Greater Manchester Combined Authority Carbon and Policy Implementation Study – Part 2 - Carbon Offsetting

Report to Greater Manchester Combined Authority

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Contents

Executive Summary

The Greater Manchester Combined Authority (GMCA) commissioned The Centre for Sustainable Energy (CSE) in partnership with Currie and Brown to provide consultancy services in support of GMCA's Spatial Framework carbon and energy policy development.

This report provides recommendations as to how GMCA may operate a carbon offsetting approach to help deliver net zero carbon development, including consideration of the policy approach, the price carbon should be set at, governance and implementation, the types of projects that could be funded and potential revenue.

Carbon offsets operate as part of planning policies that require a reduction in carbon emissions beyond that required by Building Regulations. The offset payments pay for carbon saving projects to go ahead elsewhere, to make up for the carbon savings not achieved within developments. Carbon offsets are collected through "Section 106" legal agreements attached to planning consents, and off-site carbon abatement is assumed to take place over a 30 year period.

The study team undertook a literature review and surveyed 18 local authorities in England currently operating carbon offsetting regimes to determine the current state of play. The majority of local authorities surveyed charge £60 per tonne of carbon, as per the approach taken by the Greater London Authority (GLA) in the Adopted London Plan. 62% of responding authorities stated that this price is not high enough to fund like for like carbon savings, and in this context, five London boroughs have commissioned consultants to investigate a higher cost of carbon than the GLA's current £95 figure (set in the draft London Plan). This is expected to recommend that the boroughs set a cost of carbon at around £160 per tonne.

The carbon price

This study proposes that the carbon price for the Greater Manchester offsetting scheme should be set in accordance with the supplementary documentation to the HM Treasury's Green Book, a nationally recognised carbon pricing mechanism, reflecting the approach taken by the GLA.

Updating this approach to reflect more recent government figures, a price of £113 or £118 per tonne (if the scheme came into force in 2025 or 2028) could be an appropriate price. However, CSE does not consider this approach to be consistent with Greater Manchester's Climate Emergency Declaration.

The climate emergency, the UK wide 2050 zero carbon target and the Greater Manchester 2038 net zero carbon target fundamentally challenge the conventionally accepted approach to additionality and carbon offsetting, in that within these timescales, effectively all carbon emissions will need to be avoided or sequestered in carbon sinks.

Thus the timing and rate at which emission reductions are achieved is critical, in that if Greater Manchester is to meet its commitment to become carbon neutral by 2038, the residual emissions from new development would also need to be offset by the 2038 deadline rather than over the lifespan of the measure funded – which has typically been used in the past.

This logic would support higher charges being levied on developers to achieve the carbon savings within the 2038 timeframe, increasing further as the length of time to the deadline (2038) within which carbon savings can be accrued reduces. A justifiable approach to operationalise this would be to base the carbon price for Greater Manchester on the Treasury figures but adjust the figures to reflect that Manchester's aim to be achieved 12 years earlier, resulting in a carbon price of £234 in the case of a 2028 start date.

If this approach is to be adopted, legal advice should be taken on the legitimacy of calculating the carbon cost on the basis of achieving zero carbon by a 2038 rather than the UK 2050 deadline, and specifically on the legal weight that can be given to Greater Manchester's 2038 net zero target which is a non-statutory target.

Given that Policy GM-S2's stated intent is to already be delivering net zero carbon development by 2028, CSE strongly recommend that GMCA begin collecting carbon offset payments prior to 2028 so that it is viable to deliver carbon offset projects starting in 2028 as per the policy intent. A logical point to bring in this measure would be 2025 – given that it aligns with expected changes in the 2019 Future Homes Standard Consultation. We have therefore explored scenarios where the carbon offset regime is brought into force in 2025 instead of 2028. This would result in a lower carbon price of £200.

We have estimated the potential carbon offset fund (and CO2 savings) in each of the policy scenarios indicated based on the housing development planned to come forward within the GMCA plan period. The value of the carbon fund has been calculated based on a carbon price of £234 for the scenarios with a 2028 start date and a value of £200 for the policy scenarios with a 2025 start date. This is shown in figure ES.1.

The value of the carbon offset fund

The policy scenario adopted has a significant influence on the fund size available. Scenarios one and three include policies which relate to only regulated carbon emissions, whereas scenarios two and four include policies which cover both regulated and unregulated emissions. Consequently, scenarios two and four create the largest carbons offset fund sizes at £500 million and £434 million respectively.

In contrast, policies in scenarios one and three only consider regulated emissions – a lower proportion of total emissions are considered eligible for offset payments through policies in these scenarios. Therefore scenarios one and three offer smaller fund sizes in the region of £212 million and £191 million respectively.

The policy approaches in scenarios two and four achieve net zero carbon emissions from building energy use. The policy approaches in scenarios one and three do not result in carbon offsetting for unregulated energy use and therefore do not reach net zero carbon.

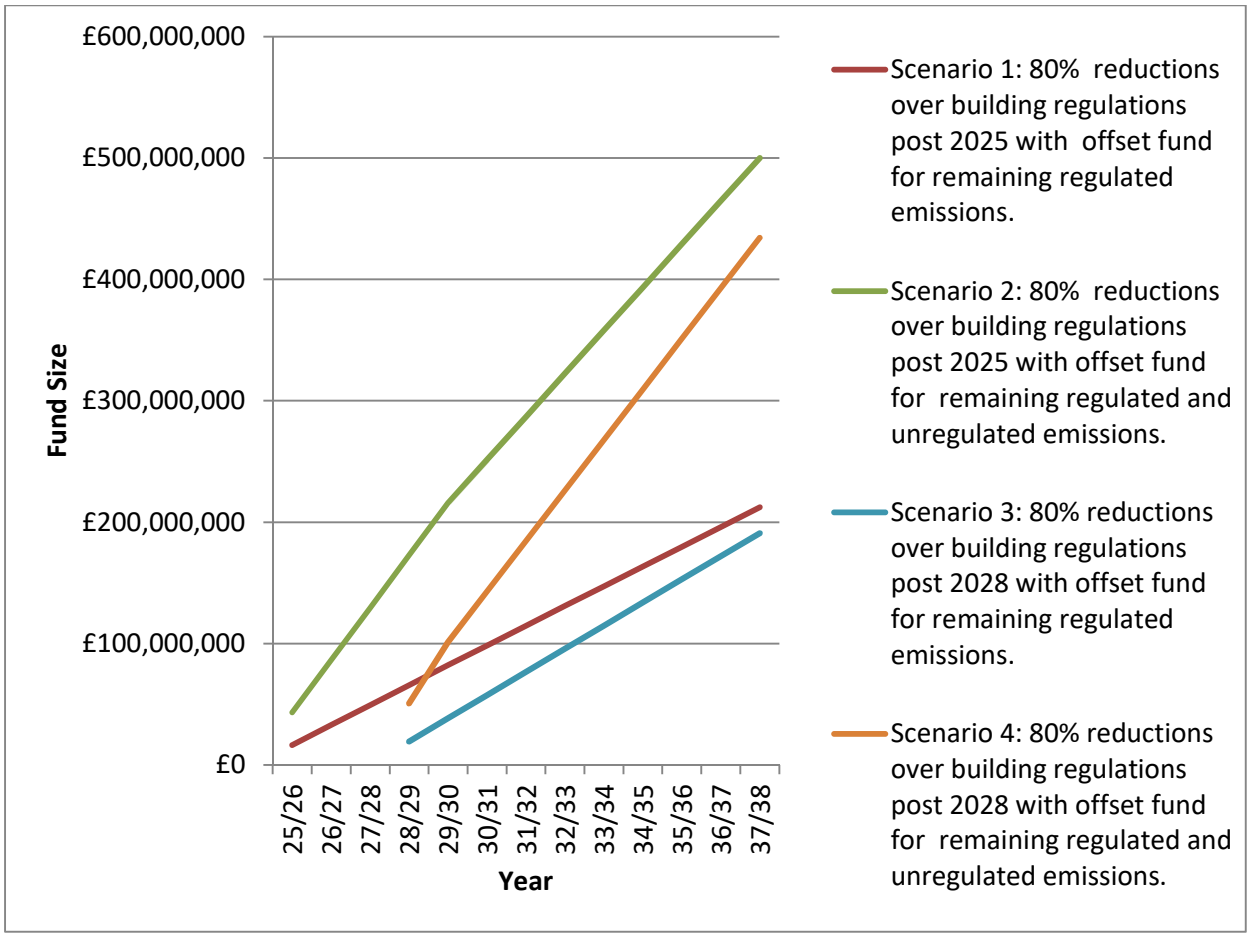

Figure ES.1: carbon offset fund size trajectory modelled across different policy scenarios

Context of the fund

At the 2018 Green Summit, the Mayor of Greater Manchester announced the vision for a 'carbon neutral, climate resilient city-region, with a thriving natural environment and circular, zero-waste economy'. To support delivery of this an action was agreed to set up a Greater Manchester Environment Fund (GMEF).

The aim of the GMEF is to improve the quality of the environment within Greater Manchester by providing grant funding to non-statutory initiatives that are currently underfunded through existing mechanisms. A fund is required to close the gap between corporate organisation and institutions who wish (or are required) to address their negative environmental impact either through voluntary contribution, to achieve compliance with their environmental objectives or as compensation and smaller, grassroots organisations who aim to deliver schemes and projects that improve the environment.

GMCA's vision is a traditional funding model disseminating donative income in the first instance, but that could grow into a model that can receive alternative, less traditional and more innovative income streams, such as investment. Our vision is that this will swell the funds available and enable access to more projects and at larger scale.

The three financial models that are initially being explored as part of the Environment Fund include the following but others could develop:

- Green Infrastructure
- Habitat Bank Facility
- Carbon Trading Vehicle

It is anticipated that the fund vehicle will be set up towards the end of the year. This report will consider the present the key issues for the carbon reduction/offsetting element of the GMEF.

Administration of the fund

Contributions should be directed into a ring-fenced carbon offset fund to provide maximum flexibility and minimise administrative costs, rather than having to specify actual projects funded within individual legal agreements. Current limitations on pooling contributions from section 106 agreements are proposed to be lifted to allow this.

Every project or programme of projects funded (including Council projects) should be required to go through an application process and be assessed against published criteria derived from the legal tests relating to S. 106 agreements: that it is necessary to make the development acceptable in planning terms; directly related to the development; and fairly and reasonably related in scale and kind to the development.

Fund administration processes, how decisions are taken to distribute funding and how projects are then subsequently monitored for the resultant carbon savings, should be specifically designed to ensure that the S. 106 tests can be met in every legal agreement entered into and every project funded.

The majority of projects types, (those with low unit cost, low risk and lower variability of carbon savings) should be required to apply to the fund just once as a whole project, with implementation targets, a pipeline of the number of installations proposed and specifications. Once approved, individual householders or community groups would apply to the project to access funding rather the fund board. Bespoke projects with higher cost, higher risk and/or higher variability of carbon savings (for example community energy projects) would need to apply individually to the fund and need individual assessment.

Applications to the fund should be proportionate to the scale of the funding provided, the emissions to be saved and the likelihood of carbon savings being delivered. The application process should be as simple as possible for residents/ communities/ businesses.

Eligible projects should be located within the area covered by the ten local authorities within Greater Manchester, although a caveat should be added that if funds aren't spent within 4 years, they may be spent on carbon offsetting measures outside the area to avoid them expiring.

The administration of the fund should be offered as a self-contained service to planning departments, who should not be involved in the administration of the carbon offset fund beyond securing contributions through legal agreements, imposing and enforcing necessary planning conditions.

As in-depth monitoring of carbon savings from projects could easily take up a large proportion of the funding available, a proportionate approach should be adopted to

monitoring according to the scale of funding and scale of the project, with large projects reporting actual carbon savings and standard assumptions being applied to small projects.

It is possible to certify the carbon offsetting fund as an emissions reduction project under a certification scheme such as Gold Standard, who would review the processes for allocating funding and undertake spot checks of funded projects.

Three basic models seem evident for the administration of the fund:

i. One city-wide carbon offset fund, administered by GMCA.
ii. One city-wide carbon offset fund, externally administered, reporting to GMCA or local authority steering group.
i. GMCA carbon offset support agency, with 10 council-run offset funds.

We have provided a high level estimate of the likely administration costs of each option based on estimates of the time needed to complete the tasks necessary for each option, for given day rates and on costs (for full details see Appendix C):

Options for fund administration	**Minimum Set Up Costs**	**Minimum Annual Running Costs**	**Total costs, year 1**
One city-wide carbon offset fund, administered by GMCA	£29,606	£45,775	£75,381
One city-wide carbon offset fund, externally administered, reporting to GMCA or local authority steering group	£42,823	£85,801	£128,624
GMCA carbon offset support agency, with 10 council-run offset funds. (Note - No estimates have been given for the costs borne by the 10 authorities in setting up and administering their own funds.)	£36,548	£19,132	£55,680

Estimates set up and running costs - different administration options

Given potential synergies between the carbon offset fund and other GMCA initiatives, possible economies of scale from operating one shared fund and the high organisational capacity of GMCA, we recommend that GMCA administer one city-wide carbon offset fund. Appointing external consultants to run the fund would also be a practical alternative, but would be more expensive and would not allow GMCA to gain institutional learning from running the fund itself, nor maximise synergies with other GMCA policies and programmes.

Option 3, where GMCA operates a carbon offset support agency and the authorities administer their own individual carbon offset funds appears to be the cheapest. However, in this approach no overarching city-scale strategy would be in place for the carbon fund, and only limited savings would be made through economies of scale. The tasks of sourcing and assessing carbon offset projects, monitoring their implementation and the resultant carbon emission savings are substantial and would need to be taken on by the individual local authorities, and there is a risk that hard pushed planning teams would become involved in these tasks. Were the 10 local planning authorities to undertake this task, there would be

significant duplication of efforts, and the overall costs across Greater Manchester would be likely to be significantly higher than either options i or ii.

In respect of planning processes:

- Require contributions to the Carbon Offset fund should be worked out at planning application stage
- Require the submission of an energy statement as a validation requirement for the submission of planning applications. Where no energy strategy is submitted, consider refusing permission.
- Contributions should be secured through Section 106 legal agreements on planning consents. The Community Infrastructure Levy is not an appropriate mechanism for collecting carbon offset payments, in that CIL is a fixed charge per m2 and does not account for the varying performance of developments in terms of carbon emissions.
- Include within planning conditions a requirement for as-built SAP measurements to be submitted, to ensure predicted performance standards are achieved. Linked to this, include within the S. 106 agreement the ability to claw back additional carbon offset contributions where the predicted energy performance standards are not achieved.
- In the majority of cases (excluding very small sites where cash-flows may be a problem and very large sites where it is reasonable to phase contributions in parallel with the build programme), assume that carbon offset contributions are to be paid prior to the commencement of development.
- For smaller scale, simpler applications where only a cash payment needs to be made, maximise the use of unilateral undertakings, and publish template agreements for use.
- It is critical to consider publishing supplementary planning guidance to assist in the interpretation of planning policy, and to assist developers in submitting policy compliance schemes.

Suitable projects to be funded

Given the existing range of projects that are already being run within GMCA, and the ease with which projects could be initiated or adapted, we would suggest that the following offer suitable carbon offsetting projects:

- Energy efficiency retrofitting of housing (council housing and private rental sector), community and council buildings, including council run projects and funding applications from the community.
- Community energy projects, adapting the Greater Manchester Low Carbon Fund to offer funding to community energy projects, or developing a new funding route, similar to the Urban Community Energy Fund
- Domestic Renewable energy projects, for example a Greater Manchester Reverse Solar Auction and / or rooftop solar installations on council buildings
- Carbon sequestration through tree planting and peat bog restoration

The following project types would be suitable carbon offset projects, provided that carbon savings can be demonstrated and existing projects or trials schemes can be scaled up:

- Commercial renewable energy projects
- Non-domestic retrofitting - energy efficiency improvements to commercial building
- Retrofitting of privately owned homes (the able to pay market)
- Energy advice linked to the installation of measures
- Installation of Low carbon heating systems
- The installation of district heating networks
- Electrification of local authority vehicle fleets

As grid-supplied electricity de-carbonises, the scale of carbon to be saved through the installation of additional renewable electricity generation reduces. This should be taken into account in the governance of the fund and in applications to the fund. Insofar as renewable heat installations will typically be replacing gas central heating (with constant carbon factors) the carbon emissions savings possible from renewable heat projects will not reduce over time in the same way.

At this stage the following are not considered suitable to receive funding through the carbon offset fund:

Measure	Comments
Carbon savings through funding upgrades to building specification (on other developments) to use materials which require less energy to manufacture, for example using timber cladding panels rather than aluminium.	Reducing the embodied energy and emissions within building materials would best be achieved by accounting for these directly within the councils zero carbon planning policies, as proposed in the latest iteration of the London Local Plan. Developers should not be able to access carbon offset funding to improve the specifications of their schemes, but should take ownership of their carbon emissions through planning processes.
Support for allocating wind sites in local and neighbourhood plan documents	Whilst currently, supportive onshore wind policies are necessary for schemes to come forward, this policy preparation work would not directly deliver carbon reductions and would take time to come to fruition. Additionally, the scale of carbon savings ultimately deliverable would not be clear at the outset and would be uncertain.
Sustainable transport measures	There are significant uncertainties as how to predict and attribute the carbon savings delivered by sustainable transport measures and there are substantial overlaps with sustainable transport infrastructure normally funded through s106

	agreements and Community Infrastructure Levy payments. If sustainable transport initiatives were to receive carbon offset funding, it would be difficult to rebut arguments that developers were being double charged.
Energy generation schemes supported with energy storage (batteries or heat) maximise the benefits of schemes and offer flexibility and balancing services which help to decarbonise the electricity grid as a whole, and therefore can result in carbon savings.	Energy storage has the potential to enable greater amounts of renewable energy to connect the distribution grid, thereby enabling carbon savings to be achieved, however more work would be needed however to develop a methodology to predict and attribute such savings to a particular scheme. Whether an individual energy storage project will result in carbon savings depends to a great extent on where and how it is used (whether in tandem with a renewable electricity plant or in isolation, storing excess night-time electricity from the distribution grid for daytime use) and for what purposes (maximum profit, maximum carbon savings). Additionally the carbon savings achieved will vary from moment to moment as the carbon intensity of grid supplied electricity varies.
Feasibility and project development work which unlocks project investment at a ratio/value of, for example 1:10.	It would be possible for GMCA to create an open application process so that projects in development and at feasibility stage would be able to apply for funding. However these type of projects would not be suitable unless direct carbon savings can be attributed to them. Considerations of whether providing funding to a project would unlock or enable greater carbon savings would already be taken into account under the criteria already suggested in section 5.4 (under the “additionality” and “value for money” criteria). However it is important to stress that the carbon offset fund should be managed on the basis of the carbon emissions secured, not the investment secured.

Introduction including narrative and justification for an Allowable Solutions approach for delivering CO2 targets in relation to Part 1

Introduction

The Greater Manchester 5-year environment plan[1] sets out a key objective for Greater Manchester to be carbon neutral by 2038 and meet carbon budgets that comply with international commitments. This is taken forward in the Greater Manchester Spatial Framework[2], which includes as a key component ensuring that all new development is built to a net zero carbon standard from 2028. This will be delivered through carbon and energy policy (GM-S2)[3].

On Friday 26 July, the Greater Manchester Combined Authority declared a Climate Emergency[4] targeting carbon neutrality by 2038. All of the 10 local authorities within Greater Manchester have now individually declared their own climate emergencies.

In this context, GMCA commissioned Currie & Brown and the Centre for Sustainable Energy (CSE) to carry out research to support the development of policy GM-S2. Part one of this study assessed policy options for reducing carbon emissions associated with new development onsite. Part two (this report) provides recommendations for how off site carbon savings could be achieved through a carbon offsetting framework. This study draws on and updates a previous review of carbon offsetting practice and policy in England carried out for the West of England Authorities, published January 2019[5].

Local Plan Carbon Offsetting

In 2009, the government of the day proposed the concept of 'Allowable Solutions' in recognition of the fact that building homes to a zero carbon standard is not always practical or cost efficient on all sites, so delivering zero carbon entirely through on site abatement was not a viable approach for mainstream housing production. By paying into an Allowable Solutions fund - which is used to finance off site projects which save carbon - house builders

[1] Greater Manchester 5-year Environment Plan - www.greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf

[2] Greater Manchester Spatial Framework – 2019 Revised Draft - www.greatermanchester-ca.gov.uk/what-we-do/housing/greater-manchester-spatial-framework/gmsf-full-plan/

[3] ibid1

[4] Greater Manchester Combined Authority declares climate emergency - https://greatermanchester-ca.gov.uk/news/combined-authority-declares-climate-emergency/

[5] West Of England Carbon Reduction Requirement Study (2018), CSE, [online] available at: https://www.bristol.gov.uk/documents/20182/3368102/Carbon+Offsetting+in+the+West+of+England.pdf/894f7c11-33e4-a8b4-ec89-383828553184

can therefore still meet a zero carbon homes definition where it is not always possible to do so on site.[6]

The majority of recent literature refers to "carbon offsetting" rather than "allowable solutions". As such, for clarity CSE uses the terms "carbon offsetting" and "carbon offset fund" throughout this document.

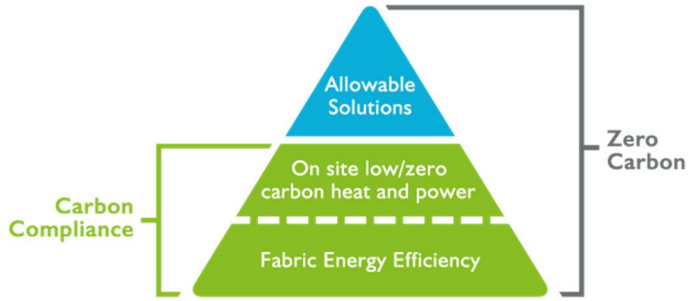

Figure 1- Carbon Offsetting within the context of the Zero Carbon Homes regime – Zero Carbon Hub

Carbon offsetting is used by some Planning Authorities in England (the most notable example being the carbon offsetting regime operated by the Greater London Authority (GLA)) as an integral component of carbon reduction planning policies. It allows carbon emission reductions that cannot be achieved cost-effectively on-site to be tackled through off site measures. **However, it is important that policies are designed in such a manner as to ensure that all viable on site methods of reducing carbon emissions are exhausted first.** Figure 1 demonstrates this approach, highlighting that building fabric energy efficiency and on site deployment of low carbon heat and power should be maximised prior to the use of carbon offsetting (referred to as allowable solutions in Figure 1).

[6] http://www.zerocarbonhub.org/sites/default/files/resources/reports/Zero_Carbon_Strategies_for_Tomorrows_New_Homes.pdf

1 Methodology

1.1 Desk review and survey of existing carbon offsetting schemes

The Project team conducted surveys and interviews with local authorities in England known to be operating carbon offsetting policies, building upon prior research undertaken by CSE in 2018[7].

The final list of Local Planning Authorities which responded to the survey request is detailed in table 1. Additional desk based research was used to supplement the responses with further details on administrative processes and paperwork.

Camden	Islington
London Legacy Development Corporation	Southampton
Croydon	Walthamstow Forest
Tower Hamlets	Merton
Milton Keynes	Kingston
Enfield	Southwark
Westminster	Sefton
South Gloucestershire	Ashford
Haringey	Hounslow

Table 1 local planning authorities operating Carbon offsetting schemes

1.2 Defensible, evidence based carbon price

The study team used outputs from the desk review and surveys to ascertain approaches to setting carbon price nationally. The study team then reviewed existing research underpinning the previous carbon price studies alongside treasury and other government department analysis, and applied these findings to the context of Greater Manchester.

1.3 Estimation of carbon fund size

The study team estimated the monetary value of the fund and the residual carbon emitted based on the following scenarios:

- **Scenario 1:** 80% onsite regulated emissions reductions over building regulations part L post 2025 including offset fund payment for all remaining regulated emissions.
- **Scenario 2:** 80% onsite regulated emissions reductions over building regulations part L post 2025 including offset fund payment for all remaining regulated and unregulated emissions.

[7] Centre for Sustainable Energy (2019) West of England Carbon Reduction Requirement Study - Carbon Offsetting in the West of England www.bristol.gov.uk/documents/20182/3368102/Carbon+Offsetting+in+the+West+of+England.pdf/894f7c11-33e4-a8b4-ec89-383828553184

- **Scenario 3:** 80% onsite regulated emissions reductions over building regulations part L post 2028 including offset fund payment for all remaining regulated emissions.
- **Scenario 4:** 80% onsite regulated emissions reductions over building regulations part L post 2028 including offset fund payment for all remaining regulated and unregulated emissions.

The value of the carbon offset fund and the associated emitted carbon have been estimated for Scenarios 1 to 4 using; the expected carbon emissions across each housing archetype (as provided by Currie and Brown in part 1 of this study), the carbon price (as determined in Section 3), and the rate of new housing building across the planning period, as provided from the GM Spatial Framework baseline. To clarify, the zero carbon planning policies and the need for contributions to carbon offset will once adopted, apply to all development proposals, not just allocations from the GM Spatial Framework.

1.4 Review of appropriate carbon offsetting projects, associated costs and carbon savings

CSE collated a broad list of indicative offset project types within Greater Manchester, the carbon savings attached to each project, and the associated monetary costs. This was based on existing studies and research carried out by CSE, GMCA and other contracted organisations including:

- Greater Manchester 5 year Environment Plan[8]
- Greater Manchester Environment Fund
- Greater Manchester Natural Capital Investment Plan[9]
- Greater Manchester Clean Air plan[10]
- Warm Homes Fund[11]
- Made to Move report[12]
- Greater Manchester Green Deal and ECO Framework[13]
- Greater Manchester Smart Energy Plan[14]
- Greater Manchester Retrofit Report[15]

[8] Greater Manchester 5 year Environment Plan https://www.greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf
[9] Greater Manchester Natural Capital Investment Plan - https://naturegreatermanchester.co.uk/wp-content/uploads/2019/01/GM-Natural-Capital-Investment-Plan-Final180119.pdf
[10] Clean Air Plan – https://cleanairgm.com/clean-air-plan
[11] Greater Manchester Warm Homes Fund https://www.greatermanchester-ca.gov.uk/what-we-do/environment/greater-manchester-warm-homes-fund/
[12] Made to Move Report https://assets.ctfassets.net/nv7y93idf4jq/1XtfykQs0g22g8cYCyoAag/dee5732015f23c5df3a338afc2353b74/Made_to_Move.pdf
[13] Greater Manchester Green Deal and ECO Framework - https://www.greatermanchester-ca.gov.uk/what-we-do/environment/domestic-and-non-domestic-energy-efficiency/
[14] https://es.catapult.org.uk/wp-content/uploads/2019/07/ESC_SSH2_D40-Smart-Energy-Plan-GMCA.pdf

- June 2019 - Solar PV collective Purchasing pilot for Greater Manchester[16]
- Greater Manchester Transport Strategy 2040[17]
- Greater Manchester Community Energy Action Plan[18]
- Northern Forest Initiative[19]
- Woodland carbon code[20]
- Peatland carbon code[21]
- Thrive Renewables Community Benefit Programme[22]
- Urban Community Energy Fund.[23]

The National Household Model (NHM), a domestic energy-policy modelling and analytical tool covering the whole of Great Britain, built by CSE and commissioned by the former Department of Energy and Climate Change (DECC) was employed by CSE to provide a more detailed breakdown of costs and carbon savings of specific domestic retrofitting measures.

1.5 Analysis and reporting

The report is set out as follows:

- Section 2 - summarises the legislative and policy background which supports the use of carbon offsetting in association with zero carbon planning policies
- Section 3 - summarises our research of carbon prices charged by other local authorities, sets out a recommended carbon price for Greater Manchester, and estimates a potential fund size according to different policies scenarios
- Section 4 - includes case studies of carbon offsetting schemes operated by other local planning authorities
- Section 5 - summarises governance and administration structures adopted by other local authorities, sets out governance and administration structures and costs within Greater Manchester and makes suggestions about monitoring arrangements for both carbon savings and spending
- Section 6 – provides commentary on the use of Section 106 (s106) planning obligations to facilitate payments into the fund
- Section 7 - summarises our research of carbon offset projects funded by other local authorities and recommends suitable projects within Greater Manchester

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[15] Greater Manchester Combined Authority – Decarbonising Greater Manchester's Existing Buildings – https://democracy.greatermanchester-ca.gov.uk/documents/s2203/Decarbonising%20Buildings%20Report%20Cover%20Paper.pdf

[16] Greater Manchester- Solar PV collective Purchasing pilot for GM

[17] Greater Manchester Transport Strategy 2040 - https://downloads.ctfassets.net/nv7y93idf4jq/7FiejTsJ68eaa8wQw8MiWw/bc4f3a45f6685148eba2acb618c2424f/03._GM_2040_TS_Full.pdf

[18] Greater Manchester Community Energy Action Plan - www.gmcr.org.uk/wp-content/uploads/2019/07/Community-Energy-Action-Plan-Green-Summit-A5.pdf

[19] Northern Forest - www.woodlandtrust.org.uk/about-us/woodland-creation/the-northern-forest-our-vision

[20] Woodland carbon code - https://www.woodlandcarboncode.org.uk/about/the-basics

[21] Peatland Carbon Code www.forestcarbon.co.uk/certification/peatland-code

[22] Thrive Renewables Community Benefit Programme - www.cse.org.uk/projects/view/1304

[23] Urban Community Energy Fund - www.cse.org.uk/projects/view/1249

2 Legislative and policy framework

Nationally the profile of climate change has never been greater, and at a high level the need for radical changes to adapt and mitigate to the impacts of climate change is broadly accepted in government and by an increasing proportion of civil society. This is due to the IPPC 1.5 degree report[24] which set out the full implications of allowing 2°C rather than 1.5°C of warming and underlined the need for more radical and urgent carbon reductions, and to climate campaigners who have finally broken through into public consciousness. The IPPC report advised that to limit us to a 1.5°C global temperature increase, greenhouse gas emissions have to be reduced by 45% from 2010 levels by 2030, and we need to reach net zero carbon (reduce emissions by 100%) by 2050. On 1st May 2019, parliament declared a formal climate and environment emergency.

2.1 Legislation

Internationally, the UN's 2015 Paris Agreement committed the 175 signatory nations to *"pursue efforts to limit temperature increase to a 1.5 degree rise[25]"*.

At the national level, the UK's 2008 Climate Change Act[26] set a legally binding target, committing to an 80% reduction in carbon emissions by 2050 on a 1990 baseline. On 12 June 2019 the Government amended the Climate Change Act to target full net zero carbon (a 100% reduction of greenhouse gas emissions) in the UK by 2050 compared to 1990 levels[27].

The legislative framework for the planning system carries forward this commitment. Section 19 of the 2004 Planning and Compulsory Purchase Act, as amended by Section 182 of the Planning Act 2008[28] states:

'*Development plan documents must (taken as a whole) include policies designed to secure that the development and use of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change.'*

The 2008 Planning and Energy Act[29] sets out powers for local authorities to set local carbon reduction standards that go beyond national Building Regulations. The Deregulation Act 2015 contained wording to repeal the power for authorities to set energy efficiency standards above Building Regulations (whilst leaving intact the power to require carbon reductions through renewable energy). However the Deregulation Act changes have not been commenced.

[24]The IPPC report Global Warming of 1.5 degrees released in 2018 https://www.ipcc.ch/sr15/
[25] UNFCC: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
[26] www.legislation.gov.uk/ukpga/2008/27/contents
[27] www.legislation.gov.uk/ukdsi/2019/9780111187654/article/2
[28] www.legislation.gov.uk/ukpga/2008/29/section/182
[29] http://www.legislation.gov.uk/ukpga/2008/21/pdfs/ukpga_20080021_en.pdf

2.2 National Planning Policy

Whilst the political environment and scientific advice within which climate policy is set has changed significantly over the last year and the government's carbon reduction commitments have been upgraded accordingly, the implications for this have yet to fully flow down into national planning policy. In particular, the National Planning Policy Framework[30] (NPPF) has yet to be revised in the light of either the IPPC 1.5 degree report or the upgraded net zero carbon target in the Climate Change Act. Having stated this, the NPPF retains strong provisions in respect of climate change, albeit rarely enforced by the planning inspectorate in local plan examinations.

Paragraph 148 of the NPPF states:

"The planning system should support the transition to a low carbon future in a changing climate... It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions..."

Paragraph 149 (incorporating footnote 48 underlined) continues:

"Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures in line with the objectives and provisions of the Climate Change Act 2008."

These paragraphs strongly stress the central role of the planning system in shaping places for radical reductions in greenhouse gas emissions, in line with the climate change act, which now sets a binding legal trajectory to net zero carbon within the next 30 years. Below we discuss the implications of this for plan making and carbon offsetting regimes.

2.3 Planning Practice Guidance

The online Planning Practice Guidance (PPG) resource, published by the Ministry of Housing, Communities and Local Government provides further interpretation of national planning policy for the benefit of local planning authorities and planning practitioners. As with the NPPF, the NPPG has not been significantly updated following the changes to the Climate Change Act and the UK Climate Emergency Declaration. Nevertheless it strongly asserts the centrality of climate change within the planning system and the need for adequate policies if Local Plans are to be found sound (paragraph 1):

"Addressing climate change is one of the core land use planning principles which the National Planning Policy Framework expects to underpin both plan-making and decision-taking. To be found sound, Local Plans will need to reflect this principle and enable the delivery of sustainable development in accordance with the policies in the National Planning Policy Framework. These include the requirements for local authorities to adopt proactive strategies to mitigate and adapt to climate change in line with the provisions and objectives

[30]National Planning Policy Framework (Feb 2019) - Ministry of Housing, Communities and Local Government https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

*of the Climate Change Act 2008, and co-operate to deliver strategic priorities which include climate change." (*emphasis added)

In respect of the approach to identifying climate mitigation measures, paragraph 7 states:

*"Every area will have different challenges and opportunities for reducing carbon emissions from new development such as homes, businesses, energy, transport and agricultural related development. Robust evaluation of future emissions will require consideration of different emission sources, likely trends taking into account requirements set in national legislation, and a range of development scenarios. Information on carbon emissions at local authority level has been published by the government for 2005 onwards, and can be drawn on to inform emission reduction options. Information is also available on GOV.UK on how emissions are reported against the national target to reduce the UK's greenhouse gas emissions by at least 80% (from the 1990 baseline) by 2050." (*emphasis added)

For the avoidance of doubt this means that local plans need to demonstrate how their policies are in line with the legally binding carbon emission reduction targets set out in the Climate Change Act, including an understanding of both the baseline carbon dioxide emissions within the council area, the emissions inherent in future development and growth within the plan period, and the actions and policies that will reduce emissions in line with the trajectory set out in the Climate Change Act.

The Royal Town Planning Institute, Town and Country Planning Association and Client Earth have issued a legal and policy briefing confirming this approach attached at appendix A, and in their report "Planning for a Smart Energy Future"[31] state: *"nothing should be planned without having successfully demonstrated it is fit to take its place in a net-zero emissions future…it makes no sense, economically, socially or environmentally, for what is planned and built today to be delivered in a form, or in places, that will require costly retrofitting tomorrow."*

Paragraph 12, updated in March 2019 details the extent to which planning authorities can set energy performance standards higher than the building regulations in their local plan:

Local planning authorities:

- *Can set energy performance standards for new housing or the adaptation of buildings to provide dwellings that are higher than the building regulations, but only up to the equivalent of Level 4 of the Code for Sustainable Homes (approximately 20% above current Building Regulations across the build mix).*
- *Are not restricted or limited in setting energy performance standards above the building regulations for non-housing developments.*

Paragraph 12 also confirms the ability of development plans to impose reasonable requirements for a proportion of energy used in development in their area to be from renewable sources from the locality of the development.

2.4 Implications for Local Authority practice

The limitation of only imposing energy performance standards for new housing up to the equivalent of Level 4 of the Code for Sustainable Homes (approximately 20% above current

[31] RTPI - Planning for a Smart Energy Future (July 2019) - www.rtpi.org.uk/media/3410158/smart_energy_future_report.pdf

Building Regulations) means that full carbon neutrality is unlikely to be achieved on-site, yet the NPPF requires Local Plans to take a proactive approach to mitigating climate change in line with a national commitment to net zero carbon by 2050, only 30 years from now. At the present time, this supports local authorities in securing contributions to fund off-site carbon abatement, so that overall, new developments are carbon neutral in line with national legislation.

The West of England Authorities (Bath, Bristol, North Somerset and South Gloucestershire), and Reading Borough Council are pushing forward with their own zero carbon planning policies (comprising high energy efficiency standards, on-site renewables and carbon offset contributions) following the model set by the London Authorities and the London Plan. If challenged at examination, the West of England authorities intend to follow the approach set out in the NPPF and NPPG to the letter in defence of their policies, setting out the baseline emissions within their area and the emissions inherent in planned future development. Their analysis is that new development needs to be zero carbon if our 2050 commitments are to be met.

In this regard Policy SI2 (Minimising greenhouse gas emissions) of the latest iteration of the London Plan[32] again includes a requirement that major development should be zero carbon, including requirement for a minimum on-site reduction of at least 35 per cent carbon emissions beyond Building Regulations for major development. Within this is a baseline requirement for emissions to be reduced by 10 and 15 percent respectively for residential and non-residential development through energy efficiency measures. The residual carbon emissions to achieve zero carbon are to be offset through payments into a carbon offset fund. The Ministry of Housing Communities and Local Government has commented on the plan and this policy in particular[33], and has raised no objections in principle to the approach adopted, subject to viability not being compromised.

Policy Consideration - The Future Homes Standard - 2019 Consultation on changes to Part L of the Building Regulations for new dwellings[34]

The 'Future Homes Standard' consultation proposes revisions to the building regulations to achieve higher levels of emission reductions for new dwellings from 2020. The consultation examines two levels of emission reductions: either 20% or 31% over current 2013 Part L standards, and for the 2025 Future Homes Standard a 75-80% reduction, with the assumption that the remaining emission reductions will be achieved through the decarbonisation of the electricity grid.

Whilst the proposals would be an improvement on current building regulations in terms of reducing emissions from new buildings, the new regulations fall short of requiring new development to be zero carbon.

[32] Draft London plan – showing minor suggested changes – July 2018 www.london.gov.uk/sites/default/files/draft_london_plan_-showing_minor_suggested_changes_july_2018.pdf

[33] Written Representation to London Plan – MHCLG - Sustainable Infrastructure - Minimising Greenhouse gas emissions, energy system and managing heat - www.london.gov.uk/sites/default/files/m67_mhclg_2631.pdf

[34] The Future Homes Standard - 2019 Consultation on changes to Part L of the Building Regulations for new dwellings - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835536/Future_Homes_Standard_Consultation_Oct_2019.pdf

The government are consulting on whether to remove the powers given to local authorities to set local carbon reduction standards that go beyond national Building Regulations under the 2008 Planning and Energy Act to set their own standards above Part L – this could happen in 2020, 2025 or not at all.

Self-evidently, depending on the outcome of the consultation, the changes in regulation could remove the discretion of Greater Manchester combined authority to put in place zero carbon planning policies with binding energy performance standards.

The full implications for carbon offsetting regimes are as yet unclear, but the potential regulatory change to use national building regulations to control emissions from dwellings could weaken the arguments for local authorities to put in place carbon offset funds to offset the residual carbon emissions from new development.

2.5 Limitations of carbon offsetting

Carbon offsetting in general is a controversial area of carbon management both because of the risk that it distracts from the pressing need to reduce emissions at source, and because the claimed savings can be difficult to monitor and verify. Some argue that for these reasons offsetting is unhelpful, and possibly even counterproductive, in addressing climate change.

The Tyndall report[35], "Quantifying the implications of the Paris Agreement for Greater Manchester", comments as follows on the scope of achieving the city's ambitions for carbon reduction through the use of carbon offsetting:

"All carbon offset arrangements are open to criticism as being ineffective at reducing emissions. 'Carbon neutrality' achieved this way is an accounting procedure rather than a physical status. These procedures and the context under which they operate are liable to change through time, for better or worse. In light of this, we would not recommend entering into offset relationships. If GMCA identify financial resources and the necessity to pursue this path then they should i) only consider regulated systems and purchases, ii) revisit the available tradeable units at the time of purchase to consider which are the most robust and reliable, iii) recognise that this will be a controversial approach potentially drawing criticism, and public and professional cynicism."

CSE largely shares these concerns. In the context of mandatory offsetting attached to zero carbon planning policies, CSE stressed in an earlier report[36] that whilst levying a carbon offset charge has good potential for positive investment in carbon savings, it will always be second best to achieving on-site carbon savings. It is far more cost-effective to "build right the first time" than to build new development to inferior standards and then have to retrofit it subsequently.

[35] www.research.manchester.ac.uk/portal/files/83000155/Tyndall_Quantifying_Paris_for_Manchester_Report_FINAL_PUBLISHED_rev1.pdf

[36] West of England Carbon Reduction Requirement Study - Carbon Offsetting in the West of England – CSE (January 2019) www.bristol.gov.uk/documents/20182/3368102/Carbon+Offsetting+in+the+West+of+England.pdf/894f7c11-33e4-a8b4-ec89-383828553184

Additionally, in a sense carbon offsetting is always playing "catch up", seeking to make up for carbon emissions which have already been emitted. Common concerns are also whether the emission reductions funded are genuinely additional to what would have happened otherwise and whether a carbon offset regime is keeping up with the pace of emissions it is intending to mitigate for.

In the case of carbon offsetting linked to zero carbon planning policies, buildings which don't achieve policy compliance will either contribute to climate change for the whole of their lifetime or require costly retrofit, whereas carbon offset payments are usually calculated on the basis of abating carbon emissions for 30 years' worth of building occupancy, so only a proportion of the emissions are compensated for. This approach, of calculating emissions on the basis of 30 years' worth of emissions was supported by the Zero Carbon Hub[37], and has been reiterated by the Greater London Authority in their 2018 advice to London Boroughs on their offset funds[38]. It assumes that within the 30 year period the de-carbonisation of grid electricity and heat will be achieved through technological developments and other policy instruments. Whilst the carbon intensity of grid electricity is rapidly decreasing, de-carbonising the generation of heat is progressing much more slowly and remains a formidable challenge

Finally, the commitment to achieve full net zero carbon by 2050 within the upgraded Climate Change Act changes the context fundamentally. With this commitment, ultimately we will need to "do everything". That is, we will need to reduce all carbon emissions in the next 30 years, and upgrade our entire building stock, and Greater Manchester have committed to achieving the same goal by 2038. Against this context, allowing a carbon emitting development to go ahead because it funds the retrofitting of another building does not make sense, because ultimately all buildings will need to be zero carbon. This also has implications for how "additionality" is defined, as is discussed in further detail in section 3.

As a result, for all of these reasons, carbon offsetting regimes forming part of zero carbon planning policies should be seen as temporary measures until regulatory regimes, development economics and the development industry deliver true carbon neutral or carbon positive developments on-site through very high energy efficiency standards, reduced/no embodied carbon and integrated renewables.

However, whilst the Climate Change Act requires the UK as a whole to be net carbon zero by 2050, as discussed in detail in the methodology, existing planning guidance advises that local authorities are advised not to set technical standards this high for the energy performance of dwellings. Therefore at the current time, if new developments are to be net carbon emitting, a key way of achieving this is through a combination of the highest thermal efficiency standards possible, the incorporation of on-site renewable energy and payments into a carbon offset fund, to make up the shortfall through off-site carbon abatement.

In the absence of developments which truly do not generate carbon emissions through their operation and occupation, carbon offset regimes can provide funds to create new carbon saving projects, and bring forward the rate at which carbon emission reductions are

[37] Zero Carbon Hub (2013) - Zero Carbon Strategies For tomorrow's new homes - www.zerocarbonhub.org/sites/default/files/resources/reports/Zero_Carbon_Strategies_for_Tomorrows_New_Homes.pdf
[38] Greater London Authority (2018) Carbon Offset Funds - guidance for London's Local Planning Authorities on establishing carbon offset funds -www.london.gov.uk/sites/default/files/carbon_offsett_funds_guidance_2018.pdf

achieved. The carbon offset regime linked to zero carbon planning policies should therefore be seen as a temporary policy solution, until national planning policy catches up.

2.6 Greater Manchester Context and Narrative

The section above shows how national legislation and policy (in particular the requirements to mitigate climate change and secure radical carbon reductions in line with the objectives and provisions of the Climate Change Act) support Greater Manchester in adopting ambitious policies for carbon reduction from new development. As set out in the draft Spatial Plan, without any mitigation, new development is likely to result in around a 3% increase in carbon emissions, but to meet the 2038 zero carbon target, all new homes and commercial / industrial buildings will need to be net zero carbon by 2028.

On 21st March 2018, Greater Manchester held a Green Summit, where the mayor Andy Burnham announced the vision for 'a carbon neutral, climate resilient city-region with a thriving natural environment and circular, zero-waste economy'. An overarching objective was to bring the date for achieving zero carbon forward by at least a decade to 2040. On Friday 26 July, the Greater Manchester Combined Authority declared a Climate Emergency[39] targeting carbon neutrality by 2038. All of the 10 local authorities within Greater Manchester have now declared their own climate emergencies.

Following on from the Green Summit, in March 2019 the Greater Manchester 5 year Environment Plan[40] was published, resolving to take prompt action to put Greater Manchester on a path to 'carbon neutrality' by 2038, initiating an immediate programme of mitigation delivering an annual average of 15% cuts in emissions.

Policy GM-S 2 of the revised draft Greater Manchester Spatial Framework[41] picks up on this, stating *"the aim of delivering a carbon neutral Greater Manchester no later than 2038 will be supported through a range of measures, including … an expectation that new development will be carbon zero from 2028 by following the energy hierarchy (with any residual carbon emissions offset)… with an interim requirement that all new dwellings should seek a 19% carbon reduction against Part L of the 2013 Building Regulations."*

Also arising from the Green Summit is the possible creation of the Greater Manchester Environment Fund (GMEF). The aim of the proposed fund is to improve the quality of the environment within Greater Manchester by providing grant funding to non-statutory environmental initiatives that are currently underfunded, and it is proposed that there will be a focus on three themes:

- biodiversity and natural environment,
- carbon reduction/offsetting,

[39] Greater Manchester Combined Authority declares climate emergency - https://greatermanchester-ca.gov.uk/news/combined-authority-declares-climate-emergency/
[40] Greater Manchester 5 year Environment Plan - https://www.greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf
[41] www.greatermanchester-ca.gov.uk/what-we-do/housing/greater-manchester-spatial-framework/gmsf-full-plan/

- resource efficiency and reducing waste.

The fund under consideration would be designed to accept voluntary funds from corporate organisations and institutions wishing to address their environmental impacts and / or organisations which are required to offset their impacts to achieve compliance with environmental objectives. Funding would be distributed to smaller environmental groups who find it difficult to access funding at present.

It is anticipated that the fund vehicle will be set up towards the end of the year. This report will consider the present the key issues for the carbon reduction/offsetting element of the GMEF.

Another relevant initiative is The Greater Manchester Natural Capital Investment Plan[42] which seeks to broaden the range of potential sources of investment in natural capital, presenting a wide range of financial models. Of particular relevance to this study because of carbon sequestration potential the investment plan looks at attracting investment into habitat creation and restoration, pursuing a net gain in biodiversity, peatland restoration and woodland and wetland creation.

The Greater Manchester Smart Energy Plan[43], published in April 2019 describes Greater Manchester aspirations for "a carbon neutral city region, with an energy system which is smart and fit for the future, low carbon and economically, environmentally and socially sustainable." The plan seeks to provide a targeted focus for GMCA and local partners, through defining a roadmap and initial projects / activities over a 5-year timeframe and GMCA seeks to play a leading role in the low carbon transition, aiming to empower local, regional and national actors and provide strategic direction towards a local, decentralised smart energy system. This plan sets out the following ambitions and focussed goals for 2024:

- Generation and storage – 45 MW of additional generation by 2024;
- Decarbonisation of heat – 10.2 TWh of low carbon heat by 2024;
- Low carbon transport – Up to 200,000 low carbon vehicles by 2024; and
- Diversity and flexibility – 45 MW of diverse / flexible energy load by 2024.

The Made to Move report[44] published December 2017 by Greater Manchester's Cycling and Walking Commissioner set out a 15-step plan to transform Greater Manchester and create a comprehensive and high quality walking and cycling network across Greater Manchester. To deliver meaningful benefits and meet required standards the report proposes a £1.5 billion investment to put cycle routes on every main corridor and make public realm improvements.

Greater Manchester Combined Authority appears to be extremely active across almost all forms of climate change mitigation, with programmes and projects looking at energy efficiency in buildings, the electrification of heat and transport, the sequestration of carbon through tree planting and the restoration of wetlands, together with significant ambitions to

[42] Greater Manchester Natural Capital Investment Plan - https://naturegreatermanchester.co.uk/wp-content/uploads/2019/01/GM-Natural-Capital-Investment-Plan-Final180119.pdf
[43] https://es.catapult.org.uk/wp-content/uploads/2019/07/ESC_SSH2_D40-Smart-Energy-Plan-GMCA.pdf
[44] Made to Move (2018) Greater Manchester Combined Authority - https://assets.ctfassets.net/nv7y93idf4jq/1a6jJ4qoJe6OwcKIAIy0qs/9e1429b07eacde218045d327ecef90dc/Made_to_move.pdf

increase renewable energy production and increase active travel. There are huge areas of possible synergy between these projects and programmes and a possible carbon offset regime, with the potential for the offset fund to resource some of these programmes and deliver significant co-benefits. Further analysis is set out below in section 3.

2.7 Key Conclusions from section 2 – Legislative and Policy Framework

National Legislation and planning policy and guidance are clear that local plans should take a proactive approach to mitigating and adapting to climate change and should achieve radical carbon reductions in line with the provisions of the Climate Change Act 2008 to reduce carbon emissions by 100% by 2050. To be found sound plans must include; an understanding of baseline carbon dioxide emissions within the council area, the emissions inherent in future development and how the council's actions and policies will reduce emissions in line with this trajectory to net zero.

Local Planning Authorities retain legal powers (from the 2008 Planning and Energy Act) to require new developments to generate a proportion of their energy needs from renewable energy sources on-site and to set local carbon reduction standards that go beyond national Building Regulations, up to the equivalent of Level 4 of the Code for Sustainable Homes (approximately 20% above current Building Regulations across the build mix). However, government guidance advises that local authorities should not seek to set higher standards than this for the energy performance of dwellings.

When local planning authorities carbon audit their plans as required, this often supports a conclusion that new development needs to be zero carbon if our 2050 carbon emission reduction commitments are to be met.

CSE maintains concerns about an over-reliance on carbon offsetting to achieve net zero carbon in new development. It is far more cost-effective to "build right the first time" than to build new development to inferior standards and pay to resource carbon reductions elsewhere through offsetting. Carbon offsetting is always playing "catch up", seeking to make up for carbon emissions which have already been emitted. In the context of a climate emergency with set deadlines to achieve net zero carbon, no carbon savings can genuinely be seen to be "additional" in that within these timescales, effectively all carbon emissions will need to be reduced or sequestered in carbon sinks.

As a result, carbon offsetting regimes forming part of zero carbon planning policies should be seen as temporary measures until regulatory regimes, development economics and the development industry deliver true carbon neutral or carbon positive developments on-site through very high energy efficiency standards, embodied carbon and integrated renewables.

Thus consideration should be also given to designing policy to ensure that carbon emission reductions achieved through contributions into the offset fund are only used as a last resort, once on-site carbon savings are maximised. Robust and transparent processes should also be developed to ensure that the carbon savings are genuinely additional to what would otherwise have happened and are realised on the ground.

The 2019 consultation on changes to part L of the Building Regulations proposes stronger energy performance standards than the current building regulations but falls short of enabling new development to be zero carbon, at least without the substantial to full decarbonisation of grid electricity. One option consulted upon would be to remove the powers given to local authorities to set local carbon reduction standards beyond national Building Regulations. Depending on the outcome of the consultation the proposed regulatory change could remove the discretion of Greater Manchester combined authority to put in place zero carbon planning policies with binding energy performance standards, and weaken the arguments for requiring developers to contribute into a carbon offset fund.

3 Proposed cost of carbon (per tonne)

3.1 Price charged by other authorities

Our survey found that the majority of London Boroughs set a price of £60 per tonne per year, as directed within the current London Plan[45]. However, some carried out independent analysis to set an alternative price. In the case of Islington this was £30.66 per tonne per year, and Southwark set a price of £46. One notable outliner is Lewisham which, based on a desk review of the Planning Obligations SPD[46] appears to have opted for a higher price of £104. However, at the time of writing CSE have been unable to speak to a member of the planning policy team at Lewisham to provide confirmation of this cost.

It is expected that London Boroughs will be updating the price in line with that recommended in the new draft London Plan (£95 per tonne per year) which has been accepted in the Local Planning Inspectors report[47]. The price for the current London Plan was determined using analysis from an independent consultant[48]. There is however ambition amongst some Boroughs to go further. Westminster together with Haringey, Ealing, Barking and Dagenham, and Greenwich have commissioned a consultant to investigate a higher cost of carbon than the GLA's £95 figure. At the time of writing, the council expect that this figure will be set at around £160 per tonne.

Outside of London, Reading Borough Council has chosen to follow the price set by the Government's non-traded carbon price central cost cap value for carbon offsetting of £60 per tonne (set out before the abandonment of allowable solutions), the same value as set in the adopted London Plan[49].

Elsewhere local authorities have commissioned their own studies, for instance a detailed study was carried out on behalf of Southampton City Council by the United Sustainable Energy Agency which looked at costs of offsetting locally. CSE's study for the West of England Authorities (B&NES, Bristol, South Gloucestershire and North Somerset) recommended that following the example of the London Plan, a carbon price of £95 per tonne should be adopted; reflecting the most up to date carbon price, based on nationally recognised pricing mechanisms.

[45] https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan
[46] [online] available at: https://lewisham.gov.uk/-/media/files/imported/planningobligationsspd2015.ashx
[47] Report to the Mayor of London - Report of the Examination in Public of the London Plan 2019 www.london.gov.uk/sites/default/files/london_plan_report_2019_final.pdf
[48] https://www.london.gov.uk/sites/default/files/london_carbon_offset_price_-_aecom_.pdf
[49] https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan

In our survey of Local Planning Authorities, we asked:

Is the carbon price adopted high enough to fund like-for-like off-site carbon abatement and achieve your policy objectives?

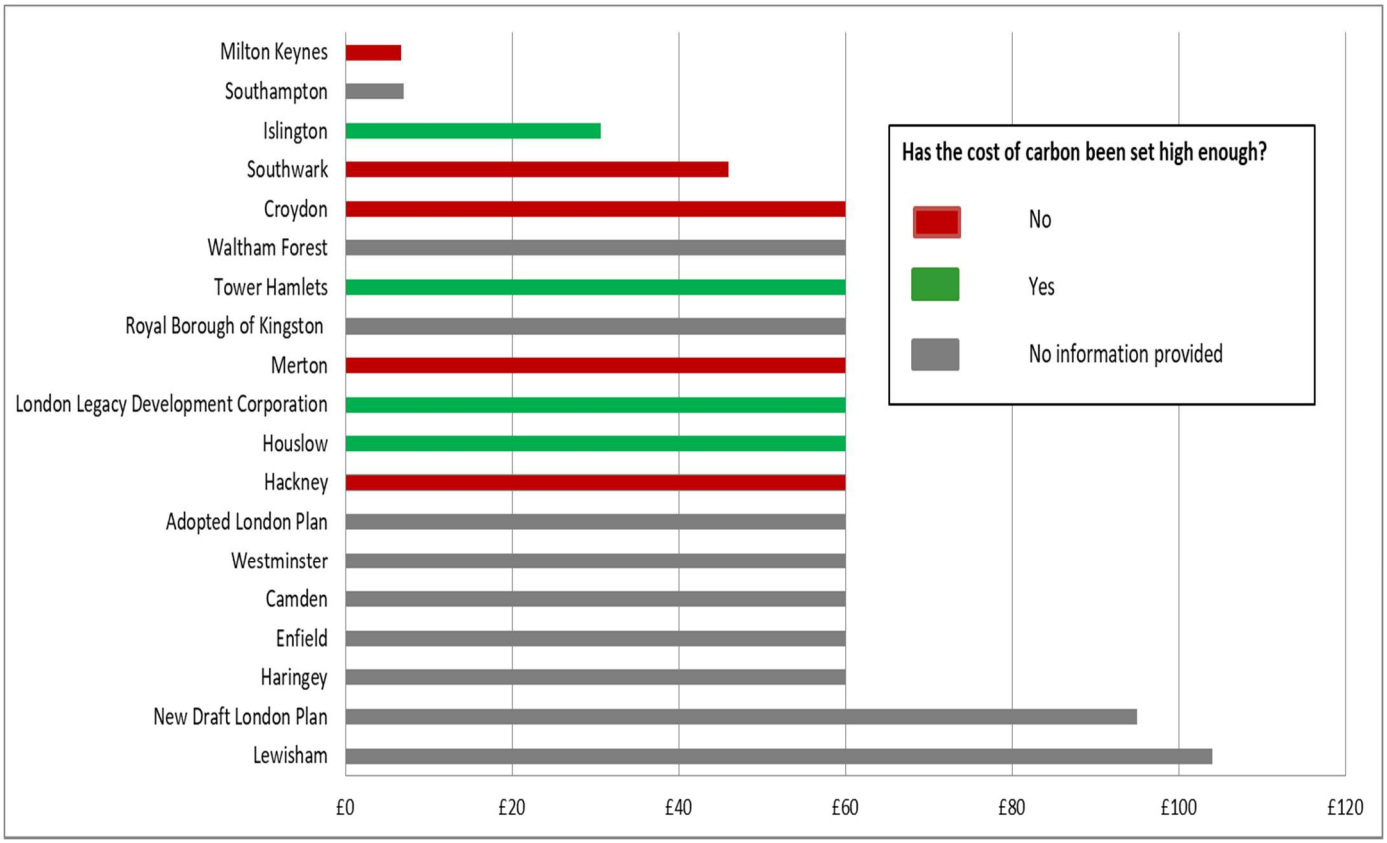

Figure 2 - Local Authority opinions on the adequacy of their adopted carbon price

62% of responding authorities stated that the adopted carbon price is not high enough to fund like for like carbon savings; this reflects an unrealised ambition to push for a higher price of carbon.

The officer from Merton Borough Council commented further (in 2018):

"We know that £60 per tonne is not enough, but no-one wants to take the risk of breaking from the pack. The few that have [done so] have not necessarily had the easiest time of it. They've stuck their head above the parapet and developers go for them whenever they do."

Our contact at Haringey advised that their carbon price had originally been set at £92, but was revised down to £60 per tonne, bringing it into line with the price set by the GLA. He considered that this approach was too conservative and reflected a fear of challenge that was counterproductive to maximising carbon emission savings.

Notably, although 38% of respondents thought the price was sufficient, due to variation in cost of carbon abatement across different project types, and the difficulty in using a standardised monitoring methodology, many authorities felt they did not have an accurate understanding of whether 1:1 abatement was being achieved.

3.2 Recommendation for GMCA carbon price, and the effect of the climate emergency

This study proposes that the carbon price for the Greater Manchester offsetting scheme should be set in accordance with a nationally recognised carbon pricing mechanism. The supplementary documentation to the HM Treasury's Green Book[50], which provides guidance on the appraisal of policies, programmes and projects, includes a set of national carbon prices and sensitivities that are based on estimates of the abatement costs that will need to be incurred in order to meet the UK's emissions reduction targets in both the short and long term[51]. These abatement cost estimates are based on government analysis of several sources of cost data, including the integrated UK Marginal Abatement Cost (MAC) model and the international Global Carbon Finance (GLOCAF) model, along with wider evidence on global abatement costs[52].

The table below is an extract from the most up to date (2019) version of the Treasury guidance, and sets out the carbon prices and sensitivities for each year from 2019 to 2050 in both the traded and non-traded sectors. Traded emissions are those that are covered under the EU Emissions Trading System (EU ETS), and non-traded emissions are those that are outside of this mechanism and are therefore most relevant to the Greater Manchester scheme (the traded figures are provided only for context and comparison)[53]. Three prices (low, central and high) are provided for each year in order to enable sensitivity analysis of policy options to account for future uncertainty (for example fluctuations in fossil fuel prices).

[50] A member of the GM Steering Group raised concerns about the limitations of the Green Book, in that the costs to Local Authorities of dealing with flooding, drought, high winds and extreme temperatures are not clearly captured or necessarily considered and health impacts only take into account air quality impacts and not flooding. Nevertheless it represents a nationally recognised carbon pricing mechanism that can be used to guide the carbon offset price.'

[51] https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

[52] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/245334/1_20090715105804_e_carbonvaluationinukpolicyappraisal.pdf

[53] The separate reduction targets were introduced as part of the 2008 EU Energy and Climate Package and effectively imply that emissions in the two sectors are different commodities. The impact of Brexit on the way that the UK accounts for carbon emissions in what is currently the traded sector, and how this might affect the valuation of emissions in the non-traded sector, is not yet known.

	Traded			Non-traded		
	Low	Central	High	Low	Central	High
2019	0	13	26	34	68	102
2020	0	14	28	35	69	104
2021	4	21	37	35	70	106
2022	8	27	46	36	72	107
2023	12	34	56	36	73	109
2024	16	41	65	37	74	111
2025	20	47	74	38	75	**113**
2026	24	54	84	38	76	114
2027	28	61	93	39	77	116
2028	32	67	103	39	79	**118**
2029	36	74	112	40	80	120
2030	40	81	121	40	81	121
2031	44	88	132	44	88	132
2032	48	96	144	48	96	144
2033	52	103	155	52	103	155
2034	55	111	166	55	111	166
2035	59	118	178	59	118	178
2036	63	126	189	63	126	189
2037	67	133	200	67	133	**200**
2038	70	141	211	70	141	211
2039	74	148	223	74	148	223
2040	78	156	234	78	156	**234**
2041	82	163	245	82	163	245
2042	85	171	256	85	171	256
2043	89	178	268	89	178	268
2044	93	186	279	93	186	279
2045	97	193	290	97	193	290
2046	100	201	301	100	201	301
2047	104	208	313	104	208	313
2048	108	216	324	108	216	324
2049	112	223	335	112	223	335
2050	115	231	346	115	231	346

Table 2: HM Treasury carbon prices and sensitivities 2019-2050, 2018 (£/tCO2e)

The use of the Treasury's carbon prices reflects the approach taken by the Greater London Authority (GLA) and set out in the London Plan[54]. The GLA's recommended price for the London boroughs was informed by a 2017 study by AECOM[55] that reviewed a number of different options for price setting, including basing the price on the cost and carbon savings associated with local carbon offsetting projects. The study found that the wide variability of these costs and savings, combined with the uncertainty in the percentage co-payments that

[54] https://www.london.gov.uk/sites/default/files/carbon_offsett_funds_guidance_2018.pdf
[55] https://www.london.gov.uk/sites/default/files/london_carbon_offset_price_-_aecom_.pdf

could be secured, meant that it would be very difficult to assemble sufficient evidence from which to calculate robust costs per tonne for different types of offsetting projects.

The GLA's current figure of £95 per tonne is the 'high' scenario figure taken from the 2017 version of Table 2. This decision was supported by the AECOM study, which found that a higher price would, logically, allow a wider range of offsetting projects to be delivered, and that few of the project types that would be likely to deliver deeper carbon savings could be fully funded under the central price scenario.

Developer contributions in London are calculated over a 30 year time period. This is in line with the outcome of a 2014 government consultation on carbon offsetting policy[56], which stated that 30 years was "broadly representative of the lifetime of onsite technologies and the period beyond which the electricity grid will be substantially decarbonised". The £95 per tonne figure over a 30 year period was tested as part of the viability assessment of the London Plan.

Taking the same approach, updated to reflect the more recent government figures, a price of £113 or £118 per tonne (depending on whether the scheme is expected to come into force in 2025 or 2028) could be an appropriate price point for Greater Manchester, highlighted in yellow (and in bold) in Table 2. However, CSE does not consider this approach to be consistent with Greater Manchester's Climate Emergency Declaration.

CSE considers that the climate emergency, the UK wide 2050 zero carbon target and the Greater Manchester 2038 zero carbon target fundamentally challenges the conventionally accepted approach to additionality and carbon offsetting, due in large part to the limited time frame in which the carbon reductions need to be achieved. National legislation commits the UK to reduce net UK carbon emissions to zero by 2050. GMCA intend to achieve net zero carbon emissions within the Greater Manchester area by 2038, excepting a residual carbon budget left for the purposes of air travel.

Therefore the timing and rate at which emission reductions are achieved through carbon offsetting is critical, in that if Greater Manchester is to meet its stated commitment to become carbon neutral by 2038, the residual emissions from development would also need to be offset prior to the 2038 deadline (e.g. in 10 years), not over the operational lifespan of the measure funded or a 30 year period. Accepting that the carbon debt from new development can be met over a longer time frame endangers Greater Manchester's ability to meet its goal

This logic would support emissions reductions achieved after 2038 not being counted towards the mitigation of the developers' carbon debt, and therefore higher charges levied on developers to achieve the carbon savings required within the timeframe allowed, increasing further as the length of time to the deadline (2038) within which carbon savings can be accrued reduces[57].

[56] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/327842/140626_Government_Response_to_Consultation_-_Next_Steps_to_Zero_Carbon_H__FINAL.pdf

[57] Whilst achieving net zero carbon by 2050 is a legislative commitment which can be afforded weight in planning decisions and policy formulation, legal advice should be taken on the legitimacy of calculating the carbon cost on the basis of Greater Manchester's non-statutory Climate emergency Declaration to achieve net zero carbon emissions by 2038.

Figure 3 below shows how this would work. Instead of calculating the carbon emission reductions funded by a contribution based on the carbon savings that would be accrued over the project lifetime, the emissions reductions attributable to a contribution should be calculated on the basis of the carbon that can be saved by 2038. Thus emissions reductions achieved after 2038 would be immaterial and would not be counted towards the mitigation of the developers' carbon debt.

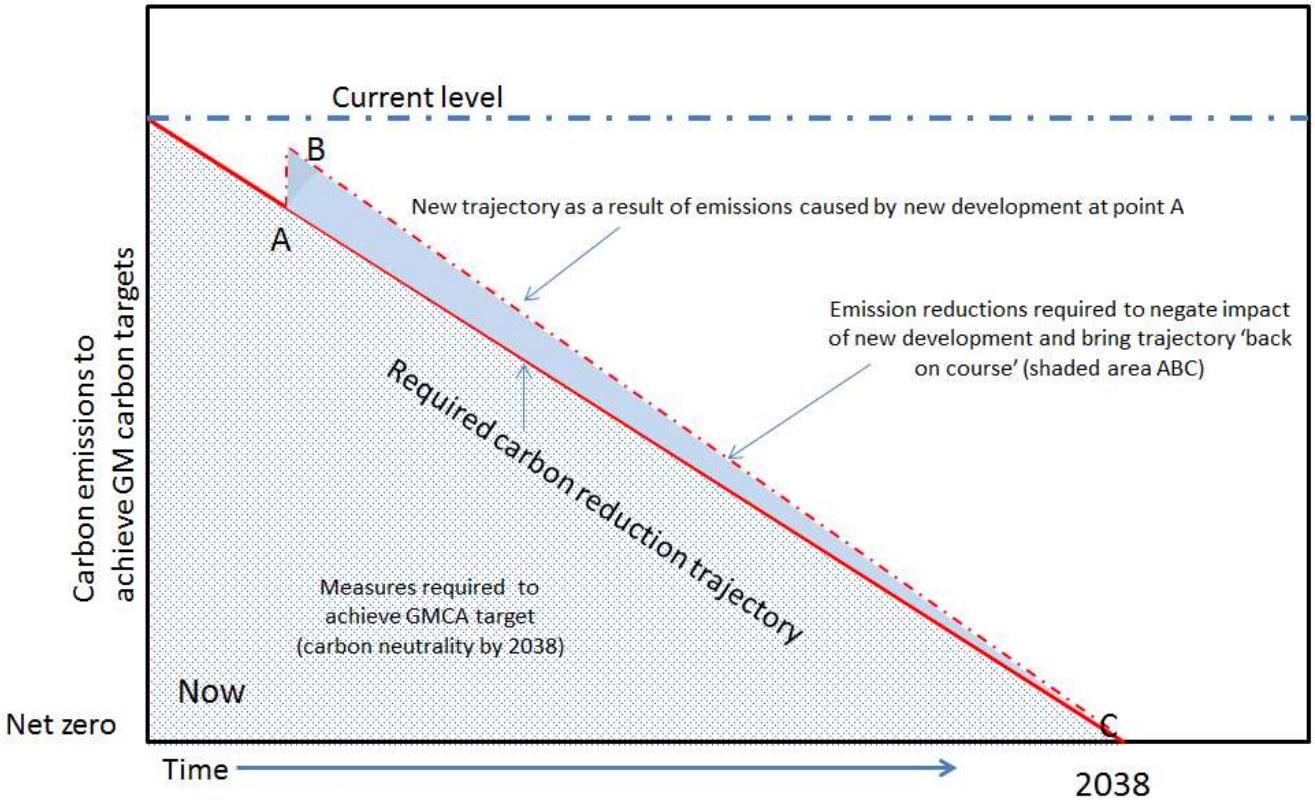

Figure 3 - carbon offsetting in the context of a climate emergency

This approach would increase the cost of carbon for developers as the life-time of measures is artificially reduced, and as time goes on the effective cost of carbon saving will increase further, as the length of time to the deadline (2038) within which carbon savings can be accrued reduces[58].

To give a simplified example, if 1 hectare of tree planting sequestered 1 tonne of carbon per year, and in 2019 a development needed to offset 30 tonnes of carbon, a hectare of trees would need to be planted, which would sequester this carbon by 2049. If by contrast the commitment is to sequester this carbon by 2038 approximately 1.5 hectares of tree planting would need to be planted. By 2020 1.6 hectares of trees would need to planted to achieve the same objective, and by 2021 1.7 hectares would be needed.

Further work beyond the scope of this study would be required to operationalise this approach. Nevertheless CSE considers that these principles are sound and Greater Manchester's adoption of a zero carbon target of 2038, 12 years in advance of the UK wide 2050 target may justify a higher price being adopted. The increasing yearly cost to Councils

[58] On this point, whilst achieving net zero carbon by 2050 is a legislative commitment which can be afforded weight in these arguments, legal advice should be taken on the legitimacy of calculating the carbon cost on the basis of achieving zero carbon by 2038 on the basis of Greater Manchester's non-statutory Climate emergency Declaration.

of addressing the impacts of the climate crisis, such as flooding would also help to justify the GM approach and proposed price.

An alternative approach which could be justified would be to base the carbon price for Greater Manchester on the Treasury figures (which are consistent with the UK's 2050 carbon target) but adjust the figures to reflect that Manchester's deadline is 12 years shorter than that of the UK's and thus the pace at which emissions need to be reduced is more rapid. If this approach was to be taken and the carbon offset regime was to come into force in 2025 or 2028, the carbon price would thus become £200 or £234 respectively, the figures shown for 2025 and 2028 in the Green Book, shown in green in Table 2 above. This would, however, be subject to viability testing.

3.3 Potential fund size that could be generated, based on projected development within GMSF

The potential size of the carbon offset fund and associated CO_2 savings have been estimated using the feasibility modelling of onsite CO_2 reductions in Part 1 of this report, the scale of housing delivery indicated by the future land supply provided in the Strategic Housing Land Availability Assessment across the 10 local authorities within the GMCA area, and the carbon price recommendations.

District	Annual average projected housing delivery 2018-2037	Total projected housing delivery 2018-2037
Bolton	726	13,800
Bury	498	9,470
Manchester	2,870	54,530
Oldham	752	14,290
Rochdale	640	12,160
Salford	1,720	32,680
Stockport	764	14,520
Tameside	466	8,850
Trafford	1,015	19,280
Wiggan	1,126	21,400
Greater Manchester	10,578	200,980

Table 2 - Housing allocations expected over the GMCA Plan Period[59]

The following four scenarios were used as the basis for the estimates. These choices have been developed so as to reflect GMCA's policy intentions and the suggested changes which may arise from the 2019 Future Homes Standard Consultation.

- **Scenario 1:** 80% onsite regulated emissions reductions over building regulations part L post 2025 including offset fund payment for all remaining regulated emissions.

[59] Shown in number of houses, Adapted from Greater Manchester Combined Authority Spatial Framework Revised Draft (2019) (https://www.greatermanchester-ca.gov.uk/what-we-do/housing/greater-manchester-spatial-framework/gmsf-full-plan/)

- **Scenario 2:** 80% onsite regulated emissions reductions over building regulations part L post 2025 including offset fund payment for all remaining regulated and unregulated emissions.
- **Scenario 3:** 80% onsite regulated emissions reductions over building regulations part L post 2028 including offset fund payment for all remaining regulated emissions.
- **Scenario 4:** 80% onsite regulated emissions reductions over building regulations part L post 2028 including offset fund payment for all remaining regulated and unregulated emissions.

Figure 4 shows the total carbon offset fund size per year within the GMCA area as a whole for the four policy scenarios selected. Table 3 shows these figures in tabulated form, and Figure 5 shows the total residual carbon emitted after onsite savings have been achieved in each policy scenario. The equivalent figures disaggregated by local planning authority are tabulated at Appendix B.

The policy scenario adopted has a significant influence on the fund size available, and the residual volume of carbon emitted is directly proportional to the size of the monetary value of the fund (i.e. scenarios with policies that seek higher onsite emissions savings will result in a smaller carbon offset fund over the life of the plan, while those scenarios with policies that require less onsite emissions savings will result in a larger fund size). In all cases the carbon offset fund has been applied to all housing development coming forward in the GMCA plan period.

The policy scenario adopted has a significant influence on the fund size available. Scenarios one and three include policies which only cover regulated carbon emissions, whereas scenarios two and four include policies which cover both regulated and unregulated emissions. Consequently, scenarios two and four create the largest carbons offset fund sizes in the region of £500 million and £434 million respectively.

In contrast, policies in scenarios one and three only consider regulated emissions – a lower proportion of total emissions are considered eligible for offset payments through policies in these scenarios. Therefore scenarios one and three offer smaller fund sizes in the region of £212 million, and £191 million respectively.

The policy approaches in scenarios two and four achieve net zero carbon emissions from building energy use. The policy approaches in scenarios one and three do not result in carbon offsetting for unregulated energy use and therefore do not reach net zero carbon.

The policy scenarios also have different start dates. In Policies one and two, offset payments begin in 2025 with a £200 per tonne cost of carbon, whereas policies three and four begin in 2028 and are modelled on £234 per tonne of carbon. The higher cost of carbon for these latter two policy scenarios is required to achieve the same level of emissions reductions over a shorter time period.

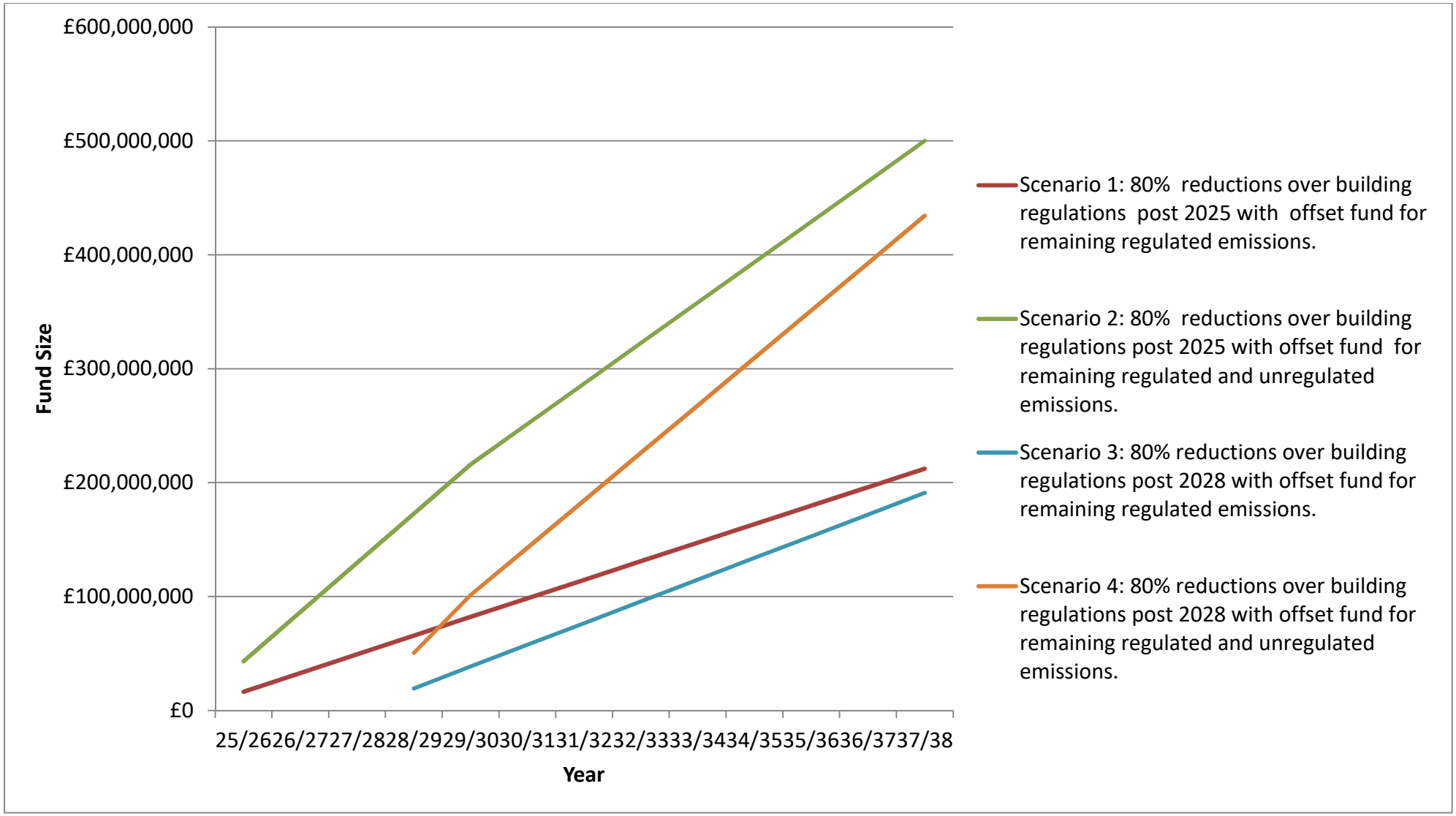

Figure 4 - Total GMCA Fund size

Year	25/26	26/27	27/28	28/29	29/30	30/31	31/32	32/33	33/34	34/35	35/36	36/37	37/38
Scenario 1: 80% onsite regulated emissions reductions over building regulations part L post 2025 including offset fund payment for all remaining regulated emissions													
CO2 tonnes	82209	164419	246628	328838	411047	493257	574487	655716	736946	818176	899406	980636	1061866
£	16,441,885	32,883,770	49,325,655	65,767,540	82,209,425	98,455,419	114,701,413	130,947,407	147,193,401	163,439,395	179,685,389	195,931,383	212,177,376
Scenario 2: 80% onsite regulated emissions reductions over building regulations part L post 2025 including offset fund payment for all remaining regulated and unregulated emissions.													
CO2 tonnes	215973	431947	647920	863894	1079867	1295840	1473380	1650920	1828460	2006000	2183540	2361080	2538620
£	43,194,676	86,389,352	129,584,028	172,778,705	215,973,381	251,481,384	286,989,388	322,497,391	358,005,395	393,513,398	429,021,402	464,529,405	500,037,409
Scenario 3: 80% onsite regulated emissions reductions over building regulations part L post 2028 including offset fund payment for all remaining regulated emissions.													
CO2 tonnes	[redacted]			82209	164419	246628	327858	409088	490318	571548	652778	734008	815238
£				19,237,006	38,531,928	57,597,238	76,662,548	95,727,858	114,793,168	133,858,478	152,923,788	171,989,098	191,054,408
Scenario 4: 80% onsite regulated emissions reductions over building regulations part L post 2028 including offset fund payment for all remaining regulated and unregulated emissions.													
CO2 tonnes	[redacted]			215973	431947	647920	825460	1003000	1180540	1358080	1535620	1713160	1890700
£				50,537,771	101,192,311	142,836,545	184,480,780	226,125,014	267,769,249	309,413,483	351,057,717	392,701,952	434,346,186

Table 3 - Carbon offset fund by year, by policy scenario

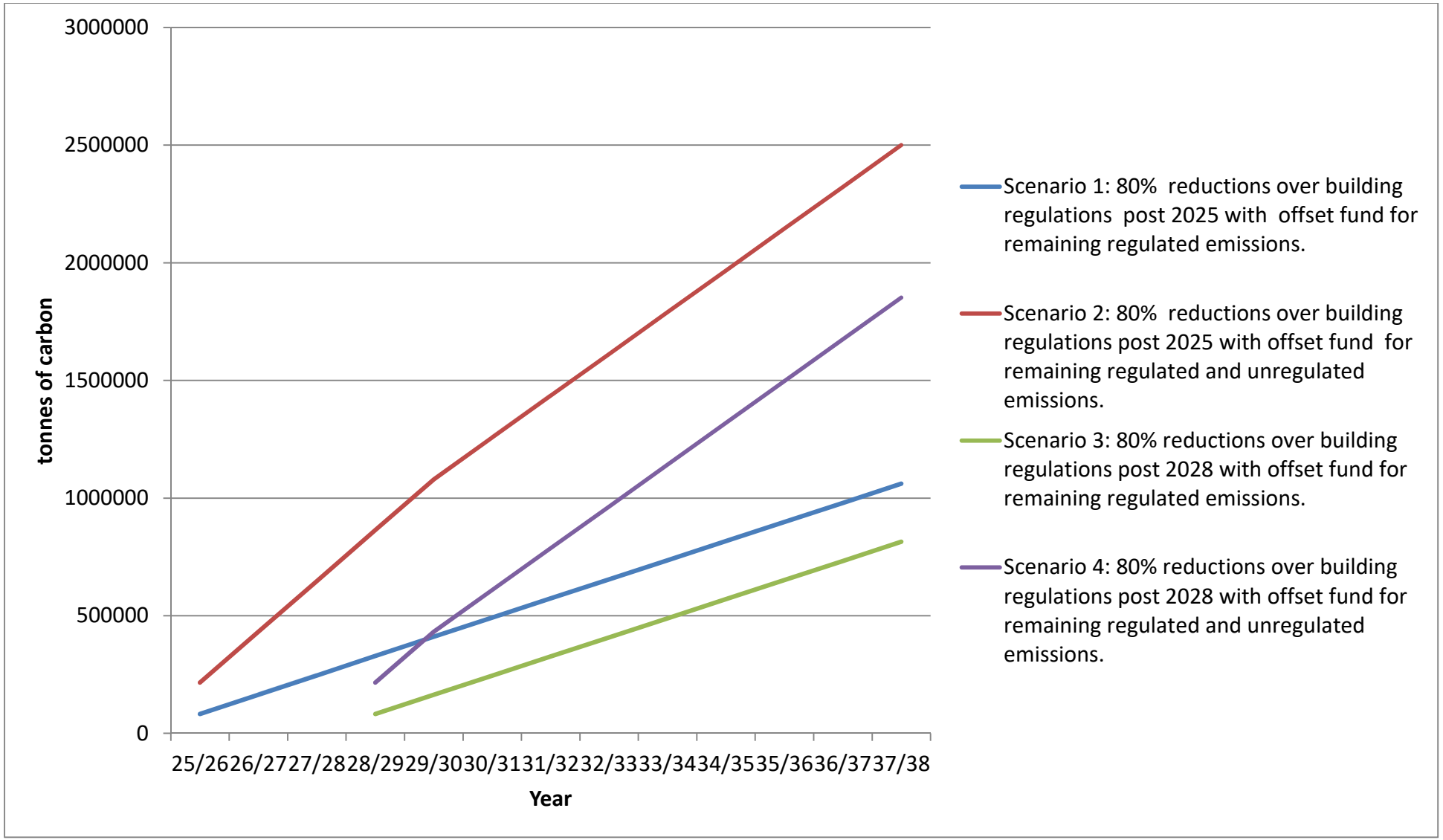

Figure 5. Total volume of offset carbon emissions

Assumptions

The modelling is based on a number of assumptions. The number of dwellings to be constructed over time has been set out to reflect the figures from SHLAA analysis integrated into the GM Draft Spatial Framework (January 2019). To account for the varying emissions that might arise from different housing types and to align with the modelling in part 1 of this study, these figures were split down into numbers of detached houses, semi-detached houses, terraced houses, and flats.

Given that there was an absence of data on future trends of housing types available through the SHLAA data, it was assumed that the future housing development would reflect the proportion of housing types previously built in local authority areas as evidenced by historical data (and therefore might depart from estimations shown in the district's housing needs assessments). Therefore, data on housing types from the 2011 census was used as a basis for estimation of future housing type proportions. GMCA have indicated that the policy under consideration would apply to all scales of development coming forward within the GMCA area.

For clarity, all references to percentage reductions over building regulation requirements reflect those found in Part L of the 2010 Building Regulations (2013 edition with 2016 amendments). Regulated emissions were estimated using SAP2012 for the concurrent notional dwelling for each one of the six archetypes. The baseline emissions were produced using the SAP10.1 gas and electricity carbon emission factors as published by BRE for 2020-2025. This follows the methodology used within the Part L 2020 consultation work. The impact of future changes within the Building Regulations (Part L 2020 – 20% or 31% and the Future Homes Standard – 78%) was then applied on the Part L 2013 estimates at future points in time when the regulations are expected to change.

All reference to carbon emissions are those which arise from regulated and unregulated energy use in a building, but do not include embodied carbon emissions (i.e carbon emitted in the process of construction or embodied in building materials).

In terms of unregulated energy emissions for the 2025-2035 period, BRE produced carbon emission factors were used as provided by Currie & Brown. All electric solutions were assumed within the calculations (cooking and plug loads).

3.4 Conclusions on recommended carbon price

This study proposes that the carbon price for the Greater Manchester offsetting scheme should be set in accordance with the supplementary documentation to the HM Treasury's Green Book, a nationally recognised carbon pricing mechanism which includes a set of national carbon prices and sensitivities that are based on estimates of the abatement costs that will need to be incurred in order to meet the UK's emissions reduction targets in both

the short and long term[60], reflecting the approach taken by the GLA in the London Plan[61], which recommends a figure of £95 per tonne.
Updating this approach to reflect more recent government figures, a price of £113 or £118 per tonne (if the scheme came into force in 2025 or 2028) could be an appropriate price. However, CSE does not consider this approach to be consistent with Greater Manchester's Climate Emergency Declaration.

The climate emergency, the UK wide 2050 zero carbon target and the Greater Manchester 2038 net zero carbon target fundamentally challenge the conventionally accepted approach to additionality and carbon offsetting, in that within these timescales, effectively all carbon emissions will need to be avoided or sequestered in carbon sinks.

Thus the timing and rate at which emission reductions are achieved is critical, in that if Greater Manchester is to meet its commitment to become carbon neutral by 2038, the residual emissions from new development would also need to be offset by the 2038 deadline rather than over the lifespan of the measure funded – which has typically been used in the past.

This logic would support higher charges being levied on developers to achieve the carbon savings within the 2038 timeframe, increasing further as the length of time to the deadline (2038) within which carbon savings can be accrued reduces. A justifiable approach to operationalise this would be to base the carbon price for Greater Manchester on the Treasury figures but adjust the figures to reflect that Manchester's aim to be achieved 12 years earlier, resulting in a carbon price of £234 in the case of a 2028 start date. Given that Policy GM-S2's stated intent is to already be delivering net zero carbon development by 2028, CSE strongly recommend that GMCA begin collecting carbon offset payments prior to 2028 so that it is viable to deliver carbon offset projects starting in 2028 as per the policy intent. A logical point to bring in this measure would be 2025 – given that it aligns with expected changes in the 2019 Future Homes Standard Consultation. This would result in a lower carbon price of £200.

If this approach is to be adopted, legal advice should be taken on the legitimacy of calculating the carbon cost on the basis of achieving zero carbon by a 2038 rather than the UK 2050 deadline, and specifically on the legal weight that can be given to Greater Manchester's 2038 net zero target which is a non-statutory target.

We have estimated the potential carbon offset fund (and CO2 savings) in each of the policy scenarios indicated based on the housing development planned to come forward within the

[60] https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal
[61] https://www.london.gov.uk/sites/default/files/carbon_offsett_funds_guidance_2018.pdf

GMCA plan period. The value of the carbon fund has been calculated based on a carbon price of £200 for the policy scenarios with a 2025 start date, and a value of £234 for the scenarios with a 2028 start date.

4 Case studies illustrating how Carbon Offsetting projects/mechanisms have been used elsewhere

4.1 Haringey Borough Council Case Study

Policy requirements

Haringey Borough Council Policy 'DM21: Sustainable design, layout and construction'[62], sets out the councils approach to carbon offsetting which is *"Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site."* The planning obligations SPD then provides further details on the councils approach.

Carbon Price

Our contact, Joe Baker, the Head of Carbon Management advised that the original carbon price had been set at £92. However this was subsequently revised down to £60 per tonne, bringing it into line with the price set by the GLA. He considered that this approach was too conservative and reflected a fear of challenge that was counterproductive to maximising carbon emission savings. Haringey have now employed consultancy support to set a higher price than the current GLA price. Given the above considerations, at the time of writing, Haringey as part of a consortium with Ealing, Barking and Dagenham, Greenwich, and Westminster have commissioned a consultant to investigate a higher cost of carbon than the GLA approach. At the time of writing, the council expect that this figure will be set at around £160 per tonne.

Management of Fund

The offsetting payment will be collected under a planning obligation, and will be collected at the commencement on site.

Funded projects

Projects that the Haringey Carbon Offset Fund may consider financing include:

- Living walls and living roof opportunities;
- Trees planting schemes;
- Renewable energy projects;
- Retrofitting projects for both dwellings and commercial development;
- Education and awareness raising projects;
- Kick starting innovative energy and carbon reduction projects;

[62] Haringey Borough Council (2017), Development Management DPD (https://www.haringey.gov.uk/sites/haringeygovuk/files/final_haringey_dmp_dtp_online.pdf)

- Energy Master planning and the management of these projects

Comments on the future plans for Haringey Carbon Offsetting Scheme, Head of Carbon Management

The head of Carbon Management at Haringey Borough Council considers that both the previous £60 per tonne rate and at the new higher £95 per tonne rate set by the GLA are both significantly too low. From experience at Haringey and Westminster Councils he considers that in the London context, currently, a price of less than £150 per tonne is not high enough to ensure that developers make appropriate carbon savings on site, and instead they will chose to pay into the carbon offset fund.

During development of the current carbon offset scheme in Haringey, a price of £92 pounds per tonne was initially floated. However, planning officers felt that the policy wasn't strong enough to stand up to challenge from developers and the price was therefore dropped down to £60 to be in line with the price set by the GLA at that point. However, it is important to note that the sustainability team felt that this was unjustified and that no legal challenge from developers were received before the price of carbon was lowered. They consider that the current treasury figures are too low to encourage new builds to meet design standards appropriate for the future, and that there will need to be a round of retrofitting of new developments for councils to have any hope of reaching net zero.

As previously discussed Haringey is now part of a consortium of London boroughs aiming to set a higher cost of carbon than the GLA approach. At the time of writing, the council expect that this figure will be set at around £160 per tonne.

Haringey considers that a flat charge is detrimental to maximising the level of carbon emission savings achieved on site, and will instead result in developers choosing to hit the minimum standard and then paying into the Carbon Offset fund, given that the cost of abating one tonne of carbon generally increases the closer towards zero carbon a building gets.

In the long term this will be detrimental to achieving net zero and Haringey intend to address this by introducing a stepped approach to the carbon pricing, so that the cost of paying into the carbon offset fund is higher at low levels of onsite improvements to encourage developers to do onsite, where the cost increases and begins to impact on viability the corresponding cost of carbon will decrease.

Haringey advises that the policy needs to be consistently enforced, and to be clearly non-negotiable in order to cut down the number of developers avoiding payment and furthermore, in terms of s106 legal agreements it is important to keep the wording as vague as possible so as not to be pigeon holed. Haringey council expects to go out to consultation on the new approach in December 2019 / January 2020.

Lastly Haringey defined living walls and living roof opportunities as eligible for carbon offset funding at members' request. Officers expressed concerns about this and advised that they would not advocate funding green infrastructure through Carbon Offsetting, in that urban green infrastructure is susceptible to cutbacks and removals, and therefore carbon sequestration could not be guaranteed. Also predicting the amount of carbon sequestered by urban green infrastructure is not well developed.

4.2 London Legacy Case Study

Policy requirements

Local Plan Policy S2[63] states:

"Major development proposals should as a minimum meet the regulated carbon dioxide emissions standards outlined within the London Plan. For residential buildings:

- *2015–2016: 40 per cent improvement on the 2010 Building Regulations Target Emission Rate*
- *2016–2031 zero carbon (including allowable solutions or equivalent contribution to the Carbon Off-setting Fund)."*

The policy also requires major applications to provide an Energy Statement that sets out how the development has addressed the Energy Hierarchy and meets / exceeds the targets set.

Carbon Price

London Legacy Corporation have followed the £60 price as set by the GLA

Management of Fund

Collection of carbon off-set payments is through the use of s106 Planning Obligations. Each scheme will have a s106 Legal Agreement in place. Where the scheme is a multi-phase scheme the carbon gap assessment and definition of the carbon off-setting sum takes place for each phase separately but is based on an initial outline application stage energy assessment. In this instance the agreed price per tonne of carbon is applied to the identified carbon gap as defined by the scheme design phase and energy assessment process. Furthermore payment is calculated at the commencement of the scheme (or for a multi-phase scheme payment of the amount related to that phase at the commencement of each phase.)

The Project Proposals Group has been established to manage the spending of the Carbon Offset Fund collected through the Legacy Corporation's Community Infrastructure Levy and through planning obligations within s106 Agreements for particular development with planning permission. The responsibility for this decision making has been delegated to this senior officer group by the Legacy Corporation Board. It is only able to make allocations to projects that have been added to the relevant project list which is agreed by the Board each year following an annual review and consultation.

Funded Projects

In order for a carbon off-setting project to be eligible for funding from the carbon off-set monies received by the Legacy Corporation, a formal application process will be required that ensures that those projects are suitable and likely to achieve the off-setting that is claimed. They are assessed on the following criteria:

[63] London Legacy Development Corporation (2015) Local Plan 2015 to 2031 (https://www.queenelizabetholympicpark.co.uk/-/media/lldc/local-plan/adoption-july-2015/lldc_localplan_2015_interactive100dpi-(4).ashx?la=en)

- Offset Scheme project cost effectiveness
- Scale of carbon savings
- Additionality
- Additional community benefit
- Innovation and strategic importance
- Deliverability
- Location

4.3 Milton Keynes Case Study

Policy requirements

Milton Keynes Local Plan Policy SC1 Sustainable Construction[64] requires developments of 11 or more dwellings, and non-residential development with a floor space of 1000 s.q.m or more to achieve a 19% carbon reduction improvement upon the requirements within building regulations part L 2013; a further 20% reduction in residual carbon emission from onsite renewable energy generation or connection to a low carbon / renewable community energy scheme, and then requires financial contribution to the carbon offset fund after this point.

Carbon Price

A one-off contribution is required to the carbon offset fund, at a rate of £200 per tonne of C02, equivalent to £6.66 per tonne of CO2 over a 30 year period.

Management of the Fund

The carbon offset fund is managed in-house by the Council in terms of s106 payments, project funding, oversight and selection of schemes. The management, delivery and verification of projects are currently outsourced to the National Energy Foundation (NEF), an independent charity based in Milton Keynes. In this context, NEF do have some influence as to which projects are funded via submitting proposals go but the ultimate decision is left with the council.

The fund payments are collected by means of a s106 agreement or unilateral undertaking or via the Milton Keynes Partnership tariff. The fund was drawn up to be used elsewhere in Milton Keynes to reduce carbon emissions mainly by improving the insulation of older houses. It was designed to be spent on carbon reduction measures with a lifespan of at least 20 years, equivalent to the increased carbon output from new development.

Funded projects

At the outset the Council decided that only domestic properties would be able to receive support from the fund. Funding only applies to existing buildings but is across all tenure types and initially included insulation retrofitting. A review of the Offset Fund was conducted by the Council in 2014 and the fund widened to also fund appliance measures

[64] Milton Keynes Council (2019) Plan: MK 2016 – 2031 (https://www.milton-keynes.gov.uk/planning-and-building/planning-policy/plan-mk)

such as boilers and low energy lighting. Currently the only live scheme being delivered by NEF is a boiler cash back scheme whereby Individual householders and landlords who apply to the certification scheme will receive a £150 flat rate for installing a new more efficient boiler.

5 Mechanisms for administering a Carbon Offset fund

The GLA guidance document entitled Carbon Offset Funds[65] advises that "*local authorities should:*

- *set up a carbon offset fund that is ring-fenced to secure delivery of carbon savings within the relevant LPA*
- *set a price for carbon, i.e. price per annual tonne of carbon, that developers pay to make up any shortfall in on-site carbon savings, securing contributions through Section 106 agreements*
- *identify a suitable range of projects that can be funded through the carbon offsetting fund*
- *put in place suitable monitoring procedures to enable reporting to the GLA.*

It advises further, LPAs should either establish a dedicated carbon offset fund or administer the funds through their Section 106 processes. In either case the funds should be ring-fenced for the sole purpose of delivering carbon reduction projects…. LPAs are encouraged to pool offset payments, rather than specifying in a Section 106 agreement the project which will offset the development's shortfall in emissions."

5.1 Management / governance arrangement of other authorities

Although the governance structure varies between different authorities the funds are typically managed by a team made up of planning staff with oversight / governance provided from senior staff – generally teams which manage bids for all streams of S106 or CIL funding.

"The fund is managed by an internal Infrastructure Finance Group (IFG) which is made up of internal staff (primarily from the spatial planning/regeneration services). IFG manages bids for all streams of S106 funding (e.g. transport, public real improvements etc) and can approve individual projects up to £100k. Projects of value above £100k must be approved via the Growth Board which is chaired by the Executive Director of Place (covering planning, regeneration, environmental services and housing investment)."

"Spending of the carbon offset fund is determined by the council via the Cabinet CIL Committee, supported by a governance group of senior council officers. All projects are verified by the council's Head of Environment Policy and Projects."

Within the authorities we surveyed and read about, we found no cases where a number of local authorities clubbed together and operated a shared carbon offset regime, though the

[65] Mayor of London (2018) Carbon Offset Funds - Greater London Authority guidance for London's Local Planning Authorities on establishing carbon offset funds www.london.gov.uk/sites/default/files/carbon_offsett_funds_guidance_2018.pdf

West of England Authorities are considering such an approach. We also found no examples of offset funds being accredited by carbon offset providers like Gold Standard.

All the local authorities we encountered through our research who were collecting carbon offset payments were doing so through s106 planning agreements. Our study found that 75% of the authorities surveyed that have a carbon offset fund in place manage the fund internally. Our 2018 survey revealed that as a result of the restrictions on pooling (discussed in section 7) Merton Borough Council specified some projects to be funded within s106 agreements, rather than collecting contributions into a ring fenced fund. They commented however that this limits flexibility and the opportunity to respond to changing circumstances, and are now in the process of setting up a ring-fenced fund. We anticipate that setting up a ring fenced fund would have the potential to introduce delays into the process of determining planning applications.

5.2 Administration Costs – findings from other authorities

Our survey found that 50% of authorities pay for administration costs of the offset fund from departmental budgets, 14% pay for the administration costs by using a percentage of the carbon offset fund, and approximately 7% pay for the administration costs through s106 monitoring charges. In the context of s106 monitoring charges, one authority stated that they include a monitoring fee of £1,000 that is charged per planning obligation where carbon offset contributions are required. Other authorities, who are at early stages in developing a carbon offset fund, stated that they are aware of GLA Guidance recommending that local authorities claim 10% of funding through s106 mechanisms and that they intend to follow this.

Q8 How have you paid for the administration costs of the offset fund?

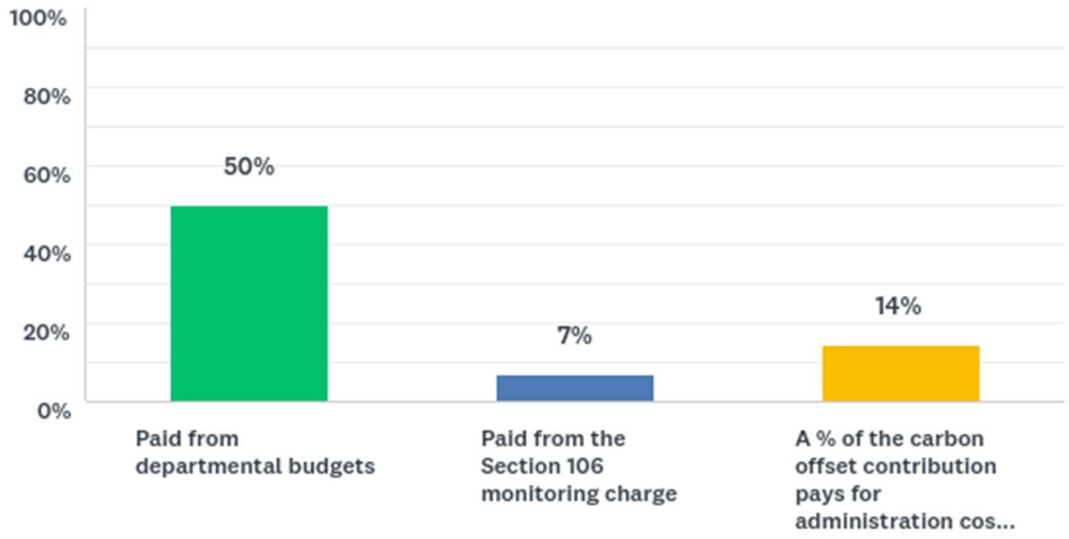

Figure 8 - Local authority survey results - how LPAs paid for the administration costs of the offset fund

An example of how one Authority administers their fund is detailed below.

"The administration costs of managing the CEF are covered by the existing internal resources dedicated to the IFG and Growth Board. The council chooses to charge a monitoring fee for some forms of S106 activity (e.g. contributions for projects to alleviate air quality impacts). We currently do not charge any monitoring fee for carbon offset. As the future CEF grows it is likely that we will need to put in place a dedicated programme management structure for delivering projects, in this case we would be most likely to fund this via a % contribution of total project/programme costs."

5.3 Principles for the management and governance of the fund

Whatever the governance arrangements decided for the carbon offset fund or funds in Greater Manchester we would suggest the following factors are considered:

Minimising the "load" for planning departments

Development management teams within local planning authorities, who apply planning policies and will secure contributions from developers into the fund are judged primarily against targets to determining planning applications in specific timescales, and have a multiplicity of policy objectives they seek to achieve. From their perspective the planning administration process attached to carbon offsetting should not incur a time penalty. Ideally therefore the administration of the carbon offset regime would happen entirely separately from the day-to-day processing of planning applications and writing of policy. Their responsibility should extend to writing planning policy and guidance, calculating the offsetting contribution using appropriate written guidance, and securing it through the s106 agreement. The GM steering group advises that some districts in Greater Manchester have separate planning policy and development management teams but that none of them would have the capacity and skills to manage the fund.

Making it easy for communities and individuals

Whilst robust processes are needed to ensure that only programmes and projects which will deliver measurable carbon savings are given carbon offset funding, once this is demonstrated it should be made as easy as possible for residents and communities to access funding. For instance whilst a council department should be required to apply to the fund to deliver a domestic retrofitting and fuel poverty alleviation programme, and would be assessed against detailed criteria, an individual householder benefitting from that programme should go through a much simpler process, and would apply to the project rather than the fund.

Maintaining trust and transparency

The accreditation of the scheme by an external body should go a long way to establishing trust in Greater Manchester's carbon offsetting regime; however this should also be built into governance arrangements. A transparent approach should be adopted to assessing carbon offset projects and deciding which projects to fund. All projects (including significant council programmes) should go through an open application process against defined criteria

including their ability to deliver additional carbon savings. The projects which make up the programme should then be subject to proportionate monitoring (proportionate with the size of the scheme) to record the carbon savings delivered. Elected politicians should also have oversight of the operation of the fund (or funds), how it is spent and the resultant emissions reductions.

Maintaining democratic oversight

Whilst the ultimate objective of carbon offsetting (saving carbon) is not particularly political, how and where carbon savings are achieved (and how funding from the pot is distributed) is inherently political. Decisions as to whether funds are allocated geographically according to the scale of development activity borne in each area, or according to greatest levels of social deprivation or fuel poverty across the city region, and the proportions of funding directed to different project types will all have distributional impacts, even more so in view in the context of the Greater Manchester Combined Authority, made up of 10 local planning authorities. It is reasonable therefore that elected politicians should have strategic oversight of the fund.

5.4 Eligibility and marking criteria for applications to the carbon offset fund

Our 2018 survey looked at the criteria used by local authorities to allocate funding to carbon offsetting projects. The following criteria were the most popular.

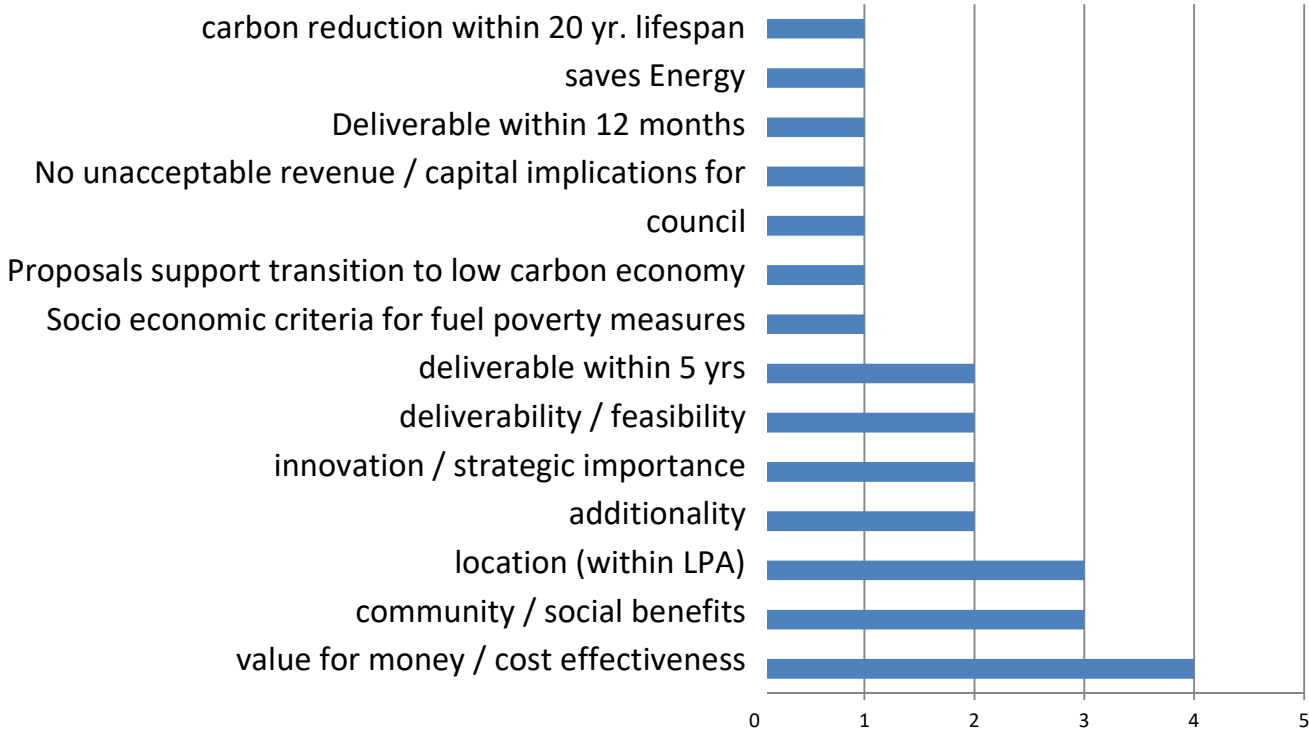

Figure 9 - Assessment criteria used by authorities in allocating carbon offset funding – Number of authorities using each criterion

The following commentary is relevant regarding the different criteria used.

Additionality

The commonly accepted definition of additionality is that projects must demonstrate that they have produced a saving in carbon that would not have happened otherwise. The project must not be required by legislation or used to demonstrate compliance against legally binding targets.[66]

The Greater London Authority guidance document "Carbon Offset Funds" advises "*offset payments should be spent on projects that:*

- *Would not have occurred without the offset funding*
- *Would not have occurred under a business as usual scenario*
- *Are not required in order to meet national legislation."*[67]

Determining whether a project offers additionality is therefore a key component of effective governance and key measure of whether the project should be funded through the carbon offsetting fund. Additionality tests have the potential to be time-consuming and expensive; however they are necessary to ensure that the funded projects achieve qualifying carbon reductions.[68]

In instances where a project has an existing business case, the offset funding would need to result in additionality beyond the original requirements of the project. For example, an existing energy efficiency programme could use offset funding to target a higher EPC rating, thereby allowing more expensive measures to be funded than the existing funding would have allowed for.

It may also be feasible (as discussed in the GLA guidance) to jointly finance projects using the carbon offset fund and a pre-existing fund. However, bearing the additionality principle in mind, it should be demonstrable that there will be an additional and measurable carbon saving achieved by using the carbon offset funding alongside the existing source of funding compared to using the existing source of funding on its own.

For example, carbon offset funds can be combined with the Energy Companies Obligation (ECO)[69], or grant funding from Mayoral Energy for Londoners programmes such as Warmer Homes[70]. This may enable more measures to be delivered in 'hard to treat' properties (such as listed properties or other nonstandard construction types) that would otherwise not attract enough funding due to the high cost of delivering these measures. When seeking to combine offset funds with other forms of public funding LPAs should seek legal advice.

The Tower Hamlets study differentiates between full and partial additionality:

[66] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791529/Env-reporting-guidance_inc_SECR_31March.pdf
[67] https://www.london.gov.uk/sites/default/files/carbon_offsett_funds_guidance_2018.pdf
[68] ibid1
[69] https://www.ofgem.gov.uk/environmental-programmes/eco/about-eco-scheme
[70] https://www.london.gov.uk/what-we-do/housing-and-land/improving-quality/warmer-homes

- Full additionality: none of the carbon savings would have occurred within a reasonable timescale without the funding. In this case, it can be said that the Carbon Offset Fund has acted as the mechanism for delivering carbon savings. 'Full additionality' means that there is no conflict between the London Borough of Tower Hamlets Carbon Offset Fund and other funding mechanisms on a particular project;
- Partial additionality: the Carbon Offset Fund complements other funding streams and enables the project to go ahead. In this case, it can be said that the Carbon Offset Fund has helped to trigger carbon savings. 'Partial additionality' means that there is a level of synergy between the Carbon Offset Fund and other funding mechanisms on a particular project.

This has consequences for how carbon emission savings are attributed. Where the fund meets 50% of the costs of a project, it is reasonable that only 50% of the carbon savings can be attributed to the fund.

Finding some way to proportionately attribute the carbon savings to the grant contribution is important in terms of the legality of the planning obligation. The legal tests state that in order to be a legitimate justification for granting planning permission, planning obligations must be necessary to make the development acceptable in planning terms; directly related to the development; and fairly and reasonably related in scale and kind to the development. If therefore the carbon savings would have happened anyway without carbon offset funding, the contribution cannot be necessary.

Additionality can also be seen in wider terms, as the benefit the scheme can deliver (with grant funding) over and above that which would be created through existing market mechanisms. Merton Council gives a weighted score from 1 to 5, depending on the degree of additionality achieved using the guidelines below:

- *Additionality test*
- *Financial additionality*
- *Regulatory additionality*
- *Common practice*
- *Barrier analysis*

Demonstrates Additionality

1. *Project can be shown to happen on a routine basis. Business case for project without carbon finance is viable. Project could be fully funded from other sources*
2. *Project has been demonstrated in other areas or other organisations; case for carbon finance is weak. Passes one of the four additionality tests*
3. *Case has been made for the additionality of funding. Co-funding case made for the use of funding from other sources. Passes two of the four additionality tests*
4. *Clear for additionality, business case not workable under other circumstances. Passes three of the four additionality tests*

5. *Unique project that could not be undertaken without carbon finance; passes most or all of the additionality test. Passes four of the additionality tests.*

Low Carbon Transition

The criterion that *Proposals should help support the transition to a low carbon economy*, adopted by Merton Council is of interest. In our interview, Merton advised that this criterion was useful in aligning projects with the ultimate objectives of the fund. For instance initiatives to improve local air quality are likely to be attractive environmental improvements, but might not score highly in terms of this objective. Conversely, allocating funding to community engagement and consultant support for the development of supportive policies for onshore wind might score poorly given the lack of clarity on the scale of carbon savings to be delivered and the long timespan, but would score highly when assessed in terms of its contribution to this criterion. This objective could be incorporated into the criterion relating to additionality.

Innovative and Strategic Importance

Similarly to the previous criterion, the London Legacy Development Corporation takes into account the degree to which projects are of *strategic importance in demonstrating best practice, or new approaches to cost-effective carbon saving.* By subsidising projects and initiatives which are not currently economically viable through existing market mechanisms, the fund has considerable potential to enable innovation, which can then inform market activities. This objective could be incorporated into the criterion relating to additionality.

Community / Social Benefits

Preference should be given to projects which both deliver carbon abatement and other co-benefits. Merton Council gives a weighted score from 1 to 5 as follows:

Demonstrates additional social benefits

1. *No social benefit. All financial benefits held by individual or business based outside of Merton*
2. *Displays some additional social benefits,*
3. *Displays some social benefit and aligns with the boroughs strategic social targets*
4. *Displays a high level of social benefits and closely aligns with the boroughs strategic social targets*
5. *Displays a high level of social benefits and targeting the boroughs social targets that are hardest to achieve.*

Value for Money / Carbon Ratio

Value for money / cost effectiveness was the most popular criteria adopted by councils in determining the schemes which should receive grant funding.

This can be measured objectively in terms of the carbon offset ratio, which is defined in the Tower Hamlets study as the ratio between the lifetime carbon savings achieved by a

measure funded by the Carbon Offset Fund and the lifetime residual CO2 emissions to be offset.

- A 1:1 Carbon Offset ratio means that the carbon savings delivered by the Carbon Offset Fund are equivalent to the residual CO2 emissions which need to be offset.
- A 2:1 Carbon Offset ratio means that the carbon savings delivered by the Carbon Offset Fund are twice the CO2 emissions which need to be offset.
- A 1:2 Carbon Offset ratio means that the carbon savings delivered by the Carbon Offset Fund are half of the CO2 emissions which need to be offset.

Our interview with Merton Council stressed the trade-offs between objectives to seek value for money, encourage innovation and achieve additionality in allocating funding to projects. If, in deciding how funds are to be allocated to projects, great weight is placed upon value for money (£ per tonne carbon saved), less innovation is likely to take place, and lower levels of additionality are likely to be seen, over and above what would have happened through market mechanisms.

The Sustainable Design and Construction SPD, published by the GLA comments:

> *"unless the price set for carbon dioxide fully reflects the delivery of the identified carbon dioxide reduction projects, it is not considered necessary that the ratio of carbon dioxide saving to the off-setting price has to be 1:1. That is, the cost of the measure to save one tonne of carbon dioxide does not have to be equal to the off-set price per one tonne of carbon dioxide. The benefit of the fund is in unlocking carbon dioxide saving measures. If a 1:1 ratio is set, only the simplest retrofitting measures are likely to be carried out. This would potentially still leave the more complicated measures without adequate funding."*

This guidance has been repeated in the recent guidance from the GLA from October 2018[71].

Merton Council gives a weighted score from 1 to 5 according to the carbon ratio achieved by the proposed measure:

1. *1:000.1*
2. *1:00.1*
3. *1:0.1*
4. *1:1*
5. *1:<1*

Delivery timescales

Different approaches seem to be taken to the timescales within which carbon saving projects are required to be delivered. Setting a time limit of 5 years is likely to relate to the

[71] GLA (2018) Carbon Offset Funds - guidance for London's Local Planning Authorities on establishing carbon offset funds - https://www.london.gov.uk/sites/default/files/carbon_offsett_funds_guidance_2018.pdf

power within the Town and Country Planning Act 1990 to modify a planning obligation where it "no longer serves a useful purpose". If after a 5 year period the contribution had still not been spent, such an argument can be made.

Logically the off-site abatement of carbon should be achieved concurrently with the rate of on-site emissions, particularly where contributions are required prior to the commencement of development, and so ideally the carbon abatement project would be delivered within 12 months. Longer periods would however be reasonable either with very large carbon abatement projects, or in connection with large multi-phased developments, which can themselves be developed over multiple years.

Project Lifespans

The GLA Sustainable Design and Construction SPD advises:

> *Where the overall contribution is calculated over 30 years, boroughs should take into consideration the lifespan of the retro-fit measures that are being funded.*

It is reasonable that where a contribution is made to fund off-site carbon abatement over a 30 year timespan, the project delivered should have a similar timespan. Reasonable allowances should however be made for speed of technological advancement, where product lifespans are commonly less than 30 years, or where typically only temporary planning consents are issued.

5.5 Administration structures and estimated costs for GMCA

The following main administration options should be considered:

One city wide carbon offset fund, administered by GMCA

In this model, GMCA would set up and administer the fund as a self-contained service to planning teams. A governing body would be set up or responsibility allocated within GMCA with a mandate to approve projects, manage funding and appropriate allocations, aid in project scoping and development to ensure this meets the standard set, and any associated rules and regulations.

We envisage that senior staff and politicians within the GM authorities would have oversight into the strategic direction of the fund and a steering group would determine applications into the fund and the delivery of the required off-site carbon savings (and monitoring and reporting that these are delivered).

GMCA would need to undertake the following tasks:

Fund set-up

- Set up a city-wide ring-fenced fund where contributions could be collected
- Formalise application forms to the carbon offset fund based on the examples given
- Confirm and formalise assessment criteria for applications to the fund and application processes

- Fund promotion and engagement with Greater Manchester councils and GMCA teams to support scheme design
- Database setup – to record funding allocations and spending, predicted and reported carbon savings
- Establish monitoring and verification processes, including processes and costs for scheme accreditation (for example by Gold Standard)
- Set up planning system administration processes and templates
- Create supplementary planning guidance or non-statutory guidance detailing planning application submission requirements and required content of energy statements, with worked examples of carbon offset calculations and template wording for legal agreements
- Train planning staff, enforcement, building control and S. 106 monitoring officers – policy requirements and interpretation, application information requirements and approach to calculating carbon offset payments
- Set up governing body within GMCA with the power to approve applications to the carbon offset fund and establish the conditions for where delegated authority is given for staff to issue funding

Ongoing tasks

- Assessing applications to the fund against agreed criteria and making recommendations to board
- Monitoring funding allocations against fund receipts
- Monitoring predicted and actual carbon savings proportionately to their size and scheme progress and installations, and on large projects, release funding in tranches, dependent on interim progress
- Annual reporting to the carbon offset board and local authorities within Greater Manchester
- Intermittently review the carbon offset price and the carbon offset ratio[72]
- Review fund management costs

Additional work and input would be required from GMCA, from council departments and others for the detailed design of individual carbon offset programmes, for example setting up project specific application forms and processes (for householders accessing retrofitting services or funding for example) and the targets and actions specific to each programme. The assumption would be that where programmes are an expansion of existing activities, council departments and GMCA itself would administer them themselves. Other programmes not clearly related to previous initiatives could be outsourced.

To save costs, it would be beneficial to consider whether existing structures and boards within GMCA could take on the responsibility for managing the fund, allocating funding and determining its strategic direction, particularly during the initial stages whilst the fund is getting established. Given the potentially wide brief of the fund and the close ties with other GMCA initiatives the Greater Manchester Green City Region Partnership (formerly the Greater Manchester Low Carbon Hub) might be a good candidate to take on this work. The

[72] The carbon offset ratio is defined as the ratio between the lifetime carbon savings achieved by a measure funded by the Carbon Offset Fund and the lifetime residual CO_2 emissions to be offset.

Green City Region Partnership is responsible for overseeing the monitoring and delivery of the Greater Manchester 5 Year Environment Plan and is also charged with the retrofitting work planned for Greater Manchester, as well as the promotion of renewable energy and the development of low-carbon skills.

The additional workload for development management teams would consist of:

- Appraising an energy statement to check the calculations of on-site carbon savings, the residual carbon to be offset, and the contribution required to do so.
- Adding planning conditions to any consent requiring the development to deliver the required level of performance on-site, using standard conditions
- Drawing up a s106 agreement or unilateral undertaking to secure the contribution, once again using template wording

Unless sustainability officers are able to undertake this task, planners will need significant training so that they are able to negotiate to maximise on-site carbon savings and sustainability standards, and validate the calculations within the energy statement.

One cost effective approach could be to create a central staff member who could potentially provide advice on energy statements to all the districts, assist planning officers in negotiating improvements in sustainability and compliance with zero carbon policies, and liaise with the GMCA programme and monitoring work. We found no examples of other authorities with shared carbon offset funds like this; however we consider that there are obvious advantages in doing so in Greater Manchester, given the existence of the Greater Manchester Spatial framework and the many other initiatives and programmes operating at the scale of the city region. This approach would enable funding decisions to be aligned with other city-wide strategies, for example the 5 year environment plan and Greater Manchester retrofit plan.

Such an approach would allow efficiencies to be made and offer economies of scale, allowing the administration of the fund to be centralised and, where there was support, allow carbon saving programmes to be set up across all 10 authorities, for example development funding for community energy projects. Such an approach would lend itself to being verified or accredited by a third party.

Operating a single shared fund would remove direct control from individual councils and would raise governance and fairness issues which would need careful resolution. With 10 authorities with an equal vote, the influence of an individual authority on the direction of the fund would be limited. One option to build local responsiveness back into such a model would be to allow individual planning authorities to define different carbon saving measures as eligible according to their priorities. This would allow shared programmes to be established across all ten authorities where there is support, but equally would allow programmes specific to each local authority to come forward as well, for example retrofitting projects tailored to the local housing and social conditions, which will differ widely.

Cost Estimates of this model

We've put together a minimum estimate of the setup and running costs of all three of the governance models considered, based on the tasks and assumptions detailed in the spreadsheet in appendix C. Their purpose is to provide GMCA with an indication of possible variations in costs associated with the different models - not to offer a firm guarantee

associated with the costs of delivering a scheme. The indicative costs are based on multiple assumptions, some of which GCMA may wish to vary and many of which will remain uncertain until the shape of any scheme is clearer. These are listed in full on table 1 of the spreadsheet, but the following points should be stressed.

- The assumptions of staff resource do not take into account the time needed to develop the detail of each project. Further work and time investment would be needed to develop the eligibility criteria, application processes and detail of each offer, for example in the case of domestic retrofitting projects, who will carry out the work to retrofit properties, what work would be eligible for funding, the specific performance levels to be targeted, which properties would be eligible, how carbon savings are to be monitored and recorded and how the quality of work is to be monitored and assured
- The estimates are also heavily reliant on the approach taken to assessing applications to the carbon offset fund. Our estimates of the time taken to assess applications to the fund (detailed on tab 5 of the spreadsheet) assume that the majority of projects types, (those with low unit cost, low risk and lower variability of carbon savings) will apply to the fund just once as a whole project. The application would be assessed as a whole and would include targets and a pipeline of the number of installations proposed and specifications. Once approved, individual householders or community groups would apply to the project to access funding rather than the fund board. Estimates have therefore not been provided for the staff resource needed within each project to manage this. Only bespoke projects with higher cost, higher risk and/or higher variability of carbon savings would need to apply individually to the fund and need individual assessment, for example community energy projects, energy efficiency improvements to council buildings and / or district heating projects where the risks, uncertainties and variabilities are higher

In all the estimates, if a different approach is taken to administering the fund than that detailed, the estimates and assumptions would need to be re-worked.

We estimate that were GMCA to administer a single shared carbon offset fund itself on behalf of all 10 authorities, the setup costs would be a minimum of approximately £29,000 including direct costs of circa £22,000 for the cost of writing supplementary planning guidance and setting up a database.

Thereafter, the staff resource needed to run the fund would be approximately 0.9 FTE senior project officer, and 23 days a year of a senior manager's time a year at a minimum cost of approximately £45,775.

One city wide carbon offset fund, externally administered, reporting to GMCA or local authority steering group

In this model, an external "carbon offset provider" takes over the day-to-day management of the fund as a whole on the basis of an agreed approach and reports regularly to a panel or board made up of representatives from GMCA and / or the 10 authorities, similar to the approach adopted in Tower Hamlets, Merton and the London Legacy Corporation. The external provider would undertake all the same tasks outlined above in option 1.

The actual delivery of carbon saving projects and programmes would be undertaken by council departments, community groups and others. A panel made up of representatives

from GMCA or the 10 councils would guide the preferred strategy for carbon savings to reflect corporate priorities and local circumstances, would regularly review the Carbon Offset Price and fund management costs and determine significant applications to the fund, as and when they are received. Council staff would continue to project manage council carbon saving projects, where these are a continuation of previous work.

This approach shares some of the advantages and disadvantages of having a centrally run fund, allowing economies of scale to be built in, and an overall strategy to be decided upon, but also might have the disadvantage of distancing the fund from the control of individual councils, perhaps even more so than a fund run directly by GMCA. This model would still lend itself to being verified or accredited by a third party.

We have seen this model used in Milton Keynes, where their carbon offsetting programme is managed by the National Energy Foundation, but this only funds domestic retrofitting measures. The likely scale, variety and complexity of GMCA's carbon offset fund would be orders of magnitude beyond this. Were the management of the fund to be outsourced, it would be beneficial if it were to be run by a locally based environmental organisation, with intimate knowledge of carbon saving activities and projects in Greater Manchester.

Cost Estimates of this model

Based on the tasks and assumptions detailed in the spreadsheet at appendix C, we estimate that were GMCA to set up a single, externally administered carbon offset fund on behalf of all 10 authorities, the setup costs would be a minimum of approximately £42,823, including direct costs of circa £22,000 for the cost of writing supplementary planning guidance and setting up a database.

Thereafter, the annual cost of administering the fund would be a minimum of approximately £86,000, consisting of approximately 25 days of a Director's / Senior Managers time and £77,725 for the staffing costs of the external consultancy.

GMCA carbon offset support agency, with 10 council run offset funds

This model most closely follows the approach adopted in London, where the GLA offers support and advice on how to set up and administer carbon offsetting and the London Boroughs themselves each operating their own ring-fenced funds. In this model, GMCA would provide guidance for local planning authorities and the Local Authorities would set up and manage their own ring-fenced funds, and distribute funding accrued from development in their areas in line with their own priorities. In this model, city-wide projects initiated by GMCA would depend on the local authorities for funding.

To encourage a unified approach in allocating funding, and to set minimum standards in terms of being able to demonstrate additionality and carbon savings, GMCA would be strongly advised to publish written guidance similar to that produced by the Greater London Authority Carbon Offset Funds. This would set the ground-rules for carbon offset funds in Greater Manchester, and would incorporate some of the findings and conclusions of this report. We have also assumed that considerable time would need to be devoted to supporting the 10 local authorities in developing their own funds, sourcing suitable carbon offset projects and ensuring consistency.

In this approach no overarching city-scale strategy would be in place for the carbon fund, and only limited savings would be made through economies of scale, but the funds would

be directly controlled by each local authority and could be very responsive to local priorities. With such a large number of separate carbon offsetting schemes, and no doubt different approaches to scheme selection and reporting, it would however be difficult and complicated to accredit such a regime externally. In such a model, planning teams would be likely to become more involved in finding and sourcing carbon offset projects, monitoring their implementation and the resultant carbon emission savings.

Based on the tasks and assumptions detailed in the spreadsheet at appendix C, we estimate that were GMCA to set up a carbon offset support agency, to support the creation of carbon offset funds by all 10 local authorities within Greater Manchester, the setup costs would be a minimum of approximately £36,548 including direct costs of circa £32,000 are estimated for the cost of writing Supplementary planning guidance, setting up a template database and creating a guidance document for LPA's "Carbon Offset Funds in Greater Manchester".

Thereafter, the annual cost of administering the fund would be a minimum of approximately £19,132, consisting of approximately 25 days of a Director's / Senior Managers time and 60 days of a senior project manager's time. If a different approach is taken to administering the fund than that detailed, the estimates and assumptions would need to be re-worked.

5.6 Monitoring and reporting of carbon emissions savings

Our Survey asked how carbon emissions savings resulting from funded projects are monitored and whether emissions savings predictions are set prior to project delivery using standard assumptions or whether the funding recipient reports actual carbon savings following project completion.

All respondents to the question have some form of system in place to determine the carbon savings achieved as part of the offset project.

Waltham Forest stated that applicants to the fund will need to provide a project plan which details the emissions saved as part of it. They currently plan to ask for follow on monitoring reports for up to 5 years, though it does not appear that this has been done yet. Similarly, the London Legacy Corporation includes this consideration within the offset project application form[73], which asks applicants how they intend to quantify the effectiveness of their project.

Camden appear to be more involved in the monitoring process and keep an audit trail from application through to installation for each case, with a database recording details of all installations, grant awards and associated estimated carbon savings.

Elsewhere Authorities stressed that while there is a need to demonstrate carbon has been saved, monitoring needs to be proportionate to the contribution. At a carbon cost of £60 or £95 a tonne, Merton Council's view is that "in-depth monitoring requirements could easily kill a scheme". Merton also stressed how lightweight the post construction monitoring of the energy performance of all new developments is, with often a 50% margin between predicted and actual performance. For this reason Merton Council are of the view that any

[73] https://www.queenelizabetholympicpark.co.uk/-/media/lldc/planning/supplementary-planning-documents/annex-2--carbon-offset-project-application-form--guidance.ashx?la=en

monitoring process should not require projects to achieve a carbon equivalence of 1:1. At the time of the survey Merton had yet to set up a formal monitoring process.

Regarding standardised methodologies for estimating emissions savings, Camden use two separate methodologies. For renewable energy projects they use details provided by the Microgeneration Certification Scheme[74]. For Energy efficiency measures Camden use the suite of Camden Climate Change Alliance tools.

In this case of energy efficiency projects the London Legacy Corporation require RDSAP or CERT calculations for residential development or ISBEM for non-residential projects. They also accept bespoke carbon calculations in exceptional circumstances.

Our view is that without in some way monitoring the actual achievement of the carbon savings funded by a s106 contribution to the carbon offset fund, it would be difficult to defend requests for these contributions, but bearing in mind Merton's comments, a proportionate approach should be set out, according to the scale of funding and scale of the project:

- Large scale retrofitting projects, run by the council and others with relatively low unit costs, low risks and high predictability of carbon savings should maintain records of the number and location of properties retrofitted, with standard assumptions being given for carbon savings by project type allowing them to report carbon savings quarterly, but post installation monitoring should not be required. Larger projects to retrofit council buildings should report real life carbon savings
- Small scale retrofitting projects carried out by third parties (for example retrofitting community buildings) should provide evidence that the works were carried out, with standard assumptions being applied for carbon savings
- Large and medium scale renewable energy projects (for example community energy projects) should monitor real life carbon savings
- Carbon sequestration projects such as tree planting or wetland restoration projects should report the areas planted or restored, give predictions for carbon sequestration and report progress in line with the Woodland and Peatland Carbon Codes

5.7 Monitoring and reporting of finances

Both Southwark and Westminster indicated that they monitor spending through relevant CIL/s106 processes, and that the spend is determined by the Cabinet CIL Committee, supported by a governance group of senior officers. Follow up reporting is done via a

[74] https://mcscertified.com/

Quarterly on-line report, with the annual monitoring report detailing where s106 and CIL money has been spent.

Waltham Forest ask applicants for monitoring reports to be provided at agreed intervals as per their funding agreement and post-completion, and will ask them to report against main objectives of the project. They currently plan to ask for monitoring reports for up to 5 years, though it does not appear that this has been done yet.

In the case of Southampton – where the Fund is managed externally by The Environment Centre, monitoring of finances occurs through annual reports from The Environment Centre to Southampton City Council with communication of any additional information including outcomes of bids which will be used alongside the Carbon Offset fund.

Tower Hamlets intend to use their Adopted Carbon Offsetting Strategy as a structure for the monitoring and reporting of finances. The Study under pinning this strategy is published online[75].

Our view is yearly financial reporting should be carried out to inform the Council's s106 financial reporting. It would however be wise for the board to undertake a more regular internal review of the state of the fund, in particular of the pipeline of carbon offset projects available to fund against s106 receipts, of the mix and balance of different measures being funded, and the average carbon price across the portfolio of the measures funded, against the carbon price being charged to developers. This would be of particular benefits when the fund is initially launched, so that carbon-saving programmes and projects can be reviewed and amended where necessary.

5.8 Accreditation of carbon offset regime

The Tyndall report recommended as follows in respect of the use of carbon offsetting to achieve net zero carbon by 2038:

"If GMCA identify financial resources and the necessity to pursue then they should i) only consider regulated systems and purchases, ii) revisit the available tradeable units at the time of purchase to consider which are the most robust and reliable."

The steering group has reinforced their interest in having the scheme accredited externally. CSE has contacted Gold Standard, a leading supplier of global voluntary carbon credits to discuss how this might be taken forward. Gold standard advised that they could assist GMCA in operating its carbon offset scheme and that there were two main options for accreditation:

- *"Option 1 – certify all the projects in the fund for application in the global voluntary carbon markets:*
    - *Each would issue credits and be able to trade these globally*

[75] https://www.towerhamlets.gov.uk/Documents/Planning-and-building-control/Strategic-Planning/Local-Plan/Carbon_Offset_Solutions_Study_2015.pdf

    - *Has specific market fees and requires you to use pre-set monitoring methodologies for specific project types*
    - *Above two bullets may therefore end up being more costly than Option 2 on that basis*
    - *Additionality is based on the CDM/Kyoto Protocol, updating shortly for Paris but broadly includes a financial test (project couldn't happen without credit finance), legal test (isn't legally compelled already) and prior consideration (you had to have decided carbon credits were needed in advance of requesting to issue them)*
    - *Your example of 'time lag' additionality wouldn't qualify for markets as it would be too easily gameable by the unscrupulous out there!*
- *Option 2 – certify the overall fund as a kind of internal reporting programme:*
    - *Doesn't issue carbon credits/doesn't have those fees*
    - *Doesn't require the use of specific methodologies if you prefer to use your own (so long as they're credible!) – you can go easier or harder than voluntary markets require in that case*
    - *Additionality test is optional – it would still be the above per voluntary markets but you could add to your own internal definition as it would just be yourselves you were gaming. This last point would need more thinking and consideration in terms of the how but I can see the basic logic.*

They advised further:

"My *heavily para-phrased synopsis is that the authority is considering a fund that takes contributions from property developers and pools this to invest in projects that reduce the overall footprint of the GMCA, for example through retro-fitted energy efficiency measures in buildings.*

It seemed to me that using global carbon markets would likely not be the ideal fit in this case – although it would lead to credible impact quantification and retriable assets towards your aims – but you have no intention to participate in the market itself and the credits would just be retired domestically. Given you also have some ideas for bespoke terms, additionality etc it is likely therefore worth considering a certified fund approach.

This would involve certifying the fund and its impacts so that you can credibly use it in such a reporting scheme, especially important given that it likely involves taxpayer resources and money from developers who no doubt may be sceptical otherwise!"

We agree with Gold Standard that option 2 would enable the carbon savings from the fund to be verified, provide the certification desired and build trust in GMCA's carbon offsetting regime. This approach would also enable GMCA to develop criteria that projects would have to meet (including for instance harmonisation with the climate emergency declaration end date) without the needed for credits to be traded on the international markets.

5.9 Combining a voluntary and mandatory carbon offset fund

We note the Interserve report, *Feasibility & Scope of a Carbon Market for Greater Manchester* (undated) which proposes setting up a tradeable carbon market offering the

potential for voluntary contributions as well as mandatory contributions from the planning carbon offset fund.

Whilst this would enable Manchester based companies to voluntarily offset their emissions, we have reservations as to whether the benefits of bringing the two funds together would outweigh the disadvantages.

The primary driver in setting the carbon price for a voluntary carbon offset fund is competitiveness with other voluntary funds. By contrast the drivers for a mandatory fund attached to GMCA's zero carbon planning policies relate back to the legal requirements for planning obligations and financial contributions, that they are *necessary to make the development acceptable in planning terms; directly related to the development; and fairly and reasonably related in scale and kind to the development*.

In the case of financial contributions, this means that the payment must be required to fix a problem directly caused by the development which would otherwise make it unacceptable, must actually fix that problem, and must be proportionate to the costs of doing so.

In this case it means that the carbon price must be set at a level which enables the necessary carbon offsetting measures within Greater Manchester to be funded. A further consideration is the cost differential between securing on-site carbon abatement (through high levels of energy efficiency and the inclusion of on-site renewable energy) and the cost of carbon offsetting elsewhere in Greater Manchester.

If the costs of minimising emissions on site are significantly lower than the costs of abating emissions off-site through a carbon offsetting payment, a rational developer will choose to pay into the fund rather than alter their design. Thus a carbon offset scheme could potentially increase rather than reduce emissions by lessening design standards. The carbon price must be reasonable and fairly related to the actual costs of saving carbon and planning legislation does not allow the carbon price to be used punitively as a pricing mechanism. Nevertheless, ideally the costs of abating carbon off-site should be higher than the costs of minimising emissions through design.

For the same reason, whilst the carbon offset fund should certainly be used to maximise the co-benefits that can be delivered from carbon saving projects and programmes, this is not what the developer is paying for. Developers are required to pay into the fund in order to deliver the carbon savings necessary to make their development acceptable against development plan policies. As a result, whilst the potential to achieve co-benefits should be considered in funding decisions, any added costs of achieving co-benefits cannot be factored into the carbon price that developers must pay.

5.10 Summary of recommendations from Section 5. - Management / Governance Arrangements in Greater Manchester

- Direct contributions into a ring-fenced carbon offset fund to provide maximum flexibility and minimise administrative costs, rather than having to specify actual projects funded within individual legal agreements.

- Require every project or programme of projects funded (including Council projects) to go through an application process and be assessed against published criteria derived from the legal tests relating to s106 agreements: that it is *necessary to make the development acceptable in planning terms; directly related to the development; and fairly and reasonably related in scale and kind to the development*.
- The following or similar criteria would be suitable for the purposes of assessing applications to the fund:
    - deliverability / feasibility
    - timescale for delivery / completion (ideally delivery within 12 months)
    - value for money / cost effectiveness in terms of the cost per tonne of CO2 saved or sequestered
    - wider benefits: community / social / economic
    - scale of carbon savings
    - additionality, incorporating innovation and strategic importance, and the degree to which proposals support the transition to a low carbon economy
    - lifespan of carbon reduction measures
- Eligible projects should be located within the area covered by the ten local authorities within Greater Manchester, although a caveat should be added that if funds aren't spent within 4 years, they may be spent on carbon offsetting measures outside the area to avoid them expiring.
- Applications to the fund should be proportionate to the scale of the funding provided, the emissions to be saved and the likelihood of carbon savings being delivered. The application process should be as simple as possible for residents/ communities/ businesses.
- The majority of projects types, (those with low unit cost, low risk and lower variability of carbon savings) will apply to the fund just once as a whole project, with implementation targets, a pipeline of the number of installations proposed and specifications. Once approved, individual householders or community groups would apply to the project to access funding rather than the fund board. Bespoke projects with higher cost, higher risk and/or higher variability of carbon savings would need to apply individually to the fund and need individual assessment, for example community energy projects, energy efficiency improvements to council buildings and / or district heating projects where the risks, uncertainties and variabilities are higher.
- The administration of the fund should be offered as a self-contained service to planning departments, who should not be involved in the administration of the carbon offset fund beyond securing contributions through legal agreements, imposing and enforcing necessary planning conditions.
- GMCA should ensure that staff are given adequate training to ensure that they fully understand GMCA's zero carbon planning policies, how carbon offsetting

contributions fit into these. GMCA should consider the creation of a dedicated post to offer expert support to planning officers, to review sustainability and energy statements and negotiate for improvements.

- As in-depth monitoring of carbon savings from projects could easily take up a large proportion of the funding available, a proportionate approach should be adopted to monitoring according to the scale of funding and scale of the project, with large projects reporting actual carbon savings and standard assumptions being applied to small projects.
- It appears to be possible to have the fund as a whole certified by an external provider such as Gold Standard, who would review the processes for allocating funding and would undertake spot checks of funded projects. Such an approach would not allow carbon credits to be issued for international trading

Three basic models seem evident for the administration of the fund:

ii. One city wide carbon offset fund, administered by GMCA, with setup costs of a minimum of approximately £30,000 and minimum annual running costs of approximately £45,775.
iii. One city wide carbon offset fund, externally administered, reporting to GMCA or local authority steering group, with setup costs of a minimum of approximately £43,000 and minimum annual running costs of approximately £86,000.
iv. GMCA carbon offset support agency, with 10 council run offset funds with setup costs of a minimum of approximately £37,000 and minimum annual running costs of approximately £19,000 per year

Options for fund administration		Set Up Costs	Annual Running Costs	Total costs, year 1
i.	One city wide carbon offset fund, administered by GMCA	£29,606	£45,775	£75,381
ii.	One city wide carbon offset fund, externally administered, reporting to GMCA or local authority steering group	£42,823	£85,801	£128,624
iii.	GMCA carbon offset support agency, with 10 council run offset funds	£36,548	£19,132	£55,680

Table 4 - Estimates set up and running costs - different administration options

Given the potential synergies between the carbon offset fund and those of other GMCA initiatives, possible economies of scale from operating one shared fund (and difficulties of

co-ordinating 10 parallel funds run by the local authorities within Greater Manchester) and the high organisational capacity of GMCA, we can see great benefits from GMCA administering one city wide carbon offset fund, and recommend that this approach is taken. Appointing external consultants to run the fund would also be a practical alternative, but would be more expensive and would not allow GMCA to gain institutional learning from running the fund itself.

As shown in Table 4 above, option 3, where GMCA operates a carbon offset support agency and the authorities administer their own individual carbon offset funds, appears to be the cheapest, but in fact the tasks of finding carbon offset projects, assessing them for their carbon saving potential (and against s106 criteria), monitoring and reporting the actual carbon emissions saved are likely to be substantial, and in this case are passed on to the 10 Local Planning Authorities in Greater Manchester. Were the 10 local planning authorities to undertake this task, there would be significant duplication of efforts and few economies of scale, and the overall costs across Greater Manchester are likely to be significantly higher than those of a centrally administered fund.

6 Use of s106 contributions to facilitate payments into the fund including template for draft condition wording, proposed payment timescales and draft documents to accompany fund administration

6.1 Planning obligations

Planning obligations (also known as s106 agreements) are legal agreements made between local authorities and developers, attached to a planning permission to make an otherwise unacceptable development acceptable in planning terms. The agreement binds the land, rather than the person or organisation that develops the land, and obligations pass on to future owners.

The Community Infrastructure Levy Regulations 2010 passed into law[76] three tests that a proposed planning obligation must pass in order be a legitimate justification for granting planning permission; *that the obligation is:*

> *(a) necessary to make the development acceptable in planning terms;*
>
> *(b) directly related to the development; and*
>
> *(c) fairly and reasonably related in scale and kind to the development.*

Requests for planning obligations are regularly challenged by reference to these tests, and in an appeal scenario a planning inspector would habitually assess a proposed planning obligation against the tests, whether or not it was challenged by the developer.

The implications of these tests are that the administration process around carbon offset contributions should be able to show:

- A proportionate audit trail showing that the contributions will actually deliver carbon emission reductions within a reasonable timescale of the development being occupied
- Additionality - that the carbon savings delivered by the payment are clearly additional to what would have happened anyway
- That the contributions demanded aren't double charging, for example requiring contributions to sustainable transport infrastructure on the basis of reducing carbon emissions, whilst also funding public transport infrastructure through the Community Infrastructure Levy or through the s106 agreement
- An evidence base to demonstrate that the contribution sought to deliver off-site carbon abatement is reasonable in scale and commensurate with the emissions to be offset, and moreover that it is necessary to make the development acceptable,

[76] Paragraph 12, The Community Infrastructure Levy Regulations: www.legislation.gov.uk/ukdsi/2010/9780111492390/regulation/122

directly related to the development and fairly and reasonably related in scale and kind to the development.

Having stated this, the GLA guidance is explicit that "*A strict 1:1 ratio (i.e. the cost of the offset measure to save one tonne of carbon compared to the offset price per one tonne of carbon) is not required. Such a ratio would only allow the simplest retrofitting measures to be carried out and would leave more complicated, costly measures without access to funding.*"

In terms of certified emission reduction credits and carbon trading schemes, these principles tie in well to principles discussed in the context of voluntary carbon markets, financing the reduction of greenhouse gases in the atmosphere in a way that is real, additional, verifiable, and permanent[77].

Policy Consideration: Where can Carbon Offset funds be spent?

Criteria (b) of the CIL tests, *that a planning obligation should be directly related to the development* is generally interpreted as requiring contributions to be spent within the locality of the development, to resolve problems directly caused by the development which make it unacceptable in planning terms. For example, it would be difficult to require that a project provide contributions to upgrade a vehicle junction miles away from the development site.

The situation regarding the requirement for carbon offsetting contributions is however highly unusual in a planning context, in that the problem the contribution is seeking to resolve (the contribution of the development to climate change through its carbon emissions) is actually global, not local in nature, though some impacts are local.

There is no direct relationship between the location where emissions are generated and the location where adverse weather and other climate impacts are experienced. The contribution could theoretically be spent anywhere and still be directly related to the development, in that climate change is proved to be caused by the generation of greenhouse gases such as carbon dioxide, and the scale of the contribution is directly proportionate to the excess emissions produced by the development which need to be offset.

It is however reasonable to impose a limitation that carbon offset projects should happen within the area where the development takes place (be that the individual district or within Greater Manchester as a whole), in order to localise the side benefits of these projects going ahead and in order to simplify the practicalities of monitoring project delivery. It would be possible to localise contributions more closely to the contributing development, operating a "proximity principle", however this would be likely to incur considerable additional administration costs, requiring individual carbon saving projects to be selected or brought forward in line with the delivery of the development making the

[77] Envisioning The Voluntary Carbon Market Post-2020 - A Working Group Statement for consultation on the future role and design of the voluntary carbon market to support the goals of the Paris Agreement - www.goldstandard.org/sites/default/files/documents/2019_06_envisioning_the_vcm_statement_consultation_0.pdf

contribution. From the perspective of cost control, it would be preferable to keep the administration of the carbon offset fund entirely separate from planning processes.

Paragraph 123 of the 2010 CIL regulations introduced further limitations, prohibiting the pooling of s106 contributions for infrastructure from five or more sources which currently, is still in force. Regulation 123 also requires Local Planning Authorities publish a list of infrastructure projects, which are taken from the Infrastructure Delivery Plan, that CIL funding may be spent on. Any other matters (i.e. those NOT on the R123 list) can be secured through a s106 agreement, should they be required.

The full text is as follows:

Paragraph 123[78]

(3) A planning obligation ("obligation A") may not constitute a reason for granting planning permission to the extent that—

a) obligation A provides for the funding or provision of an infrastructure project or type of infrastructure; and

b) five or more separate planning obligations that—

i. relate to planning permissions granted for development within the area of the charging authority; and

ii. which provide for the funding or provision of that project, or type of infrastructure,

have been entered into before the date that obligation A was entered into.

The regulations continue:

(b) in relation to paragraph (3), a determination made on or after 6th April 2014 or the date when the charging authority's first charging schedule takes effect, whichever is earlier; and

"relevant infrastructure" means—

(a) where a charging authority has published on its website a list of infrastructure projects or types of infrastructure that it intends will be, or may be, wholly or partly funded by CIL, those infrastructure projects or types of infrastructure, or

(b) where no such list has been published, any infrastructure.

Policy Consideration: Removal of Pooling restriction on s106 obligations

In their March 2018[79] and December 2018[80] consultations the government proposed and confirmed proposals to remove the restriction on pooling contributions from s106

[78] The Community Infrastructure Levy Regulations: www.legislation.gov.uk/ukdsi/2010/9780111492390/regulation/122

[79] Supporting housing delivery through developer contributions - Reforming developer contributions to affordable housing and infrastructure - Ministry of Housing, Communities and Local Government – March 2018 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/691182/Developer_Contributions_Consultation.pdf

agreements allowing *"all local planning authorities to seek s106 planning obligations to fund infrastructure to help support, and bring forward new housing regardless of how many planning obligations have already contributed towards an item of infrastructure."*

Also proposed was the removal of the need for local councils to publish lists (regulation 123 lists) of the infrastructure projects or types of infrastructure intended to be funded by the Community Infrastructure Levy, to be replaced with a more transparent approach to reporting by charging authorities on how they propose to use developer contributions through Infrastructure Funding Statements.

In June 2019 the Government published their response to the December 2018[81], summarising the outcome of the consultation. The majority of respondents supported the proposal to lift the pooling restriction, and the report commented (paragraph 20):

"The Government welcomes the broad support for the removal of the pooling restriction raised in response to the earlier policy consultation, and through the technical consultation. In particular, the Government recognises that 83% of respondents believed there were no elements in regulations 4 and 12 which will prevent the Government achieving the policy intent, and a third of the respondents that provided comments underlined that removing the restriction would improve flexibility and/or improve certainty."

The report continues (paragraph 21)

"The Government acknowledges that 12 respondents expressed an opinion that using funds from section 106 and the Levy for the same piece of infrastructure ('double dipping') should not be allowed. This is dealt with in more detail in the response to Question 8. However, lifting the pooling restriction will address the uncertainty, complexity and delay that the restriction creates. Alongside the changes to regulation 123 lists, described in Question 8, it will allow authorities to use funds from both section 106 planning obligations and the Levy to pay for the same piece of infrastructure, regardless of how many planning obligations have already contributed towards an item of infrastructure. … Meanwhile, the introduction of infrastructure funding statements will increase transparency to ensure that it is clear how local authorities have spent funds secured through section 106 planning obligations and the Levy. The Government will not retain the existing regulatory barriers under regulation 123, as it considers that improved transparency is a better mechanism for addressing concerns over the interaction of the Levy and section 106 planning obligations."

Taking the June 2019 report at face value, it should be assumed that carbon offset funds can be pooled within a single ring-fenced pot and directed to the full range of eligible projects, whether defined as infrastructure or not. Also carbon offset payments, secured

[80] Reforming Developer contributions - Technical consultation on draft regulations" (December 2018) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/767292/CIL_Amendment_Regulations_Consultation_Paper.pdf

[81] Government response to reforming developer contributions - A summary of responses to the technical consultation on draft regulations and the Government's view on the way forward (June 2019) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/806284/Developer_contributions_government_response.pdf

through s 106 planning obligations can be used in combination with CIL funds to pay for infrastructure provision.

6.2 Community Infrastructure Levy

The Community Infrastructure Levy (CIL), introduced by the Planning Act 2008 is a tool to help councils deliver infrastructure in tandem with new development. It works differently to s106 payments, and effectively operates as a development tax based on a fee per m^2 of development. Where a local planning authority has chosen to set a charge in its area, the authority publishes a list of infrastructure projects or types of infrastructure that it intends will be funded by CIL payments.

The London Mayor Sustainable Design and Construction Supplementary Planning Guidance advises that boroughs should secure off-setting measures through s106 agreements. CIL is not an appropriate mechanism for collecting carbon offset payments, in that it is a fixed charge per m^2 and does not account for the varying performance of developments in terms of carbon emissions.

6.3 Draft wording for s106 agreements / Unilateral undertaking

We attach at appendix D and E examples of s106 agreement and unilateral undertakings used in Merton Borough Council and Islington Council respectively to secure carbon offset payments.

The key differences between unilateral undertakings and full planning obligations are that unilateral undertakings bind only the landowner(s), require less involvement from the council's legal team, and are generally only used for simple money payments, whereas planning obligations can be used to require the council to undertake required actions. In the context of carbon offset payments, this means that a unilateral agreement could secure the payment of carbon offset payments to the council by a certain trigger point, but could not for instance bind the council to return the money if it hadn't been spent by a certain point, as would be possible through a full planning obligation.

On smaller schemes (requiring offsite carbon abatement but where a full s106 legal agreement would not otherwise be required) it would be advantageous to encourage the submission of a completed unilateral undertaking with the planning application itself (this could be made a validation requirement, along with a fully completed energy statement), in order to avoid introducing further delays to the process.

It would also be possible to include formulas within the s106 agreement which would provide the basis for subsequently calculating a contribution, see the wording at Appendix F sourced from the London Legacy Development Corporation. This would be suitable in cases

where an outline application is submitted, where the detailed design of the development and its energy performance are matters reserved for latter approval.

6.4 Payment timescales

Our 2018 study for the West of England Authorities looked at payment timescales for carbon offset payments. Reviewing the literature, 45% of the authorities required contributions to the carbon offset fund to be paid on the commencement of development, with 33% requiring payment on completion of development. The remaining two authorities (Ashford and Hackney) allow payment on completion and in phases on large projects.

A 2017 cabinet report from the London Borough of Merton specifically discusses the timing of carbon offset payments, commenting

> *While the opportunity and level of funding has increased, the delivery of carbon saving projects in Merton is currently limited. Carbon offset funding is typically collected upon completion/occupation of the scheme, so the timescales for receiving funding are uncertain. This makes the forward planning and strategic delivery of carbon offset projects extremely challenging.*

The cabinet accepted the recommendation that instead carbon offset funding be collected at commencement. Our interview with Merton touched on the same subject:

> *We started talking to developers suggesting we collect 50% on commencement, and 50% on completion, the theory being that developers would have a continued financial incentive to add in additional carbon savings. Actually, with the volumes of cash we're talking, even if they were able to secure additional carbon savings they'd save more money by not having to employ lawyers and planners to renegotiate. The developers we spoke to didn't want more processes to discharge (*conditions*). They just wanted to pay the money at the beginning or the end.*

For the majority of schemes there is a very strong logic for requiring payment on commencement of development. The payment is required to abate carbon generated through the occupation of the development off-site, but most carbon offset projects will themselves need time to be planned and implemented from the time that funding is secured. It is reasonable therefore that where inadequate carbon reduction will take place on-site, payments should be made upon commencement of development, to allow the off-site abatement of emissions to happen in parallel with the generation of the emissions themselves. Following the same principle, it is reasonable that for very large, phased projects being developed over an extended timespan it would be reasonable to allow payments to be made in proportionate tranches on the commencement of each phase of development.

6.5 Draft conditions

We have found some examples of conditions relevant to securing carbon emission reductions and carbon offset payments attached at Appendix H. As set out in our commentary on the right hand side of this matrix, the examples could be improved. Therefore, using these as examples, we've drafted the following condition wording. The suggested condition wording will need further work and refinement, and it may be possible to simplify the wording if a supplementary planning document or other guidance is published. Training may be necessary to ensure that planning officers understand and can apply the planning conditions detailed below, and are confident in discharging them.

Condition wording, purpose and source	**CSE commentary**
Outline consent - Carbon emissions reductions to be secured from reserved matters applications + documentation to be included Each application for the approval of Reserved Matters shall be accompanied by an energy statement for the written approval of the Local Planning Authority and no Development shall be commenced pursuant to the relevant Reserved Matters approval until the energy statement has also been approved. Each energy statement shall to the extent relevant to the subject matter of the Reserved Matters application detail how the development complies with the requirements of policy __ of the __ Local Plan and the prevailing development plans policy at the time. as follows: - A minimum of 10% reductions in carbon dioxide emissions beyond Part L of the 2013 Building Regulations, achieved through fabric energy efficiency improvements and - An overall 35% /50% reduction in carbon dioxide emissions beyond the requirements of Part L of the Building Regulations, achieved through the installation of renewable and low carbon energy generation on site. - To full zero carbon *(regulated / regulated and unregulated)* through off-site carbon abatement. The energy statement shall set out: a. The Part L Building Regulations compliant "Baseline" including details of energy demand (kWh pa), regulated CO2 emissions (kg pa) using the Standard Assessment Procedure (residential) or SBEM (non-residential) and unregulated emissions b. Proposed scheme after energy efficiency measures and CHP ("Residual" energy demand & emissions)	*CSE have concerns about leaving compliance with zero carbon policies to reserved matter stage. Depending on the form of the outline permission, elements of the development might be set which constrain the ability to plan the lowest carbon development possible.* *If this is unavoidable, and where aspects of the development are set which influence the potential for low carbon heat or electricity technology, for instance the layout and orientation, or the number of units and therefore density of development, which might limit the incorporation of solar pv, or the feasibility or viability of connection to district heating systems, these*

including details of energy demand (kWh pa) and regulated CO_2 emissions (kg pa) using the Standard Assessment Procedure (residential) or SBEM (non-residential) c. Residual energy demand (kWh pa) and CO_2 emissions (kg pa) after on-site renewables, and full plans and details of the renewable energy plant to be installed including installed capacity (kW) d. Residual energy demand (kWh pa) and CO_2 emissions (kg pa) and unregulated emissions to be offset via financial contribution to Carbon offset fund The development shall be carried out in full accordance with the details agreed. **Reason:** To ensure that the development achieves the energy performance standards and carbon reductions required by policy __ of the __ Local Plan, and the 2008 Climate Act, in the interests of mitigation of climate change and achieving sustainable development.	*issues should be considered at outline stage.* *Care should also be taken to include formula-based text within the legal agreement attached to the outline permission, to enable appropriate contributions to be required into the carbon offset fund following reserved matters approval, once the performance of the development is known.*
Full consent – missing energy statement Prior to the commencement of development, an energy statement shall be submitted to and agreed in writing by the Local Planning Authority. This shall detail how the development complies with the requirements of policy __ of the __ Local Plan as follows: - 10% reductions in carbon dioxide emissions beyond Part L of the 2013 Building Regulations, achieved through fabric energy efficiency improvements and - An overall 35% reduction in carbon dioxide emissions beyond the requirements of Part L of the Building Regulations, achieved through the installation of renewable and low carbon energy generation on site. - To full carbon zero *(regulated unregulated?)* through off-site carbon abatement. The energy statement shall set out: a. The Part L Building Regulations compliant "Baseline" including details of energy demand (kWh pa), regulated CO2 emissions (kg pa) using the Standard Assessment Procedure (residential) or SBEM (non-residential) and unregulated emissions b. Proposed scheme after energy efficiency measures and CHP ("Residual" energy demand & emissions)	*Require contributions to the Carbon Offset fund to be worked out through the planning application stage within a detailed energy strategy. Better yet, raise your zero carbon policies and the potential for contributions to off-site carbon abatement with developers at the pre-app stage, in order to influence design decisions and maximise carbon savings through building fabric and integrated renewables. Raised early, these additional liabilities can also be factored into developers' land valuation*

including details of energy demand (kWh pa) and regulated CO_2 emissions (kg pa) using the Standard Assessment Procedure (residential) or SBEM (non-residential) c. Residual energy demand (kWh pa) and CO_2 emissions (kg pa) after on-site renewables, and full plans and details of the renewable energy plant to be installed including installed capacity (kW) d. Residual energy demand (kWh pa) and CO_2 emissions (kg pa) to be offset via financial contribution to Carbon offset fund The development shall be carried out in accordance with the details so agreed and shall be retained as such thereafter. **Reason:** To ensure that the development achieves the energy performance standards and carbon reductions required by policy __ of the __ Local Plan, and the 2008 Climate Act, in the interests of mitigation of climate change and achieving sustainable development.	*processes, and come off the value offered to landowners, making negotiations simpler with the development industry.* *Most of the time planning permission should be refused where an energy statement is missing, and ideally such applications should not be validated until it is submitted. However there may be cases (particularly during the transition where the policy is bedding) when such a condition might be used.*
Implementation of agreed carbon reduction measures + renewable energy aspects and monitoring Prior to the occupation of the development, a statement shall be submitted to and approved in writing comparing the predicted energy performance of the development (set out in the approved energy statement) and the as built performance of the completed development, comprising: a. The Part L Building Regulations compliant "Baseline" including details of energy demand (kWh pa), regulated CO_2 emissions (kg pa) using the Standard Assessment Procedure (residential) or SBEM (non-residential) and unregulated emissions b. "Residual" energy demand & emissions of the as-built development after energy efficiency measures and CHP, including details of energy demand (kWh pa) and regulated CO_2 emissions (kg pa) using the Standard Assessment Procedure (residential) or SBEM (non-residential) c. "Residual" energy demand and CO_2 emissions after on-site renewables, and confirmation that the renewable energy plant has been installed, such as certification through the Microgeneration Certification Scheme (MCS)	*The final sentence of the condition is the only clause which requires the renewable energy plant to be installed and used. CSE are not sure that it's strong enough. However the clawback mechanism we are suggesting in the legal agreement would provide a financial incentive to maintain the standards predicted.*

d. Confirmation of the residual energy demand and CO_2 emissions to be offset via financial contribution to Carbon offset fund The development hereby approved shall not be occupied until the statement is submitted to and approved by the Local Planning Authority, and until the renewable energy plant is generating renewable or low carbon electricity or heat and connected to the building and / or heat or electrical grid, as specified in the energy statement. **Reason:** To ensure that the development achieves the energy performance standards and carbon reduction standards described in the application, as required by policy __ of the __ Local Plan, and the 2008 Climate Act, in the interests of mitigation of climate change and achieving sustainable development.	
Informative relating to s106 clawback clauses (carbon offset fund) Where the carbon emission savings set out in the agreed energy statement (achieved through the fabric performance of the development and the integration of renewable energy) do not achieve the standards set out in the approved energy statement, the planning obligation requires that additional payments are made into the West of England carbon offset fund to pay for the residual carbon savings to be achieved off-site.	*A decision is to be taken here as to whether monitoring / enforcement (and the s106 clawback) is to be carried out prior to occupation, or prior to occupation <u>and</u> after occupation (e.g. after 12 months). We believe a pragmatic approach might be to monitor and enforce (and claw-back additional carbon offset payments) prior to the occupation of the building, at least then the developer is still around to take action against.* *In the majority of cases, CSE are not convinced that it is proportionate or feasible to continue monitoring beyond 12 months, due to the significant workloads imposed on the local planning authority. Also we are*
Monitoring Within 18 months of the development being first occupied, a statement shall be submitted to and approved in writing by the local planning authority comparing the as-built and as-occupied performance of the development over a continuous calendar year, comprising: a. The in-use energy demand & emissions of the development after energy efficiency measures and CHP, including details of energy demand (kWh pa) and regulated CO_2 emissions (kg pa) using (*insert methodology here)* *b.* Proof of the in-use energy generation from the renewable energy plant fitted, comprising (*insert details here)* **Reason:** To ensure that the development achieves the energy performance standards and carbon reduction standards described in the application, as required by policy __ of the __ Local Plan, and the 2008 Climate	

Act, in the interests of mitigation of climate change and achieving sustainable development.	*doubtful of the additional benefit that 5 years of monitoring would provide that a year's monitoring wouldn't.* *However, where more technologically complex solutions are applied, solutions that require maintenance and solutions that require interventions to achieving optimum performance, it may be reasonable to impose longer monitoring requirements.* *In cases where optimal use of building technology relies on the householders familiarity, use and maintenance of a "new" system (for example, an air source heat pumps) it may be more effective to use awareness raising approaches than to commence formal planning enforcement action against homeowners.*

Table 5 - Suggested planning conditions, drafted by CSE.

6.6 Potential content of Supplementary Planning Guidance or informal guidance note

Arguably the complexity of carbon offsetting could justify the preparation of Supplementary Planning guidance (as has been prepared in Ashford Council and the London Legacy Corporation), although we note that other authorities such as Kingston upon Thames, Waltham Forest and Westminster have approached this via informal guidance notes on their websites. The timescales and budget allowed mean that the preparation of such guidance is outside of the scope of this project; however we would suggest that the following guidance is provided in some form, alongside training to assist in its implementation and enforcement:

Purpose and content
Planning Application assessment
- Resources to assist developers and the council to calculate the residual carbon to be offset and the offset payments to be made including excel worksheet and worked examples, to enable case officers and developers to calculate whether a project is policy compliant, and the size of the carbon offset payment payable, if any. See the example excel worksheet at Appendix G, based on the London Plan policy requirements and a carbon price of £60 per tonne, which we created for a previous project.
- Template Unilateral Agreement / Template Planning Obligation text.
Applications to the Carbon offset fund and Administration of the Carbon Offset Fund
- Application forms for applications to the fund (different application forms may be required for the different project types.)
- Eligibility Criteria and assessment approach for Carbon Offset projects
- Template contract for carbon offset project, detailing project type and location, funding and funding tranches, timescale to completion, reporting requirements. (Large scale projects and grants only)
- Administration and strategic management of the fund
Monitoring of carbon offset projects
- Large scale projects and grants only - update report template, monitoring steps towards completion of carbon offset project and release of funding
- Large scale projects and grants only - Project closedown report – confirmation of completion, costs and delivery of CO2 savings
- Approach to annual monitoring of fund as a whole Update on portfolio of carbon saving projects – carbon savings achieved, cost per measure type. Review of carbon cost, eligible measures and application process.

Table 6 - content of supplementary planning guidance or informal guidance relating to carbon offset regime

6.7 Summary recommendations from Section 6

- Require contributions to the Carbon Offset fund to be worked out through the planning application stage within a detailed energy strategy. Ideally raise the zero carbon policies at pre-app stage, in order to maximise their influence on design decisions and the carbon savings achieved through building fabric and integrated renewables.
- Require the submission of an energy statement as a validation requirement for the submission of planning applications. Where no energy strategy is submitted, consider refusing permission. If there is a wish to approve the application anyway (or in the transition period, for instance, applying newly adopted policies to already submitted applications) secure the submission of an energy strategy using a pre-commencement planning conditions.
- In the majority of cases (excluding very small sites where cash-flows may be a problem and very large sites where it is reasonable to phase contributions in parallel with the build programme), assume that carbon offset contributions are to be paid prior to the commencement of development.
- Include within planning conditions a requirement for as-built SAP measurements to be submitted, to ensure predicted performance standards are achieved. Linked to this, include within the s106 agreement the ability to claw back additional carbon offset contributions where the predicted energy performance standards are not achieved.
- For smaller scale, simpler applications where only a cash payment needs to be made, maximise the use of unilateral undertakings, and publish template agreements for use.
- Consider publishing supplementary planning guidance to assist in the interpretation of planning policy, and to assist developers in submitting policy compliance schemes.

7 Identification of suitable projects for spending the carbon funds generated

7.1 Findings from Survey of Local Authorities

In addition to the local evidence base that was reviewed CSE also conducted surveys and interviews with a range of local authorities in England known to be operating carbon offsetting policies. CSE surveyed Local authorities within Greater London, as well as Reading, Southampton and East Hants on the type of eligible measures each Local Authority operates.

Table 7 highlights that the most common types of retrofitting projects funded through carbon offset schemes are those which involve energy efficiency retrofitting of council owned properties such as schools and other buildings. 54% of Councils who responded to the survey are funding this type of project. 54% of Councils responding to this question also funded community owned renewable energy projects.

Energy efficiency retrofitting of private homes and community buildings are also a commonly funded scheme and are carried out by approximately 46% and 38% of responding authorities respectively.

Energy efficiency retrofitting of council and housing association homes, business energy grants and behaviour change / education initiatives are all funded by 38% of Authorities. Domestic renewable energy projects are funded by 31% of authorities while commercial and Council owned renewable energy projects are only funded by around 15% of Authorities. Carbon Sequestration schemes also make up 15% of authorities funding these schemes. None of the authorities who were interviewed funded any form of transport initiatives.

Project type	**Percentage of authorities with projects**	**Number of authorities with projects**
Energy efficiency retrofitting - schools and other council buildings	54%	7
Renewable energy - community owned projects	54%	7
Energy efficiency retrofitting - private housing	46%	6
Energy efficiency retrofitting - council housing and housing association dwellings	38%	5
Energy efficiency retrofitting - community buildings	38%	5
Energy efficiency - business energy grants	38%	5
Behaviour change and education	38%	5
Renewable energy – domestic	31%	4
Renewable energy - commercial projects	15%	2
Renewable energy - within the council's land holdings	15%	2
Carbon sequestration (e.g. tree planting and restoration of carbon sinks, for example peat bogs)	15%	2
Transport initiatives - energy efficiency upgrades to council vehicle fleet	0%	0

Transport initiatives - electric vehicle (EV) charging points	0%	0
Transport initiatives - diesel scrappage and EV replacement schemes	0%	0

Table 7 - results of local authority survey - carbon offset projects funded

Further research on the implementation of London's Zero Carbon Target and carbon pricing policies carried out by the University College London - Bartlett School of Planning (hereafter the Bartlett study) highlighted that the most widely deployed projects were those tackling fuel poverty, retrofitting of council housing and schools as well as energy efficiency and renewable energy projects on corporate or operational estates.

Project type	**Current Project**	**Future Project**
Fuel Poverty	17	8
Housing: Council	14	4
Schools: Maintained	13	4
Corporate / Operational Estate: energy efficiency projects	12	5
Corporate / Operational Estate: Renewable Energy Projects	12	6
Decentralised Energy Projects	9	5
Housing: Associations	7	2
Behaviour Change and Education	5	3
Schools: Academies	4	2
Greening Projects (Trees and Green Spaces)	4	1
Private Sector housing grants	3	1
Other (Specify)	3	2
Business Energy Grants	2	1

Table 8 - Carbon offsetting project types by London Boroughs

We also carried out a literature review of all the projects and initiatives currently being carried out or proposed by the Greater Manchester Combined Authority, to see if any of these could receive funds from the carbon offset fund and deliver measurable carbon savings and demonstrate clear additionality. We reviewed the following documents and reports:

- Greater Manchester 5 year Environment Plan[82]
- Greater Manchester Environment Fund
- Greater Manchester Natural Capital Investment Plan[83]
- Greater Manchester Clean Air plan[84]
- Warm Homes Fund[85]

[82] Greater Manchester 5 year Environment Plan https://www.greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf

83 Greater Manchester Natural Capital Investment Plan - https://naturegreatermanchester.co.uk/wp-content/uploads/2019/01/GM-Natural-Capital-Investment-Plan-Final180119.pdf

84 Clean Air Plan – https://cleanairgm.com/clean-air-plan

85 Greater Manchester Warm Homes Fund https://www.greatermanchester-ca.gov.uk/what-we-do/environment/greater-manchester-warm-homes-fund/

- Made to Move report[86]
- Greater Manchester Green Deal and ECO Framework[87]
- Greater Manchester Smart Energy Plan[88]
- Greater Manchester Retrofit Report[89]
- June 2019 - Solar PV collective Purchasing pilot for Greater Manchester[90]
- Greater Manchester Transport Strategy 2040[91]
- Greater Manchester Community Energy Action Plan[92]

7.2 Commentary on potentially eligible carbon offset projects in Manchester

The following section includes commentary set out by project type and funding stream, according to the existing projects already running in Greater Manchester and the other potential carbon offset projects, including the challenges and opportunities which exist for each one within the GMCA region.

Where data is available, we have provided high level estimates of the scale of opportunity that exists, the costs and the carbon savings which could be achieved.

Carbon Emissions savings related to specific retrofit measures

In looking at carbon savings from retrofitting, many of the existing and potential projects and funding streams below potentially overlap. Therefore we have provided high level indications on the quantum and cost of carbon savings possible based on data from the National Household Model.

The National Household Model (NHM) is a domestic energy-policy modelling and analytical tool covering the whole of the UK, built by CSE and commissioned by the former Department of Energy and Climate Change (DECC). Using information from national housing surveys, the NHM presents a detailed representation of the physical characteristics of Great Britain's housing stock and the types of occupants who live in these homes.

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86 Made to Move Report https://assets.ctfassets.net/nv7y93idf4jq/1XtfykQs0g22g8cYCyoAag/dee5732015f23c5df3a338afc2353b74/Made_to_Move.pdf

87 Greater Manchester Green Deal and ECO Framework - https://www.greatermanchester-ca.gov.uk/what-we-do/environment/domestic-and-non-domestic-energy-efficiency/

88 https://es.catapult.org.uk/wp-content/uploads/2019/07/ESC_SSH2_D40-Smart-Energy-Plan-GMCA.pdf

89 Greater Manchester Combined Authority – Decarbonising Greater Manchester's Existing Buildings – link awaited

90 Greater Manchester- Solar PV collective Purchasing pilot for GM www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwiRpJ-5yuvkAhXsVBUIHfWHCQsQFjAAegQIABAC&url=https%3A%2F%2Fwww.gmcameetings.co.uk%2Fdownload%2Fmeetings%2Fid%2F4746%2F20_solar_pv_collection_pilot&usg=AOvVaw2VCNrWgR4JWnGlOq4_6xGj

91 Greater Manchester Transport Strategy 2040 - https://downloads.ctfassets.net/nv7y93idf4jq/7FiejTsJ68eaa8wQw8MiWw/bc4f3a45f6685148eba2acb618c2424f/03._GM_2040_TS_Full.pdf

92 Greater Manchester Community Energy Action Plan - www.gmcr.org.uk/wp-content/uploads/2019/07/Community-Energy-Action-Plan-Green-Summit-A5.pdf

Using data from the English Housing Survey, the NHM has been used to model the expected costs and associated carbon emissions savings derived from a range of energy efficiency and low carbon heating system retrofit options across the housing archetypes defined by the English Housing Survey. The sample group covers the North West region as a whole rather than only Greater Manchester to help ensure that figures are statistically significant. Each of these measures may be used in isolation or alongside a number of other measures as part of a wider retrofitting scheme.

The costs and carbon emissions savings data presented in the NHM are based on the most recent grid electricity factors as used in SAP10 calculations.

GMCA commissioned two separate pieces of work to suggest theoretical decarbonisation pathways for Greater Manchester as part of the five year environment plan. These were the 'Setting City Area Targets and Trajectories for Emissions Reductions' (SCATTER) model, and the 'Energy System Modelling Environment' (ESME) model.[93] Retrofitting homes in Manchester is an important intervention considered in both of these models. CSE has therefore used indicative figures from these models as a basis for estimating the potential carbon savings and costs associated with a carbon offset funded fabric based retrofit scheme. The ESME model figure of the retrofitting of 23,500 homes per year was taken as low estimate and the SCATTER Figure of 61,000 per year was taken as a high figure. The NHM modelling undertaken by CSE assumes that for each scenario the yearly number of properties retrofitted is representative of the proportion seen in the current housing stock.

As part of this analysis CSE has considered both of these approaches each with a notional suite of measures for a minor fabric retrofit and those for an extensive fabric retrofit (decarbonisation of heat is considered separately below). Measures have been grouped into either minor or extensive based on monetary costs and differences in the ease of installation for specific measures. This was determined using research underpinning the NHM and the professional judgement of CSE staff respectively.

A minor retrofit is indicative of an easy to treat property retrofitted using the lowest cost measures available, whereas an extensive retrofit is indicative of a harder to treat property (e.g. traditional construction) using more expensive measures and / or a comprehensive, whole house approach.

A notional minor retrofit includes; loft insulation, cavity wall insulation, secondary glazing, low energy lighting. A notional extensive retrofit includes: loft insulation, external/internal wall insulation (mean value used for this figure), double glazing, floor insulation, low energy lighting.

Tables 9 and 10 show the indicative carbon emission savings and associated costs per year for both the minor suite of retrofit options and the extensive suite of retrofitting options.

[93] https://greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf

Not all measures are appropriate for each housing typology and therefore do not count towards carbon savings created under the different notional retrofit types. e.g the model assumes that it is not possible to install loft insulation in flats, and a detached home is assumed to have cavity walls, and therefore (internal wall / external wall insulation are assumed to not be appropriate.

Low (ESME) scenario, 23,500 retrofitted homes per year				
	minor retrofit		extensive retrofit	
	$C0_2$ savings (tonnes) per year	Cost (£) per year	$C0_2$ savings (tonnes) per year	Cost (£) per year
Detached	9,071	£14,623,400	21,485	£89,148,000
Semi-D	13,317	£29,118,000	26,772	£114,850,500
Flat	2,875	£9,292,000	6,647	£37,398,000
Townhouse (a three storey terraced house)	7,590	£20,113,500	14,990	£73,660,950
Total	32,853	£73,146,900	69,895	£315,057,450

Table 9 - Low (ESME) scenario, 23,500 retrofitted homes per year

high (SCATTER) scenario, 61,000 retrofitted homes per year				
	minor retrofit		extensive retrofit	
	CO_2 savings (tonnes) per year	Cost (£) per year	CO_2 savings (tonnes) per year	Cost (£) per year
Detached	24,058	£38,783,800	56,983	£236,436,000
Semi-D	35,319	£77,226,000	71,004	£304,603,500
flat	7,625	£24,644	17,629	£99,186,000
Townhouse (a three storey terraced house)	20,130	£53,344,500	39,757	£195,361,650
Total	87,132	£169,378,944	185,373	£835,587,150

Table 10 -high (SCATTER) scenario, 61,000 retrofitted homes per year

7.3 Domestic energy efficiency retrofit

The report, *Decarbonising Greater Manchester's Existing Buildings*[94] (hereafter the GM Retrofit Report) states:

To realise the scale of reduction in CO_2 emissions from reducing buildings' demand for energy, Greater Manchester need tens of thousands of deeper retrofits every year. Modelling informing Greater Manchester's 5 Year Environment Plan is based on 61,000 retrofits per year which, on average, reduce heat loss per house by 57%. At present, deeper retrofit projects achieving this scale of reduction are pilots of tens or at most 100-200 homes, or are not retrofitting to the depth needed.

Policy consideration

Below we have stressed that as national grid derived electricity continues to decarbonise, the carbon emissions saving achieved from substituting grid electricity with onsite renewable energy installations falls away, with a corresponding increase in the cost per tonne of carbon saved.

By contrast, domestic and commercial buildings are still dominated by gas heating systems. The GM retrofit report advises that 95% of Greater Manchester postcodes are connected to the gas grid and over half of the energy used in Greater Manchester's domestic and non-domestic buildings is from gas. As such, significant carbon emission savings can be achieved by switching to lower carbon heating systems such as air or ground source heat pumps. These factors should be taken into account during consideration of the strategic direction and allocation of the fund.

Domestic retrofitting projects would offer the following benefits as a potential carbon offsetting project:

- Direct socio-economic benefits to residents through reduced heating costs and reduced ill health / mental health issues associated with fuel poverty

[94] Greater Manchester Combined Authority – Decarbonising Greater Manchester's Existing Buildings – https://democracy.greatermanchester-ca.gov.uk/documents/s2203/Decarbonising%20Buildings%20Report%20Cover%20Paper.pdf

- Significant potential for cost-effective local carbon savings and economies of scale
- Potential to align with, contribute to and expand existing retrofitting and fuel poverty alleviation schemes and be delivered through existing programmes.
- Potential economic benefits for local contractors and SME's

In this context, we note that fuel poverty is a particular concern in Greater Manchester, where all but one of the city regions 10 districts, have fuel poverty rates above the national average, and where fuel poverty rates across all 10 districts have increased over the last 3 years[95].

The intended removal of the current limitation on pooling s106 contributions increases the potential for such programmes to deliver at scale, enabling multiple carbon offset contributions to be pooled to fund large scale projects. As the council's housing departments already carry responsibilities for alleviating fuel poverty and improving the quality of the housing stock, the ten authorities are already well set up to deliver grant funding. The following projects would be possible.

Energy Company Obligation

The Energy Company Obligation (ECO) is a government energy efficiency scheme in Great Britain to help reduce carbon emissions and tackle fuel poverty. Under the Heating Cost Reduction Obligation (HHCRO) obligated energy suppliers must mainly promote measures which improve the ability of low income, fuel poor and vulnerable households to heat their homes. This includes actions that result in heating savings, such as the replacement of a broken heating system or the upgrade of an inefficient heating system.

In Greater Manchester, it has been agreed that there will be one Statement of Intent[96] covering all 10 districts and declarations of eligibility will only be issued for Greater Manchester wide or Local Authority led schemes via the affordable warmth service operating in each district.

The final decision on whether a household receives ECO measures is made by the energy suppliers or their agents/contractors. Inclusion in a Declaration made by the LA or GMCA to a supplier will not guarantee installation of measures, as the final decision will depend on surveys carried out by suppliers agents/contractors and the installation costs calculated, the energy savings that can be achieved for a property, and whether suppliers have achieved their targets or require further measures to meet their ECO targets.

GMCA already carries out ECO retrofits through an intermediary, Agility Eco. The Local Authorities within GMCA already top up eco funding to enable more expensive upgrades and improvements to be carried out. There is considerable potential to use carbon offset funding to target higher EPC standards than would otherwise be achieved, or enable more expensive measures to be delivered in 'hard to treat' properties (such as listed properties or other non-standard construction types) which would otherwise not attract sufficient funding.

[95] Greater Manchester Combined Authority – Decarbonising Greater Manchester's Existing Buildings

[96] Energy Company Obligation - Local Authority Flexible Eligibility Statement of Intent – Greater Manchester Combined Authority - www.greatermanchester-ca.gov.uk/media/2097/energy-company-obligation-flexible-eligibility-statement-of-intent-v3-final.pdf

Provided that the additional benefit provided by carbon offset funding could be costed, predicted and audited, a high level of additionality could be demonstrated.

The Greater Manchester retrofit report recommends that "*Partners across Greater Manchester should develop proposals for and push for changes to current the current ECO framework when it ends in 2022 to better align it with the city-region's ambitions*".

Council owned housing stock

There would be significant potential to direct carbon offset funding at the retrofitting of council owned housing stock, provided clear additionality could be proved, either by upgrading the EPC standard properties are being upgraded to, or increasing the scale of retrofitting from currently funded levels.

With regards to the level of retrofitting required, a previous study for The Lambeth Carbon Offset Fund[97] considered the trade-offs between deep and shallow retrofits and short and long term carbon saving strategies. The study found that capital costs rose rapidly in line with the percentage of carbon reduction sought and therefore that in the short term, "shallow" retrofits might be considered the "cost effective" approach. However, when considering medium / long term effects the study noted that "there is a potential risk for shallow retrofits to result in lower levels of energy efficiency and higher medium term mitigation costs when compared to performance based policies promoting deep retrofits" (Para 5.2.4).

The GM Retrofit Report acknowledges the need for deep retrofit, with the SCATTER analysis pointing to the need for whole house retrofits, reducing heat loss per house by on average 57% if carbon reduction targets are to be met. The retrofit report does not define "deep" retrofit in detail, but discusses the need for a unified, whole house approach, rather than as in the past programmes centred around the mass installation of individual energy efficiency measures such as loft insulation or external wall insulation.

In the context of Greater Manchester's climate emergency declaration, and with due regard to long term cost effectiveness, it would be short sighted to pursue a process of 'shallow' retrofitting on the basis of short term cost savings, and instead it is justifiable to direct the fund at deeper, more expensive measures. Although, for a given fund size, this option would achieve greater carbon reductions to a smaller pool of properties, meaning that socio-economic benefits of housing efficiency gains would be distributed to a smaller pool of residents. Additionally, as deeper whole house retrofits are pursued, the costs are likely to rise per tonne of carbon saved.

In calculating the resultant carbon savings, retrofitting and energy efficiency projects would need to consider "comfort taking[98]" by occupiers, so as not to over-state the carbon savings achieved.

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[97] The Lambeth Carbon Offset Fund – Report, Energy And Carbon Databases Gis Tool (2015) www.towerhamlets.gov.uk/Documents/Planning-and-building-control/Strategic-Planning/Local-Plan/Carbon_Offset_Solutions_Study_2015.pdf

[98] Comfort taking is where, following energy efficiency improvements being made, some residents particularly those in fuel poverty may heat their home to a higher temperature, rather than using the increased energy efficiency to lower heating bills and carbon emissions.

Policy Consideration: directing retrofitting to maximise social benefits (and fuel poverty alleviation or long term carbon reductions)

In planning and delivering retrofitting projects, there are tensions between the objectives to target fuel poverty and maximise social benefits and the objective to achieve long term carbon reductions.

- **The capital costs for retrofitting projects rise rapidly with the % carbon reduction sought. Simple "shallow" retrofitting projects, targeting moderate carbon savings and leaving more complex invasive work for the future, might be considered the most cost effective in the short term, and would assist in spreading the social benefits most widely.**
- **Such "shallow" retrofitting projects may however represent poor value for money in the medium term, given the likely need to upgrade these properties again to achieve net zero carbon by 2038.**

Action and Next Steps

In designing and specifying retrofitting schemes funded by the carbon offset fund, careful consideration should be given to the tensions between short and medium term cost effectiveness, and in particular to ensure that short-term "shallow" retrofitting measures are not pursued at the loss of "deep" retrofits, making the total carbon savings achieved more expensive to administer in the long run, or create unnecessary disruption for residents. Using the National Household model, further analysis could be carried out of the mix of measures which across the ten authorities could achieve the greatest carbon savings and fuel poverty improvements.

Energy advice service

Utilising carbon offset funding to pay for fuel poverty advice services in tandem with the implementation of energy efficiency measures is another option, with households in fuel poverty given first priority. It would deliver significant social benefits to often highly disadvantaged groups, deliver corporate objectives around fuel poverty and could potentially enable continuity of advice services; however directly attributing carbon savings to advice delivery is challenging. We do note however that over a third of authorities we surveyed fund behaviour change programmes from their carbon offset funds and the GLA guidance on carbon offsetting does not rule out funding soft measures such as behaviour change programmes:

"*The GLA expects LPAs to prioritise spending on hard measures, i.e. those that deliver a tangible physical asset with more transparent carbon savings, but does not discourage spending offset fund payments on soft measures, i.e. those that demonstrably create the enabling environment for carbon reductions. LPAs may choose to exclude certain types of projects or set a limit on the proportion of the pipeline that will be spent on soft measures.*

Where soft measures are funded LPAs should set stricter information and performance requirements to recognise the limited control over the outcome. For example, we recommend that LPAs make it a requirement that all behaviour change projects set out an engagement strategy and monitoring plan in advance of receiving funding. Carbon savings should also be adjusted to reflect the uncertainty and lack of control over outcomes."

The degree to which savings can be achieved will depend on a combination of the type of household being advised, the type of advice being given and any physical intervention in the property.

Households with higher disposable income typically have higher energy use and associated carbon emissions. If these households are given advice on the optimal use of their heating controls then the potential savings are significantly higher than those for a fuel poor household. Furthermore, if this advice is given in conjunction with an intervention, such as full or smart heating controls, then the savings are likely to be higher and sustained. In this respect, we note the Manchester based Carbon Literacy Project[99], a 3rd sector agency delivering carbon literacy across Greater Manchester.

The Centre for Sustainable Energy (CSE) runs an energy advice service for a number of local authorities. The majority of CSE's advice work is focussed on vulnerable households who have lower energy use. Our advice work often helps these households to use energy in the most optimal way possible. This may also result in them using *more* energy if that's affordable i.e. they are using energy more wisely and understand that their household budget can accommodate this. To help maximise the benefits of our advice work we now install minor measures as part of our service e.g. LED lightbulbs, draught proofing and secondary glazing. These measures will all deliver quantifiable carbon savings, when compared to the status quo, which could be claimed as part of a scheme supporting carbon offsetting. Although the savings from these minor measures can't be guaranteed in the context of the property, many funders and Government schemes are happy to claim the savings in this way.

There are two options to maximise carbon savings from an energy advice scheme:

1. Savings attributed to single measures – the scheme would support and claim the savings from energy efficiency measures. It would ignore comfort taking and assume the average savings achieved using published figures.
2. Household level savings – the scheme would be designed to maximise carbon savings i.e. advice would be given to higher income households with measures tailored to deliver the highest saving. Ideally the advice and associated measures would be designed to inherently deliver the maximum saving e.g. behavioural advice at the point of heating control installation.

Policy Consideration: Using Carbon Offset funding to pay for an energy advice service

It would be challenging to reliably attribute carbon savings to the delivery of energy advice and therefore a conservative approach should be taken to predicting carbon savings. Energy advice, focussed on vulnerable households in fuel poverty may result in these households using *more* energy to improve their health and comfort. Therefore we would advise against simply funding existing fuel poverty advice work from the carbon offset fund. Instead any advice work should be tailored to deliver carbon savings:

- **Installing minor measures alongside our advice to which quantifiable carbon savings can be attributed e.g. LED lightbulbs, draught proofing and secondary glazing.**
- **Targeting higher income households, which are likely to have higher energy demands.**
- **Delivered alongside retrofitting and other physical interventions to properties**

It could potentially be appropriate to fund the delivery of energy advice alongside retrofitting projects, as a minor element of the overall costs.

Privately owned homes - the Able to Pay Market

The report "Decarbonising Greater Manchester's Existing Buildings" stresses the need to influence the decisions and behaviours of home owners to encourage them to take up opportunities to retrofit their properties and reduce the barriers to them doing so. The report goes on to stress the need to build public awareness using tools such as open homes and social marketing and community-based groups to put whole-house deep retrofit on people's radars and turn awareness into demand.

Our experience reinforces these recommendations. In 2015, CSE reviewed the Green Open Homes programme, which we administered between 2013 and 2015 (now re-opened). Green Open Homes events allow residents to visit homes which have been retrofitting in their neighbourhood, allowing them to experience real world examples of low-carbon measures, in a house similar to theirs, whilst providing the opportunity to obtain impartial and informal advice from the home owner.

Between 2013 and 2015 there were 20,000 visitors to Green Open Homes properties. When surveyed on the day of their visit, 72% of visitors stated that they would go on to install measures. We carried out further detailed follow up surveys to look at the retrofitting measures actually installed following visits. This found that 6 % of respondents had installed or were planning to install energy saving and/or renewable energy measures as a result of their visit. Further analysis showed that those who made improvements to their homes invested a likely average of £8,0141. Such awareness events which normalise the installation of energy saving measures and demonstrate the benefits of doing so can be a powerful catalyst for driving investment in domestic energy efficiency improvements.

The initiative People Powered Retrofit[100] is an example of the type of project which might be able to be funded. This six-month research and development project is exploring the potential for a householder-led approach to domestic energy efficiency retrofit in Greater Manchester. The project targets the more affluent, able to pay market, and seeks to tackle the key barriers that home owners face in commissioning retrofit, including lack of appropriate contractors and concerns around the quality of works. People Powered Retrofit will test a streamlined, whole house retrofit service featuring a 'Retrofit Concierge' to simplify the retrofit and refurbishment process. Should the research trials prove effective and demonstrate carbon savings, this project could be a good candidate for receiving carbon offset funding to expand and run this programme at scale. It is not however possible at this stage to predict the scale of carbon savings which could be delivered by such a project or the cost of such a programme.

Private rental sector – Domestic and non-domestic

There is also potential to target funding at upgrading properties which fail to meet the minimum energy efficiency standards (MEES) brought in for private rental properties, in both domestic and non-domestic use[101]. These regulations introduce a minimum EPC

[100] People Powered Retrofit - https://carbon.coop/portfolio/people-powered-retrofit/
[101] Energy Efficiency (Private Rented Property) (England and Wales) Regulations 2015 - www.legislation.gov.uk/ukdsi/2015/9780111128350/contents

standard of E and mean that buildings cannot be rented out unless they meet this standard, however they rely on Local Government for enforcement. Additionally there are exemptions in relation to the cost of the measures needed (under £3,500), and their impact on the market value of the property. Since in order to rent their properties out, landlords are legally required to upgrade them to EPC band E, additionality could be demonstrated by funding the upgrade of exempt properties (provided funding is not already available through other mechanisms) or offering additional funding (on top of the landlord's investment) to target higher EPC standards. Our experience in the Bristol context is that residential landlords tend to specify improvements to achieve only the minimum legal standard.

Such a project would target the least energy efficient of GMCA's housing and building stock and also provide socio-economic benefits to residential tenants – especially those which may be experiencing fuel poverty; however careful thought should be given to mitigating perverse incentives for vulnerable households. Having upgraded their property beyond the minimum legal standards required, landlords may seek to increase the rent, outweighing any financial relief the tenant might have gained from reduced heating costs.

Similarly funding could be directed at upgrading properties which are exempt from these regulations, for example those properties where the cost of bringing the EPC rating of domestic properties up to band E would cost more than £3,500.

7.4 Non-domestic retrofitting

Energy efficiency improvements to other non-domestic buildings

Initiatives to improve the energy efficiency of the ten authorities' building stock, including schools, offices and shops, and council buildings have potential as eligible "carbon offset" projects offering:

- In the case of improvements to council-owned buildings, straight-forward delivery through the council's own asset / building management teams
- Secondary benefits to residents and tax payers though reductions in corporate spending on fuel, allowing the savings to be re-directed towards service delivery
- Direct benefits to residents of council housing through reduced fuel bills
- Potential economic benefits for local contractors and SMEs
- In the case of privately owned non-domestic buildings, such initiatives could assist in increasing carbon savings possible from privately leased offices and shops, where the owner has little incentive to achieve bill savings or comfort improvements, the benefits of which flow to the lease.

Given the ease of delivery, the retrofitting of council owned properties would be well suited to be the first projects funded through the carbon offset fund, with funding being opened up to the retrofitting of privately owned buildings following on from this.

Energy efficiency improvements to community buildings

CSE has in recent years administered the Thrive Renewables Community Benefit Programme[102], a corporate social responsibility project offering grants of up to £4,000 for energy efficiency improvements to community buildings such as village or community halls within proximity of Thrive renewable energy sites across the UK. In order to be eligible, applications to these funds needed to be from not-for-profit community or voluntary groups and the community buildings were required to be regularly used by a wide cross-section of the community, for example village halls and community centres.

Our experience suggests that this type of project could be highly attractive as an eligible carbon offsetting project, offering:

- Significant benefits to local communities, reducing the running costs of community buildings, improving their usability and allowing savings in running costs to be directed towards community activities. Grant recipients report that renting the space to local clubs and groups becomes easier once the building is warmer, meaning that they can generate more income than before the retrofit, in addition to the savings on bills.
- A high degree of additionality, offering funding for upgrades to community buildings which would be very unlikely to take place otherwise.
- A great deal of flexibility. Such grants can be dispensed and implemented quite quickly, within 3 – 6 months.
- Potentially a relatively large pipeline of projects.
- Improved understanding of sustainable energy use for applicants.

Within the Thrive programme, funding is often directed to fairly basic upgrades to buildings in poor condition, and that there is a high latent demand for such improvements. The chart below shows the spread of measures funded through the Thrive scheme in 2018. Whilst the Thrive scheme funded the installation of replacement gas boilers, and assumed carbon savings for the energy efficiency improvements achieved, given the need to phase out fossil fuel heating, funding could instead be offered to carbon saving efficiency measures and / or low and zero carbon heating technologies.

[102] Thrive Renewables Community Benefit Programme - www.cse.org.uk/projects/view/1304

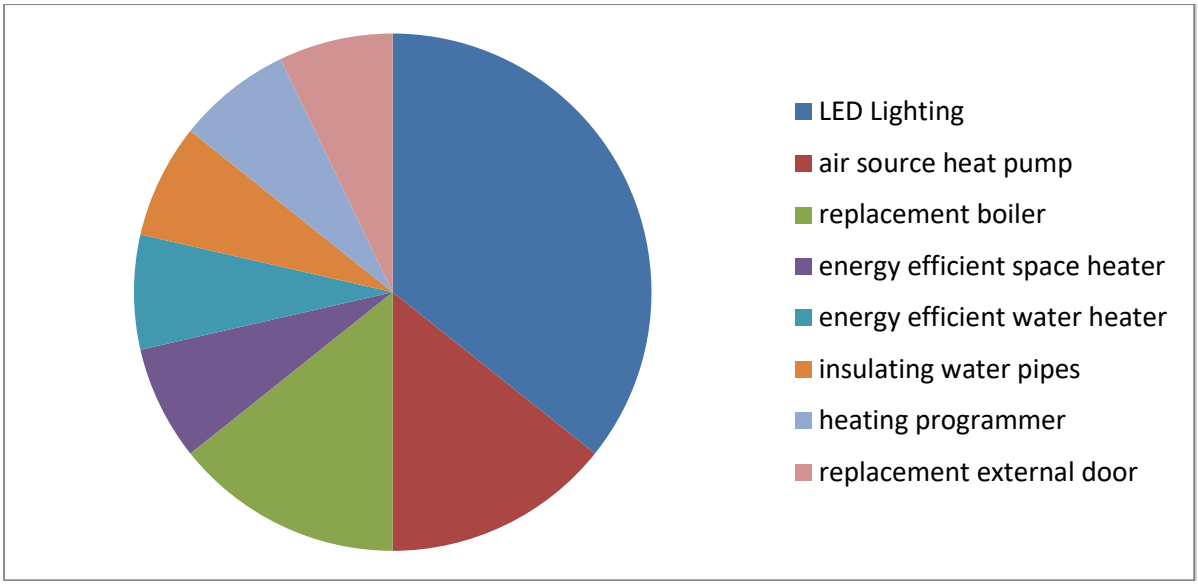

Figure 5 - Energy efficiency measures funded 2018 - Thrive Community Energy Fund

Applications to the Thrive fund were subject to a spending cap of £4,000 for measures that reduced carbon emissions including lighting and heating upgrades, insulation and draft proofing, low energy appliances, double glazing and renewable energy technologies, but it was evident from the number of repeat applications that considerably more than £4,000 could be invested in upgrading the energy efficiency of some community buildings.

At present the Thrive fund is administered as follows:

- Thrive replenishes the fund (and pays CSE's administration costs) as their finances allow. Between funding cycles the scheme lies dormant.
- At each replenishment, the fund is promoted to eligible community buildings.
- The fund can be used in conjunction with other funding to pay for improvements but measures must be installed within 6 months.
- Applications are required to be accompanied by an energy survey and 2 quotes for the work and provide photos to demonstrate that the measures funded have been installed.
- Applicants are required to carry out an energy audit, using a template provided by CSE, and provide details of their gas, oil, LPG and electricity consumption, allowing total energy consumption and carbon emissions to be calculated.
- Assumed reductions are applied to the carbon emissions according to the measures installed, for example roof insulation will typically reduce heating energy use by 15%.
- The Thrive Community Benefit Programme is deliberately designed so as to be accessible to anyone, and no specialist skills or reports are needed to apply or access funding.

In the latest round of funding, CSE allocated a grant pot of £30,600 within a 3 month period, for which our administration costs were £4,400. As the Thrive scheme operates across the UK independently of local authorities and eligible buildings need to be within small postcode areas, getting word to the correct people takes considerable effort, using over 20% of this

budget. A scheme promoted within the GMCA area by all ten authorities and through local networks would require less promotion.

Approximately 15% of the administration costs were devoted to assessing applications and making awards. It is likely that if the spending cap of £4,000 per application were to be increased allowing deeper retrofits, these costs would fall as a proportion of the total funds awarded.

We calculate that the 2018 round of funding delivered predicted carbon savings of 22.81 tonnes per year across 9 buildings, and will save approximately 280 tonnes of carbon within the lifetime of the measures fitted, at a cost of £30,600. The average cost per tonne of carbon saved was £283. The Thrive programme is a corporate social responsibility project with funds provided from profits rather than from a specific offset fund charged with delivering carbon saving at a specific cost rate. It would be possible to amend the grant process so that applications delivering carbon savings at a lower cost were given preferential treatment to more expensive measures.

The architecture and administration of this fund could easily be adapted for use as a carbon offset project, offered across all ten authorities. The application forms, guidance notes and the template energy survey can be viewed on this link: www.cse.org.uk/projects/view/1304.

We estimate that there are approximately 300 community buildings (including community halls, church halls and meeting rooms) in greater Manchester which could potentially be eligible for such a funding scheme.

Bolton	Bury	Manchester	Oldham	Rochdale	Salford	Stockport	Tameside	Trafford	Wigan	**Total**
31	12	66	21	21	36	12	32	24	31	**286**

Table 11 - Community buildings in Greater Manchester within Use Class D1 – Energy Performance of Buildings data – England and Wales - Non domestic buildings[103]

EPC data suggests that the energy efficiency of these buildings is relatively poor, with 183 buildings (64%) having an EPC rating of D or below.

[103] https://epc.opendatacommunities.org/non-domestic/search?address=&postcode=&local-authority=E08000009&constituency=&property-type=d1-community&from-month=1&from-year=2008&to-month=12&to-year=2019

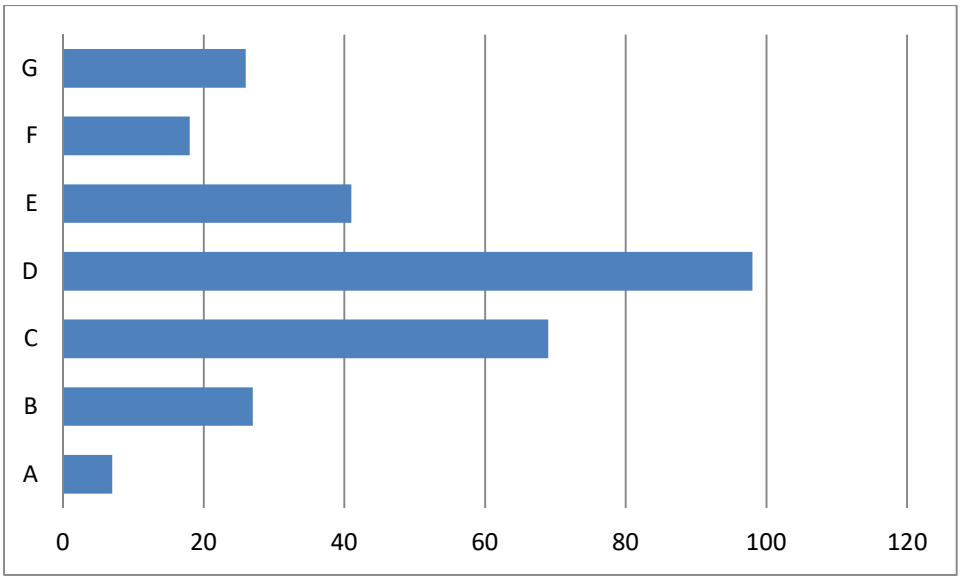

Figure 6 - Energy Performance Rating of Community Buildings in Greater Manchester (Use Class D1) - source – Energy Performance of Buildings data – England and Wales - Non domestic buildings[104]

Assuming that the maximum grant allowed were to be increased to £10,000 and that 30% of eligible buildings in Greater Manchester applied for the full grant, such a scheme could offer an investment opportunity of approximately £0.86m, and assuming the same average carbon cost (£283 per tonne CO2) could deliver approximately 3000 tonnes of carbon savings.

7.5 Renewable energy projects

Policy consideration

Whilst renewable energy projects do not themselves directly reduce carbon emissions, they can be considered as a carbon abatement technology to the extent that they replace or substitute energy generated from fossil fuels. They therefore have the potential to be considered as eligible Carbon offset projects.

Of significance however is that as grid-supplied electricity de-carbonises, the carbon emissions saved by installing an additional MW of additional renewable electricity generation reduces. Consequently as time goes on and the carbon intensity of the grid diminishes further, greater and greater amounts of renewable electricity generation will be required to abate a tonne of carbon. Whilst costs of renewable electricity technology has continued to fall (in particular solar pv and wind) this effect may mean that the costs of saving carbon through fitting renewable electricity plant rise. This should be taken into account in the governance of the fund and in applications to the fund. Funding applications for renewable energy projects should include the MW or KW of the proposed

[104] https://epc.opendatacommunities.org/non-domestic/search?address=&postcode=&local-authority=E08000009&constituency=&property-type=d1-community&from-month=1&from-year=2008&to-month=12&to-year=2019

installation, plus the installation (or development) costs, plus the carbon emissions saved against up to date emission factors[105], to enable an accurate cost of carbon saving (£ per tonne saved) to be calculated for the project.

Insofar as renewable heat installations will typically be replacing gas central heating (with constant carbon factors) the carbon emissions savings possible from renewable heat projects will not reduce over time in the same way.

In March 2019 the feed-in-tariff (FiT) closed to new entrants. This was a subsidy paid to owners of small-scale renewable generators per unit of electricity produced, funded through levies on suppliers, which are passed on to consumers. The feed in tariff has been extremely successful in helping renewable energy technologies come to market and the income from FiT has been central to many renewable energy projects coming forward. Whilst installers of renewable energy may benefit from generating free electricity for them to use themselves, or may be able to sell electricity to a specific end user, new projects will no longer receive an income from generating electricity for export to the local distribution network. Therefore whilst the costs of renewable energy continue to fall, in the short to medium term, previous business models will become redundant.

With the closure of the FiT renewable energy developers are exploring alternative income streams. During this transition, directing carbon offset funding to support renewable energy development of all types could offer high levels of additionality.

There is significant potential for the carbon offset fund to reduce carbon emissions through investing in renewable energy technology, adding to existing Council and GMCA initiatives, including the exploitation of council land and assets.

Scale of opportunity

The GM 5 year environment plan sets out as a priority increasing local renewable energy generation by at least 45MW by 2024 and stresses the low level of exploitation of the regions renewable energy resources, with current generation rates amounting to only about a quarter of the estimated technical potential of the city region.

The Greater Manchester Smart Energy Plan[106] sets out the following ambitions and focussed goals for 2024 utilising current ESME modelling in the first instance as a minimum goal:

- Generation and storage – 45 MW of additional generation by 2024;
- Decarbonisation of heat – 10.2 TWh of low carbon heat by 2024;
- Low carbon transport – Up to 200,000 low carbon vehicles by 2024; and
- Diversity and flexibility – 45 MW of diverse / flexible energy load by 2024.

The smart energy plan comments further that up to 1,030 GWh/yr. (9 %) of existing electricity consumption could technically be generated by renewable energy sources within GM, delivering annual CO2 reductions of 2.6 million tonnes (19 %) from 2014 levels.

[105] The emission factor is a measure of the carbon intensity of grid derived energy, reflecting the proportion of fossil fuel and renewable energy sources powering the national grid. It fluctuates day by day and hour by hour according to the weather and energy mix at any one time but over longer time spans is reducing rapidly as additional renewable energy plant comes on line and as coal generation is phased out.

[106] Whole System Smart Energy Plan - Greater Manchester (2019) https://es.catapult.org.uk/wp-content/uploads/2019/07/ESC_SSH2_D40-Smart-Energy-Plan-GMCA.pdf

Community Energy Projects

The Greater Manchester Community Energy Action Plan[107] includes a target to generate 10% of Greater Manchester's renewable energy targets by 2024. The Greater Manchester Smart Energy Plan[108] comments on the need to support activity by community energy groups and on the potential for community-led action to tackle challenging issues around energy, with community groups well placed to understand their local areas and to bring people together with common purpose.

Community energy projects offer:

- Benefits to local communities. Community Energy Companies, often incorporated as non-profit community interest companies or Community Benefit Societies, are required by their articles of association to return their profits to the community. Consequently such projects have high potential to deliver socio-economic benefits within their communities (for instance funding fuel poverty projects, other community projects and community buildings) and grow community capacity.
- High levels of additionality. Community energy projects have struggled to secure conventional financing in the past, in particular during the development phases. As demonstrated by the success of the Urban Community Energy Fund[109] (now closed) and Bristol Community Energy Fund[110] (limited to 2 or 3 projects at a time) such funds and programmes have the potential to unlock community run projects which would not occur through the open market.
- Market stimulation, the potential local supply chain procurement, and upskilling of and increased paid employment within local community energy groups.
- If nourished the community energy sector has the potential to contribute to the wider low carbon economy in the GMCA region and increase the proportion of energy spending captured in the local and regional economy.
- Alignment with corporate objectives.
- Informed community consent and understanding for renewable energy[111]. Bottom-up community energy projects have huge potential to increase energy literacy amongst the wider community, and to deliver informed consent around renewable energy projects, which can in turn reinforce local authority initiatives and open up the scope of what is possible. By illustration, in Bristol a consultation by a local energy group returned a 95%+ support rate in respect of the potential for large scale (community owned) onshore wind from local residents. It's doubtful whether the city council or a private developer could have leveraged this

[107] Greater Manchester Community Energy Action Plan - www.gmcr.org.uk/wp-content/uploads/2019/07/Community-Energy-Action-Plan-Green-Summit-A5.pdf - states a target of generating 10% of GM renewables by 2024.
[108] https://es.catapult.org.uk/wp-content/uploads/2019/07/ESC_SSH2_D40-Smart-Energy-Plan-GMCA.pdf
[109] Urban Community Energy Fund - www.cse.org.uk/projects/view/1249
[110] Bristol Community Energy Fund - www.bristolcommunityenergy.co.uk/

level of support. On the basis of this consultation, a commercial application for large scale onshore wind was approved and a further proposal for a community owned turbine is in development.

The community energy sector in the Greater Manchester Region is made up of the following six community energy groups[112]:

- Biomass Energy Co-op
- Carbon co-op
- Community Energy North
- Co-operatives UK
- Greater Manchester Community Renewable
- Oldham Community Power
- Rochdale Community Energy CIC
- St John's Sunshine
- Saddleworth Community Hydro
- Stockport Hydro

There seems significant potential to offer carbon offset funding to such projects. The Greater Manchester Low Carbon Fund (a rotating £15m fund) already offers funding for renewable energy projects in Greater Manchester, but appears primarily to be oriented towards public sector bodies, the private sector and public-private joint ventures, with minimum investments of between £1-3m.

Clear additionality could be demonstrated by extending this fund to also offer funding to smaller scale community energy projects or setting up another funding route for community energy projects along the lines of the Urban Community Energy Fund. Due to the wide variability in the risk profile of community energy projects, the varied levels of experience of community energy groups and high costs of these projects, funding applications for community energy projects should be given close inspection, and funding applications should potentially be made by the carbon offset board itself.

Domestic renewable energy projects

Grants or subsidies for privately owned domestic scale renewable energy projects have reasonable potential to be eligible "carbon offset" projects offering:

- Some additionality. The ownership of the asset means that the benefit from domestic renewable projects would primarily accrue to the "able to pay" market: homeowners and private landlords; however tenants would still benefit from the energy generated through reduced energy bills. The ability to provide a larger subsidy for vulnerable applicants would potentially open up the installation of domestic renewable energy beyond its traditional market.

[112] https://communityenergyengland.org/current-members?filter%5BCurrentMember%5D%5Bname%5D=&filter%5BRegion%5D=421792

- Market stimulation. With the closure of the Feed in Tariff in 2019, this funding source could help support SMEs working in the micro-generation sector.
- Scale-ability and ease of delivery. Such a grant scheme would be relatively easy to administer. The micro-generation industry should be well placed to provide quotations and projections of energy savings to support applications from householders.
- Predicting and reporting carbon emissions would also be relatively straight forward, as would verifying installations.
- As an alternative model, bulk buying solar panels through reverse auctions, offering householders access to trusted and vetted installers giving reliable and realistic predictions of the financial returns of solar installations, and potentially scaling installations at street scale could greatly reduce the financial and uncertainty barriers for homeowners and reduce installation costs through economies of scale. GMCA is already exploring a potential reverse auction to boost solar installations in Greater Manchester by circa 5 MW. This initiative if successful could be refunded and expanded through the use of carbon offset funding.

Given the low risk profile of domestic renewable energy projects and relatively low cost per installation, funding applications could be determined by staff members, or by the project itself once established, rather than being referred to the carbon offset board.

Case study: Camden's Climate Fund offers grants of up to £1,500 to support households and landlords install renewable energy measures to help reduce bills and cut associated carbon emissions. Grants are open to homeowners, private tenants and private landlords. Successful applicants are required to match-fund 50% of the cost up to (and any additional costs over) £3,000, although the online application process also takes into account affordability considerations, such as age, illness and whether applicants receive benefits. Some applicants may therefore receive 100% funding. Applications are assessed on carbon reduction potential, cost to benefit (i.e. cost of installation in relation to the carbon savings) and feasibility. Complementing this, Camden have signed up to "solar together[113]", a reverse auction for Solar PV providers, whereby suppliers bid to offer the most competitive price for solar PV installations.

Rooftop Solar installations on council housing

In tandem with solar projects for the able to pay market, there is considerable potential to develop a Greater Manchester wide initiative to fit solar panels to council housing, benefiting from the same economies of scale. Such an initiative would directly benefit vulnerable households through reduced fuel bills. Such a project could be co-ordinated with energy efficiency retrofits of council housing in order to deliver deep emissions reductions.

[113] Solar Together - https://www.london.gov.uk/what-we-do/environment/energy/solar-together-london

Commercial renewable energy projects

Whilst commercial renewable energy projects deliver fewer community benefits than community energy projects, they are highly scalable. Following the closure of the Feed-in Tariff, the development of new business models would be highly beneficial to the local and wider economy and in terms of the take-off of renewable energy without subsidies. Therefore, there are strong arguments behind using carbon offset funding, at least in the short term, to provide low interest loans and development finance for commercial renewable energy projects. To ensure this does not backfire with communities feeling that renewable energy projects are imposed upon them (and subsidised by development which may in part also feel imposed), commercial developers should be encouraged to offer a high level of local community engagement for such projects.

Electrical Energy Storage

One of the most significant barriers to the greater use of renewable energy in our energy system is the problem of intermittency: matching the variable and often unpredictable supply of renewable electricity to our variable demands for electricity.

The decarbonisation of our transport system (the rise of electrical vehicles) and energy system (the move from gas to electrified heating) is likely to place further demands on our electricity supply network, which in parts of the south west is already at capacity, and thereby add to these problems.

Electrical energy storage technology, most commonly in the form of batteries, offers the potential to help overcome these problems, storing energy locally for when it is needed, and smoothing out peaks in demand and supply and energy generation schemes supported with energy storage (batteries or heat) maximise the benefits of schemes such as PV installations. Energy stored directly in that sense doesn't suffer grid energy losses, has a low primary energy factor and – if appropriate infrastructure and strategies are in place – may lead to peak demand management. For example most residential properties will require energy at the end of the day after work, which means that the grid needs to deliver high loads across the country; often requiring additional capacity to be delivered at short notice, with energy produced from higher carbon supplies, such as diesel generators. Less reliance on such energy sources could mean that additional actual carbon savings are achieved if energy storage methods are implemented on a local / community level and the peak demand can be better managed, however predicting and directly attributing carbon savings to energy storage proposals would be difficult.

Energy storage also offers the potential to improve the economic viability of renewable energy projects by increasing the proportion of renewable electricity used locally as opposed to being sold to the distribution grid. For example the resident who fits a solar panel and wall mounted battery, and uses the electricity generated whilst they are at work in the daytime in the evening, reducing the amount they buy from the national grid. Even greater potential is realised where electricity storage is combined with rooftop solar and the use of an electric vehicle, maximising the proportion of renewable electricity used at source and minimising reliance on distribution grid.

Energy storage thus has the potential to enable greater amounts of renewable energy to connect the distribution grid, thereby enabling carbon savings to be achieved. However, whether an individual energy storage project will result in carbon savings depends to a great

extent on where and how it is used (whether in tandem with a renewable electricity plant or in isolation, storing excess night-time electricity from the distribution grid for daytime use) and for what purposes (maximum profit, maximum carbon savings). Additionally the carbon savings achieved will vary from moment to moment as the carbon intensity of grid supplied electricity varies. It would therefore be very difficult to predict attribute carbon savings to electrical storage projects and therefore at present electricity storage should not be defined as an eligible carbon offset project type.

Unlocking barriers to renewable energy projects – enabling onshore wind through the planning process

The greatest barrier to the development of onshore wind within the GMCA authorities is the current national planning regime. Since 2015, in order to be permitted, onshore wind projects must be located in areas that have specifically been identified as being suitable for onshore wind in a local or neighbourhood plan[114]. Nationally only a minority of local planning authorities have done so[115].

Funding from the carbon offset fund could potentially pay for extra planning expertise and community engagement capacity in order to bring forward this work and allocate sites for wind, either within local plans or neighbourhood plans. CSE's experience has shown that renewable energy projects have a much higher success rate where communities are given the opportunity to develop an informed consensus over the project or plan.

Delivering funding to bring this work forward could offer benefits to local communities (provided that a community led approach is taken), benefits to the local low carbon economy and, in the case of funding neighbourhood plans to carry out this work, clear additionality over existing market processes. Government funding for neighbourhood plan development administered through Locality[116] (the government's main appointed advisor for neighbourhood planning) does not provide for renewable energy studies.

The greatest difficulty would be to attribute carbon savings to such work, in that this type of policy preparation work would not directly deliver carbon reductions itself and would take time to come to fruition. Additionally, the scale of carbon savings ultimately deliverable would not be clear at the outset, and would depend on developers coming forward with projects. However at the present time, the preparation of supportive policies for onshore wind is a necessary pre-condition for any schemes coming forward.

Decarbonisation of Heat - Warm Homes fund

The Greater Manchester Smart Energy Plan[117] sets out how Greater Manchester intends to respond to the challenge of decarbonising heat within the GMCA, and outlines the range of projects and activities that will enable this change. In this context, the Carbon Offset fund would be a clearly advantageous option to use as a co-funding mechanism for these

[114] The wind ministerial Statement is now integrated into the 2018 National Planning Policy Framework, footnote 49 - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf

[115] Centre for Sustainable Energy (2017) Survey of local authority wind policies www.cse.org.uk/downloads/reports-and-publications/policy/community-energy/planning/survey-of-local-authority-wind-sites.pdf

[116] https://neighbourhoodplanning.org/

[117] https://es.catapult.org.uk/wp-content/uploads/2019/07/ESC_SSH2_D40-Smart-Energy-Plan-GMCA.pdf

projects. The GM Retrofit Report, stresses the need for heat supply to be decarbonised if carbon reduction targets are to be met:

"If there was to be no change in how Greater Manchester's heat was supplied (e.g. a shift to electrified heating and/or heat networks or hydrogen ingress into the gas grid) or in its demand over the next 5 years, all other sources of CO_2 emissions (including from private vehicles, buses, industry and freight) would have needed to reduce to zero by 2025 in order for us to reduce emissions in line with the SCATTER GM model."

As touched on above, insofar as renewable heat installations will typically be replacing fossil fuel (gas) central heating, the decarbonisation of heat supply offers the potential for continued carbon savings in the medium term, beyond the point where carbon emission reductions from renewable electricity plant will fall away (due to the decarbonisation of grid supplied electricity).

The Greater Manchester Smart Energy Plan[118] states "Up to 68% of existing gas demand could technically be replaced with renewable heat from heat pumps, solar thermal and bioenergy within the GM region, with ground and air source heat pumps having the technical potential to provide 50% of current domestic and non-domestic heat consumption in Greater Manchester. "

The Warm Homes Fund is a £150million fund administered by Affordable Warmth Solutions and is currently being delivered in Manchester. The focus of the Warm Homes Fund is predominantly on installing gas central heating, with only a maximum of 20% of the total installations will be air source heat pumps. Whilst updating gas boilers or replacing outdated or inefficient heating systems can save carbon emissions and is certainly likely to mitigate fuel poverty, in view of national and GMCA carbon commitments, this programme is counter-productive locking these properties into fossil fuel heating for a further installation cycle, and runs against GMCA's stated intention to phase out gas boilers[119]. If GMCA has agency to revise this nationally directed project so that homes are retrofitted solely using renewable heat sources such as heat pumps, this could present a viable funding avenue.

If this option is pursued, contractors should consider the energy efficiency of the property in question, and whether the new heating system should be complemented by energy efficiency improvements. Heat pumps will tend to reduce overall energy consumption, but they are powered by electricity which currently has a greater unit cost than gas. Consequently if heat pumps are fitted to inefficient or draughty properties, fuel bills can go up.

The Greater Manchester Smart Communities demonstration project was a pilot project supporting the shift from gas to electric heating. The project replaced old and inefficient heating systems in 550 social housing properties with air-source heat pumps (HPs) fitted with an energy aggregation system and controls to coordinate the electricity usage of the HPs collectively and reduce electricity usage during peak periods, and tested the effectiveness of this system to potentially trade in the electricity market. The project was able to demonstrate that a significant amount of energy could be saved through collective

[118] https://es.catapult.org.uk/wp-content/uploads/2019/07/ESC_SSH2_D40-Smart-Energy-Plan-GMCA.pdf

[119] Greater Manchester 5 year Environment Plan https://www.greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf

DR across a large number of social housing properties. However, the project also found that the development of a commercial demand response venture in the social housing sector did not offer a viable return on investment, based on the current limited uptake of HP systems, the market cost of these and the payback period of a commercial venture.

The project report did not include an analysis of the carbon savings beyond the high level observation that the installation of heat pumps can produce 30% to 50% reductions in CO2 emissions over conventional gas boilers. Nevertheless, if reliable and cost effective carbon savings can be demonstrated, and funding from the carbon offset fund could reduce the upfront costs, funding such a project could offer clear additionality.

Table 12 displays outputs from CSE's National Household Model that shows the carbon savings and associated costs (per dwelling) for installing ground source heat pumps, air source heat pumps, and Solar thermal. It is important to note that the model assumes that GSHP and Solar Thermal options are not suitable for flats, due to lack of garden / roof space.

savings	ASHP		GSHP		Solar Thermal	
	Cost (£)	CO_2 Savings (k.g)	Cost (£)	CO_2 Savings (k.g)	Cost (£)	CO_2 Savings (k.g)
Detached	£7,060	2,300	£13,550	3,690	£4,500	230
Semi-D	£7,060	2,030	£12,960	3,100	£4,500	230
Small flat	£5,840	880	N/A	N/A	N/A	N/A
Large flat	£5,870	880	N/A	N/A	N/A	N/A
Townhouse	£6,790	1,790	£12,290	2,580	£4,500	230
all dwellings	£6,710	1,740	£12,760	3,140	£4,500	230

Table 12 - carbon savings and installation costs of heat pumps, National Household Model

Carbon saving figures vary between different systems however, using average figures from the National Household Model given above, were the Smart communities project to be scaled up to fit air source heat pumps in 5,500 properties, average carbon savings of roughly 9,500 tonnes would be possible, at a total cost of roughly £37 million. This would equate to a cost per tonne of carbon saved of roughly £3,850, and therefore funding streams would need to be combined, in order for such a project to be deliverable.

However there is potential for the carbon offset fund to contribute to the capital costs of heat pump installation and claim the resultant carbon savings, thereby improving the viability of this project, potentially enabling it to be rolled out at scale. By moving and reducing peak demand on the electrical distribution system, such demand management projects also introduce the potential to ease capacity constraints which can limit the ability to connect additional renewable energy projects to the local electrical distribution grid, though firmly attributing carbon savings to this benefit would be complicated.

District Heating

The Greater Manchester Smart Energy Plan stresses the technical potential for district heating to expand significantly in GM. Urban areas are most likely to move towards heat networks and GM has previously identified feasible opportunities for approximately 35

individual District Heating Networks with technical potential to reduce GM carbon emissions by 413 ktCO2 (3%). This shift across GM would be equivalent to up to 330,000 homes connected to District Heating by 2050.

Government funding is available through the Heat Networks Investment Project for the installation of district heating networks, and planning policies are likely to require new developments to fit district heating infrastructure within the boundary of development sites, and to connect to wider district heating networks where they exist. Nevertheless carbon offset funding could be used to expand the district heating network further. The Greater Manchester Steering group comment on the need for a scheme or agency that assists developers and local authorities with the design, development and deployment of district heating across Greater Manchester.

Community Infrastructure Levy (CIL) funds have often been used in the past to fund the installation of district heating networks, and this has posed a barrier to using carbon offset funding (secured via "s106" planning obligations) for this purpose, in that in the past CIL and s106 agreements could not be used to fund the same type of infrastructure. The government has indicated that these regulations will be loosened up, allowing CIL and s106 funds to be used more flexibly in the future. This means that carbon offset funding (delivered through s106) could be used to top up CIL funding directed to district heating networks, provided that clear additionality can be demonstrated. To ensure additionality and avoid double counting carbon offset funding should only be used to expand the wider network outside of the development boundary of the contributing development, and on top of infrastructure provision already funded through CIL funding.

The carbon emission savings delivered by district heating will vary hugely according to the specific characteristics of the network and the heat source powering it, as will the ultimate cost of saving carbon. Therefore district heating projects would best apply to the fund project by project as these variables are known rather than as a multi-site project. Thermos[120], a recent free online tool developed by CSE enables district heating network layouts to be designed, tested, and optimised without the need for bought in consultancy, and delivers cost and carbon saving predictions. This tool could be used to predict the project and carbon cost and the resultant carbon savings in funding applications to the carbon offset fund, and with further development, may be able to be used to test different masterplan layouts.

Planners and developers need support to integrate energy planning within large-scale masterplan preparation, in order to ensure that new developments are best able to connect to and integrate district heating systems, and in order to assess applications that include such technologies. Planning policy CP4 of the Bath and North East Somerset Core Strategy[121] takes such an approach.

[120] https://www.thermos-project.eu/home/

[121] www.bathnes.gov.uk/sites/default/files/sitedocuments/Planning-and-Building-Control/Planning-Policy/Placemaking-Plan/cs_pmp_vol_1_district-wide.pdf

7.6 Sustainable Transport initiatives

To the extent that walking, cycling and public transport infrastructure reduces carbon emissions by getting people out of their cars; it would be possible to treat such infrastructure as a form of carbon offsetting. Such an approach would have benefits, enabling unfunded sustainable transport initiatives to go ahead, including sustainable transport proposals put forward by community groups, and would deliver significant socio-economic benefits.

Comprehensive cycling and walking network

The made to move report[122] calls for the development of a comprehensive high quality walking and cycling network for greater Manchester. The report calls for an investment of £1.5 B into the city region and is only currently funded to £137 m.

Such a network would undoubtedly deliver significant carbon savings and carbon offset funding could allow more of the envisaged network to be realised than would otherwise be the case. There remain however significant uncertainties as how to predict and attribute the carbon savings delivered by such infrastructure.

Additionally there are substantial overlaps both with site specific infrastructure normally funded through s106 agreements and with strategic infrastructure funded by CIL payments. Whilst amended regulations around the use of s106 and CIL funding allows both sources to be combined and used more flexibly, were such sustainable transport initiatives to be defined as eligible for carbon offset funding, it would be difficult to rebut arguments of double charging.

Therefore at this time we would not recommend that such sustainable transport infrastructure is defined as an eligible carbon offset project within the GMCA scheme.

Vehicle electrification and car scrappage

The GMCA five year environment plan included as a target the phasing out of fossil-fuelled private vehicles and replacing them with zero emission (tailpipe) alternatives. Picking up on these themes, the clean air plan[123] proposes to offer funding and support to help Greater Manchester move to electric vehicles, including loans for Taxis, buses, private hire and commercial vehicles licensed in Greater Manchester and support for Local authority and Greater Manchester fleet upgrades. The Smart Energy Plan sets a 5-year goal to foster the uptake of up to 200,000 low carbon vehicles by 2024.

Alongside air quality improvements, the take-up of electric vehicles will offer significant carbon emission reductions; however demonstrating additionality for such carbon savings is problematic, particularly for vehicles in private or commercial ownership where establishing the counterfactual (what would have happened without carbon offset funding) is almost impossible. It may however be possible to demonstrate additionality for the electrification of the local authority fleet, where there is greater transparency as to the funding available.

Extension of Tram and Metro Systems

[122] https://assets.ctfassets.net/nv7y93idf4jq/1XtfykQs0g22g8cYCyoAag/dee5732015f23c5df3a338afc2353b74/Made_to_Move.pdf

[123] https://cleanairgm.com/clean-air-plan

The Greater Manchester Transport Strategy discusses the potential in the medium term (to 2030) to expand the tram and metro systems and improve connectivity into and across the Regional Centre. With lower emissions per km travelled, achieving a modal shift from motorised vehicles to mass transit public transport can reduce carbon emissions from transport, which is responsible for a third of Greater Manchester's carbon emissions.

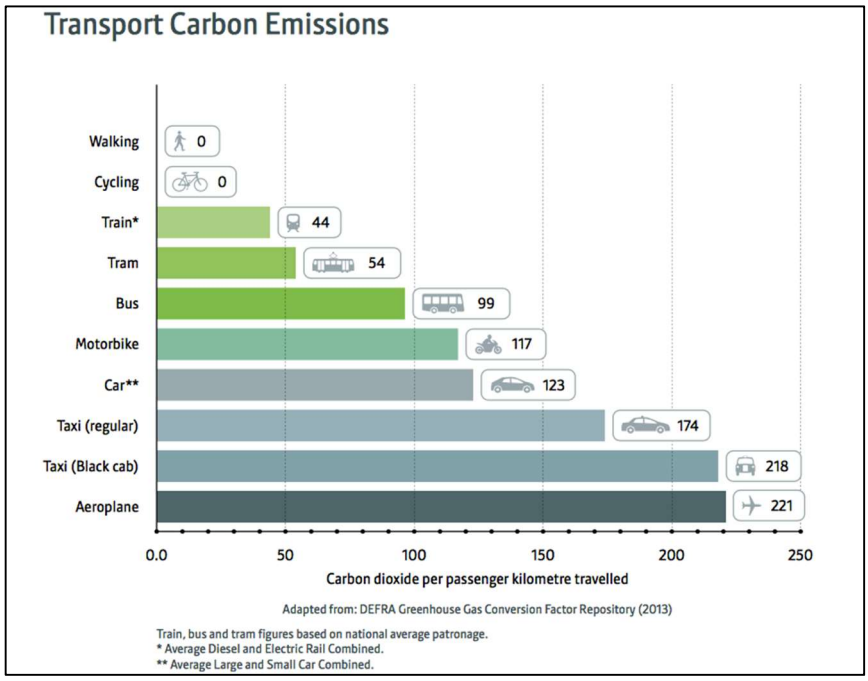

Figure 7 - carbon emissions from different transport modes, Greater Manchester Transport Strategy 2040

Provided that the emissions savings could be quantified and that clear additionality was demonstrated, there is potential to offer carbon offset funding to the expansion of the tram / metro network. However, other funding sources should be exhausted first, and the carbon offset fund should concentrate primarily on building retrofitting and renewable energy projects.

7.7 Carbon sequestration

Tree Planting

Tree planting has been suggested as a possible carbon offset measure in only a few of the previous carbon offset schemes. In addition to the ability to sequester carbon dioxide, tree planting has a variety of benefits to a local area, including:

- Habitat provision;
- Surface water management;
- Leisure opportunities

And within an urban context:

- Localised cooling and reduced Urban Heat island;
- Improved local air quality;

- Townscape improvements;

The Greater Manchester 5-year Environment Plan sets out an objective to plant 3 million trees by 2035 and a further 1 -2 million by 2050 in order to mitigate and adapt to climate change. We understand that this scale of planting is needed to achieve the carbon emission reductions modelled by the Tyndall Institute.

In the Greater Manchester context, the Natural Capital Investment Plan[124] proposes significant investment in tree planting, with the allocation of £50 million to the Woodland Carbon Guarantee, which offers woodland creators a guaranteed price for woodland carbon units they produce, as verified through the Woodland Carbon Code. The investment plan also comments on a £500m government commitment to creating the Northern Forest, a project to plant 50 million trees around the cities of Liverpool, Manchester, Leeds, Sheffield and Hull. Funding is also available from DEFRA to assist with large scale planting, for up to 50% of the eligible costs.

In a previous study for the West of England Authorities, CSE raised concerns about using carbon offset funding to pay for tree planting. Our concerns were that that there could be a substantial overlap between the requirements to carry out tree planting to achieve carbon sequestration and landscaping required as an integral aspect of new development and that it would therefore be difficult to rebut arguments of double charging. Additionally, trees are only effective in sequestering carbon if they are left in place to grow, and therefore to be included as an eligible measure, a mechanism would need to be created to ensure this. We commented that these issues might be able to be resolved were tree planting to happen in a way that is clearly independent of and additional to the landscaping associated with a development, for instance in managed blocks and with an agreed management plan.

A monitoring and verification structure like the woodland carbon code would provide clear differentiation between the landscaping provided within a development site and managed forestry for carbon capture and would provide surety of the carbon emissions sequestered.

Additionality could be demonstrated by extending the scope of the project or delivering additional funding over and above that already committed to bring forward tree planting at a more rapid pace, bringing forward carbon sequestration which would happen later. The woodland carbon code[125] is an assurance scheme, and would provide the reassurance needed of the accuracy of estimates of the amount of carbon that will be sequestered, that carbon sequestration is in perpetuity and that appropriate management will take place.

The Carbon Market Feasibility report by interserve sought to quantify the scale of carbon savings possible:

"For example if part of the northern forest is taken as an offset project, with the aim of increasing woodland cover within Greater Manchester by 10%, there are wider ecosystem benefits, however this would increase carbon sequestration in Greater Manchester by 2000 tCO2 per year during the first 5 years of project implementation. "

We have not been able to obtain a firm figure for the cost of carbon sequestered through tree planting. The forestry commission stated: "the new Woodland Carbon Guarantee

[124] Greater Manchester Natural Capital Investment Plan (2019) https://naturegreatermanchester.co.uk/wp-content/uploads/2019/01/GM-Natural-Capital-Investment-Plan-Final180119.pdf
[125] Woodland carbon code - https://www.woodlandcarboncode.org.uk/about/the-basics

Scheme (to be launched this Autumn / Winter) will offer an auction approach so woodland creation schemes can bid in and sell their carbon at a price that makes their project viable. … £4/t to £25/t figures are suggested as current to potential figures." The Woodland landowner's guide to the Woodland Carbon Code[126] states that recent UK woodland carbon sales have realised between £3 and £10/tCO 2e.

Peat Restoration

Greater Manchester contains significant areas of peat bogs and wetlands which in good condition act as carbon sinks, storing and locking away carbon, but which if drained become net sources of carbon. Peatland restoration stops CO2 losses immediately, creates conditions for laying down fresh peat and can also contribute to improved water quality, habitat creation and flood mitigation and has potential to be considered as eligible for the purposes of carbon offsetting.

The Greater Manchester 5-year Environment Plan sets out an objective to restore 50-75% of our

Peatlands in order to mitigate and adapt to climate change. The UK Peatland Carbon Code[127] provides a basis through which the amount of carbon sequestration can be verified. The Peatland Carbon Code follows all the same rules as the Woodland Carbon Code: projects must be additional to business as usual and they must be monitored and re-certified; the carbon calculations should be conservative and based on sound evidence; and emissions reductions should be permanent.

We understand that Heathrow Airport are already funding Lancashire, Manchester and North Merseyside Wildlife Trust to improve peat bogs to offset their carbon emissions. Their website[128] quotes the average cost of securing and restoring mossland sites to be £30 per tonne and states that in the North West there are 840 hectares of mosslands that can be restored as carbon sinks, with the potential to absorb the carbon footprints of 25,657 people, equivalent to approximately 250,000 tonnes of CO2.

Embodied energy improvements

Embodied energy improvements consist of capturing additional carbon savings within development sites through upgrading building specification to use materials which require less energy to manufacture, for example using timber cladding panels rather than aluminium.[129] These carbon savings are therefore additional to those achieved through only specifying higher standards of energy efficiency. Such an approach enables carbon savings throughout the lifetime of the building (rather than over a 30-year period). This approach also stimulates local supply chains for low carbon materials and may help to shift the construction industry in a more sustainable direction.

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[126] Woodland landowner's guide to the Woodland Carbon Code - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/707412/Woodland_Carbon_Code_BuyersGuide_links.pdf

[127] Peatland Carbon Code www.forestcarbon.co.uk/certification/peatland-code

[128] Lancashire, Manchester and North Merseyside Wildlife Trust - Natural Carbon Capture scheme www.lancswt.org.uk/aviation-funding-mosslands

[129] Embodied energy is the total amount of energy (and therefore carbon dioxide emissions) embodied in the material or component through its life-cycle, including the extraction and processing of raw materials and the manufacturing process.

The main challenges with such an approach include ensuring that the carbon savings secured through reducing embodied energy are additional to what would have happened anyway, and developers attempting to 'game' the system. They may do this by intentionally specifying materials with very high levels of embodied energy only to revert to standard materials, and thereby claim the "carbon savings" achieved.

As part of the London Legacy Corporation[130] Carbon Offsetting Regime 3rd party developers can apply for a grant - delivered from the carbon offset fund - to upgrade the specification of materials to be used in the development. Such an approach would help ensure that the carbon savings were genuinely additional to what would have happened anyway, however does raise the question as to whether planning policies should in any event be taking into account the emissions embodied in construction materials, as is now proposed in the London Plan:

Extract from London Plan[131] - Policy SI2 Minimising greenhouse gas emissions

"DB Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Paragraph 9.2.9A from accompanying text:

Operational carbon emissions will make up a declining proportion of a development's whole life-cycle carbon emissions as operational carbon targets become more stringent. To fully capture a development's carbon impact, a whole life-cycle approach is needed to capture its unregulated emissions (i.e. those associated with cooking and small appliances), its embodied emissions (i.e. those associated with raw material extraction, manufacture and transport of building materials, and construction) and emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal). Whole life-cycle carbon emission assessments are therefore required for development proposals referable to the Mayor. Major non-referable development should calculate unregulated emissions and are encouraged to undertake whole life-cycle carbon assessments. The approach to whole life-cycle carbon emissions assessments, including when they should take place, what they should contain and how information should be reported, will be set out in guidance."

CSE consider that reducing the embodied energy and emissions within building materials would best be achieved by accounting for these directly within the councils zero carbon planning policies as proposed in the latest iteration of the London Local Plan. Therefore developers should not be able to access carbon offset funding to improve the specifications of their schemes in this way, but should take ownership of these emissions through planning processes.

[130] Carbon Offset - Local Plan Supplementary Planning Document – London Legacy Development Corporation – August 2016 - www.queenelizabetholympicpark.co.uk/-/media/lldc/planning/supplementary-planning-documents/carbon-offset-spd-august-2016.ashx?la=en

[131] London Plan - consolidated changes version July 2019 www.london.gov.uk/sites/default/files/draft_london_plan_-_consolidated_changes_version_july_2019.pdf

7.8 Feasibility and project development work which unlocks greater project investment

The suggestion has been received that carbon offset funding might be directed to feasibility and project development work which unlocks greater project investments at a ratio/value of, for example 1:10 to stimulate greater investment.

It would be possible for GMCA to create an open application process so that projects in development and at feasibility stage would be able to apply for funding. To a degree this will already be the case, in that the delivery of some renewable energy projects may not be fully guaranteed at the time they are funded. The eligibility criteria used to determine applications to the fund and decide whether they get funded should ensure that the likelihood of carbon emissions actually being delivered is considered fully and transparently in funding decisions.

However, projects should not be considered suitable if direct carbon emission savings or reductions cannot be attributed to these types of project. Considerations of whether providing funding to a project would unlock or enable greater carbon savings would already be taken into account under the criteria already suggested in section 5.4 (under the "additionality" and "value for money" criteria). However it is important to stress that the carbon offset fund should be managed on the basis of the carbon emissions secured, not the investment secured.

7.8 Summary of recommendations for suitable carbon offset projects

Given the existing range of projects that are already being run within GMCA, and the ease with which projects could be initiated or adapted, we would suggest that the following offer suitable carbon offsetting projects:

- Domestic energy efficiency retrofitting, via council fuel poverty alleviation initiatives, topping up of ECO funding, retrofitting of council houses and private rental sector
- Non-domestic retrofitting - energy efficiency improvements to council buildings, managed by the council's facilities management teams
- Non-domestic retrofitting - energy efficiency improvements to community building, expanding on CSE's Thrive Community Energy Programme, retrofits of council owned buildings
- Community energy projects, adapting the Greater Manchester Low Carbon Fund to offer funding to community energy projects, or developing a new funding route, similar to the Urban Community Energy Fund
- Domestic Renewable energy projects, for example a Greater Manchester Reverse Solar Auction and / or rooftop solar installations on council buildings
- Carbon sequestration through tree planting
- Carbon sequestration through peat bog restoration

The following project types would potentially be suitable carbon offset projects, provided that carbon savings can be demonstrated and existing projects or trials schemes can be scaled up:

- Commercial renewable energy projects
- Non-domestic retrofitting - energy efficiency improvements to commercial building
- Retrofitting of privately owned homes (the able to pay market)
- Energy advice linked to the installation of measures
- Decarbonisation of heat and installation of heat pumps
- The installation of district heating networks
- Electrification of local authority vehicle fleets

At this stage the following are not considered suitable to receive funding through the carbon offset fund:

Measure	Comments
Carbon savings through funding upgrades to building specification (on other developments) to use materials which require less energy to manufacture, for example using timber cladding panels rather than aluminium.	Reducing the embodied energy and emissions within building materials would best be achieved by accounting for these directly within the councils zero carbon planning policies, as proposed in the latest iteration of the London Local Plan. Developers should not be able to access carbon offset funding to improve the specifications of their schemes, but should take ownership of their carbon emissions through planning processes.
Support for allocating wind sites in local and neighbourhood plan documents	Whilst currently, supportive onshore wind policies are necessary for schemes to come forward, this policy preparation work would not directly deliver carbon reductions and would take time to come to fruition. Additionally, the scale of carbon savings ultimately deliverable would not be clear at the outset and would be uncertain.
Sustainable transport measures	There are significant uncertainties as how to predict and attribute the carbon savings delivered by sustainable transport measures and there are substantial overlaps with sustainable transport infrastructure normally funded through s106 agreements and Community Infrastructure Levy

	payments. If sustainable transport initiatives were to receive carbon offset funding, it would be difficult to rebut arguments that developers were being double charged.
Energy generation schemes supported with energy storage (batteries or heat) maximise the benefits of schemes and offer flexibility and balancing services which help to decarbonise the electricity grid as a whole, and therefore can result in carbon savings.	Energy storage has the potential to enable greater amounts of renewable energy to connect the distribution grid, thereby enabling carbon savings to be achieved, however more work would be needed however to develop a methodology to predict and attribute such savings to a particular scheme. Whether an individual energy storage project will result in carbon savings depends to a great extent on where and how it is used (whether in tandem with a renewable electricity plant or in isolation, storing excess night-time electricity from the distribution grid for daytime use) and for what purposes (maximum profit, maximum carbon savings). Additionally the carbon savings achieved will vary from moment to moment as the carbon intensity of grid supplied electricity varies.