) | |

Royal Institution of Chartered Surveyors (RICS) (2017). Whole life carbon assessment for the built environment RICS professional statement, UK. [online] Available at: https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/building-surveying/whole-life-carbon-assessment-for-the-built-environment-1st-edition-rics.pdf

* Building-related items: Building-integrated technical systems and furniture, fittings and fixtures built into the fabric. Building-related MEP and FF&E typically include the items classified under shell and core and Category A fit-out.





# Appendix B: NZCB – Operational Minimum Reporting Template

## OVERVIEW

| | |
|---|---|
| Dates of achievement | 12 month period over which a net zero carbon balance has been achieved e.g. 1 April 2019 to 31 March 2020 |
| Verified by | Third-party verifier name and organisation |
| Building location | Full address |
| Building type | Provide planning use class |
| Building description | No. of storeys, structural frame, façade type, basement(?), brief description of associated external areas and any ancillary structures. |
| Energy scope | E.g. individual dwelling, tenant area in multi-unit building, base building, whole building, multi-building development, portfolio (base building or whole building etc. |
| Assessed area | NLA, GLA |
| Percentage of total building area | I.e. assessed area / total building area |
| Data sources | List all data sources used in the assessment |

## ENERGY – OVERALL

| Indicator | kWh | kWh/m² |
|---|---|---|
| Total annual energy consumption | | |
| Total annual electricity consumption | | |
| Total annual fuel consumption (all other sources e.g. natural gas, 'green gas', heat network) per fuel/delivery type | | |
| Total annual electricity exported by renewable energy sources minus storage losses (e.g. photovoltaic) | | |

## RENEWABLE ELECTRICITY PROCUREMENT

| Indicator | kWh | % |
|---|---|---|
| Total annual electricity consumption: a row per procurement route (Refer to Table 9-10 of the Renewable Energy Procurement & Carbon Offsetting guidance) | | |
| | Total | 100% |

### SUPPLEMENTARY NARRATIVES REQUIRED:

- Where interim EUI targets have not been met: an action plan setting out how the target will be met in subsequent years.
- For existing buildings utilising fossil fuel based heating, hot water, and cooking: a trajectory plan setting out how fossil fuels will be phased out by its next system replacement cycle. The plan should also indicate how all other energy systems will be compatible with being powered from renewable energy sources by their next system replacement cycle.
- Supporting procurement information, e.g., supplier and green tariff name, REGO registry entry (Refer to Table 9-10 of the Renewable Energy Procurement & Carbon Offsetting guidance).

## CARBON

| | Dual reporting | | | NZCB Framework Definition approach | |
|---|---|---|---|---|---|
| | Scope 1 | Scope 2 (location-based) | Scope 2 (market-based) | Scope 1 | Scope 2 |
| Total annual direct $CO_2e$ emissions from self-generation and consumption | | | | | |
| Total annual indirect $CO_2e$ emissions from imported electricity | | | | | |
| Total annual direct $CO_2e$ emissions from combustion of fuel (e.g. onsite gas) per fuel type | | | | | |
| Total annual indirect $CO_2e$ emissions from combustion of fuel (all other sources, e.g. heat network) per fuel type | | | | | |
| Total annual $CO_2e$ for Scope 1 + 2 emissions | | | | | |
| For net calculations: | | | | | |
| Total annual displaced $CO_2e$ emissions from electricity exported by on-site renewable energy sources minus storage losses | | | | | |
| Total annual displaced $CO_2e$ emissions from international carbon offsets | | | | | |
| Total annual displaced $CO_2e$ emissions from domestic carbon units | | | | | |
| Total annual net $CO_2e$ emissions | | | | 0 (only when verified) | |

## OFFSETS

| | |
|---|---|
| Carbon offset approach used | Minimum / Leadership: Transition Fund |
| International carbon offset standard used, amount and type of offset credit procured | |
| Registry link | |
| Domestic carbon unit standard used, amount and type of offset unit procured | |
| Registry link | |
| Weighted average cost per tonne of $CO_2e$ for carbon credits/units bought | |
| Transition Fund – carbon price, cost per tonne of $CO_2e$ (if applicable) | |

**SUPPLEMENTARY NARRATIVE REQUIRED:**

- For Transition Fund approach – narrative on projects / schemes invested in, how it supports a transition to net zero, with evidence of projected or measured carbon savings. If there are any remaining funds, how these will be spent in the upcoming three years with a rolling fund figure update.





# Appendix C: Supporting Information

This section contains supporting information to aid organisations and consumers navigate their procurement choices for both their energy and carbon accounting strategies. Note that the information presented here is largely specific to the UK context and the year of publication.

The supporting information has been structured to follow the order of the main report:

| | |
|---|---|
| **C1: Green gas** | • Biomethane<br>• Green gas certificates: RGGOs and BMCs<br>• Current green gas market |
| **C2: Renewable electricity** | • REGO certificates and greenwashing concerns<br>• Green electricity tariffs and suppliers<br>• Power Purchasing Agreements<br>• Example procurement mixes |
| **C3: Carbon accounting** | • GHG Protocol Scope 2<br>• Location- and market- based carbon factors<br>• Residual fuel mix<br>• UK Environmental Reporting Guidelines<br>• Example carbon accounting calculation |
| **C4: Carbon offsets** | • Carbon offset standards and labels<br>• Additional social standards<br>• UK standards: Woodland Carbon Code, Peatland Code<br>• Local planning requirements |

# Appendix C1: Green Gas

Table 15 provides an overview of green gas products that are commercially available. To date, these specifically relate to biomethane, but it is expected that other types of green gas, such as green hydrogen, will enter the market over the coming decades:

- Biomethane can be produced from a range of sources, including biogas from anaerobic digestion, landfill gas and synthetic gas from the gasification of biomass.
- Biogas is converted into biomethane through the removal of $CO_2$, which can then be treated to ensure pipeline quality for injection into the National Grid.

There is a specific Quality Protocol set out by Government for the production and use of biomethane arising from the degradation of organic wastes in a landfill site or anaerobic digestion plant for injection into the gas grid. The protocol is applicable in England and Wales, and if met, the biomethane will typically be regarded as having been fully recovered and to have ceased to be waste.

### GREEN GAS CERTIFICATES

Ofgem does not administer a 'green certificate' scheme for gas similar to the Renewable Energy Guarantees of Origin (REGO) scheme that exists for renewable electricity procurement. Instead, there are two industry-led providers of UK green gas certification:

- Green Gas Certification Scheme: Renewable Gas Guarantees of Origins (RGGOs)
- Green Gas Trading Ltd: Biomethane Certification Scheme (BMCs)

### ADDITIONALITY

Where green gas has been subsidised, such as through the Renewable Heat Incentive (RHI) or the Renewable Transport Fuel Obligation (RTFO), it should be noted that no additional green gas can be said to have been directly produced as a result of a green gas certificate being purchased.

**Table 15**: Green gas products

| | |
|---|---|
| **Green Gas Purchase Agreements (GPAs)** | Green Gas Purchase Agreements models are similar to those seen for electricity procurement (Refer to Appendix C2 for further detail) – although they are less common due to the volumes of biomethane currently available and the maturity of the market. There may be circular economy opportunities in areas or industries with significant waste or residue streams, but these should be assessed on an individual basis. Organisations procuring a GPA should ensure that the associated green gas certificates are retired on the organisation's behalf. |
| **Green gas tariffs** | Due to the limited biomethane to grid capacity within the UK at the present time, the vast majority of green gas tariffs only provide a small proportion of green gas that is backed by RGGOs or BMC. The rest of the supply is fossil-fuel sourced but offset by the supplier through the voluntary offset market – hence being sold as a '100% carbon neutral' tariff. The proportion that is certified biomethane within a green gas tariff can be as low as 6%.[16] The Government have committed to increase the proportion of biomethane flowing into the gas grid, and 2021 should see the introduction of the Green Gas Support Scheme, with the Green Gas Levy being introduced in 2022. |
| **Unbundled green gas certificates (RGGOs or BMCs)** | Green gas certificates can be purchased separately to the sustainable biomethane itself. Due to the low volumes of certified biomethane available within the market at the present time, green gas certificates were priced between £6-9/MWh in 2020 depending on their feedstock, with waste products retailing at a higher price than agriculture products.[4]<br><br>As the certificates can be 'unbundled' separately to the biomethane, there is a risk that the green gas market for certificates may lead to similar issues seen in the renewable electricity market – but this is not presently the case due to the low volumes of biomethane and higher prices of the certificates. |

4 Based on conversations UKGBC conducted with industry bodies, including Green Energy UK and Green Gas Certificate Scheme.

### GHG PROTOCOL AND UK'S ENVIRONMENTAL REPORTING GUIDELINE

There is not yet certainty around the reporting of biomethane use within the GHG Protocol or UK's Environmental Reporting Guidelines. Both have indicated that that the accounting of grid-injected biomethane and use of green gas certificates is under review, and additional guidance will be forthcoming to provide clarity for the market.[17,18]

The use of certificates to track green gas consumption will also require a 'residual fuel mix' emission factor to be made available for the national gas grid, similar to that seen within scope 2 reporting, such that a comparable market-based accounting method can be introduced for the UK gas market. This does not currently exist. Refer to Appendix C2 for further details on the 'residual fuel mix' used in scope 2 accounting.

### ALIGNMENT WITH THE NZCB FRAMEWORK DEFINITION

As per the NZCB Framework Definition, off-site renewable energy procurement should demonstrate additionality. Those that do can claim lower GHG emissions relating to its use. It is acknowledged however, that with the current maturity of the green gas market and typical length of commercial GPA models[5] , that demonstrating this additionality will be difficult. This, combined with the current uncertainties around GHG reporting of biomethane, means that further guidance will need to be developed when a consistent best practice approach can reasonably be applied across the industry.

Organisations or consumers currently on an existing gas system are encouraged to consider the procurement of green gas where feasible, such as through a GPA or green gas tariff. It should be noted that until further guidance has been developed, non-additional green gas will not be able to claim reduced emissions from the certificates in calculating the residual carbon emissions to offset in line with the Framework Definition, but it will help support the growth of the UK green gas market and provide broader ESG value to the organisation. In the case of green gas tariffs, it is strongly recommended that the proportion of the tariff that is certified biomethane is established and disclosed, and whether the gas and certificates are bundled or not.

Note that Industrial and Manufacturing loads, such as the processing of aluminium, are excluded from the 'net zero carbon - operational energy' requirements as the methodologies and technologies to reduce these loads are currently limited. Commercial process loads, such as commercial catering operations, refrigerated display cabinets in food retail premises, etc. should be included. Both UKGBC and WorldGBC aim to include industrial and manufacturing loads in future iterations of the Framework Definition and Net Zero Carbon Buildings Commitment when the right methodologies become available. As a result, entities are actively encouraged to plan how they can incorporate this challenge going forward.

5 Over the 20-30 year lifespan of a biomethane plant, contracts are currently typically being signed every 2-3 years. (Based on conversations conducted with the Green Gas Certificate Scheme)

# Appendix C2: Renewable Electricity

## REGO CERTIFICATES AND GREEN TARIFFS

**What is a REGO?**
Each Renewable Energy Guarantees of Origins (REGO) certificate represent the 'energy attribute', i.e., the zero GHG emissions, associated with 1MWh of renewable energy generated.

The REGO scheme is administered by Ofgem and was set up to provide consumers transparency about the proportion of electricity that suppliers source from renewable generation.

Electricity suppliers require REGOs for their Fuel Mix Disclosure (FMD) which requires all suppliers in the UK to disclose to their customers the mix of fuels used to generate electricity annually. This is the main use of REGOs in the UK. Suppliers can also purchase the European equivalent, *Guarantees of Origins (GoOs)* for this purpose.

Organisations and consumers can also buy REGO certificates separately (i.e., unbundled) to their power procurement for their scope 2 accounting.

**Why are there concerns around greenwashing?**

**REGO certificates can be sold independently to the power itself – this is referred to as being 'unbundled'**

Under FMD, suppliers are not required to generate renewable electricity, or have Power Purchasing Agreements in place to purchase it directly from renewable generators themselves. As a result, REGO certificates has become a critical component and driver of the green electricity tariff market. Certificates are relatively inexpensive, with costs ranging from £0.20p in 2020, which has meant many tariffs that promise 100% renewable electricity are basing this commitment on the REGO certificates that they purchase.

There is little transparency within the UK market, and there is currently no legislation that governs the terminology of the green tariff market, and how products can be marketed and sold to consumers. This means that a green electricity tariff consisting of fossil fuel-sourced power can be sold as 100% renewable electricity if 100% matched by REGOs. For an average household using 2,900 kWh/year electricity, it can cost the supplier as little as £0.58p to upsell the tariff as 'green'.

**Will this not change with the increased demand for REGOs?**

In theory, if demand for renewable energy, which on a shared grid can only be expressed using these REGO certificates, approaches supply, the incentives to build additional renewable capacity should grow – with REGOs signalling that demand. However, it is widely acknowledged that even with the increasing demand and value for REGOs, the structure of the UK energy system will never provide prices high enough by itself to stimulate additional renewable generation capacity.[19]

**What does this mean for organisations and consumers?**

The 'unbundling' of REGO certificates to power can lead organisations and consumers to believe they are contributing towards emission reductions through their active procurement choices when this is largely not the case. Unless the procurement can demonstrate 'additionality' – that is, it contributes to the construction of new renewable energy facilities, then the electricity being purchased either already exists (e.g., from an existing wind farm) or is being supported through Government mechanisms such as Contracts for Difference.

Procurement routes that do demonstrate additionality are highlighted within Section 2, Table 9, and includes onsite renewable energy, such as rooftop solar, or a PPA with a new, unsubsidised generator.

It is noted that there is currently a limited number of suppliers that have been recognised by Ofgem to provide additionality, although this may not be an exhaustive list. There is of course, still varying quality of green tariffs amongst the suppliers who do not provide additionality. These are described later in this section, alongside supporting questions which organisations and consumers can ask their suppliers to help determine this.

## GREEN TARIFF SUPPLIERS

In Section 2, green tariff products were categorised as either '***high quality'*** or ***'low quality***' based on the supplier's activities:

**Table 16**: Categorisation of green tariff products

| Electricity procurement route | Energy Attribute | Renewable Sourced | Additionality |
|---|---|---|---|
| Green tariff from supplier with 100% Renewable Sourced tariffs only – ***'high quality green tariffs'*** | ✓ | ✓ | ✓ future |
| Green tariff from all other suppliers – ***'low quality green tariffs'*** | ✓ | ✗ | ✗ |

As a reminder, the principle 'renewable sourced' related to whether the power was 100% renewable electricity, or not. Any supply that is a mix of renewable electricity and fossil fuel power, such as 'low quality green tariffs', were not considered to have met this principle.

The key differences between the two categories of green tariffs and suppliers are described below and illustrated in Figure 9.

### HIGH QUALITY GREEN TARIFFS

These are suppliers that only:

- Generate their own renewable electricity[6]; and/or
- Purchase renewable sourced electricity and the REGO certificates via PPAs direct from generators (i.e., bundled power and certificates)

There are currently (at time of publication) only three UK energy suppliers that have been recognised by Ofgem to provide additionality to an extent that is materially greater than that which is brought about as a result of subsidies, obligations or other mandatory mechanisms: Green Energy, Ecotricity and Good Energy. As a result, they have all been awarded derogation from the default tariff cap which will remain in force for the duration of the cap to the end of 2023, pending energy market reviews. It is noted however, that there may be other suppliers who can demonstrate additionality based on the same criteria but has not applied to Ofgem for derogation from the energy price cap.

6 Any associated REGOs that are generated are retained and retired on behalf of the supplier to match the electricity consumed by its customers.

### LOW QUALITY GREEN TARIFFS

These are all other suppliers, and broadly are either:

- Suppliers that offer 100% REGO-backed green tariffs only
- Suppliers that offer 100% REGO-backed green tariffs alongside standard tariff products

These suppliers may still secure a proportion of their electricity through self-generation, or PPAs direct with renewable generators, but their commitment to provide '100% renewable electricity' relies, in part or fully, on the purchase of unbundled REGOs.

It is acknowledged that there may be suppliers who have specific tariff products that meet the 'high quality green tariff' criteria, but as they also offer other green or standard tariffs that do not, the suppliers have been considered based on their overall supply offering. This is for two reasons:

- This is important for organisations with an active fossil fuel divestment strategy, as standard tariff products may have a higher carbon intensity than the grid average if the supplier has a direct contractual agreement with fossil fuel generators.
- UK net zero is only achievable with a fully decarbonised National Grid, and thus it is critical that additional renewable generation is supported. To ensure informed procurement, this will also require a higher degree of transparency and accuracy from the energy market on the environmental impact of energy services and products.

### IMPROVING TRANSPARENCY

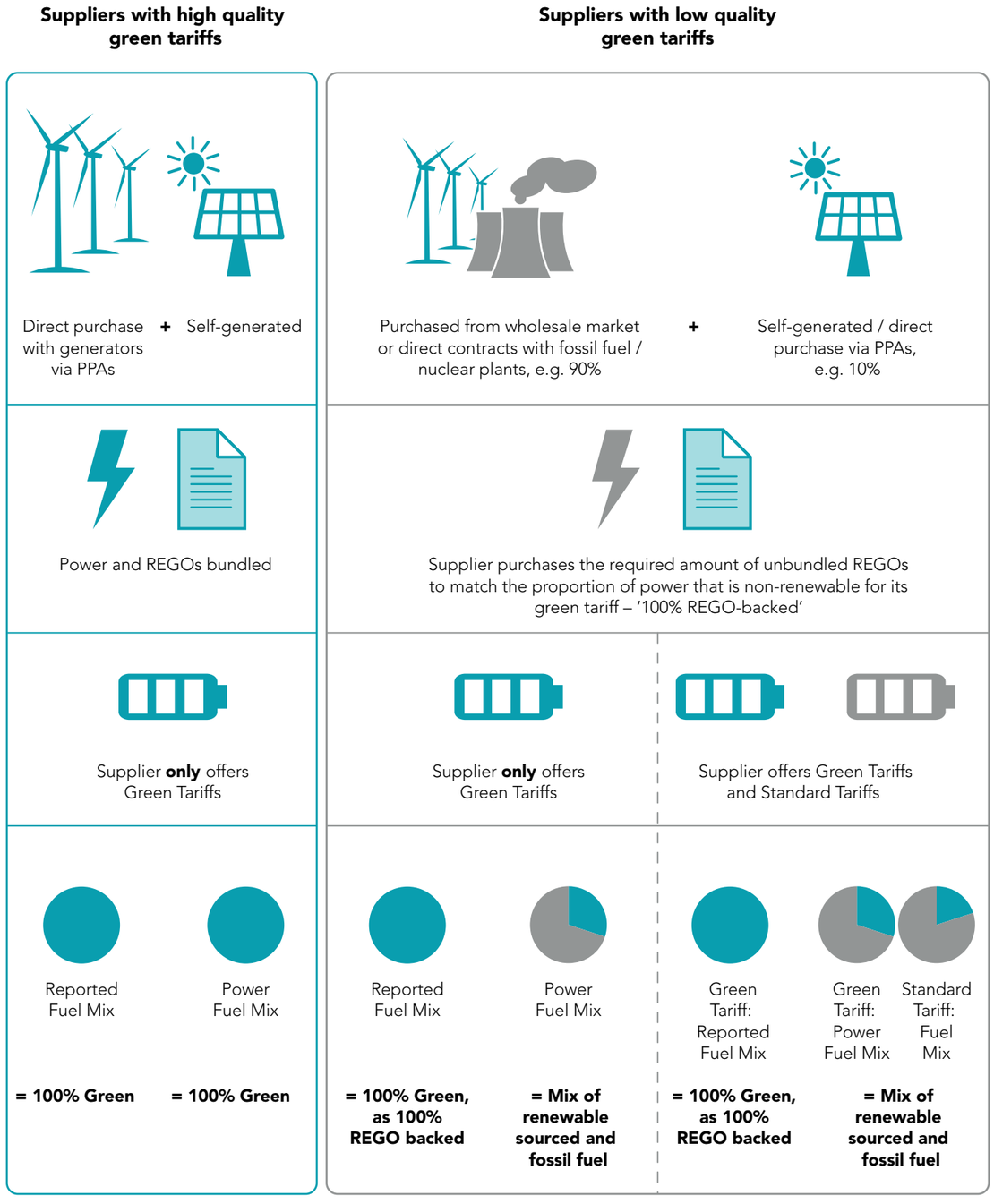
There is limited transparency over the green tariff market; organisations and consumers seeking to increase their understanding of their procurement choices can consider the following questions. In particular, this will help differentiate between the relative qualities of the 'low quality green tariffs' suppliers.

1. How much of the electricity is sourced directly from renewable energy generators via PPAs, or self-generated by the supplier?
2. What is the additional cost uplift (if present) for the green tariff product being reinvested in?
3. Has the supplier publicly set out their overall decarbonisation commitments or strategy?

### OTHER CONSIDERATIONS

There are other considerations that may impact an organisation's or consumer's choice in green tariff supplier; these include, but are not limited to: demand side management, electric vehicle and storage compatibility, smart export guarantees, etc. Consumers and organisations should also increasingly seek to operate, and not just procure renewable energy or zero carbon energy as demand side flexibility and time-in-use accounting becomes more accessible.

**Figure 9: Illustrative overview of green tariff suppliers; the 'reported fuel mix' is based on ownership of REGO certificates and is what is reported under the Fuel Mix Disclosure. The 'power fuel mix' is the fuel mix based on the power, rather than the REGO certificates.**



## POWER PURCHASING AGREEMENTS

*The following section has been written by Emma Andrews, Senior Associate at Burges Salmon LLP.*

A corporate power purchase agreement (PPA) is a contract entered into between a generator and a customer which allows the customer to have a direct purchasing relationship with a generator without needing a direct physical connection to the generation plant (such as under a private wire arrangement). It may take the form of a traditional PPA or be a type of contract for difference. A corporate PPA can bring electricity consumers and generators together irrespective of location.

'Corporate PPA' is used as a generic term that covers different contract structures. In terms of approach, there are two main structures in the market:

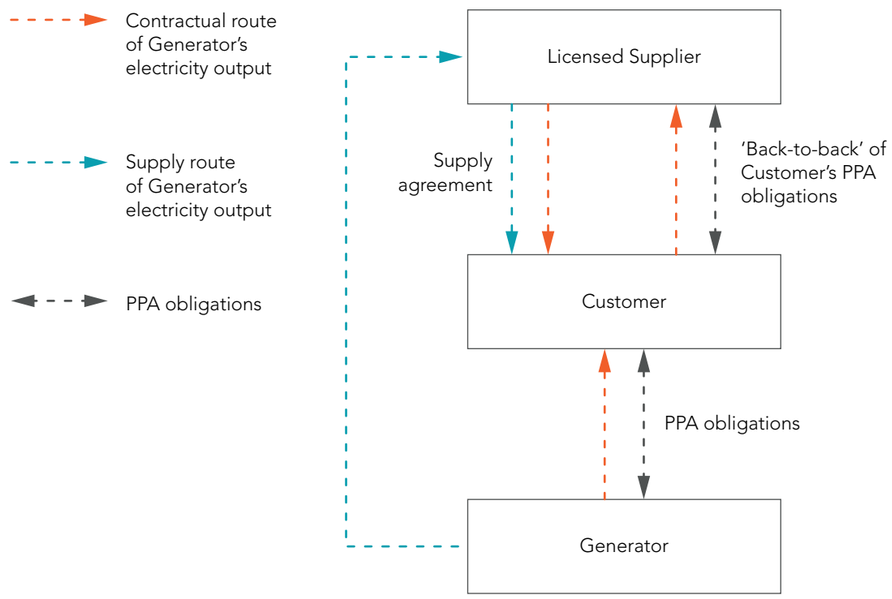
| Corporate PPA structure | Also known as |
|---|---|
| **1.** Back-to-back PPA | Direct PPA, Physical PPA |
| **2.** Virtual PPA | Financial PPA |

### BACK-TO-BACK PPAS

A back-to-back structure where the customer enters into a PPA with the generator and purchases the electricity (and associated benefits, including REGOs) directly from the generator. The customer then enters into a back-to-back arrangement with its licensed supplier who purchases the electricity from the customer and then sleeves this into the customer's supply contract.

The customer can choose to retain the REGOs itself (and hold these in an account on the Renewables and CHP Register with Ofgem) or can ask its licensed supplier to hold them in its account on the customer's behalf (in which case the licensed supplier should be obligated not to use them for its own fuel mix disclosure).

**Figure 10: Back-to-back PPA**



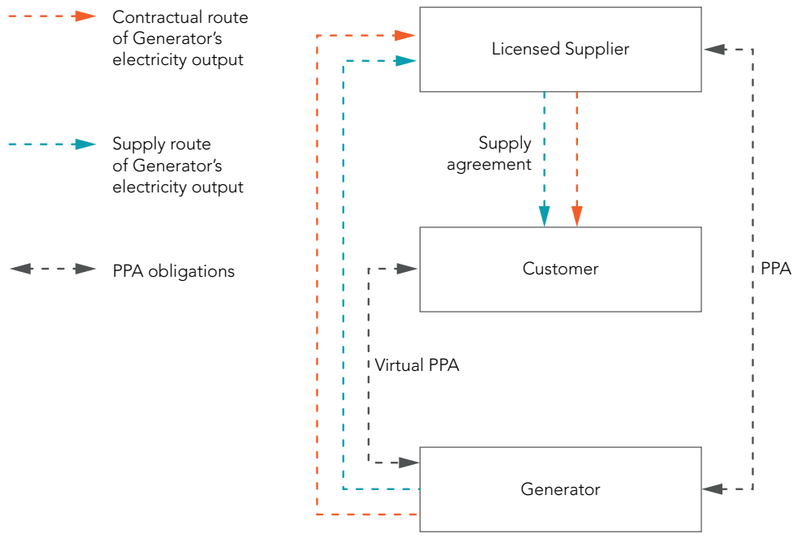

### VIRTUAL PPA

This is effectively a contract for difference. The customer does not take the power from the generator (the generator has a separate PPA with a licensed supplier), but rather agrees a price with the customer for the power that it generates and exports. The customer can also take the REGOs from the generator in order to evidence that it is taking renewable power.

Where the customer uses the Virtual PPA route, the customer could, working with its licensed electricity supplier and the generator, agree that the electricity flows to the customer via its licensed supplier (as shown in Figure 11).

Alternatively, the energy does not need to flow to the customer in this way: the generator could sell the electricity it generates via a power purchase agreement or in the power market to any offtaker in the usual way, and the arrangement between the customer and the generator can be purely a price guarantee arrangement and REGO purchase agreement.

**Figure 11: Virtual PPA – As set out above, alternatively, this can be a pure price guarantee arrangement, and the generator could sell the electricity it produces in the usual way to any offtaker, rather than to the customer's licensed supplier.**



## FREQUENTLY ASKED QUESTIONS (FAQS)

In the FAQ below with Burges Salmon LLP, the term 'PPA' is used to refer to a corporate PPA in its generic sense. Where relevant, these have been distinguished between the two main structures by referring to either a 'Back-to-Back PPA' or a 'Virtual PPA'.

### 1. Is there an initial 'rule of thumb' for whether PPAs should be a potential option to explore?

The customer will want to consider:

**a)** Whether it can make a longer term commitment in respect of the volumes it is looking to purchase (with a Back-to-Back PPA we would normally expect this to be 10-15+ years, for a Virtual PPA, we are beginning to see shorter periods of 5+years, but the period will need to be sufficiently attractive to the generator and, if the generator is financing a new project with debt finance, it will ideally want the term of the PPA to match the term of the debt). The customer will need to have a good understanding of its energy needs and how those needs might fluctuate over time.

**b)** Whether there is management-level support within its organisation (as the procurement process does involve some additional work and cost, including any legal and other advisory fees, and this is often outside the 'core' business of the customer, so will involve working with new concepts and understanding of the risks involved).

**c)** Whether it has undertaken financial analysis of how it wants to structure the pricing, (e.g., fixed price, market prices with a cap and floor) bearing in mind that the PPA price covers only the cost of the electricity and the customer will still have to pay non-commodity costs as it ordinarily would via its supply contract (unlike with on-site/private wire generation).

**d)** Particularly where putting in place a Back-to-Back PPA, whether its contracted licensed supplier will support the proposed approach. With a Back-to-Back PPA, the customer will need its licensed supplier to sleeve the electricity into its supply contract and this creates some additional work for the supplier (in terms of agreeing, documenting and managing these arrangements), the supplier will usually expect a certain commitment from the customer in terms of the supply period (and this will vary from supplier to supplier), and may only look at this for those customers with a significant annual energy demand (again, this varies from supplier to supplier).

For the Virtual PPA, depending on the structure that the customer wants to use (and whether it wants its licensed supplier to purchase the electricity being produced by the generator), the customer may need to discuss this with its licensed supplier, in terms of arrangements for the movement of REGOs and ensuring the Virtual PPA dovetails with the customer's supply contract.

As a general rule, we would normally only expect a Back-to-Back PPA to be attractive where the customer has a moderate to high energy demand, due to the additional work required (by all parties: generator, customer and licensed supplier) to set up these arrangements. However, with the Virtual PPA, we have seen that this can work for smaller volumes and is perhaps less complex for the customer, in terms of the contract it is entering into with the generator and so suitable for a much wider customer base.

### 2. Is there a typical % of the energy demand that consumers would normally secure through a PPA?

This varies significantly and will depend on the customer's key drivers. It may be that a customer wants a fixed price for a certain percentage of its electricity demand to hedge against future price increases. Where a customer is looking at this in the context of its sustainability targets, it may want to ultimately have 100% renewable electricity, but may opt to do so via a number of different routes (any combination of on-site generation, private wire, PPA and/or green tariffs offered by its supplier).

### 3. Is there a typical best practice % of energy demand that you *wouldn't* exceed with PPAs?

When a customer signs a PPA, it is agreeing to take the volume of electricity produced for the term of that agreement. On that basis, the customer needs to look at its likely demand over the term of the PPA, which can be lengthy (as per above, if a generator has debt funding, it will be looking to at least cover the term of the debt).

Additionally, where the PPA is a fixed price PPA (which would usually be the case, or, if not, we might expect a floor price), the customer is tied into that price for the term, so this can give certainty, but the customer may not want to fix the price for all of its energy demand.

In most cases, we have seen this route as part of an overall energy procurement strategy. The PPA arrangements are sleeved by the licensed supplier/dovetailed with the arrangements in the customer's supply contract as part of overall supply volumes (so the customer still purchases the rest of its energy demand in the normal way).

### 4. What is a ballpark example timescale or lead time? For PPAs with new plants vs PPAs with existing plants?

In terms of the procurement process to point of signature, we would normally expect this to take between 6-12 months, depending on the procurement process that is run and the length of the contractual negotiations (however we have seen both shorter and longer processes). We would normally expect that a Back-to-Back PPA will take longer to negotiate than a Virtual PPA (due to the additional complexity in the PPA between the generator and the customer).

The customer may also want to undertake some due diligence on the generator and the projects, for example: Is the developer reputable? Has all planning been secured? Are there any issues within the local community (for example do neighbours to the project site have objections to the turbines/panels being installed)?

If a customer goes down the route of a Virtual PPA, the time can be shortened as the customer has a template to work with and, as part of procurement of further volumes from other generators, requires that the template stays substantively the same.

If a customer is contracting in respect of a new-build generating station, following signature the generator will then need to build out the asset. We would expect there will be a 'long stop date' in the PPA by which the generator must be ready to export, and if it fails to do so, there will be a right for the customer to terminate.

### 5. Are there specific sectors/buildings/energy profiles that are most suitable for PPAs? Or most unsuited?

It is often most attractive to those corporates or organisations that have a fairly stable moderate to high energy demand, but we are starting to see other organisations come in with smaller energy needs. The PPA is portable across the business as a whole rather than being linked explicitly to a site unlike on-site or private wire generation, so, for this reason, it is a more widely available solution. We have seen a range of customers use this route including corporates, banks, retailers, and local authorities.

**6. Credit rating, board appetite and energy profiles – are these the main blockers? What key questions should be asked internally around these before procuring formal external expertise?**

Credit strength of the customer is critical to ensure the bankability of the PPA in the eyes of the ultimate investor in the project. From the perspective of the customer, the credit strength of the generator is important to give some assurance as to the long term viability of the project.

As we have commented above, management buy-in is important, as this can be seen as something that is not 'core' business. However, we are increasingly seeing that companies are looking at their energy supply, both in terms of this being a large (and growing) cost item and also in terms of how this fits into any sustainability targets of the company. We are also seeing increasing pressure from investors to place more emphasis on environmental, social and governance issues (ESG). If you have management buy-in, this is an important facilitator.

The customer will need an understanding of its energy profile and how that might fluctuate (or not) over time. We would normally expect Back-to-Back PPAs only to be attractive where the customer has a moderate to high energy demand (for the reasons set out above), but we have seen Virtual PPAs for smaller volumes. Another key point, as flagged above, is the dialogue between the customer and its licensed supplier.

**7. Are there any key considerations to be aware of specifically for real estate landlords?**

Where a real estate landlord has a portfolio of properties where it is responsible for entering into electricity supply for parts of the building/estate (for example common parts), then we would envisage that its considerations would be substantially the same as any other customer. We would ordinarily expect that the landlord would want to pass through these costs via the service charge, and that the drafting in respect of the service charge in the lease will allow this (as part of wider utility costs).

**8. Aside from long term price certainty, what are the main differences between a Virtual PPA and green tariffs?**

The reasons that an organisation signs a PPA differ from organisation to organisation. For some it is peace of mind by financially hedging some of their energy costs over a defined period of time, whereas for others it can be to enhance their brand.

In our experience, most organisations sign PPAs to meet their sustainability or carbon targets. Many value the ability to be able to point to the specific renewable energy projects they are supporting and purchasing their energy from. This can be for a number of reasons: supporting local projects (which could be community owned), or being able to show stakeholders (customers, investors, funders) specifically where energy is being purchased from, and, where the PPA is with a project under development, showing additionally (i.e., that the signing of the PPA has facilitated new green generation that may not have come on the system without it).

There has been some scepticism in the market in respect of green tariffs, and there have been some reports of 'green washing'. This has made some organisations wary. With a PPA, whether it is a Back-to-Back PPA or a Virtual PPA, you can point to the exact renewable generating stations that you are buying green power and/or the REGOs from, and some organisations see that as valuable. That is not to say that utilising a green tariff is not a viable alternative, but an organisation may want to ask its supplier some questions around the supplier's portfolio and where it is sourcing any REGOs/GoOs from.

**9. Are PPAs typically signed for new or existing assets? What are the key differences between the two?**

In our experience, generally new assets. For the customer, this can evidence additionality. This does of course rely on sufficient new proposed plant coming forward. For the generator, especially where debt finance is being put in place to finance the construction of a new generating asset, a long term PPA with a fixed or floor price will provide certainty of revenue, which will be key for the project's financial model and business case.

**10. How common is it for renewable plants, post-subsidies, to be decommissioned or not be economically feasible for refurbishment or repowering without another PPA/revenue stream?**

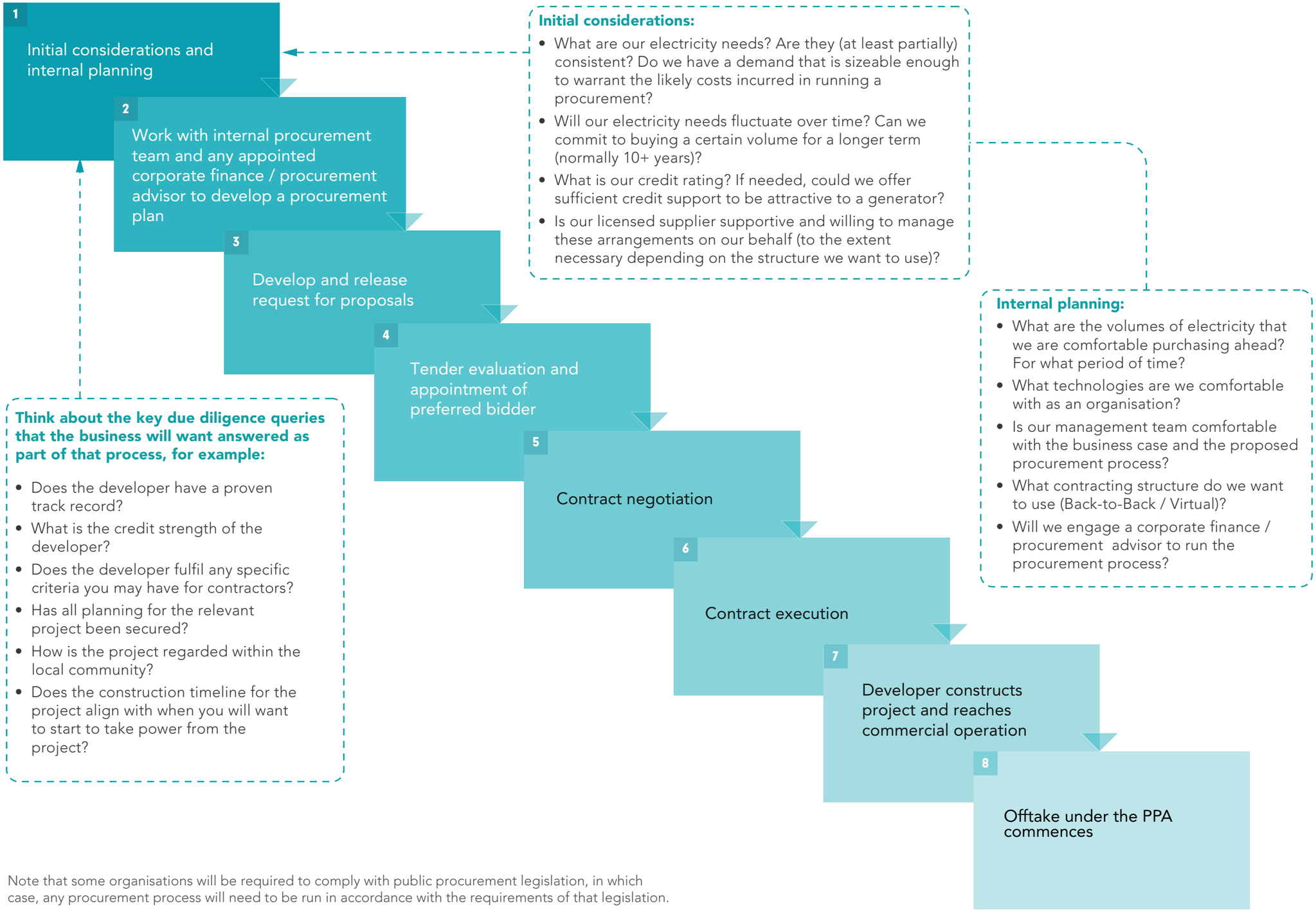
Where a project is coming to end of a subsidy, we would generally see that the generator would want to maximise the life of that asset. Any debt will have been paid off, so the generator can take merchant risk on the power market. The generator may be willing to enter into a PPA to give a fixed revenue stream for an additional period of time, but there may be less appetite to do so as there is not the same imperative to have a certain minimum income, which is usually a requirement for a debt funder. Approach will vary from generator to generator.

Where a generator is looking at repowering (putting in larger turbines for example), this is more akin to a new project because the generator has to secure ongoing land rights, new planning etc., and there are additional costs associated with the significant upgrade to plant/installation of new plant. Here, the generator may need to secure a longer term, certain, revenue stream in order to do that.

## PPA PROCUREMENT PROCESS

A high-level overview of a typical PPA procurement process is as illustrated in Figure 12.

**Figure 12**: Typical steps in a PPA procurement process




Note that some organisations will be required to comply with public procurement legislation, in which case, any procurement process will need to be run in accordance with the requirements of that legislation.

## EXAMPLE PROCUREMENT MIXES

**Figure 13: Example procurement mixes and alignment to the guidance requirements**

### For 'net zero carbon – in operation' claims:

1. The building's overall procurement mix shall only consist of routes provided in Table 9 and 10*
2. Buildings should demonstrate that a share of their overall procurement mix provides additionality, (e.g., as per routes listed in Table 9), with the overall aim of increasing this share to 100%
3. Where this is not currently feasible, the rationale shall be publicly disclosed with an action plan of how additionality will be secured for at least a share of the mix by the next procurement cycle opportunity
4. The annual electricity consumption (kWh), the breakdown of the overall procurement mix by route (kWh, %) and the associated reporting requirements per route (as per Table 9 and 10) shall be publicly disclosed.

* Or any other routes not listed that fully or partially meet the three principles

**Owner-occupier A procures:**

Onsite PVs | Low Quality Green Elec Tariff | Carbon Offset Credits

| | | |
|---|---|---|
| 1 | ✓ | Electricity procurement only consists of routes in Table 9 and 10 |
| 2 | ✓ | Onsite PVs demonstrates additionality |
| 3 | | N/A – but aim to increase share that is additional |
| 4 | ✓ | Required disclosure provided as per Minimum Reporting Template |

✓ **Emissions relating to low quality green electricity tariff is offset through an approved international or domestic carbon standard**

**Owner-occupier B procures:**

Onsite PVs | Standard Electricity Tariff

| | | |
|---|---|---|
| 1 | ✗ | Electricity procurement does not only consist of routes in Table 9 and 10 |
| 2 | | N/A |
| 3 | | N/A |
| 4 | | N/A |

✗ **Building does not meet the requirements, and cannot seek 'net zero carbon – in operation'. To align with the guidance, Owner-occupier B is required to transition their standard electricity tariff to a route in Table 9 or 10, e.g. a green tariff at a minimum. They cannot purchase unbundled REGOs to match their standard tariff consumption as they have control over the energy procurement.**

**Tenant A (with control over their energy procurement) procures:**

High Quality Green Electricity Tariff | Standard Gas Tariff | Carbon Offset Credits

| | | |
|---|---|---|
| 1 | ✓ | Electricity procurement only consists of routes in Table 9 and 10 |
| 2 | ✓ | High quality electricity tariff demonstrates additionality |
| 3 | | N/A – but aim to increase share that is additional |
| 4 | ✓ | Required disclosure provided as per Minimum Reporting Template |

✓ **Emissions relating to standard gas tariff is offset through an approved international or domestic carbon standard. Tenant A has a trajectory plan demonstrating how gas will be phased out by the next system replacement.**

**Tenant B (with no control over their energy procurement):**
Tenant B's Landlord procures:

Standard Electricity Tariff | Standard Gas Tariff

Tenant B procures:

Unbundled REGOs | Carbon Offset Credits

| | | |
|---|---|---|
| 1 | ✓ | Tenant B's electricity procurement only consists of routes in Table 9 and 10 |
| 2 | ✗ | No additionality demonstrated |
| 3 | ✓ | Action plan to engage landlord over energy procurement choices or lease agreement |
| 4 | ✓ | Required disclosure provided as per Minimum Reporting Template |

✓ **Tenant B meets requirements for 'net zero carbon – in operation' but will be expected to actively engage their landlord to influence the procurement choice prior to the next procurement cycle. The emissions related to electricity and gas consumption are offset through a verified carbon standard. To 'future-proof' their net zero claims, they should seek to increasingly improve their electricity procurement mix such that a share demonstrates additionality**

**Tenant C (with no control over their energy procurement):**
Tenant C's Landlord procures:

High Quality Green Electricity Tariff | Standard Gas Tariff | Carbon Offset Credits

| | | |
|---|---|---|
| 1 | ✓ | Electricity procurement only consists of routes in Table 9 and 10 |
| 2 | ✓ | High quality electricity tariff demonstrates additionality |
| 3 | | N/A |
| 4 | ✓ | Required disclosure provided as per Minimum Reporting Template |

✓ **Emissions relating to standard gas tariff is offset through an approved international or domestic carbon standard. Tenant C will engage with landlord to consider how gas can be phased out by the next system replacement cycle.**

**Developer**

| | |
|---|---|
| ✓ | Design to reduce construction impacts |
| ✓ | Design to reduce operational energy use – energy systems installed are compatible with being powered from renewable energy sources |
| ✓ | Meets energy performance targets where available |
| ✓ | Assess the viability of on-site renewable energy |

✓ **Offset upfront embodied carbon (modules A1 to A5 of EN15978) if seeking to achieve 'net zero carbon – in construction' through an approved international or domestic carbon standard.**

# Appendix C3: Carbon Accounting

## GHG PROTOCOL SCOPE 2 GUIDANCE

***"Companies with any operations in markets providing product or supplier-specific data in the form of contractual instruments shall report scope 2 emissions in two ways and label each result according to the method: one based on the location-based method, and one based on the market-based method."***

The GHG Protocol Scope 2 guidance specifically outlines that any organisation operating within a market with procurement choice, such as the UK, should be reporting their emissions using both the location- and market-based method.

### LOCATION-BASED METHOD

The location-based method reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid-average emission factor data).

The Department for Business, Energy and Industrial Strategy (BEIS) publishes the location-based emissions factors to use on an annual basis.

### MARKET-BASED METHOD

The market-based method reflects the GHG emissions associated with the procurement choices a consumer makes regarding its electricity supplier or products. The GHG Protocol identifies a hierarchy of different types of qualifying contractual instruments from which emission factors can be derived. This covers any type of supplier-provided emission data or contract, provided it meets the Scope 2 Quality Criteria and can include:

- Unbundled energy attribute certificates, e.g., REGOs
- Green tariff products from energy suppliers
- Power Purchasing Agreements with energy generators – for renewable, nuclear or fossil-fuel based energy

**Residual fuel mix – emission factor**

To prevent double counting of GHG emission rate claims tracked through contractual instruments, the market-based method requires an emission factor for the residual mix – i.e. the energy mix once all claimed generation are removed from the overall national average.

> This residual emission factor is what UK consumers should use to report under the market-based method if they have chosen not to purchase renewable electricity via PPAs, Green Tariffs or REGOs, and do not have any other supplier-specific data.

BEIS publishes the residual fuel mix annually – this is used by electricity suppliers to calculate the electricity they supply between fuel type when they do not have generator declaration or REGO certificates. For 2019/20, the residual fuel mix consisted of 8.3% renewable energy, compared to the UK grid-average (i.e., location-based) of 37.9%.[20]

Note that the 8.3% renewable energy relates to unclaimed electricity. This means that all electricity suppliers can claim to supply at least 8.3% renewable electricity without having to take any action.

To date, BEIS does not publish the associated emission factor for the residual fuel mix. Organisations would need to obtain this elsewhere, such as via the Association of Issuing Bodies (AIB) which publishes annual figures for Great Britain, and a figure for Northern Ireland and Ireland combined.

For comparison, the 2019/20 residual fuel mix factor for GB and NI/Ireland were 0.348 $kgCO_2e/kWh$ and 0.495 $kgCO_2e/kWh$ respectively. The location-based grid average for the UK was 0.233 $kgCO_2e/kWh$.

### LIMITATIONS OF LOCATION-BASED AND MARKET-BASED METHOD

As explained within Section 3, there are limitations to both location-based and market-based methods in the UK:

- The location-based method does not consider an organisation's or consumer's active procurement choices. Consequently, organisations cannot achieve net zero in their scope 2 emissions without carbon offsets until the national grid is fully decarbonised.
- The market-based method is reliant on contractual instruments such as REGOs. However, as the REGO system does not act as a support mechanism in driving additionality, the market-based method does not necessarily indicate a causal relationship between the reporting entity and emission rate claims.

Despite these limitations, it is still important to report scope 2 emissions using both approaches, as this will provide a more accurate reflection of the overall electricity market. It will also help guide organisations incorporate demand side management considerations within their procurement strategies.

Nonetheless, for the purposes of calculating an appropriate residual carbon balance to offset for net zero building claims, neither approach sufficiently captures the context of the UK electricity market and active procurement choices. As a result, the third method, the NZCB Framework Definition approach, was developed – this is as described in Section 3, Table 11

## UK ENVIRONMENTAL REPORTING GUIDELINES

The UK Environmental Reporting Guidelines only requires location-based reporting; market-based reporting is optional.

International carbon offsets credits and domestic carbon units purchased should also be reported separately; the NZCB Framework Definition's Minimum Reporting Template reflects this to ensure alignment.

## EXAMPLE CARBON ACCOUNTING FOR 'NET ZERO CARBON – IN OPERATION'

This is an example calculation which indicates the procurement choices of an organisation, and how it relates to the residual carbon emissions as calculated using the location-based, market-based and NZCB Framework Definition methods. It is the latter figure that determines the amount to be offset in order to claim a net zero carbon building. Note that the minimum reporting requirements are as Appendix B; this example only serves to demonstrate how the residual carbon balance can be calculated.

| | | | | Onsite owned | Onsite PPA w/ new unsubsidised (private wire) | Offsite PPA w/ new unsubsidised | High quality green tariffs | Offsite PPA w/ new subsidised | Low quality green tariff | Unbundled REGOs | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Building** | **Area ($m^2$)** | **Gas (kWh)** | **Electricity (kWh)** | **Renewable electricity procurement mix – consumption (kWh)** | | | | | | | **Exported generation (kWh)** |
| Office 1 | 77 | 6,273 | 9,828 | | | | | | 9,828 | | |
| Office 2 | 262 | 0 | 17,102 | | | | 17,102 | | | | |
| Office 3 | 359 | 18,381 | 12,196 | | | | | | 12,196 | | |
| Office 4 | 1,449 | 81,397 | 124,815 | 12,482 | | | | | 112,334 | | 10,000 |
| Office 5 | 213 | 19,975 | 11,652 | | | | | | 11,652 | | |
| **Total** | **2,360** | **126,026** | **175,593** | **12,482** | **0** | **0** | **17,102** | **0** | **146,010** | **0** | **10,000** |
| | | | **%** | **7%** | **0%** | **0%** | **10%** | **0%** | **83%** | **0%** | |
| | | | **CHECK** | **100%** | | | | | | | |

| Scope 1 | Scope 2: location-based | Scope 2: market-based | Scope 1 | Scope 2: location-based |
|---|---|---|---|---|
| **Dual reporting (gross $tCO_2e$)** | | | **NZCB Framework (gross $tCO_2e$)** | |
| 1.2 | 2.5 | 0.0 | 1.2 | 2.5 |
| 0.0 | 4.4 | 0.0 | 0.0 | 0.0 |
| 3.4 | 3.1 | 0.0 | 3.4 | 3.1 |
| 15.0 | 28.7 | 0.0 | 15.0 | 28.7 |
| 3.7 | 3.0 | 0.0 | 3.7 | 3.0 |
| **23.2** | **41.7** | **0.0** | **23.2** | **37.3** |
| Gross scope 1 + 2 combined ($tCO_2e$) | 64.9 | 23.2 | | **60.5** |
| Exported generation ($tCO_2e$) | 2.6 | 2.6 | | **3.5** |
| Net combined ($tCO_2e$) | 62.3 | 20.6 | | **57.0** |
| **Min. offset credits required** | | | | **58** |

**2019 Figures**

| **Energy component** | | **GHG Protocol Scope 2** | | **NZCB Framework Definition approach** |
|---|---|---|---|---|
| | | **Location-based** | **Market-based** | |
| **Table 9:** Renewable electricity procurement routes aligned with the three principles | Private wire | 0 | | 0 |
| | Grid distributed | 0.256 | 0 | 0 |
| **Table 10:** Renewable electricity procurement routes partially aligned with the principles | | 0.256 | 0 | 0.256 |

| **Energy component** | | **GHG Protocol Scope 1** | **NZCB Framework Definition approach** |
|---|---|---|---|
| **Table 9:** Renewable electricity procurement routes aligned with the three principles | Onsite owned | 0 | 0 |
| Natural gas | | 0.184 | 0.184 |

**Additional reporting for <u>net</u> emissions calculation:**

| **Energy component** | **UK Environmental Reporting Guidelines** | **NZCB Framework Definition approach** |
|---|---|---|
| Exported renewable generation (avoided emissions) | 0.256 | 0.348 |

Sources: UK Government Greenhouse gas reporting: conversion factors 2019
Association of Issuing Bodies 2019 European Residual Mix

# Appendix C4: Carbon Offsetting

**WHAT IS A CARBON OFFSET?**

The terms carbon offset and carbon credit are used interchangeably:

- Carbon offset means emission reductions or removals achieved by one entity can be used to compensate (offset) emissions from another entity
- A carbon offset credit refers to the transferable instrument certified by government or independent certification bodies to represent an emission reduction of one metric tonne of $CO_2$ or $CO_2e$.

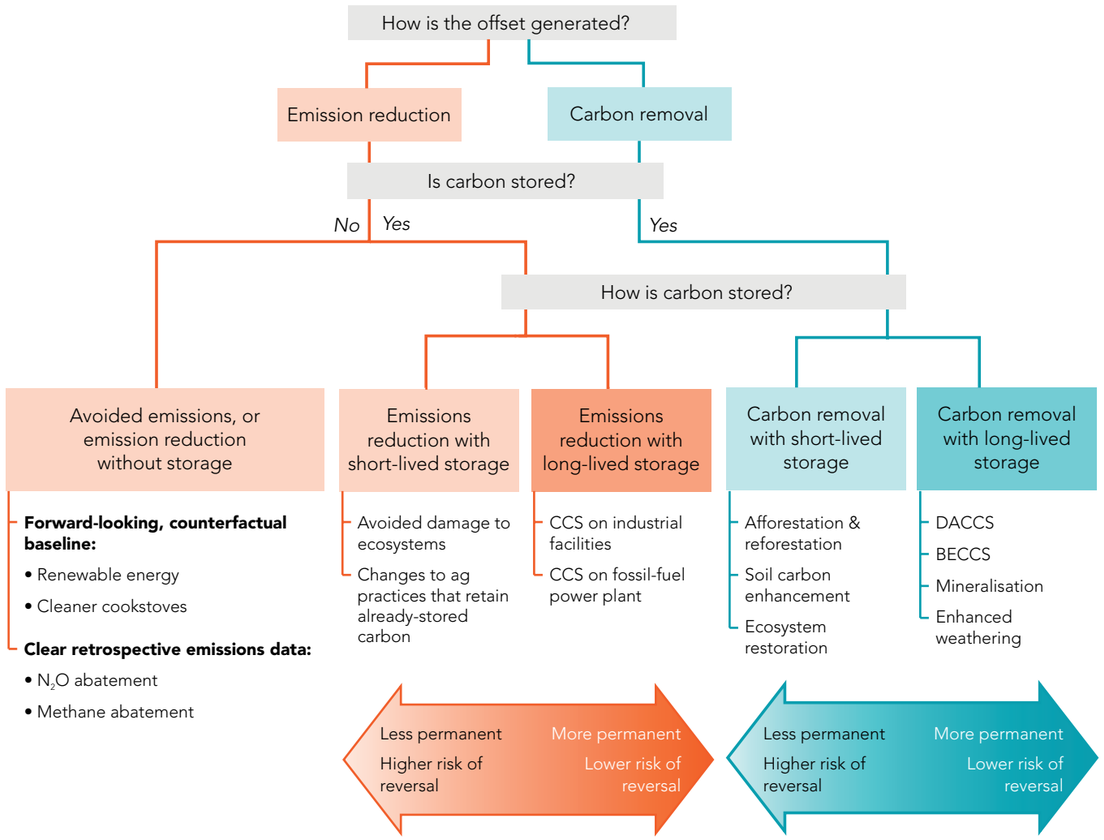
Any carbon offset credit bought must be 'retired' in a registry on behalf of the organisation or consumer in order for the related reduction / removal to be claimed towards GHG reporting goals.

Carbon offset projects can broadly be split into the categories illustrated in Figure 14. The majority of carbon offset credits commercially available to date are:

- Carbon removals with short-lived storage – forestry and land use projects
- Avoided emissions, or emission reductions without storage – renewable energy projects, energy efficiency/fuel switching projects, waste disposal projects, etc.

**Emissions reduction with long-lived storage** and **carbon removal with long-lived storage** are largely not yet available, and it is not known how finite such resources may be.

**Figure 14: Taxonomy of carbon offset credits; reproduced from the Oxford Principles for Net Zero Aligned Carbon**




## CARBON OFFSET STANDARDS

There are two types of carbon markets: **compliance** and **voluntary**. For the purpose of this guidance, only the voluntary market is applicable:

*Voluntary markets function outside of compliance markets and enable companies and individuals to voluntarily offset their emissions through carbon credit purchase. Independent offset standards are not governed by any national regulation or international treaties and are administered by private and independent third-party organisations.*

The three main carbon offset standards used in the voluntary market by UK consumers are: Gold Standard, the Verified Carbon Standard, and the UN Clean Development Mechanism.

Each standard has their own label for their offset credits – but all are equivalent to an emission reduction or removal of one metric tonne of $CO_2e$. These are as indicated in Table 17.

Note that standards may offer '**ex-ante**' credits, which represent a promise that an emission reduction or removal *will* be achieved in the future. This can often be seen with afforestation projects. These credits have different labels to those listed in Table 17 and **are not** permitted to be used in GHG accounting or net zero claims as they do not represent an actual reduction or removal of $CO_2e$.

There are also *additional* certifications that can be used in conjunction to the carbon standards to certify wider social and environmental benefits of these carbon offset credits. These include:

- SOCIALCARBON
- The CCB Standard
- Gold Standard for the Global Goals

**Table 17: Carbon offset credit labels by standard**

| Carbon offset standard | Label used for offset credits |
|---|---|
| Gold Standard | Verified Emission Reduction (VER) |
| Verified Carbon Standard (VCS) | Verified Carbon Unit (VCU) |
| Clean Development Mechanism (CDM) | Certified Emission Reduction (CER) |

## UK CONTEXT

The UK does not have a national or regional market mechanism, similar to the Australian Emission Reduction Fund or the California Compliance Offset Programme. Mechanisms such as these can supply carbon offset credits that can be used in compliance schemes.

The UK does, however, have two voluntary standards: Woodland Carbon Code and Peatland Code which are both hosted on the UK Land Carbon Registry database.

Note that domestic standards are to be reported separately to international voluntary carbon credits as set out in the UK Government's Environmental Reporting Guidelines and in Appendix B Minimum Reporting Template.

### WOODLAND CARBON CODE

The Woodland Carbon Code (WCC) is the voluntary standard for woodland creation projects in the UK that seeks to make claims about the carbon emission sequestered.

Any organisation seeking to claim carbon sequestration through afforestation on their own land must certify with the WCC. Woodland seeking certification must commit to a permanent land use change to woodland and to maintaining the woodland as a carbon sink.

There are two types of carbon units that can be issued for certified projects certified projects, as indicated in Table 18.

**Table 18**: Woodland Carbon Code units

| Carbon Unit | Represents | What can they be used for? |
|---|---|---|
| **Woodland Carbon Units (WCUs)**<br><br>Average cost in 2020 = not yet determined due to market maturity | 1 tonne of $CO_2$ that has been sequestered in a verified woodland.<br><br>The sequestration has been independently verified and guaranteed. | • By organisations to compensate for their UK-based GHG emissions.<br>• By organisations in claims of carbon neutrality via PAS2060:2014.<br>• Contribute directly to the UK's national targets for reducing GHG emissions.<br>• **Cannot** be used in compliance schemes, e.g., UK-ETS.<br>• **Cannot** be used for emissions outside of the UK, or emissions from international aviation or shipping. |
| **Pending Issuance Units (PIUs)** – *ex-ante*<br><br>Average cost in 2020 = £7-20 /$tCO_2$ [21] | 1 tonne of $CO_2$ of predicted sequestration – a 'promise to deliver'.<br><br>The sequestration is not yet guaranteed. | • Can be used by organisations to plan compensation against future UK-based emissions, i.e., plan their pathway to net zero.<br>• Can be used by organisations to make credible CSR statements in support of woodland creation.<br>• **Cannot** be used by organisations to report against their UK-based emissions until verified.<br>• **Cannot** be used in claims of net zero. |

Most units that have been available for purchase to date are **Pending Issuance Units**. There is a comparatively small number of **Woodland Carbon Units** available, given the time it takes to verify any carbon sequestered:

- Monitoring and verification of woodland creation takes place at Year 5, then every ten years after
- In Year 5, there is only a limited level of assurance of carbon sequestered; amounts are based on projects
- From Year 15 onwards, there is a reasonable level of assurance for standard projects of the carbon sequestered; amounts are based on field survey measurements

As a result, it can take a significant number of years before a purchased PIU can be converted to a WCU. This does not mean that UK woodland carbon creation should not be supported – however, it does mean that organisations seeking net zero claims or to report against national, or international accounting requirements will need to be aware of what can and cannot be stated if only purchasing PIUs.

**Table 19**: Woodland Carbon Code units available on the UK Land Carbon Registry, correct as of December 2020. Note 1 Carbon Unit = 1 tonne of $CO_2$ saved

| | Available for sale | Already sold | Landowners 'growing their own' credits | Total |
|---|---|---|---|---|
| Woodland Carbon Units | 800 | 5,500 | 800 | 7,100 |
| Pending Issues Units | 1,048,000 | 2,133,000 | 54,000 | 3,235,000 |

### PEATLAND CODE

The Peatland Code is a voluntary certification standard for UK peatland projects seeking to market the climate benefits of peatland restoration. This applies to any landowners intending to restore their peatlands to account for their residual emissions, or to create units that can then be sold on.

At date of publication, the Peatland Code is comparatively less established in the domestic market but has seen interest surge with a doubling of registered projects in 2020. This brings the total registered projects in 2020 to 24 projects, with 4 validated projects.[22]

## LOCAL PLANNING AUTHORITIES: NEW BUILD REQUIREMENTS

To date, 308 councils have declared a climate emergency; many of these have correspondingly set or are looking to set ambitions for their local area to be net zero by 2050 at the latest. This often includes aspiration for new developments to be built to a net zero carbon standard, which in turn can lead Local Planning Authorities (LPAs) to explore setting up a 'carbon offset fund'.

A number of LPAs to date, such as those in Greater London, have already set established funds which typically require developers to make a cash-in-lieu contribution to account for the shortfall in achieving net zero carbon developments. This is generally applicable to regulated energy only, and is an upfront payment calculated for a 30-year period secured through section 106 agreements.

These funds provide a source of income for carbon reduction projects across the local area and can play a role in funding projects where achieving carbon savings have traditionally been more challenging. This can include emission reductions from existing buildings, such as providing community funding for the residential sector, local businesses, and the fuel poor. Funds are also often accumulated over a period in order to fund larger-scale projects.

### RELATIONSHIP TO THE NZCB FRAMEWORK DEFINITION

Local planning requirements and the NZCB Framework Definition should be treated as separate and distinct mechanisms for driving decarbonisation in the built environment. Both the timescale and purpose of the respective carbon offset funds differs from one another:

**Table 20**: Difference in carbon offset requirements between UKGBC's NZCB Framework Definition and Local Planning Requirements

| | NZCB Framework Definition: 'Net zero carbon – in operation' | Local planning requirements: New build |
|---|---|---|
| **Timescale** | • Requires building to have been occupied for 12 months prior to verification<br>• Carbon offset calculation and net zero verification based on measured, in-use energy consumption data (regulated and unregulated energy)<br>• Payments levied on an annual basis, based the building occupation data for the 12 months prior to each verification | • Carbon offset calculation and net zero verification may be based on modelled design data or post-construction data (usually regulated energy only)<br>• Payments levied as part of the planning process as a one-off fee for a 30 year lifetime |
| **Purpose** | • The polluter pays<br>• Residual emissions are offset by the polluters in the timeframe that they occur<br>• Residual emission must be offset through an approved international or domestic carbon standard to ensure the carbon savings are real, measured and verified<br>• Allows 'net zero carbon – in operation' to be claimed based on ongoing annual performance | • The developer pays<br>• Funds levied on separate development / planning permissions across the local area may be accumulated over a period, e.g., five years, in order to fund larger-scale projects<br>• The LPA defines the criteria to determine what carbon reduction projects the funds can be spent on (in line with any broader strategic policy framework), but does not necessarily require savings to be measured and verified |

# Abbreviations

| | |
|---|---|
| **BECCS** | Bioenergy with Carbon Capture and Storage |
| **BMC** | Biomethane Certificate |
| **CCC** | Climate Change Committee |
| **CCS** | Carbon Capture and Storage |
| **CDM** | Clean Development Mechanism |
| **CHP** | Combined Heat and Power |
| **$CO_2e$** | Carbon Dioxide Equivalent |
| **COP26** | 26th United Nation Climate Change Conference |
| **DACCS** | Direct Air Capture with Carbon Storage |
| **ERG** | Environmental Reporting Guidelines |
| **ESG** | Environmental, Social & Corporate Governance |
| **EU** | European Union |
| **FMD** | Fuel Mix Disclosure |
| **GHG** | Greenhouse Gas |
| **GoO** | Guarantees of Origin |
| **HMT** | Her Majesty's Treasury |
| **ICROA** | International Carbon Reduction & Offset Alliance |
| **LV/HV** | Low Voltage / High Voltage |
| **MWh** | Megawatt-hour |
| **$N_2O$** | Nitrous Oxide |
| **NDC** | Nationally Determined Contributions |
| **NZCB** | Net Zero Carbon Building |
| **PIU** | Pending Issuance Unit |
| **PPA** | Power Purchase Agreement |
| **REGO** | Renewable Energy Guarantees of Origin |
| **RGGO** | Renewable Gas Guarantees of Origin |
| **RHI** | Renewable Heat Incentive |
| **RTFO** | Renewable Transport Fuel Obligation |
| **STOR** | Short-term operating reserve |
| **VCS** | Verified Carbon Standard |
| **VCU** | Verified Carbon Unit |
| **VER** | Verified Emission Reduction |
| **WCC** | Woodland Carbon Code |
| **WCU** | Woodland Carbon Unit |

# Glossary

| | |
|---|---|
| 1.5 degrees | Relates to the Intergovernmental Panel on Climate Change special report on 1.5 degrees which found that limiting global warming to 1.5 degrees compared with 2 degrees would reduce challenging impacts on ecosystems, human health, and well-being. |
| Additionality (Section 2: Renewable Energy Procurement – Principle) | The principles of additionality apply when an organisation / consumer self-generates renewable energy from their own facilities, or closes an electricity purchasing contract that contributes to the construction of new renewable energy facilities. Projects that comply with the principle of additionality result in real and verifiable emission reduction or emission avoidance for the organisation / consumer, as their direct effect is to increase renewable energy generation. |
| Additional (Section 4: Carbon offsets – Principle) | Carbon offset projects must demonstrate that (1) the project could not take place without the carbon finance from selling credits and (2) project-based emission reductions or removals are additional to what would have occurred if the project had not been carried out. The project must not be required by legislation or be used to demonstrate compliance against legally binding targets. |
| Carbon offset | Emission reductions or removals achieved by one entity can be used to compensate (offset) emissions from another entity |
| Carbon offset credit | A transferable instrument certified by government or independent certification bodies to represent an emission reduction of one metric tonne of $CO_2$ or $CO_2e$ |
| Contractual instrument | Any type of contract between two parties for the sale and purchase of energy bundled with energy attributes, or for unbundled attribute claims. Includes energy attribute certifications (e.g., REGOs, GoOs), direct contracts (for renewable, low-carbon or fossil fuel generation), supplier specific emission rates or other default emission factors representing the residual fuel mix if a company does not have other contractual information that meet the GHG Protocol Scope 2 Quality Criteria. |
| Emission factor | An emission factor gives the relationship between the amount of a pollutant produced and the amount of raw material processed or burnt. |
| Energy attribute certificates | A category of contractual instruments used in the energy market to convey information about the energy generation to other entities involved in the sale, distribution, consumption or regulation of electricity – for example, in the UK REGO certificates are used to convey to consumers the proportion of electricity that suppliers source from renewable generation. The energy attribute certificates can be sold or purchased separately, i.e., unbundled, to the power itself. |
| Fuel Mix Disclosure | The Electricity (Fuel Mix Disclosure) Regulations 2005 (SI 2005 No. 391) introduced a requirement on all electricity suppliers in Great Britain to disclose to their customers the mix of fuels used to generate the electricity supplied annually, provided that electricity is supplied for a full disclosure period (1 April – 31 March). Suppliers must disclose this information by 1 October annually. |
| Green product | In the context of the NZCB Framework Definition, green product relates to any renewable energy procurement route that is available within the market. Examples include green tariffs, and variations of PPA models. |
| Green tariff | A consumer product offered by an energy supplier distinct from the 'standard' fossil-fuel based offering. These are often supported by renewable generation or energy attribute certificates such as unbundled REGOs. |

| | |
|---|---|
| Guarantees of Origin | A Guarantees of Origins is an energy attribute certificate used in the European Union. The UK equivalent is the REGO scheme. Ofgem is required by legislation to recognise overseas GoOs for the purposes of Fuel Mix Disclosure. |
| Location-based method for scope 2 accounting | A method to quantify scope 2 GHG emissions based on average energy generation emission factors for defined locations, including local, subnational, or national boundaries. |
| Market-based method for scope 2 accounting | A method to quantify scope 2 GHG emissions based on GHG emissions emitted by the generators from which the reporter contractually purchases electricity bundled with instruments, or unbundled instruments on their own. |
| Megawatt-hour | A unit of electrical energy; the amount of energy produced over one hour by a power plant with an output of 1MW |
| Power Purchase Agreement | A power purchase agreement is a contract entered into between a generator and a customer which allows the customer to have a direct purchasing relationship with a generator without needing a direct physical connection to the generation plant (such as under a private wire arrangement). It may take the form of a traditional PPA or be a type of contract for difference. A corporate PPA can bring electricity consumers and generators together irrespective of location. |
| REGO certificate | Each Renewable Energy Guarantees of Origins (REGO) certificate represent the 'energy attribute', i.e., the zero GHG emissions, associated with 1MWh of renewable energy generated. |
| Residual carbon / emissions | In the context of NZCB Framework Definition, the residual carbon relates to the remaining emissions once it has been reduced as far as possible in line with Steps 1 – 4 of the Framework Definition. These steps relate to reductions in whole life carbon, improvements in energy efficiency and the procurement of renewable energy. |
| Residual fuel mix | The residual fuel mix represents the energy mix once all claimed generation tracked through contractual instruments are removed from the overall national average. |
| Retiring | Carbon offset holders must 'retire' the carbon credit in order to use and claim the associated GHG reductions towards their reporting requirements. Retirement is evidenced through a publicly available registry – these may vary depending on the carbon offset standard used. REGO certificates must also be 'retired' within the Renewables and CHP Register for the associated energy attribute benefits to be claimed. Once a carbon credit or REGO certificate is retired, it cannot be transferred or claimed by another entity. |
| Scope 1 emissions | Emissions from operations that are owned or controlled by the reporting company |
| Scope 2 emissions | Indirect emissions from the generation of purchased or acquired electricity, steam, heat, or cooling consumed by the reporting company. |
| Scope 2 Quality Criteria | A set of requirements defined within the GHG Protocol Scope 2 guidance that contractual instruments shall meet in order to be used in the market-based method for scope 2 accounting. |
| Scope 3 emissions | All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. |
| Unbundled | An energy attribute certificate or other instrument that is separate, and may be traded separately, from the underlying energy produced. E.g., in the UK, REGO certificates can be 'unbundled', meaning that it can be purchased or sold separately to the renewable generated power. |



# References

All references correct as of publication date: 9th March 2021.


1 Climate Change Committee (2019). Net Zero Technical report. (online) Available at: https://www.theccc.org.uk/publication/net-zero-technical-report/

2 Energy Systems Catapult (2019). Living Carbon Free. (online) Available at: https://www.theccc.org.uk/publication/living-carbon-free-energy-systems-catapult/

3 The Institution of Engineering and Technology, Nottingham Trent University (2020). Scaling up retrofit 2050. (online) Available at: https://www.theiet.org/media/5276/retrofit.pdf

4 Ofgem (2018). Default Tariff Cap: Policy Consultation. Appendix 13 – Renewable tariff exemption. (online) Available at: https://www.ofgem.gov.uk/ofgem-publications/133685

5 Independent Commodity Intelligence Services (2020). ICIS Power Perspective: British GOs price rise expected to continue on healthy demand outlook. (online) Available at: https://www.icis.com/explore/resources/news/2020/03/03/10477053/icis-power-perspective-british-gos-price-rise-expected-to-continue-on-healthy-demand-outlook

6 National Grid ESO (2020). Future Energy Scenarios 2020. (online) Available here: https://www.nationalgrideso.com/future-energy/future-energy-scenarios/fes-2020-documents

7 Climate Change Committee (2020). Corporate Procurement of Renewable Energy – Implications and Considerations. (online) Available here: https://www.theccc.org.uk/publication/corporate-procurement-of-renewable-energy-implications-and-considerations/

8 BEIS (2020). Energy White Paper: Powering Our Net Zero Future. (online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

9 Ofgem (2020). Ofgem Decarbonisation Programme Action Plan. (online) Available at: https://www.ofgem.gov.uk/system/files/docs/2020/02/ofg1190_decarbonisation_action_plan_revised.pdf

10 Climate Change Committee (2020). Corporate Procurement of Renewable Energy – Implications and Considerations. (online) Available here: https://www.theccc.org.uk/publication/corporate-procurement-of-renewable-energy-implications-and-considerations/

11 HM Government (2019). Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance. (online) Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/850130/Env-reporting-guidance_inc_SECR_31March.pdf

12 HM Government (2020). Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal. (online) Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/793632/data-tables-1-19.xlsx

13 Climate Change Committee (2019). Net Zero – The UK's contribution to stopping global warming. (online) Available here: https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/

14 High-Level Commission on Carbon Prices (2017). Report of the High-Level Commission on Carbon Prices. Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO. (online) Available here: https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices

15 Ecosystem Marketplace (2020). Voluntary Carbon and the Post-Pandemic Recovery. (online) Available here: https://www.forest-trends.org/publications/state-of-the-voluntary-carbon-markets-2020-2/

16 Green Gas Certificate Scheme (2018). Green Gas Certification Scheme (GGCS) response to Ofgem's Default Tariff Cap: Statutory Consultation. (online) Available here: https://www.ofgem.gov.uk/ofgem-publications/141597#:~:text=UK%20biomethane%20to%20grid%20capacity,consumption%20%E2%80%93%20less%20than%201%25.

17 Greenhouse Gas Protocol (2020). Corrections to the Scope 2 Guidance. (online) Available here: https://ghgprotocol.org/sites/default/files/standards_supporting/List%20of%20Corrections%20to%20the%20Scope%202%20Guidance_0.pdf

18 HM Government (2019). Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance. (online) Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/850130/Env-reporting-guidance_inc_SECR_31March.pdf

19 Climate Change Committee (2020). Corporate Procurement of Renewable Energy – Implications and Considerations. (online) Available here: https://www.theccc.org.uk/publication/corporate-procurement-of-renewable-energy-implications-and-considerations/

20 HM Government (2020). Fuel Mix Disclosure Data Table. (online) Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/906175/fuel-mix-disclosure-data-2019-2020.pdf

21 Woodland Carbon Code (2021). How to buy woodland carbon units. (online) Available here: https://woodlandcarboncode.org.uk/buy-carbon/how-to-buy

22 IUCN UK Peatland Programme (2020). Green carbon initiatives join forces to expand the UK market- launching the new Peatland Code registry. (online) Available here: https://www.iucn-uk-peatlandprogramme.org/news/green-carbon-initiatives-join-forces-expand-uk-market-launching-new-peatland-code-registry

# Acknowledgements

This document is an output from the UKGBC Advancing Net Zero Programme. Its development was led by an industry task group and informed by a stakeholder consultation on the proposals. UKGBC would like to sincerely thank all task group participants, alongside all involved stakeholders and consultation respondents for their feedback, assistance, and contributions over the development of the guidance.

## TASK GROUP SUPPORTERS:

**BBP**, Chris Botten
**BPF**, Chris Paul
**CIBSE**, Julie Godefroy
**Energy Institute**, Gareth Veal
**IEMA**, Nick Blyth
**Passivhaus Trust**, John Palmer
**REA**, Frank Gordon
**RIBA**, Peter Fisher
**RICS**, Paul Bagust
**SEA**, Jade Lewis

## TASK GROUP PARTICIPANTS:

**Acclaro Advisory**, Jo Burton
**AECOM**, Tom Pendrey
**amber energy®**, Nick Proctor
**ARUP**, Christopher Pountney
**BRE**, Christine Pout
**Burges Salmon LLP**, Emma Andrews
**Buro Happold Engineering**, Duncan Price
**Carbon Intelligence**, Sam Carson
**Carbon Trust**, Veronika Thieme
**The Crown Estate**, Jane Wakiwaka
**Currie & Brown**, Tassos Kougionis
**Hilson Moran**, Marie-Louise Schembri
**Hoare Lea**, Kevin Couling
**JLL**, David Mead
**Landsec**, Andy Mazzucchelli
**Marks & Spencer**, Zoe Mountford
**Max Fordham LLP**, Tom Greenhill
**Peel Energy (Peel L&P)**, Joe Chambers
**Syzygy Consulting**, Kirsty Berry
**Turley**, James Blake
**Verco**, Tim Crozier-Cole
**Willmott Dixon**, Alasdair Donn

## REPORT PRODUCTION:

UKGBC: Emily Huynh, with editorial support from Alastair Mant, Alex Smith, Brooke Penman

With thanks to Emma Andrews, Burges Salmon LLP, for author contributions to Appendix C2.

## THIS GUIDANCE HAS BEEN MADE POSSIBLE BY OUR UKGBC ADVANCING NET ZERO PROGRAMME PARTNERS:

**Lead Partner:**
The Redevco Foundation

**Programme Partners:**
BAM Construct UK, Berkeley Group, Grosvenor Britain & Ireland, Hoare Lea and JLL

To access the latest UKGBC guidance on net zero carbon buildings, please visit https://www.ukgbc.org/ukgbc-work/net-zero-carbon-buildings-framework/

## QUESTIONS AND FEEDBACK

We welcome input from any interested stakeholders from across the building value chain on the content of this guidance and any future revisions.

If you have any questions on this guidance, or would like to provide feedback, please email ANZ@ukgbc.org.

**UK Green Building Council**
The Building Centre
26 Store Street
London WC1E 7BT

T 020 7580 0623
E info@ukgbc.org
W ukgbc.org