Tackling Carbon Offsetting in Hertfordshire: A Report

by

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Executive Summary

Following the publication of the UK Climate Change Committee’s assessment that the UK Carbon Budget for 2033 to 2037 will be difficult to keep to, efforts to address this are required. This research addresses the need to speed up decarbonisation through mitigation or reduction of carbon emissions. Hertfordshire is a fossil fuel intensive economy, which needs to decarbonise at a faster pace in the coming years. This research recommends the use of a new offsetting tool, known as ‘area-based insetting’ to provide further resources for decarbonisation. Assessing the Hertfordshire Climate Change and Sustainability Partnership (HCCSP) carbon reduction plan, this research recommends the adoption of the following revised clause in its Carbon Reduction Action Plan.

5.4. As a principle, the group has agreed that reduction of carbon emissions should be prioritised and pursued over offsetting.
   a. Such offsetting should fall only within the geographical region of the county from 2027 onwards (also known as Insetting).
   b. Residual emissions should not go beyond (5%) of total carbon budget of the county.
   c. Insetting of residual emissions to be facilitated through the ‘Hertfordshire Residual Emissions Administration Office’ (HREAO)
   d. Encourage users of insets to increase their portion of insets that come from carbon removal from the atmosphere rather than from emissions reduction.
   e. Strive to take up long-term storage of carbon vis a vis options of short-term storage.

The report sets out a detailed account on the Hertfordshire Residual Emissions Administrator (HREA) with a view to focussing debate on what the acceptable levels of residual emissions are and how to tackle it in partnership with a wide range of stakeholders in Hertfordshire. The research highlights the need to revisit the debate on setting a science-based target for the county as whole, including its private and domestic sectors, which are its largest emitters.

Developed countries, under the United Nations Framework Convention on Climate Change, take on a larger responsibility for reducing emissions, and it is alarming to consider that a significant amount of this (~18%) is considered unavoidable, and residual, and will be accounted for through carbon offsetting. The impact of offsetting in the global context is significant for the global net zero goal, the discussion of the importance of which is outside the scope of this research but is nevertheless noted as a closely aligned and integral part of the fight against global warming.
1. HCCSP Policy on Offsetting

This report considers the HCCSP Carbon Plan (2021) clause on Offsetting and recommends policy going forward.\(^1\) Clause 5.4. of the HCCSP Carbon Plan states

‘As a principle, the group has agreed that reduction of carbon emissions should be prioritised and pursued over offsetting. Only unavoidable emissions should be offset and as a last resort. Both reduction and offset should be done in the closest proximity to the source before looking elsewhere, in district, in county, out of county, UK and abroad. Following this principle, the Action Plan addresses different pathways to achieving carbon emission reduction within Hertfordshire. However, the group recognises that there may be unavoidable emissions. These emissions may need to be offset to achieve net zero targets.’

This research recommends the adoption of the following clause,

5.4. As a principle, the group has agreed that reduction of carbon emissions should be prioritised and pursued over offsetting.

a. Such offsetting should fall only within the geographical region of the county from 2027 onwards (also known as Insetting).

b. Residual emissions should not go beyond (5%)\(^2\) of total carbon budget of the county.

c. Insetting of residual emissions to be facilitated through the ‘Hertfordshire Residual Emissions Administration Office (HREAO)

d. Encourage users of insets to increase their portion of insets that come from carbon removal from the atmosphere rather than from emissions reduction.

e. Strive to take up long-term storage of carbon vis a vis options of short-term storage.

HCCSP aims to deliver its Carbon action plan through partnership working across the private, public and voluntary sectors in Hertfordshire\(^3\), therefore this clause goes beyond the public authorities own organisational carbon reduction and sustainability ambitions. It applies to business, commercial, public organisations and households within Hertfordshire, with the aim of contributing to Hertfordshire’s share of the UK’s net zero target in the Climate Change Act 2008 (2050 Target Amendment) Order 2019. The rest of this report is focussed on developing the partnership working for tackling residual emissions, through the building of institutional structures and systems.

The recommendation for the revised clause 5.4 is put forward to the HCCSP group for their consideration and aims to be act as an evidence and research-based starting point for consideration by the political members and the decision makers in the group. In particular, clause, 5.4 (a) and (b) require serious consideration. The feasibility of the recommended end date for offsetting, i.e. 2027 and the proportion of emissions considered as residual emissions

\(^1\) HCCSP stands for Hertfordshire Climate Change and Sustainability Partnership

\(^2\) On average, a rather high 18% of current emissions is listed as residual emissions in developed countries, as the long-term low-emissions development strategies (LT-LEDS) as invited under Article 4, paragraph 19 of the Paris Agreement shows. In the UK’s LT-LEDS, residual emissions at mid-century are estimated to come from waste, agriculture, and international aviation and shipping, for which mitigation solutions are increasingly available. Therefore the 5% recommended in this report has as it’s aim reducing the percentage (amount) of residual emissions planned for.

will require calibration based on total baseline emissions in Hertfordshire and the plans and pathways for emissions reduction by members of the group and beyond.

2. The Rationale for Insetting: Speeding decarbonisation

The imperative of 'speed' in decarbonisation becomes evident when considering the ongoing rise in greenhouse gas emissions, even in the presence of international and national legal frameworks designed to address this issue. Therefore, it becomes crucial to analyse the reasons behind the surge in emissions and emphasise the importance of slowing down this alarming trend.

According to the Climate Change Committee (CCC) Progress in reducing emissions 2023 Report to Parliament, the UK is facing challenges in meeting its legally binding climate goals. Notably, the response to the fossil fuel price crisis has had an impact on assessing the progress made in 2022. Disturbingly, this evaluation involves the government's approval of a new coal mine in Cumbria, and its continued backing of oil and gas production.

The CCC’s report concludes that the UK's likelihood of achieving its fourth carbon budget between 2023 and 2027 has significantly improved due to increased electric-vehicle sales and reduced road traffic post-Covid-19. However, whether this trend in sales of EV will be sustained is questionable given the change in government policy to push back the 2030 deadline for sales of petrol and diesel cars to 2035. Surface transport emissions saw a 3% increase in 2022, driven by the resurgence in travel post-lockdowns. Nevertheless, these emissions still remained 8% below the levels observed in 2019, indicative of a new steady state that has emerged. With surface transport contributing 23% (105 million tonnes of carbon dioxide equivalent - MtCO2e) to the UK's total emissions in 2022, it stands as the country's highest-emitting sector.

In the building sector, home emissions witnessed a significant 16% decrease in 2022, primarily due to a milder winter, but high fossil fuel prices also played a role. After adjusting for winter temperatures, emissions fell by 6%. However, the CCC’s report highlights uncertainty about the extent to which the reduction resulted from efficiency improvements versus reduced heating usage due to unaffordable energy prices. Despite this reduction, the report points out that installation rates for energy efficiency measures remain insufficient. Moreover, heat pump installations are falling significantly below government targets. The government aims for 600,000 heat pump installations per year by 2028, but currently, only one-ninth of this target is being met, and the installation rates are not increasing rapidly enough.

Industry stands as the UK's third highest-emitting sector, responsible for 14% of emissions in 2022 (63MtCO2e). The Climate Business and Development Plan (CBDP) outlines a target to reduce industrial emissions by 69% by 2035, based on 2022 levels. Although emissions from industry decreased by 3% in 2022, the pace of industrial decarbonisation must accelerate to approximately 8% per year until 2030 for the UK to achieve this target, as per the progress report.

4 https://www.carbonbrief.org/ccc-chance-of-uk-meeting-climate-pledges-has-worsened-since-last-year/
5 https://www.theccc.org.uk/publication/2023-progress-report-to-parliament/#downloads
6 https://www.carbonbrief.org/ccc-chance-of-uk-meeting-climate-pledges-has-worsened-since-last-year/
In 2022, emissions from the UK's electricity sector saw a minimal decline of 1% compared to the previous year, despite an increase in renewable electricity capacity. The reason behind this phenomenon is attributed to the UK becoming a net exporter of electricity for the first time in 44 years. The CCC estimates that without this export-driven generation, electricity supply emissions could have been approximately 6% lower in 2022.

Other sectors, such as agriculture and land use, contributed 11% (49MtCO2e) of the UK's emissions in 2021, showing a 1MtCO2e increase from 2020. Aviation accounted for 7% (29MtCO2e) of emissions in 2022, a significant 95% rise from 2021 due to pandemic travel restrictions, yet still 25% below 2019 levels. Shipping constituted 3% (12MtCO2e) of emissions in 2022, with a slight increase from 2021 but remaining 12% below 2019 levels.

Within the waste sector, responsible for 6% (25MtCO2e) of the UK's emissions in 2021, efforts to reduce emissions are hindered by the continued growth of energy from waste (EfW). To mitigate this, improvements to recycling are essential to decrease EfW and landfill emissions.

The CCC's confidence in the government's ability to meet its sixth carbon budget and NDC (Nationally Determined Contributions under the Paris Agreement 2015) target has noticeably diminished since 2022, primarily due to delays in action leading to increased delivery risk.

As per the CCC's assessment, "credible" government plans will now result in emissions cuts of just 49% below 1990 levels by 2035, compared to the previously projected 55%. These policies would cover only one-fifth of the emissions cuts needed for the sixth carbon budget, down from two-fifths in the previous year. Looking ahead, with seven years remaining until the NDC target, the CCC's report indicates that the "credible" plans currently cover just 25% of the required emissions reductions.

In summary, while some progress has been made, critical challenges lie ahead for the UK in achieving its long-term climate goals, necessitating a stronger and more expeditious commitment to effective and timely policies. Specifically, emissions cuts need to increase almost fourfold, from 1.2% annually between 2014 and 2022, to an average of 4.7% between 2022 and 2030.

If emissions are not cut fast enough and deep enough, there will remain residual emissions. Residual emissions (RE) refer to the unavoidable greenhouse gas emissions that certain entities may still have even after implementing extensive emission reduction measures\(^7\). While some actors can achieve "absolute zero" emissions, others will face challenges in eliminating emissions entirely by 2050. For instance, emissions from agricultural biological processes, specific industrial activities, and fossil fuel combustion in aviation are difficult to eliminate fully. Currently RE is dealt with through offsetting. But this research considers an alternative to offsetting, in the form of insetting.

The key rationale behind considering insetting as a substitute for offsetting is that it can aid in speeding up decarbonisation. Insetting (defined in the next section) will help aid decarbonisation in the UK, by contributing to the speeding up of decarbonisation. It will provide considerable benefits to the local economy and enhance mitigation actions. However, there are challenges in setting up the mechanisms for insetting and for finding the resources, not to mention, the willingness to implement it.

2.1 Area Based Insetting (ABI)

Insetting represents a viable alternative to the conventional practice of offsetting, wherein an organisation seeks to neutralise or reduce its carbon emissions by engaging in emissions reduction activities external to its operational scope. Instead, insetting involves the strategic focus on mitigating emissions that occur within the organization’s own value chain.

Area based Insetting (ABI) represents an innovative approach that extends the fundamental principles of traditional 'insetting' by redirecting the emphasis of carbon reduction initiatives to the geographical boundaries of a local authority. Local authorities face distinct challenges with traditional offsetting and insetting options compared to the corporate sector. Striking the right balance between emission reductions and offsetting is crucial. Challenges include public scrutiny, difficulty in retaining local co-benefits, lack of financial return on investment, and limited supply and impact of UK certified options. ABI’s primary objective is to offer local authorities insetting options within their geographic boundaries. This mechanism aims to stimulate increased investment in local carbon-saving projects and provide a robust and consistent method to quantify and report associated carbon impacts. Drawing from the experiences of corporations, which have seen direct returns on investment through insetting projects within their value chains, ABI seeks to enable local authorities to unlock similar benefits. This, in turn, would bring social and economic advantages to the communities they serve while expediting their journey towards achieving Net Zero goals. The focus in structured ABI is on providing support through financing and facilitating connections between project executors and potential funders. The ultimate outcome will be the transformation of high emitter activities into those of medium or low emitters, resulting in reduced carbon intensity.

Decarbonization is a multifaceted process that involves several key steps. Firstly, it necessitates the reduction of greenhouse gas emissions resulting from the combustion of fossil fuels. Additionally, decarbonization requires active efforts to capture emissions and enhance carbon storage to effectively remove carbon from the atmosphere. Achieving decarbonization is a complex and non-linear journey, demanding comprehensive changes across all sectors of the economy. This encompasses transforming the methods of energy generation, reevaluating production and delivery processes for goods and services, and adopting sustainable land management practices. In essence, decarbonization represents a far-reaching transformation that involves a holistic shift towards a low-carbon and sustainable future.

2.2 Local authorities' duties regarding insetting

The position of local authorities, as of 2023, with respect to the ambition in Section 1 of the Climate Change Act, 2008 is that local authorities are not empowered to take action towards net zero. They lack powers and resources. Consequently, they are also not burdened with any duties in relation to net zero and insetting. A proposal for a new Net Zero Local Powers Bill should be able to address this, however the prospects for such a Bill are not bright. Not only have local authorities not been empowered to take action, but national frameworks have

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8 [https://www.anthesisgroup.com/areabasedinsetting/](https://www.anthesisgroup.com/areabasedinsetting/)

9 Section 1(1) It is the duty of the Secretary of State to ensure that the net UK carbon account for the year 2050 is at least [F1100%] lower than the 1990 baseline.

hindered the exercise of their powers. In the words of the CEO of UK100\textsuperscript{11}, a network of local leaders who have pledged to lead a rapid transition to Net Zero,

“Not only has a reduction in local authority funding over more than a decade impacted on capability and capacity at local level, there is also a problem with national frameworks limiting the ability of local authorities to use their powers effectively. This needs to change”.

In general, local authorities have powers related to planning and development, energy, transport, housing and waste, all of which contribute to greenhouse gas emissions, and therefore should be subject to regulation with a view to reducing these emissions. Local authorities have the power to set planning policies that promote energy efficiency, renewable energy, sustainable transport, and the circular economy. They can require developers to build new homes and businesses to high energy efficiency standards. Local authorities can invest in and operate their own energy generation and distribution infrastructure, including renewable energy projects. They can provide grants and loans to businesses and residents to help them install energy efficiency measures and renewable energy technologies. Local authorities have the power to set speed limits, introduce traffic calming measures, and promote sustainable modes of transport such as walking, cycling, and public transport. They can invest in infrastructure such as cycle lanes, bus lanes, and electric vehicle charging points. They can invest in retrofitting existing homes to improve their energy efficiency. They can set standards for new builds and require them to be highly energy efficient and zero-carbon. Local authorities can implement policies to reduce waste and promote recycling and composting. They can also invest in waste-to-energy facilities.

But some of these powers are impeded by national policies and directions. Considering the national Building Regulations under the Planning and Energy Act 2008, local authorities can require new buildings to meet higher energy efficiency standards than those set out in the national Building Regulations, but not more than by 20%. This was further lowered to 19% by a Ministerial written statement\textsuperscript{12} in 2015. With the ever-increasing needs for new homes, there will always, at least for the foreseeable future, be a demand for them, and it is necessary to balance the interests of new homes with that of increasing energy efficiency requirements in order to meet the requirement of reducing greenhouse gas emissions under the Climate Change Act 2008. Technology is available, and the costs are reducing, and therefore, this too should be reflected in the plans for increasing energy efficiency in new homes and non-domestic buildings. National regulations provide some flexibility to require higher energy efficiency in new buildings, but it also puts a cap on what local authorities can require, under their powers in the Planning and Energy Act 2008. This impedes progress towards climate ambitions that local authorities may have set.

Furthermore, the current situation with stunted local authority powers, pits the Climate Change Act of 2008 against the Planning Act of 2008, requiring, from a net zero perspective, a reform of the planning law, to allow climate change impacts to override other issues – a huge political hot potato. In the area of transport, the national guidance for informing transport investment decisions in the UK, the WebTAG model\textsuperscript{13}, impedes local authorities choice to invest in different transport options by favouring road projects over increasing the value of traffic

\textsuperscript{11} Jason Torrance, Interim Chief Executive, UK100 https://www.uk100.org/sites/default/files/2023-04/Powers%20in%20Place%20-%20Political%20Briefing%20with%20Exec%20Summary.pdf
\textsuperscript{12} Statement made on 25\textsuperscript{th} of March 2015 (Mr. Eric Pickles, Secy of State for Communities and Local Government, https://questions-statements.parliament.uk/written-statements/detail/2015-03-25/HCWS488
reduction, active travel and health impacts and allowing alternative justifications for funding schemes that contribute to the Net Zero target.

UK is a dualist state under international law, meaning the obligations to implement an international treaty that the country has signed up to requires to be channelled via the national legislature\textsuperscript{14}. Even though the treaty would be binding on the UK in international law, treaties are not part of UK law and give rise to no legal rights or obligations in municipal law\textsuperscript{15}. Therefore, it would be difficult to argue that UK’s membership of the UNFCCC (United Nations Framework Convention on Climate Change) and the Paris Agreement of 2015 directly bestow duties on local authorities. Nor could local authorities link their declarations of climate emergencies in a legally significant way to the Paris Agreement 2015. This further increases the stranglehold by central government on local authorities for climate action.

The prospects for a New Zero Powers Bill should be considered. The purpose of the Bill would be to provide clear direction to local authorities on their role in the implementation of net zero, to require sustainable transport contributions to be part of an area-wide transport emissions reduction plan, embed a requirement for local planning authorities to prioritise The Climate Change Act in planning policy, provide a formal power to determine and govern Local Area Energy Plans, with a wider remit than just heat zone coordination, and to extend work on producer responsibility and circular economy to reduce waste at source, among other things. A private member’s Bill (Caroline Lucas, Green Party, MP) was put forward in 2021. The Climate and Ecology Bill\textsuperscript{16}, the first reading of which has been completed. Although not explicitly calling for empowering local authorities, it has the potential to pave the way for such empowerment. However, the Bill has not made much progress thus far.

A court in the UK found that the executive is not able to show a clear strategy towards net zero, specifically, how the government’s plans will meet the 6\textsuperscript{th} carbon budget, i.e., the quota of emissions the whole of the country is allocated under the Carbon Budget Order 2021\textsuperscript{17}, a regulation related to the fulfilment of the Climate Change Act 2008. The government strategy, eliciting measures under its Heat and Buildings Strategy, Net Zero Research and Innovation Framework and HM Treasury’s Net Zero Review was too vague and that there were no assurances that the targets listed under the strategy would decarbonise the UK economy to reach net zero by 2050\textsuperscript{18}. Therefore, there are instances when the government’s plans have come under scrutiny, they have failed to demonstrate credibility for achievement of targets. The argument for new powers for local authorities can also be made from this perspective. The structural institutional changes required need to be put in place in order to enable the fulfilment of the targets. The government released a new policy in March 2023, titled the Carbon Budget Delivery Plan\textsuperscript{19}, in which it clearly states the importance of local authorities, yet there is no mention of consideration of new local authorities powers for net zero. It states

\textsuperscript{14} The reception of international law into domestic law depends upon its acceptance in one of two ways: either by Parliament through legislation or by the judges through the common law. (Lord Mance, UK Supreme Court, 2017)
\textsuperscript{15} Miller v Secretary of State for Exiting the European Union [2017] UKSC 5
\textsuperscript{16} https://publications.parliament.uk/pa/bills/cbill/58-02/0061/21061.pdf
\textsuperscript{17} https://www.legislation.gov.uk/ukdsi/2021/9780348222616
\textsuperscript{18} R (Friends of the Earth Ltd, Client Earth, Good Law Project and Joanna Wheatley vs Secy of State for Business, Energy and Industrial Strategy [2022] EWHC 1841 (Admin)
Local authorities play an essential role in driving and accelerating action to tackle climate change with significant influence in energy, housing, and transport. Local authorities are directly responsible for only 2-5% of local emissions through their own estates and operations, but they have potential to influence up to around 80% of all UK emissions. Local authorities can also attract private sector net zero investment that wouldn’t otherwise be obtained, supporting local supply chains with new and upskilled local jobs. Local authorities can therefore play a key role in supporting the delivery of our national net zero targets across a number of sectors.\textsuperscript{20}

In sum, there is a pressing need for local authorities to be empowered with powers to address decarbonisation of the local economy. However, in the absence of such powers, they can work towards a partnership for decarbonisation, as is currently the case in Hertfordshire. The next steps in relation to tackling offsetting is to consider extending the partnership working through HCCSP to directly address how offsetting can be channelled into insetting and aid the county’s decarbonisation.

3 Building Insetting Institutions

Hertfordshire Climate Change and Sustainability Partnership (HCCSP) was inaugurated in 2020 with the primary objective of maximizing its influence through collaborative efforts via focussing on key actions in the areas of (1) Water Sustainability; (2) Biodiversity; (3) Carbon Reduction; (4) Transport, (5) Behaviour Change and (6) Adaptation. Carbon reduction lies at the core of the HCCSP climate change mitigation strategy. HCCSP aims to decrease emissions collaboratively and offer solutions for unavoidable or residual ones. These endeavours are detailed in the HCCSP Carbon Reduction Strategic Action Plan. In terms of the local authority members of the HCCSP, their carbon budgets for the next five years look like this:

Carbon Budgets for Local Authorities: 2023-2027, Megatonnes of CO2

![Figure 1: Carbon Budgets 2023-2027](image)

The Carbon Action Plan of 2021 was set as a response to CCC’s report titled 'Local Authorities and the Sixth Carbon Budget', which emphasised the necessity for coordinated efforts among the Government, regional agencies, and local authorities to achieve the Sixth Carbon Budget goals. The report identified four crucial elements essential for implementing a collaborative approach: (1) Establishing a framework to deliver a national and local action plan in

\textsuperscript{20} p. 160 Ibid
coordination; (2) Ensuring long-term financing to support local authorities in their efforts; (3) Providing flexibility to accommodate unique local circumstances and leverage local knowledge; (4) Developing coherent policies and empowering authorities to facilitate successful implementation. The report highlights that local authorities wield significant powers or influence, encompassing approximately one-third of emissions within their respective areas. Over half of the required emission reductions rely on the adoption of low-carbon solutions by individuals and businesses. These decisions, made at the local and individual levels, necessitate support in the form of infrastructure, systems, local knowledge, and networks.

The HCCSP's Carbon Action Plan emphasises prioritising carbon emission reduction over offsetting. Offset measures should be considered a last resort, specifically for unavoidable or residual emissions (RE). The HCCSP's plan emphasises focusing on proximate sources, beginning at the local district and county level, before exploring options beyond the region, within the UK, or abroad. Guided by the 'proximity' principle, the plan can adopt ABI as an appropriate measure to address emissions gaps effectively.

In the context of carbon reduction efforts, insetting institutions play a crucial role in addressing RE. Shifting the focus from individual organisations or projects, ABI emerged, emphasising the geographical region as the boundary. A geographical boundary refers to a physical and well-defined limit that demarcates a specific area or region. For this research, the designated area is Hertfordshire. These emissions can originate within the area, resulting from local sources such as industrial activities, transportation, and energy production. Additionally, they can be emissions produced outside the area but arriving within its confines, influenced by factors like atmospheric transport patterns or long-range dispersion.

Traditional offsetting poses crucial questions for its users, with local authorities encountering specific challenges due to increased public scrutiny surrounding climate change accountability. Issues like additionality, permanence, and emissions savings verification are now under greater

Figure 2: Map Hertfordshire.
scrutiny. Additionally, the risk of low-quality, poorly controlled, or unverified offsets leading to "double counting" of carbon savings and lacking permanence guarantees is a concern. Furthermore, the use of low-quality offsets can inadvertently cause negative co-impacts, such as reducing biodiversity through non-native species in nature-based projects.

Local authorities grapple with justifying the international diversion of socio-economic co-benefits, given their localized focus. While existing offsetting schemes mainly focus on nature-based solutions, the need for substantial emissions reduction in sectors like transport, energy, and buildings presents challenges for areas with limited land availability. Moreover, local authorities face resource pressures as most conventional offsetting schemes require annual investments without direct financial payback.

To address their unique context, local authorities must demonstrate a social return on investment within the borough they serve, encompassing aspects like increased jobs and improved health. However, existing schemes often relate to projects outside the UK, making it challenging to retain project co-benefits locally. However, transitioning to ABI can offer significant advantages, supporting councils in reducing emissions within their borough and providing financial incentives for carbon-saving projects. ABI fosters collaboration with stakeholders, acknowledging the collective action needed for city-wide targets. ABI has three key strategies focus on identifying local carbon-saving projects, attracting new funding, and improving project impact reporting within the local authority borough.

However, alongside initiating the ABI process, it is useful to establish a localised carbon reduction target. This preliminary step will pave the way for an effective and sustainable approach towards mitigating carbon emissions and fostering environmental responsibility.

For successful insetting to take place in an area, certain criteria are laid out, and they are as follows:

i. A target or commitment to achieving net zero by 2050 (or earlier).

ii. A carbon reduction plan that is published on their website.

iii. The carbon reduction plan should include their current emissions for the sources included in Scope 1 and 2 of the GHG Protocol, and a defined subset of Scope 3 emissions.

iv. The carbon reduction plan should also include specific carbon reduction measures that will be applied to their own emission sources to achieve net zero.

**Status of Maturity Criteria in Hertfordshire**
Table 1: Status of Maturity Criteria in Hertfordshire

As illustrated in Table 4, various local authorities are positioned at distinct stages concerning the maturity criteria applicable to insetting projects. Specifically, St. Albans, Dacorum, Stevenage, and Watford have reached a state of preparedness to actively engage. Conversely, there remains room for progress among the remaining entities, with particular emphasis on Broxbourne, where no formal climate emergency has been declared (it is noted that carbon reduction plan exists in Broxbourne).

Global emission targets are set at the national level. The United Kingdom (UK), encompassing the entire territory, including its four constituent nations, for the period of 2028-2032, the allocated carbon budget amounts to 1,725,000,000 tonnes of carbon dioxide equivalent. Subsequently, for the period of 2033-2037, the carbon budget has been reduced to 965,000,000 tonnes of carbon dioxide equivalent\(^2\).

The challenge lies in determining the individual carbon quotas for counties like Hertfordshire. This necessitates a comprehensive understanding of Hertfordshire's emissions and its proportional contribution to the national carbon budget. Precise quantification of Hertfordshire's greenhouse gas emissions and alignment with the national framework is essential to establish its specific carbon quota. Adopting this localised approach is critical for effective emissions management, achieving broader environmental objectives, and ensuring adherence to national and international climate commitments. It is a political decision that needs to be considered seriously.

However, from an independent perspective, the Tyndall Carbon Budget Tool provides climate change targets for UK local authority areas, aligning with the commitments set forth in the United Nations Paris Agreement\(^3\). These targets are informed by the most up-to-date scientific research on climate change and established through science-based carbon budgeting methodologies.

**Carbon Budgets for Hertfordshire Authorities: 2023-2047, Megatonnes of CO2**
According to the data from 2023-2017, St. Albans city and district is the area that requires the most significant reduction in emissions. It is important to note that achieving the budget targets should not heavily depend on carbon offsets. However, implementing the ABI could potentially permit certain areas, like St. Albans, in the 2023-2027 period to exceed the Tyndall budget threshold of 1.9 for that specific timeframe.

The following table provides a comparative picture of the metric tonne of CO2 emission for each of the ten regions of Hertfordshire, which differs according to the approach which is adopted.

<table>
<thead>
<tr>
<th>Region</th>
<th>2023-2027</th>
<th>2024-2028</th>
<th>2025-2029</th>
<th>2026-2027</th>
<th>2027-2028</th>
<th>2028-2029</th>
<th>2029-2030</th>
<th>2030-2031</th>
<th>2031-2032</th>
<th>2032-2033</th>
</tr>
</thead>
<tbody>
<tr>
<td>St Albans</td>
<td>1.9</td>
<td>0.9</td>
<td>0.4</td>
<td>0.2</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Dacorum</td>
<td>1.4</td>
<td>0.7</td>
<td>0.3</td>
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<td>0.1</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>East Herts</td>
<td>1.4</td>
<td>0.7</td>
<td>0.3</td>
<td>0.2</td>
<td>0.1</td>
<td></td>
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</tr>
<tr>
<td>Hertsmere</td>
<td>1.4</td>
<td>0.7</td>
<td>0.3</td>
<td>0.2</td>
<td>0.1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>North Herts</td>
<td>1.4</td>
<td>0.7</td>
<td>0.3</td>
<td>0.2</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wel - Hat</td>
<td>1.3</td>
<td>0.7</td>
<td>0.3</td>
<td>0.2</td>
<td>0.1</td>
<td></td>
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<td>Three Rivers</td>
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<td>0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broxbourne</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stevenage</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
<td>0.1</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Watford</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Table 2: Carbon Budget for Hertfordshire 2023-2047.**

The following table provides a comparative picture of the metric tonne of CO2 emission for each of the ten regions of Hertfordshire, which differs according to the approach which is adopted.

<table>
<thead>
<tr>
<th>Region</th>
<th>Average Annual Mitigation Rate (%)</th>
<th>Choice of Allocation Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broxbourne</td>
<td>-12.90%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td>-10.20%</td>
<td>Per capita approach</td>
</tr>
</tbody>
</table>

**Figure 3: Carbon Budget for Hertfordshire 2023-2047**
The approach for allocating the quota of emissions for each of the ten local areas in Hertfordshire involves implementing three distinct methodologies: the grandfathering approach, per capita allocation approach, and the GVA (Gross Value Added) approach. The grandfathering approach subdivides the UK energy-only carbon budget among the local areas, while the per capita allocation approach ensures an equal distribution of the energy-only carbon budget across the UK on a per capita basis. However, the most appealing allocation regime is the GVA approach, which takes into account the economic productivity of each local area.

Industrialization is directly linked to CO2 emissions, and the economic productivity of a local area can be associated with its level of industrialization, resulting in a value-added assessment. It is essential to recognize that economic productivity in a local area may not solely stem from industrialization, as other factors can influence energy consumption. Therefore, the local authority must identify both high-energy consuming economic units and those with lower energy consumption, encompassing a range of situations. Adopting the GVA approach ensures that the highest energy-consuming units actively participate in insetting initiatives by voluntarily becoming the subject of insetting projects.

For the HRE administrator, the recommended approach is the GVA approach.

Table 3: Mitigation Rate % Allocation Regimes

<table>
<thead>
<tr>
<th>Local Area</th>
<th>GDP Growth</th>
<th>Grandfathering</th>
<th>Per Capita</th>
<th>GVA split</th>
</tr>
</thead>
<tbody>
<tr>
<td>DACORUM</td>
<td>1.4</td>
<td>-10.10%</td>
<td>-13.60%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-11.20%</td>
<td>-11.50%</td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>EAST HERTS</td>
<td>1.4</td>
<td>-13.40%</td>
<td>-12.00%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-12.30%</td>
<td>-12.30%</td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>HERTSMERE</td>
<td>1.4</td>
<td>-13.70%</td>
<td>-16.00%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-13.20%</td>
<td>-16.80%</td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>ST ALBANS</td>
<td>1.9</td>
<td>-13.90%</td>
<td>-15.20%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-16.80%</td>
<td>-16.80%</td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>STEVENAGE</td>
<td>0.8</td>
<td>-12.70%</td>
<td>-11.10%</td>
<td>Grandfathering</td>
</tr>
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<td></td>
<td></td>
<td>-9.10%</td>
<td>-9.10%</td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>THREE RIVERS</td>
<td>1.1</td>
<td>-14.10%</td>
<td>-15%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>WATFORD</td>
<td>0.8</td>
<td>-12.50%</td>
<td>-9.60%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>NORTH HERTS</td>
<td>1.4</td>
<td>-13.50%</td>
<td>-5.90%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-12.60%</td>
<td>-5.90%</td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA split</td>
</tr>
<tr>
<td>WEL - HAT</td>
<td>1.3</td>
<td>-13.10%</td>
<td>-13.10%</td>
<td>Grandfathering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-14.40%</td>
<td>-11.40%</td>
<td>Per capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GVA approach</td>
</tr>
</tbody>
</table>

The approach for allocating the quota of emissions for each of the ten local areas in Hertfordshire involves implementing three distinct methodologies: the grandfathering approach, per capita allocation approach, and the GVA (Gross Value Added) approach. The grandfathering approach subdivides the UK energy-only carbon budget among the local areas, while the per capita allocation approach ensures an equal distribution of the energy-only carbon budget across the UK on a per capita basis. However, the most appealing allocation regime is the GVA approach, which takes into account the economic productivity of each local area.

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For the HRE administrator, the recommended approach is the GVA approach.
In addition to CO2 emissions, it is crucial to address non-CO2 climate forcers, such as methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), sulphur dioxide (SO2), and black carbon, due to their high global warming potential (see table below). Reducing these emissions is vital for achieving the area's CO2 equivalent emissions reduction goals, contributing to overall mitigation efforts. Unfortunately, robust non-CO2 emissions data for different areas in Hertfordshire is currently lacking. Nonetheless, there are opportunities for HRE projects to focus on reducing non-CO2 greenhouse gases. While ambitious, this aspect should be considered within the scope of the HREA.

**Global Warming Potential of the Major Greenhouse Gases**

<table>
<thead>
<tr>
<th>Greenhouse Gas (GHG)</th>
<th>Atmospheric Lifetime (yrs)</th>
<th>Global Warming Potential (GWP)</th>
<th>Primary Current Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide (CO2)</td>
<td>50 - 200</td>
<td>1</td>
<td>Fossil fuel use, land use, cement</td>
</tr>
<tr>
<td>Methane (CH₄)</td>
<td>12 ± 3</td>
<td>21</td>
<td>Fossil fuel use, agriculture</td>
</tr>
<tr>
<td>Nitrous oxide (N₂O)</td>
<td>120</td>
<td>310</td>
<td>Mostly agriculture, ~ 1/3 are anthropogenic</td>
</tr>
<tr>
<td>Hydrofluorocarbons (HFCs)</td>
<td>1.5 to 209</td>
<td>150 to 11,700</td>
<td>Alternative to ozone depleting substances</td>
</tr>
<tr>
<td>Perfluorocarbons (PFCs)</td>
<td>2,600 to 50,000</td>
<td>6,500 to 9,200</td>
<td>Primary aluminium production; semiconductor manufacturing</td>
</tr>
<tr>
<td>Sulfur Hexafluoride (SF₆)</td>
<td>3,200</td>
<td>23,900</td>
<td>Used in electric power transmission magnesium</td>
</tr>
</tbody>
</table>

*Table 4: Global Warming Potential of the Major Greenhouse Gases*[^24]

### 4 Hertfordshire Residual Emissions Administrator (HREA)

The Hertfordshire Residual Emissions Administrator plays a crucial role in facilitating effective collaboration between different local authorities and other emitters in Hertfordshire by connecting their respective needs and projects. For instance, while St. Albans may identify a pressing need for emissions reduction in the transport sector, Three Rivers might already have a successful project in place to address this issue. the HRE administrator acts as a liaison, bridging the gap between authorities and other bodies, ensuring that resources and expertise are appropriately shared and utilized to achieve common objectives. However, given that local authorities do not have sufficient powers to provide for a HREA, alternatives need to be considered (see later section).

By serving as a centralized point of coordination, the HRE administrator fosters synergy and efficiency in addressing regional challenges related to greenhouse gas emissions. This proactive approach allows for more streamlined and impactful implementation of sustainability initiatives, avoiding unnecessary duplication of efforts and maximising the overall positive impact on the environment.

Through the effective linking of needs and projects from different local authorities regions, the HRE administrator promotes a collaborative environment where best practices are shared, and successful strategies are adopted and adapted to suit specific circumstances. This collaborative spirit enables each authority to build upon the achievements of others, leading to accelerated progress in achieving environmental goals.

The HRE administrator fulfils their role through three core functions, each aimed at achieving specific objectives to facilitate successful project management and promote growth in the targeted sectors:

Defining and identifying projects: The first function involves a meticulous process of defining and identifying projects that align with Clause 5.4 of the Carbon Reduction Plan. By carefully selecting projects with significant potential and feasibility, the administrator aims to enhance the visibility of "shovel-ready" investable opportunities.

Implementing measures for commercial attractiveness: By addressing key factors that impact investment attractiveness, such as financial viability, risk assessment, and return on investment, the administrator works to make these projects more appealing to potential investors and financiers.

Reporting project impacts and progress: Transparent reporting enables stakeholders to have a clear understanding of the projects' contributions, fostering accountability and further building investor confidence.

4.1- Defining project requirements and identifying potential projects

The primary focus of this process is on projects that are beyond direct ownership and control but within the local authority's geographical boundaries. By establishing a well-defined project pipeline, not only is the effectiveness of financing activities ensured, but it also fosters more productive outcomes, enhances transparency, and promotes accountability. Alongside satisfying Clause 5.4 criteria, the process of defining project requirements entails the application of high-quality insetting, complying with stringent social and environmental safeguards to safeguard communities and preserve the natural environment.

Below is a list of potential 'shovel-ready' investable projects active in Hertfordshire.

St. Albans (SACDC)
In July 2019, St. Albans (SACDC) formally declared a climate emergency. However, SACDC’s climate action plan started in 2006 and was updated in 2016 and 2019. St Albans’ 2019 emissions are mostly made up of emissions from domestic energy (234,000 tonnes) and road transport (212,000 tonnes); other sectors such as industry (89,000 tonnes) and commercial sector; and public sector energy (14,000 tonnes)²⁵.

²⁵https://www.stalbans.gov.uk/sites/default/files/attachments/District%20GHG%20Briefing%20Sheet%202021.pdf
Moving forward, the SACDC has set an ambitious target to achieve Net Zero by 2030, necessitating a substantial reduction of 49,600 tonnes in emissions annually. To comprehend the scale of this undertaking, it can be illustrated in various relatable contexts:

- Removing approximately 25% of vehicles from the roads, making a significant impact on transportation-related emissions.
- Planting a staggering 2,480,000 trees, bolstering efforts to sequester carbon and enhance green spaces within the district.
- Turning off the electricity supply to 82,700 homes, emphasising the significance of energy conservation in meeting the Net Zero goal.
- Development of 22 solar farms, each generating 5 MW of clean energy, contributing substantially to the renewable energy capacity of the region.
- Encouraging every household in the District to reduce their electricity consumption by approximately 74%.
- Installation of solar panels on 31,000 households would contribute significantly to the generation of clean and sustainable energy within the community.

These comparisons underscore the scale of the challenge ahead and the diverse approaches that must be embraced to achieve Net Zero by 2030.

**Corporate CO2: Historic and Projected Emissions to achieve Net Zero by 2030**


Based on Figure 4, it becomes evident that the contractor transport sector can effectively decrease its carbon emissions through collaboration with the council’s transportation initiatives,
thereby advancing towards a more sustainable and environmentally conscious approach. One effective strategy for achieving this is through insetting projects, where the council actively assists in reducing contractor energy consumption and transport-related emissions.

By partnering with the council’s transport initiatives, contractors can gain valuable support and resources to implement environmentally friendly practices and technologies. Through these collaborative efforts, the council plays a pivotal role in facilitating the reduction of carbon emissions in the contractor transport sector in St. Albans.

SACDC shovel-ready projects in the area of energy: *Council homes EPC certificate target of C by 2030*27

**Dacorum**

In 2019, Dacorum declared a climate and ecological emergency and pledged to achieve net zero emissions in the council activities by 2030.

**Dacorum 2019 emissions from BEIS and SCATTER**

![Dacorum CO₂ Emissions - 2019 Scopes 1-2 (BEIS)](image)

![Dacorum CO₂E Emissions - 2019 Scopes 1-3 (SCATTER)](image)

*Figure 5: Dacorum 2019 emissions from BEIS and SCATTER*28.

The charts below indicate that while there is a notable difference between the data from the two sources, BEIS29 and SCATTER30, the essential breakdown information remains consistent, highlighting that transport and energy usage in buildings are the primary contributors to emissions. Consequently, Dacorum has identified four key sectors that require targeted emission reductions, namely:

- Sustainable Transport
- Energy Use in Buildings
- Improving Biodiversity
- Sustainable Communities

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29The Government Department for Business, Energy and Industrial Strategy (BEIS) publish annual GHG emission reports.
30Setting City Area Targets and Trajectories for Emissions Reduction (SCATTER) tool is a local authority focussed emissions resource which accounts for all GHG emissions and all scopes 1-3. SCATTER is a relatively new tool and has emissions data available from 2017 to 2019 only.
Evidently, emissions data underscores that transport and energy consumption in buildings play pivotal roles in the borough's carbon footprint. Given that the Council's own emissions constitute less than 6% of the total, a significant aspect of Dacorum’s efforts will be geared towards fostering positive change throughout the broader community.

A potential ‘shovel-ready’ project in the area of housing in Dacorum is the Hemel Garden Communities. The project's vision is to revitalise Hemel Hempstead by creating appealing and sustainable new neighbourhoods to the north and east of the town, encompassing over 11,000 new homes and 10,000 new job opportunities.

**East Hertfordshire**
In July 2019, East Herts councillors voted unanimously to declare a climate emergency, demonstrating their dedication to addressing environmental challenges. They have set new ambitious commitments to significantly reduce the council's carbon footprint to an "absolute minimum" by 2027.

**Sources of Carbon by percentage of total across the whole district of East Hertfordshire**

![Figure 6: Sources of Carbon by percentage of total across the whole district of East Hertfordshire.](image)

East Herts 'shovel-ready' projects in the area of housing and energy: Residential Grants
2023 – 2024 Actions in progress in the housing sector’s aim is to support at least 100 households to become more energy efficient in 2023/24 through the provision of grants, loans and/or advice and signposting.

**Hertsmere**
Hertsmere Borough Council declared a Climate Emergency in September 2019. Hertsmere's CO2 emissions per capita from sources under Local Authorities' jurisdiction stand at 4.4 kt,

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31 https://www.hemelgardencommunities.co.uk
slightly above England's average of 4.3 and just below the UK average of 4.5 kt CO2 per capita. Overall, there has been a 39% reduction in CO2 emissions in Hertsmere since 2005. The distribution of emissions in Hertsmere is fairly even among industrial and commercial sources (33%), domestic sources (37%), and transport (31%).

Hertsmere 'shovel-ready' projects in the area of energy: *Domestic Energy*

On-going since 2020, for homeowners, implement grants/incentives/schemes linked to EPC ratings to improve insulation by providing support for double glazing doors and windows, loft, cavity wall and underfloor insulation, central heating systems and other such measures.

**North Hertfordshire**

North Hertfordshire in 2019, the council passed a motion to declare a Climate Emergency, in this motion the council pledged their commitment to do everything within its power to make North Hertfordshire Council’s activities net-zero by 2030 and the whole district by 2040.

North Hertfordshire ‘shovel-ready’ projects in the area of building: *Council Buildings and Property*

One of the objectives set by North Hertfordshire is to achieve carbon neutrality for the council’s own operations by 2030. As part of this goal, efforts are being made to improve building insulation and conduct lighting surveys in order to reduce energy consumption.

**Welwyn Hatfield**

Welwyn Hatfield Borough Councils' (WHBC) Climate Strategy has been developed to take into account the declaration of a Climate Emergency in 2019 and the subsequent net zero target across the Borough by 2030.

Welwyn Hatfield's 'Shovel-Ready' Transport Projects:

Welwyn Hatfield remains committed to expanding their charging infrastructure within the borough. A recent funding award has facilitated the installation of up to 105 charging units, resulting in an additional 192 charge points. The utilization of these chargers has contributed to an impressive reduction of 70.5 tonnes of CO2 emissions.

**Three Rivers**

Three Rivers District declared a climate emergency and is committed to achieving net-zero emissions by 2030 for its own emissions and by 2045 for the district.

39 https://one.welhat.gov.uk/environment/climate-change/5
40 https://www.threerivers.gov.uk/services/environment-climate-emergency/climate-emergency
Three Rivers’s 'shovel-ready' projects on building sector: Sustainable Design and Construction

Three Rivers has outlined proposals for enhancing Part L standards, starting with an interim uplift commencing in 2021. Upon adoption, this revision would necessitate new homes to achieve a 31% reduction in carbon emissions.

Broxbourne
The primary formidable challenge faced by the Borough in facilitating sustainable growth pertains to the escalating vehicular traffic and consequential air pollution due to emissions. Residents predominantly depend on personal vehicles for transportation, as the north-south public transport connections exhibit commendable efficacy; however, traversing in the east-west direction sans personal vehicles presents notable hardships.

Broxbourne’s 'shovel-ready' projects on the transport sector: This initiative encompasses establishing an extensive array of rapid electric vehicle charging stations. A comprehensive network of 100 rapid charging points for electric vehicles will be strategically situated across the Borough to adequately serve residents without home charging capabilities. Additionally, integration of electric vehicle home charging points will be mandated in upcoming developments.

Stevenage
In June 2019, Stevenage declared a climate emergency and reaffirmed its dedication to addressing climate change\(^41\). This commitment was underscored by the establishment of a goal to achieve net-zero emissions for Stevenage by 2030.

Stevenage’s 'shovel-ready' projects in biodiversity: Biodiversity Action Plan\(^42\)
The Stevenage Borough Council takes immense pride in its enduring dedication to the preservation and augmentation of biodiversity within the borough. The fundamental objective has consistently centered on the expansion of biodiversity in Stevenage through the conservation, rehabilitation, recreation, and reconnection of wildlife habitats. This includes fostering greater awareness and appreciation of the local wildlife, promoting active engagement in biodiversity conservation, and ensuring the accessibility of nature to all residents.

Watford
Watford Borough Council declared a climate emergency in July 2019 and committed to becoming a climate neutral council by 2030\(^43\). In 2023, Watford Borough Council passed a new Environmental Strategy 2023-2030 and Delivery Plan 2023-2025\(^44\).

Watford’s 'shovel-ready' projects in transportation: Achieving net zero\(^45\).

\(^{41}\) https://www.stevenage.gov.uk/environment/climate-change#:~:text=On%20the%2012%20June%202019,foundation%20for%20all%20Council%20actions.
\(^{44}\) https://www.watford.gov.uk/sustainable-watford/sustainable-watford-1
The objective involves a modal shift that redirects focus from private cars to alternative modes of transportation. The proposed modal shifts include raising the percentage of public transport usage from 11.5% to 15%, increasing cycling modal share from 2.5% to 7%, and elevating the modal share for walking from 28% to 34% by the year 2030. This goal will be pursued through the execution of the "Transforming Travel In Watford" strategy.

4.2 - Making Projects Commercially Attractive

The HRE administrator is positioned to play a pivotal role in catalysing and incentivising augmented investments in low-carbon initiatives. This pursuit encompasses a spectrum of strategies, including:

I) Augmenting the Business Case: Delving into the realm of financial viability, the HREA can bolster projects with palpable financial returns, thereby rendering them more attractive and compelling for potential investors. Key avenues for this enhancement include:
- Facilitating streamlined access to funding by cultivating a portfolio of "investment-ready" ventures.
- Generating capital through the trade of carbon credits.

II) Elevating Reputation: With an eye on broader Corporate Social Responsibility (CSR) and strategic inclinations of prospective investors, the HREA can establish a strong appeal for their chosen projects. This is achieved through strategies such as:
- Cultivating investment from local enterprises keen on enhancing their standing within the community.
- Offering precise and uniform methodologies to assess the impact of philanthropic contributions on carbon-mitigation projects.

By executing these the HREA can markedly elevate the commercial allure of low-carbon projects, thereby fostering an environment conducive to heightened investment and sustainable progress.

4.3 - Validation, Quantification, Allocation and Reporting

Comparable to financial data, project-related information serves as a critical accountability tool for a diverse spectrum of stakeholders. It ensures mutual responsibility and guarantees that projects yield a net positive impact by curbing or circumventing carbon emissions. The process of Validation, Quantification, Allocation, and Reporting encompasses five principal activities:

I) Validation: This phase entails meticulously evaluating project components to ascertain their alignment with Clause 5.4 and its related provisions.

II) Quantification: Through this activity, an assessment is made to estimate carbon emission reductions and other pertinent project outcomes with precision.

III) Allocation: The apportionment of realised savings among various Invested Stakeholders is executed in this stage, ensuring equitable distribution.

IV) Reporting: This aspect involves disseminating pertinent project details to stakeholders in a lucid and consistent manner.

V) Verification: Conducting risk-based assessments to enhance the level of confidence in the attainment of project objectives constitutes the final step in this framework.
By adhering to these systematic practices, the HREA can bolster the integrity of project execution, foster transparency, and facilitate productive engagement among stakeholders.

4.4- Choosing the HRE administrator for the County of Hertfordshire:

A number of possible options exist, taking into account the current (loose) regulatory framework. If local authorities are endowed the powers to realise the emissions reduction in the local authority area, then the HREA could be well placed within the local authority, however, alternative options need to be considered in the absence of such powers and resources for local authorities.

4.4.1- Public Body – Hertfordshire County Council

4.4.1.1 - Pros:

Hertfordshire County Council stands as the predominant public sector entity within the jurisdiction, bearing the responsibility for a diverse range of countywide functions, notably encompassing the intricate domain of regional transportation. This expanse of responsibilities naturally designates the Council as the preeminent custodian for initiatives pertaining to emissions reduction, an imperative subject in contemporary governance.

The Council’s deliberate undertaking of initiatives to reduce emissions attests to their proactive engagement in addressing environmental concerns, embodying their commitment to sustainable development and forward-looking governance. As deliberations surrounding emissions reduction intensify, the County Council assumes an indomitable position at the nexus of policy formulation and practical implementation, emblematic of their profound role in shaping a greener and more ecologically balanced future for the region.

4.4.1.2 - Cons:

The transition in political leadership within the County Council raises the potential for consequential impacts on the organisational culture of the public sector entity. This shift may potentially impede organisational agility, potentially leading to challenges in adapting swiftly to evolving circumstances.

Compounding these concerns is the potential challenge to the credibility that could arise from the Council being responsible for verifying its activities and initiatives. The inherent conflict of interest in self-assessment could cast doubt on the transparency and impartiality of such evaluations. This, in turn, might erode public trust and confidence in the Council’s decision-making processes and outcomes.

A thorough examination of all these factors is imperative to assess the potential ramifications of the change in leadership comprehensively and to proactively address any resultant limitations. This will ensure the sustained effectiveness of the Council’s endeavours and safeguard its reputation as a credible and accountable institution serving the community’s interests and the broader public sector landscape.
4.4.2- Independent Body - Centre of Climate Change Research at the University of Hertfordshire

4.4.2.1- Pros:
Considering the potential for establishing an entity characterised by neutrality, independence, and the capability to undertake the functions of the HRE administrator seamlessly, the University’s research centre is a potential option.

Recognising projects based on predefined criteria, subsequent monitoring, and the authentication of their outcomes inherently demand a significant degree of technical acumen. In this context, it is conceivable to view the Climate Change Research Centre at the University of Hertfordshire as an adept candidate for fulfilling the role of the HREA. The Centre possesses the requisite technical competencies to facilitate these tasks effectively. Additionally, its impartiality detaches it from the prevailing political environment, ensuring that its involvement remains divorced from any political influences.

Integrating such an independent and technically proficient institution augments well for ensuring a rigorous and unbiased assessment and validation process, thereby bolstering the credibility and effectiveness of insetting initiatives.

4.4.2.2- Cons:
A potential drawback associated with an independent body is that it could inadvertently lead to a lack of centralised coordination and cohesive decision-making. With various stakeholders potentially operating with differing agendas and perspectives, the absence of a unified leadership structure might result in fragmented efforts and difficulties in aligning strategic directions.

Additionally, an independent body might encounter challenges in terms of resource allocation. Without a central governing authority, securing adequate funding and resources for initiatives could become more complex, potentially impeding the organisation's ability to execute its mandates effectively.

Furthermore, the autonomy of an independent body could raise concerns about accountability and oversight. With a reduced level of direct oversight from a centralised authority, questions might arise about the transparency and effectiveness of the organisation's operations, potentially eroding public trust and credibility.

4.4.3- Joint Venture - the Hertfordshire County Council and the Centre for Climate Change Research

4.4.3.1- Pros:
The collaboration between the Hertfordshire County Council and the Centre for Climate Change Research offers the opportunity for a symbiotic exchange of expertise. By amalgamating the Council's insights into local governance and policy implementation with the Centre's cutting-edge research findings, the Joint Venture can forge a comprehensive approach to climate change mitigation and adaptation.

Pooling resources is another significant advantage. With combined financial and non-financial assets, the Joint Venture can embark on more ambitious projects and initiatives, distributing the burden of costs and potential risks more equitably between the two entities.
Moreover, the collaboration enhances the credibility of the County Council's climate efforts. Partnering with a research-focused institution underscores the Council's commitment to informed decision-making backed by solid scientific insights, thereby bolstering trust among stakeholders and the public alike.

The synergy between the parties can also expedite progress. By harnessing the collective expertise and resources, the Joint Venture can accelerate the implementation of climate initiatives, potentially yielding quicker and more impactful results. Furthermore, the collaboration encourages innovation. The involvement of a research institution can stimulate the development of creative solutions to intricate climate challenges, fostering an environment of continuous improvement and ingenuity.

Importantly, the Joint Venture provides a platform for knowledge exchange. The Centre's latest advancements in climate science can inform the Council's policy decisions, while the Council can offer insights into practical challenges, enabling a dynamic exchange that enriches both parties.

The collaboration's potential networking and partnership opportunities extend the Joint Venture's influence beyond its immediate scope, facilitating connections with other research institutions, governmental bodies, and stakeholders, enhancing its overall reach and effectiveness.

By formalizing the collaboration, the Joint Venture showcases a long-term commitment to sustainability efforts. This stability underpins ongoing climate change initiatives, providing a robust foundation for concerted action and enduring impact.

4.4.3.1-Cons: The collaboration could encounter challenges stemming from differing objectives between the two entities. If their primary priorities diverge significantly, disagreements could emerge regarding the overarching direction and focus of the Joint Venture's initiatives.

Bureaucratic delays might also hinder the collaboration's efficiency. With each organization adhering to its own decision-making processes and bureaucratic structures, decision-making and project implementation could become protracted, potentially impeding timely progress.

Resource allocation disputes could arise as a point of contention. Differences in how resources, including funding and personnel, are distributed between the two entities could create friction and hamper the seamless functioning of the collaboration.

The collaborative partnership could lead to a loss of autonomy for both parties. As accustomed as they may be to independent decision-making, relinquishing some degree of control to the collaboration could result in internal conflicts and hinder forward momentum.

Effective communication is paramount in any collaboration, and differences in communication styles or misinterpretations of messages between the two organisations could lead to misunderstandings that hinder the efficient exchange of ideas and progress.

The Joint Venture might encounter conflicts of interest if the actions or priorities of one entity clash with the overarching goals of the collaboration. This divergence in approach could lead to tensions and challenges in finding common ground.
Managing coordination across two distinct organisations with their own established protocols and processes can introduce complexities. Ensuring alignment and synchronicity in activities could prove time-consuming and operationally intricate.

The ambiguity surrounding accountability is another potential drawback. Determining responsibility for specific outcomes or failures within the collaboration could be challenging, creating confusion and the potential for shifting blame.

Cultural differences between the County Council and the Centre for Climate Change Research could pose challenges. If their organisational cultures significantly differ, establishing a cohesive working environment and shared values might prove to be an ongoing effort.

Developing a well-defined exit strategy in the event that the collaboration needs to be dissolved could present complexities. The interwoven nature of responsibilities and resources might require intricate legal or administrative manoeuvring.

External influences could also impact the collaboration. Factors such as shifts in leadership, political changes, or fluctuations in funding could introduce instability and alter the trajectory of the Joint Venture.

Additionally, the collaboration might struggle with adapting to rapidly changing circumstances or capitalizing on new opportunities due to the combined structure's potential limitations.

While the Joint Venture offers promise, the array of potential challenges underscores the need for careful planning, open communication, and the establishment of well-structured agreements to mitigate potential downsides and ensure a productive and successful partnership.

4.4.4 Community Interest Company (CIC)

4.4.4.1 Pros

Can be tailored to a specific organisational structure, governance or membership. It can be flexible, from a cooperative to a single member company. It can therefore work for, be independent of the public and private sectors in the county, aimed at developing effective decarbonization strategies to meet county emissions as a whole. It serves the geographical area and any actors within it.

Funding can come from sources other than public authorities and from any entity with a stake in reducing emissions, essentially, any organisation or household interested in mitigating their emissions, therefore taking in costs and funds for a double-glazing project, to a solar farm project, as long as it is within the county.

A CIC mechanism utilises existing willingness and plans to reduce emissions and can successfully build structures for implementation.

A CIC arrangement can reach out to all HSSCP partners and be guided and supported by the above mentioned entities, including the University and the public sector bodies.

A CIC would be financially independent from all stakeholders, and yet be capable of being financially supported by various different emitting as well as non-emitting organisations.
4.4.4.2 Cons

A CIC needs initial momentum and vision provided by existing organisations, as it will be a brand-new entity.

It is at risk, more than any other organisation of ceasing to exist and therefore insetting activities in Hertfordshire losing its leadership.

In sum, considering the pros and cons of various arrangements, this research recommends the CIC as the most viable option. Until such time as local authorities are empowered to act for net zero, a CIC can effectively provide a structure for a partnership approach to funding the HREA.

5 Science-based Target for Hertfordshire

The endeavour to establish a Science-Based Target (SBT) for greenhouse gas (GHG) reductions in Hertfordshire encountered obstacles due to the contextual factors involved, particularly within the discourse concerning combined authorities. It will be very useful to initiate a fresh discussion to formulate an SBT for Hertfordshire, driven by the following considerations:

1. **Enhancing Credibility for Project Identification**: A robust SBT will bolster the credibility of our efforts to identify and implement insetting projects, underscoring our commitment to effective GHG reduction strategies.

2. **Promoting Commercial Viability**: The establishment of an SBT will render projects more commercially appealing, attracting investment and fostering sustainable economic growth within the region.

3. **Fostering Public-Private Collaboration**: An SBT provides a unifying focal point, facilitating collaboration between the public and private sectors as they collectively strive towards a shared environmental objective.

4. **Maintaining Coherence in Decarbonization and Sustainability Plans**: The adoption of an SBT will ensure consistency and coherence in our plans for decarbonization and overall sustainability, enabling a harmonized and effective approach.

5. **Alignment with the Paris Agreement**: Formulating an SBT aligns our aspirations with the principles set forth in the Paris Agreement of 2015, emphasizing our dedication to international climate goals.

Given these reasons, it is imperative to reinitiate discussions and establish an SBT for Hertfordshire, transcending previous challenges and fostering a unified commitment to meaningful environmental progress.

Hertfordshire County consists of the aggregate carbon budget of the following local authorities: Broxbourne, Dacorum, East Hertfordshire, Hertsmere, North Hertfordshire, St Albans, Stevenage, Three Rivers, Watford, Welwyn Hatfield. Below are the climate change targets for Hertfordshire County derived from the commitments enshrined in the Paris Agreement, informed by the latest science on climate change and defined in terms of science-based carbon setting using the Tyndall tool. These carbon budgets are based on translating the “well below 2°C and pursuing 1.5°C” global temperature target and equity principles in the United Nations Paris Agreement. It provides the County with budgets for carbon dioxide (CO2) emissions and from the energy system for 2020 to 2047.
Aviation and shipping emissions remain within the national UK carbon budget and are not scaled down to sub-national budgets. Land Use, Land Use Change and Forestry (LULUCF) and non-CO2 emissions are considered separately to the energy CO2 budget.

Based on our analysis, to ensure Hertfordshire County aligns equitably with the Paris Climate Change Agreement, we propose the following recommendations:

1. **Adhere to Cumulative Emissions Budget:** Stay within a maximum cumulative carbon dioxide emissions budget of 37.3 million tonnes (MtCO2) for the period of 2020 to 2100. At 2017 CO2 emission levels, Hertfordshire County SBT would use this entire budget within 7 years from 2020.

2. **Implement Immediate CO2 Mitigation:** Initiate an immediate programme of CO2 mitigation to deliver cuts in emissions averaging a minimum of -13.5% per year to deliver a Paris aligned carbon budget. These annual reductions in emissions require national and local action and could be part of a wider collaboration with other local authorities.

3. **Reach Carbon Zero or Near Zero no later than 2041:** provide an indicative CO2 reduction pathway that stays within the recommended maximum carbon budget of 37.3 MtCO2. In 2041 5% of the budget remains. This represents very low levels of residual CO2 emissions by this time, or Hertfordshire may opt to forgo these residual emissions and cut emissions to zero at this point. Earlier years for reaching zero CO2 emissions are also within the recommended budget, provided that interim budgets with lower cumulative CO2 emissions are also adopted.

These recommendations ensure that Hertfordshire County's SBT contributes substantively and justly to climate goals while staying consistent with established carbon budgets.

**Carbon Budgets for Hertfordshire County: 2023-2047 (Megatonnes of CO2)**

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<tr>
<th>Carbon Budget Period</th>
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<tr>
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*Table 5: Carbon Budgets for Hertfordshire County: 2023-2047*
Figure 7: Hertfordshire County’s Recommended Carbon Budget (Mt CO2)