





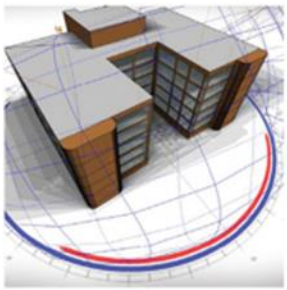


Net Zero Carbon Update – Assessment of £300 /t Cabron Offset Price

Prepared by: CIS

Prepared for: London Borough of Richmond upon Thames

LONDON BOROUGH OF RICHMOND UPON THAMES

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V1	Report	Owen Thomas	Steve Gray	15/07/2024
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Introduction

Executive Summary

London Borough of Richmond (LBR) instructed Climate Integrated Solutions (CIS) to provide additional analysis of a range of carbon offset fund (CoF) rates that were reviewed as part of the development of the £300/t/CO2 rate incorporated into the Publication Local Plan (Regulation 19) to inform the Examination of the Local Plan.

The objective is to substantiate the proposed policy £300/t/CO2 CoF rate reviewing the impact of the declining embedded carbon rates in grid supplied electricity in Standard Assessment Procedure SAP2012, SAP 10.0 and SAP10.2.

This additional report will summarise the effect of diminishing kg/CO2/kWh in grid supplied electricity and the impact of varying the CoF rate to maintain the incentive to build more efficient properties. This will be outlined by reviewing the range of archetypes selected to best reflect build types in the borough and to compare the cost to developers of offset payments based on a fixed building design and efficiency.

Scope & Context

The Net Zero Carbon Study (NZCS) (March 2023) assessed a range of building typologies using nationally recognised assessment procedures, detailed in Appendix 2 of that report. This further report builds on the NZCS and assesses the same building typologies, taking the data model and applying the carbon factors for Building Regulations UK Part L (BRUKL)/ Standard Assessment Procedure SAP 2012, 10.0 and 10.2. This provides a clear picture of the carbon attributable to energy (namely electricity) for each building typology showing the impact of the decarbonisation of the grid as the percentage of renewable energy content continues to rise.

Since the Council have been working on the new Local Plan, other London boroughs have also been working on the role of carbon pricing in achieving greater carbon reductions on site. In order to benchmark carbon pricing, the Delivering Net Zero (May 2023)[1], has been referenced. Table 2 of this report shows the impact of different CoF rates against the different BRUKL/SAP rates, taking the CoF rates from Delivering Net Zero (May 2023) study, starting at £95/t/CO2 rising to £840/t/CO2.

Richmond carbon offset pricing: the rate of £60/t was first adopted by the Council in October 2016 reflecting the then London Plan 2016. The Richmond Local Plan (adopted 3 July 2018) reflected the London Plan price of carbon of £60/t x 30 years, for carbon offsetting (see 6.3.12). This carbon offset rate was increased to £95/t on 3 June 2020 when the update to the Planning Obligations SPD was adopted.

Assessment Approach - Domestic SAP Modelling and Carbon Pricing

[1] An evidence study to support planning policies which deliver Net Zero Carbon developments - collaborative study by 18 London boroughs and led by Haringey Council
www.haringey.gov.uk/sites/haringeygovuk/files/delivering_net_zero_-_20_minute_summary.pdf
https://www.haringey.gov.uk/sites/haringeygovuk/files/delivering_net_zero_-_main_report.pdf

The Embodied Carbon (in some contexts called the Carbon Factor) of a fuel is the kg of CO2 that each kWh of energy is calculated to be responsible for. Below we will consider only the Embodied energy of National Grid Electricity as this is the only fuel used in the case studies within the NZCS and under the current London Plan and upcoming Richmond policy. It is noted that for new build developments in the vast majority of cases Heat Pumps are specified, which use electricity only, and it is rare for there to be any request for an alternative heat source.

The Embodied Carbon values are taken from the relevant version of Part L calculation methodology. So, although accurate at the time of their publication these have tended to be become significantly out of date during their time in use, creating significant falls in kg/CO2/kWh when a new version of Part L is released. It is planned by Government for smaller more incremental updates to be released going forward to reduce this issue.

The three Embodied Carbon factors that have been relevant over the past decade have been:

- 0.519kg/CO2/kWh used by 2012 building regulations (used nationally until 2022 and in London until 2019)
- 0.233kg/CO2/kWh used by "SAP10.0" a draft version of 2021 building regulations but also applied to Part L 2012 GLA applications from January 2019 via the GLA Carbon Emissions Reporting spreadsheet.
- 0.136kg/CO2/kWh used by "SAP10.2" in Part L 2021 (which came into full effect 2022)

Table 1: Embedded carbon rates in Part L

Software version	**SAP 2012**	**SAP10.0**	**SAP10.2**
Carbon factor for electricity*	0.519 kg CO2 per kWh	0.233 kg CO2 per kWh	0.136 kg CO2 per kWh
Used by:	SAP 2012	SAP2012 with GLA Carbon Reporting Tool	Release version of SAP10 i.e. SAP10.2

As can be seen between 2018 and 2021, the embodied carbon rate within grid tied electricity has reduced to roughly a third of the rate in 2018. This means that a building with identical electricity demand would be calculated as emitting approximately a third of the CO2 under SAP10.2 as under the 2012 carbon rates.

The CoF rate per tonne of carbon set by Richmond, in line with the current standard GLA rate, was also about a third of the proposed new rate (£95 to £300) this means that a building with identical electricity use would end up paying approximately the same amount in CoF contributions. In the absence of other factors any development viable in 2018 under the £95 per tonne rate should be viable under the new £300 per tonne rate.

This has been tested in Table 2 below using a number of rates adopted or proposed by different councils at different times, plus round numbers in increments of £50 in between them.

As can be seen in the Table 2, the closest £/tonne rate under SAP10.2 carbon factors to the final price of £95/tonne under SAP2012 carbon factors is £350 for each building typology. This means that the increase to £300 per tonne proposed would actually slightly reduce the contribution to the previous £95 rate, with the offset reduction caused by decarbonisation of grid electricity.

Note that by looking only at the two factors of embodied carbon and price per tonne of CO2, a number of other factors have been excluded including other changes made to Part L methodology and improvements in the efficiency of technology available. However, it is not considered that these make reductions in reported carbon emissions more onerous overall in the majority of cases – this is reflected in the overall upwards trend in carbon saving over Part L reported in recent years.

Key Findings

The NZCS report in 2023 set out at Table 5.2 the results of modelling set out the suggested £300 per tonne rate and the financial contributions for the residential typologies. This has now been further assessed to provide additional comparators.

Table 2 below compares the CoF rates and the total cost for each building typology based on increased rates against reduced embedded CO2 per kWh. This table highlights the rate of £300/t/CO2 proposed under the revised local plan and notes the rate that creates the closest charge to the payment level under SAP 2012 which was in place at the time it was set with the then £95/t/CO2 rate under the existing local plan policy.

Table 2 demonstrates that significantly reduced embedded carbon rates in grid tied electricity have significantly decreased the total emissions figures for developments without any increase in building efficiency or costs for developers.

The CoF rates have been extended from the existing £95/t/CO2 through a series of rates through to a rate of £840/t/CO2 to assess the impact on commercial viability and for comparison to costs under the old rate with the 2012 BRUKL/SAP rates for embedded CO2.

Findings show that the proposed rate of £300/t/CO2 without any building improvement work will produce a slightly lower CoF payment than the previous rate with the 2012 CO2 rates per kWh of electricity.

Conclusion

This assessment clearly demonstrates that the cost of carbon offsetting using SAP10.2 Carbon Factor (nationally recognised methodology effective since 2022) and the carbon price of £300/t, as proposed in Policy 4, would cost less that the cost of offsetting using 2012 building regulations /SAP2012 with a carbon offset price of £95/t. This report justifies the £300/t carbon offset rate proposed in Richmond Local Plan Policy 4 is achievable, maintaining similar levels of financial cost to developers for the same specification for each typology and is keeping pace with the current context.

Table 2: Assessment of different building typologies by different SAP Carbon factors and different Carbon Prices Per Tonne

Carbon Factor	1-4 Residential Best Practice New Build	1-4 Residential Best Practice Conservation Area	1-4 Residential Best Practice CoU	1-4 Residential Best Practice CoU in Conservation Areas	Upper Floor High St Conservation Area CoU	500m nursery CoU	500m Nursery new	sports CoU	Sports new	500m retail CoU	500m2 Comm new
*SAP2012 emissions	0.08	0.23	0.27	0.46	0.57	3.63	3.43	4.02	1.51	4.35	2.23
SAP10.0 emissions	0.03	0.10	0.12	0.21	0.26	1.63	1.54	1.81	0.68	1.95	1.00
SAP10.2 emissions	0.02	0.06	0.07	0.12	0.15	0.95	0.90	1.05	0.40	1.14	0.59

**SAP2012 carbon factors applied to SAP10 calculation*

Carbon Factor	Price per tonne	1-4 Residential Best Practice New Build	1-4 Residential Best Practice Conservation Area	1-4 Residential Best Practice CoU	1-4 Residential Best Practice CoU in Conservation Areas	Upper Floor High St Conservation Area CoU	500m nursery CoU	500m Nursery new	sports CoU	Sports new	500m retail CoU	500m2 Comm new
SAP2012	£ 60.00	£137.38	£412.15	£480.84	£824.29	£1,030.37	£6,525.66	£6,182.21	£7,241.42	£2,724.15	£7,830.79	£4,018.43
SAP2012	£ 95.00	£217.52	£652.57	£761.33	£1,305.13	£1,631.42	£10,332.30	£9,788.49	£11,465.59	£4,313.24	£12,398.76	£6,362.52
SAP10.0	£ 95.00	£97.65	£292.96	£341.79	£585.93	£732.41	£4,638.58	£4,394.45	£5,147.36	£1,936.39	£5,566.30	£2,856.39
SAP10.2	£ 95.00	£57.00	£171.00	£199.50	£342.00	£427.50	£2,707.50	£2,565.00	£3,004.47	£1,130.25	£3,249.00	£1,667.25
SAP10.2	£ 100.00	£60.00	£180.00	£210.00	£360.00	£450.00	£2,850.00	£2,700.00	£3,162.60	£1,189.74	£3,420.00	£1,755.00
SAP10.2	£ 150.00	£90.00	£270.00	£315.00	£540.00	£675.00	£4,275.00	£4,050.00	£4,743.90	£1,784.61	£5,130.00	£2,632.50
SAP10.2	£ 200.00	£120.00	£360.00	£420.00	£720.00	£900.00	£5,700.00	£5,400.00	£6,325.20	£2,379.48	£6,840.00	£3,510.00
SAP10.2	£ 250.00	£150.00	£450.00	£525.00	£900.00	£1,125.00	£7,125.00	£6,750.00	£7,906.50	£2,974.35	£8,550.00	£4,387.50
SAP10.2	£ 300.00	£180.00	£540.00	£630.00	£1,080.00	£1,350.00	£8,550.00	£8,100.00	£9,487.80	£3,569.22	£10,260.00	£5,265.00
SAP10.2	£ 350.00	£210.00	£630.00	£735.00	£1,260.00	£1,575.00	£9,975.00	£9,450.00	£11,069.10	£4,164.09	£11,970.00	£6,142.50
SAP10.2	£ 400.00	£240.00	£720.00	£840.00	£1,440.00	£1,800.00	£11,400.00	£10,800.00	£12,650.40	£4,758.96	£13,680.00	£7,020.00
SAP10.2	£ 480.00	£288.00	£864.00	£1,008.00	£1,728.00	£2,160.00	£13,680.00	£12,960.00	£15,180.48	£5,710.75	£16,416.00	£8,424.00
SAP10.2	£ 840.00	£504.00	£1,512.00	£1,764.00	£3,024.00	£3,780.00	£23,940.00	£22,680.00	£26,565.84	£9,993.82	£28,728.00	£14,742.00

Shows carbon offset rates. GLA rate of £95 per tonne CO2 based on pre 2019 approach

Shows proposed £300 per tonne carbon offset rate in the Publication Local Plan (Regulation 19)

Shows the closest Carbon Offset Rate under the proposed new polcy compared to £95 per tonne CO2 at 2012 embedded carbon rate