

CARBON OFFSET REVIEW

Evidence Document

January 2024

Executive Summary

Canterbury City Council published a Draft Canterbury District Local Plan to 2045 that went out to public consultation in October 2022. Upon review of the responses, it was clear that more information was desired to demonstrate the feasibility of carbon offsetting. A new council was elected in May 2023 and a new Cabinet formed.

A new version of the draft Local Plan has since been developed and is expected to go out to regulation 18 consultation in March 2024. The research in this evidence report has been undertaken to further inform Policy DS6 Sustainable Design as per the feedback from the previous consultation.

This document aims to review existing carbon offset policies across the country to help provide context and evidence on how Canterbury City Council can implement Policy DS6 Sustainable Design and finalise a carbon offset value.

The carbon offset figure established in this report will be reflected in the Sustainable Design Guide Supplementary Planning Document (SPD) that is expected to be subject to consultation alongside the new draft local plan. Carbon offsetting is intended as a last resort for applicants who can provide the requested evidence to justify that net zero is not feasible for the proposed development. In these circumstances the residual carbon could be offset via a carbon offset payment to the council. The figure proposed is intended to encourage applicants to achieve net zero, rather than offset at a lower cost.

In December 2023, a written ministerial statement was published by Lee Rowley, Minister of State for Housing, titled Planning - Local Energy Efficiency Standards Update. The statement announced that further changes to energy efficiency building regulations are planned for 2025.

1. Carbon Offset Research - Existing Policies

In 2008, Milton Keynes Council became the first local authority in the UK to establish a Carbon Offset Fund as part of its Local Plan policy. This was a definitive turning point in integrating carbon offsetting into local government planning and policy.

Some of the first councils to adopt carbon offsetting included Milton Keynes in 2008 at £60 per tonne of CO₂ and Southampton Council in 2012 at £210 per tonne of CO₂.

The London Borough of Lewisham produced a report on Carbon Offsetting in 2013¹. Within the report it stated that £104 per tonne of CO₂ was the appropriate figure based on the following:

- The study aimed to develop a carbon offset strategy aligned with local policies and practical alternatives for onsite carbon reduction, consistent with Lewisham's Core Strategy and the requirements of the Borough.
- An evaluation of the predicted residual emissions in Lewisham and the costs associated with offsetting these emissions in the local area.
- Different 'baskets of measures' were analysed to determine the most cost-effective ways of generating offset fund projects. The study evaluated various scenarios and the associated costs per tonne of CO₂ saved, including management costs.
- The final offset figure was chosen to balance the need for a flexible approach for developers and the ability to deliver carbon reduction projects within Lewisham. The cost needed to be sufficient to fund these projects while maintaining viability.

The study's localised approach led to the adoption of the £104 per tonne figure.

The Greater London Authority (GLA) introduced Carbon Offsetting for new build developments as part of a broader climate strategy under the London Plan in 2014.

The strategy supported London's ambition to be net zero, as declared by the Mayor of London in response to the climate emergency. The initial step was taken when the London Plan Policy 5.2 was introduced in 2014. It set a target of a 35% carbon reduction beyond the standards of Part L of the Building Regulations 2013 for major development. This plan was

¹<https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwix4sSzmMuEAXU7TEEAHc0-D4sQFnoECA8QAQ&url=https%3A%2F%2Flewisham.gov.uk%2F-%2Fmedia%2Ffiles%2Fimported%2Flewis-hamcarbonoffsetstudy.ashx&usg=AOvVaw0XDWHn85E9zyena9AM7Myx&opi=89978449>

formed based on the expectation that national zero-carbon targets for homes would be in place by 2016.

The GLA issued the Housing Supplementary Planning Guidance in March 2016, which further escalated requirements by setting a new standard of a 100% carbon reduction for major new residential developments in London, effective from 1 October 2016. This represented a significant increase from the initial 35% reduction target.

The GLA's approach included a mechanism for carbon offsetting, as it was recognised that the challenge of achieving the required reduction levels differs based on building types. If a development couldn't meet the on-site emissions reduction target, the shortfall was offset either off-site or through a cash contribution. This ensured that the overall carbon reduction objectives were met regardless of the scenario.

The carbon offset price changed from £60 to £95 per tonne in the London Plan 2020. The increase was based on evidence² created for the draft London Plan, which reflected the HMT Green Book, tested within viability assessment of the draft London Plan. In 2018, London boroughs were advised to apply the new price of £95 per tonne of carbon. This change was followed by consultation on the London Plan and the declaration of a Climate Emergency by several London councils.

Bristol City Council published guidance for their carbon offset policy BCS14 in 2020 setting a carbon offsetting price of £95 per tonne CO₂, aligned with the LGA guidance. In 2023, they further updated³ the guidance due to the changes presented in Building Regulations Part L 2021. The changes to the regulations meant that the cost of offsetting carbon emissions would be cheaper than making on-site changes to reduce emissions. The new revised price for carbon offsetting in Bristol City was set at £373 per tonne CO₂, which was based upon the high series in the 2022 version of the Green Book.

The report by Bristol City Council goes on to explain that the carbon factors for electricity within Part L 2021 software are approximately 75% lower than they were in Part L 2013. Meaning that the offset costs per unit of energy for the previous £95/tonne figure and the new £373/tonne figure are very similar when relatively compared. Using Part L 2013 carbon factors, 1 MWh of electricity equates to 0.519 tonnes of CO₂, which at £95/tonne is valued at £49. Using the updated carbon factors, 1 MWh of electricity equates to 0.136 tonnes of CO₂, which at £373 is valued at £51, making the difference minimal.

² [London Carbon Offset Price DRAFT Report](#)

³

<https://www.bristol.gov.uk/files/documents/5808-climate-change-and-sustainability-practice-note-addendum-and-faqs/file>

Bath & North Somerset Council is widely considered to be one of the most progressive councils in terms of carbon offsetting. Bath and North East Somerset (B&NES) were the first English council to implement an energy-based net zero policy, in 2023⁴, after previously using a carbon based offsetting model. The new policy mandates that new housing must be 100% self-sufficient and net zero emissions. This means that the energy required for the building's consumption must be generated. To make the policy viable, an energy-based offset system will finance the retrofitting of social housing stock.

Cornwall Council also adopted an energy-based net zero policy in 2023⁵. Their updated policy states that new residential development must achieve net zero carbon emissions and submit details in achieving so via an Energy Statement. The council has implemented parameters for space heating demand, total energy consumption and on site renewable generation. Applicants are encouraged to meet the proposed requirements in the first instance, and if this is not viable the next resort is to prioritise renewable energy generation. As a final resort, applicants may pay into an offset fund.

2. The Green Book

Business, Energy & Industrial Strategy (BEIS) publish the annual nationally recognised non-traded price of carbon, via the Green Book⁶. In 2021 a paper was published titled Valuation of greenhouse gas emissions: for policy appraisal and evaluation⁷. In Annex 1 of the report, the updated prices for 2024 are:

Low series: £128 per tonne of CO₂

Central series: £256 per tonne of CO₂

High series: £384 per tonne of CO₂

The varied scenarios, or 'series', were established to reflect and account for the varied levels of carbon reduction based on influencing factors such as the carbon reduction ambitions, location, etc. For this reason, the middle or 'central' series is often used as a standard value. More recently, the 'high series' has been used by authorities such as the GLA.

Based on the updated prices presented in the 2021 paper, the previous carbon cost of £95 per tonne of CO₂ is no longer considered relevant.

⁴ beta.bathnes.gov.uk/sites/default/files/2023-06/1. Districtwide Composite plan final.pdf

⁵ [Climate Emergency Development Plan Document - Strategic Planning \(cornwall.gov.uk\)](https://www.cornwall.gov.uk/Climate-Emergency-Development-Plan-Document-Strategic-Planning)

⁶ [The Green Book \(2022\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/the-green-book-2022)

⁷ [Valuation of greenhouse gas emissions: for policy appraisal and evaluation - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/valuation-of-greenhouse-gas-emissions-for-policy-appraisal-and-evaluation)

The information behind calculating the carbon cost can be found within the Valuation of energy use and greenhouse gas (GHG) document from BEIS⁸.

3. Regulated vs Unregulated Carbon

The majority of carbon offset funds focus on regulated emissions rather than total emissions. By regulated emissions, we mean 'operational' i.e. the emissions required to operate a building once it's built. This is usually the adopted approach as it aligns with the baseline CO₂ emissions used in Part L 2021 of the Building Regulations.

Part L uses the unit of kilograms of CO₂ per square-metre per annum (kg/CO₂/m²). To then calculate a total emissions for a specific building, this figure can be multiplied by the building size.

In Part L of the Building Regulations, the below are considered to derive 'regulated' carbon emissions:

- Heating
- Cooling
- Hot Water
- Lighting
- Auxiliary (Pumps and Fans)

Unregulated emissions are generally harder to quantify, as these are based on theoretical calculations, such as small appliances and occupant behaviour, and not based on fixed systems. It is for this reason that they aren't factored into SAP calculations in relation to Part L.

For domestic buildings, unregulated emissions consist of:

- Equipment (Small Power devices)
- Cooking
- External Lighting
- Appliances

The impact of appliances and white goods in relation to energy consumption varies depending on the design and performance of the building. Where buildings are more efficient and air tight, appliances can be the last thing to push energy consumption higher

⁸ [Valuation of energy use and greenhouse gas \(GHG\) emissions \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/101422/valuation_of_energy_use_and_greenhouse_gas_emissions.pdf)

than necessary when not properly considered. High efficiency appliances should be installed as a priority to reduce electricity demand further and minimise overheating risk.

In March 2021, energy labelling ratings for appliances were revised and are now rated A-G. This was a significant step change, where what may have previously been an A+++ could now be a B or even a C rating. Very few appliances will achieve an A rating currently, as the new system has been designed to enable improvement in the industry. Appliances should be sourced with the highest available ratings to ensure optimum efficiency.

Canterbury City Council commissioned HDH Development to undertake a viability study in 2022 which was later updated in 2023, titled Local Plan Viability Study. Within the Climate Change section of the document, the cost of on-site carbon reduction is tested for both regulated and unregulated carbon. The testing demonstrates that reducing regulated carbon emissions to net zero is viable for various building typologies.

Based on the research undertaken in this report and the Local Plan Viability Study, Canterbury City Council's proposed approach is to base the Carbon Offset on Regulated Emissions only. Best practice advice in relation to the reduction of unregulated emissions can be found in the Sustainable Design Guide Supplementary Planning Document, through the use of energy efficient appliances and mindful consumer behaviour.

4. Carbon Offsetting in Practice

Please see below a worked example of carbon offsetting for a residential building.

For this example we are using a 100m² dwelling which has emissions, as per the SAP/HEM/SBEM submitted to the Council of:

Target Emission Rate (TER) – 10kg/CO₂ /m²/year

Dwelling Emission Rate (DER) – 2kg/CO₂ /m²/year

This shows an 80% reduction over Part L of the Building Regulations.

First the applicant should calculate the annual carbon emissions of the property. In this case, there is a residual carbon figure of 0.2 tonnes/annum for a 100m² property (2kg x 100).

The BEIS Green Book carbon values for policy appraisal for the year 2024 are:

Low £128

Central £256

High £384

These figures represent the cost per tonne of CO2 equivalent (tCO2e). Using these figures, the cost of offsetting 0.2 tonnes of CO2 per year for 30 years is as follows, for each scenario:

	Green Book cost	Tonnes CO2	CO2 cost over 30 years
Low	£128	0.2	£768
Central	£256	0.2	£1,536
High	£384	0.2	£2,304

The costs have been calculated again below for a 90% on-site reduction

	Green Book cost	Tonnes CO2	CO2 cost over 30 years
Low	£128	0.1	£384
Central	£256	0.1	£768
High	£384	0.1	£1,152

The costs have been calculated again below for a 70% on-site reduction

	Green Book cost	Tonnes CO2	CO2 cost over 30 years
Low	£128	0.3	£1,152
Central	£256	0.3	£2,304
High	£384	0.3	£3,456

Conclusion

To demonstrate compliance with the Written Ministerial Statement ⁹, Canterbury City Council has assessed the viability of its emerging net zero policies and has demonstrated them to be viable and deliverable.

The Local Plan Viability Study demonstrates the cumulative impacts of emerging policy costs including for affordable housing, infrastructure funding and delivering new homes to net-zero standards, will not adversely affect the viable delivery of planned growth in the district to 2040.

The examples shown in section 4 of this report also demonstrate that it is viable to offset any residual carbon emissions that cannot be mitigated within the development process through the council's carbon offset fund approach at the "High" figure as per the updated BEIS Green Book.

This figure is considered to be appropriate to deter applicants from designing for a lower level of carbon reduction on-site and is in line with the principles of the offset fund being a last resort, and the new development should be built to net zero standards wherever possible.

5. Methodology

The standard formula for calculation of a Carbon Offset payment is:

$$\text{Carbon Offset Value} = (T - R) \times Y \times Z$$

Where:

T is the target reduction in carbon dioxide emissions (tonnes CO₂)

R is the actual reduction in carbon dioxide emissions (tonnes CO₂)

Y is the number of years for which the contribution is payable (generally 30 years)

Z is the cost of carbon per tonne

Based on the above and the research within this document, the proposed figures for Canterbury City Council's Carbon Offset payments are:

T Dwelling Emission Rate (DER) of 0

⁹ [Written statements - Written questions, answers and statements - UK Parliament](#)

R TBC (depending on outcome of SAP/HEM/SBEM)

Y 30

Z £384 per tonne of CO2 over 30 years

Using the above, the total figure (Z) over 30 years would equate to £11,520 per tonne.

The council expects it is highly unlikely that a development would have a tonne of residual carbon left after implementation of sustainable design measures. It has been demonstrated getting to net zero is achievable within the viability evidence document.