Colchester City Council

Preferred Options

Local Plan Topic Paper

Net Zero and embodied carbon

July 2025

Colchester Local Plan

Contents

Executive Summary

The impacts of climate change are becoming increasingly apparent and the need for action to limit the production of greenhouse gas emissions is paramount. Within the Climate Change Act 2008, a target for hitting net zero by 2050, reducing 100% of emissions of 1990 levels, was set. However, The Climate Change Committee warned in their 2022 report to Parliament that the UK is off target and rapid and deep cuts to emissions must be made in all sectors to get on track.

Relevant legislation encourages local planning authorities to take action to address climate change. Notably, the Planning and Compulsory Purchase Act (PCPA) 2004 states that development plan documents must include policies designed to contribute to the mitigation of, and adaptation to, climate change alongside the Planning and Energy Act (PEA) 2008 which gives local authorities the power to set their own energy efficiency standards in their development plan documents. The National Planning Policy Framework (NPPF) outlines that “the planning system should support the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change”.

With buildings being a significant contributor to emissions, setting higher energy efficiency targets is important for acting in line with our statutory duty and the NPPF. Legal justification supports the ability for local planning authorities to do this, despite the 2023 written ministerial statement (WMS) suggesting that it does not expect local authorities to set local energy efficiency standards for buildings that go beyond current or planned building regulations. This is because other existing legislation, including the PCPA 2004 and PEA 2008 state this is possible, alongside the WMS 2023 stating higher standards can be set, as long as they have a well-reasoned and robustly costed rationale. The approach for setting higher energy efficiency standards is being followed by many other authorities and several have had plans found sound with policies including higher energy efficiency standards included, including the Tendring Colchester Borders Garden Community Development Plan Document (DPD).

To support the justification for including policies that detail higher energy efficiency standards which measure the energy use throughout a building energy metrics approach and meet net zero standards for new buildings, an extensive evidence base has been prepared, commissioned by Essex County Council. The evidence base details that building to these standards are technically, financially and legally viable. A set of principles and targets for building net zero homes and buildings was outlined in a ‘Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex’ produced by Essex County Council. Colchester City Council published this policy position as part of issues and options engagement with many being supportive of the ambitious targets but some issues were raised by developers namely the increased costs, skills and training requirements and responsibility for maintenance of renewable

energy systems associated with building to a net zero standard. The evidence base includes information that addresses these issues.

The technical feasibility, supported by the Essex Net Zero Policy Study and Essex Net Zero Specifications Guide outlines how energy use targets are to be met by different residential and non-residential typologies alongside the technical and fabric solutions required. The financial viability is supported by the Essex Net Zero Policy Study which outlines that the cost uplift of building to net zero standards when compared to building regulations is 3% - 7% for residential typologies and between 2% - 12% for non-residential typologies. Costs can also be reduced through improving form factors, building orientation for solar gain and adjusting sizes of windows to balance heat loss and gain. The Essex Net Zero Specifications Guide identifies that the practices, products and technologies required to build to net zero standards are not novel and that many contractors will already possess the required skills to work with these approaches. Legal justification, and the reasoning for going above Part L Building Regulations and using the energy metrics approach, is shown within the 'Essex Open Legal Advice A (Updated May 2025) – Energy policy in plans and Building Regulations', backed up by support that other authorities have had development plans approved with policies including higher energy efficiency standards, including the Tendring Colchester Borders Garden Community DPD.

Separate evidence was sourced for supporting the introduction of an embodied carbon policy, detailing that there is scope for reducing embodied carbon, particularly upfront embodied carbon produced during materials supply and building construction.

This evidence, alongside the NPPF and legislation, informed policies NZ1: Net Zero Carbon Development (in operation) and NZ2: Net Zero Carbon Development – Embodied Carbon. Policy NZ1 includes several key requirements for ensuring homes and buildings are highly energy efficient, do not use fossil fuels and have their energy needs fully provided by on site renewable energy. It also outlines the need for contractors to confirm they have built to these standards alongside requiring developments of more than 100 dwellings to report in use energy monitoring on a minimum of 10% of dwellings. Policy NZ2 outlines key principles for reducing embodied carbon through giving priority to the reuse, renovation or retrofitting of existing buildings, requiring new proposals to demonstrate how they have reduced embodied carbon through good design and material efficiency and requiring major developments, retrofit and rebuilds to meet specified embodied carbon targets as recommended within the Essex Embodied Carbon Policy Study.

1. Introduction and Purpose

1.1 To help with the consideration, interpretation and consultation on the Preferred Options Regulation 18 Plan and later stages of plan making, a series of Topic Papers have been prepared which summarise the evidence base and details how this evidence has helped shape the policies in the Preferred Options Local Plan. These Topic Papers are 'live' documents and will be updated as the plan making process progresses.

1.2 This is the Net Zero and Embodied Carbon Topic Paper. It provides the context for the Net Zero Carbon Homes and Buildings and Embodied Carbon policies in the Net Zero Homes and Buildings, Renewable Energy and Water chapter of the Preferred Options Local Plan.

1.3 This Topic Paper summarises the relevant evidence base documents, which are:

- Net Zero Carbon Viability and Toolkit Study (August 2022)
- Essex Net Zero Policy Study (July 2023)
- Essex Embodied Carbon Policy Study (June 2024)
- Essex Open Legal Advice A (Updated May 2025) – Energy Policy and Building Regulations
- Update Report – Essex Energy Offsetting Tariff (July 2025)

1.4 Using these evidence documents, Essex County Council have formed two model policy positions outlining suggested policy wording for inclusion in Local Plans. These are outlined below:

- Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex (November 2023)
- Planning Policy Position for Lower Embodied Carbon Homes and Buildings in Greater Essex (July 2025). This has been published as a draft position.

1.5 These documents provide recently prepared, comprehensive and robust evidence sources that are drawn on at various points throughout the paper and have informed the Plan. Much of the evidence is lengthy, technical, and in part complex. The Topic Papers aim to help make the evidence clearer where necessary and also bridge the gap between the evidence and how it has informed the plan.

1.6 Other relevant Topic Papers include:

- Water
- Environment

2. Background

2.1 In December 2015, the UK joined forces with 195 countries to endorse a ground-breaking international accord aimed at curbing climate change. The Paris Agreement compels nations worldwide to reduce greenhouse gas emissions to avert the direct consequences of global warming. The UK's Climate Change Act, established in 2008, sets a target to slash net carbon emissions to 100% of 1990 levels by the mid-21st century, with five-year carbon budgets setting interim targets and tracking progress. To drive progress and set the UK on a pathway towards this target, the Act contains a legally binding requirement for carbon budgets which acts as 'stepping-stones'. This ambition has been bolstered by subsequent laws mandating a transition to net zero greenhouse gas emissions by 2050 and the latest, Sixth Carbon Budget, sets a target of a 78% reduction in emissions by 2035 compared with 1990 levels.

2.2 The Climate Change Committee warned in their 2022 report to Parliament that the UK is off target and rapid and deep cuts to emissions must be made in all sectors to get on track. It is therefore imperative that the built environment sector does not delay and plays its full role in tackling climate change.

2.3 In 2019, Colchester City Council acknowledged the pressing need to address climate change by declaring a climate emergency. The Council has a carbon neutral emissions target they are committed to achieving by 2030.

2.4 Following climate emergency declarations across Essex, Essex County Council (ECC) established the Essex Climate Action Commission (ECAC), bringing together the skills and expertise of 30 independent commissioners, drawn from a range of public, private, and third sector organisations to help develop a co-ordinated approach to addressing climate change. The ECAC was launched in May 2020 for an initial term of two years and was then extended for a further three years till 2025. A further extension was granted so it will now run till March 2027.

2.5 We are already experiencing some of the impacts in Essex with hotter summers, water supply pressure and more frequent and intense weather events. The number of homes at risk of flooding in Essex could double by 2050. This is all consistent with projections of climate change. The independent Climate Commission for Essex has been established and published its interim report in November 2020. This report recommends that all new homes and commercial buildings granted planning permission should be carbon net zero by 2025 and carbon positive by 2030. A full commission report 'Net Zero: Making Essex Carbon Neutral' was published in July 2021 and an update on progress with actions in the

report, ‘The Essex Climate Action Commission: Review of Impacts 2020-2024’ produced in December 2024. ECC also have their own Essex Climate Action Plan 2021-2025.

2.6 Progress is being made in Essex, from extensive tree planting to improvements to the cycle networks, but we can do so much more and the sooner we do the better to avoid the worst effects. The responsibility doesn’t just lie with the national and local government but with parish councils, businesses, voluntary groups as well as individuals.

National Context

Climate Change Act 2008

2.7 The Climate Change Act 2008 (CC Act 2008) sets the UK statutory target for reducing greenhouse gas emissions to at least 100% lower than 1990 levels by 2050. This is known as the 2050 UK Net Zero target.

2.8 As part of the duties set out in the CC Act 2008, the Government must set carbon budgets for five year periods taking into account advice from the Climate Change Committee. The latest, Sixth Carbon Budget, sets a target of a 78% reduction in emissions by 2035.

2.9 The Government is also required to make annual reports to Parliament on the progress made towards meeting the carbon budgets and 2050 Net Zero target, and it must report on the impact of climate change.

2.10 The Climate Change Committee warns that the UK is currently off target and rapid and deep cuts to emissions must be made in all sectors.

2.11 It is therefore imperative that the built environment sector plays its full role in tackling climate change, and the new build sector must not delay action and add to the problem by increasing emissions unnecessarily. Evidence prepared for Essex shows that delivering net zero carbon homes and buildings now is technically feasible and financially viable.

The Planning & Compulsory Purchase Act 2004 (as amended)

2.12 Section 19 (1A) of the Planning and Compulsory Purchase Act 2004 (P&CP Act 2004) requires that development plan documents must include policies designed to secure that development of land in the local authority’s area ‘contribute to the mitigation of, and adaptation to, climate change.’

2.13 There is a statutory obligation on Local Plans to therefore contribute to the national climate targets set out in the Carbon Budgets and the 2050 Net Zero target.

2.14 By ensuring new homes and buildings are net zero carbon in operation from the outset and are built to a robust net zero standard accounting for all of a buildings energy use (known as regulated[1] and unregulated energy[2]), Colchester City Council will be able to demonstrate that it is fulfilling its legal duty and contributing to national climate targets. In addition, the policy also helps contribute to locally set targets which the City Council has committed to through its Climate Emergency declaration and subsequent Action Plan.

Planning and Energy Act 2008

2.15 The Planning and Energy Act 2008 (PEA 2008) gives power to local authorities to set their own energy efficiency standards in their development plan documents. Section 1 of the PEA 2008 provides that:

"(1) A Local planning authority in England may in their development plan documents, ..., include policies imposing reasonable requirements for –

A proportion of energy used in development in their area to be energy from renewable sources in the locality of the development;

A proportion of energy used in development in their area to be low carbon energy from sources in the locality of the development;

Development in their area to comply with energy efficiency standards that exceed the energy requirements of building regulations. ....

(4) The power conferred by subsection (1) has effect subject to subsections (5) to (7) and to –

(a) section 19 of the Planning and Compulsory Purchase Act 2005 (c.5), in the case of a local planning authority in England; [...]

(5) Policies included in development plan documents by virtue of subjection (1) must not be inconsistent with relevant national policies in England."

2.16 The 'Essex Open Legal Advice – Energy Policy and Building Regulations' (published May 2025 as a revision to previous advice) confirms that:

"The PEA 2008 confirms beyond peradventure that LPAs can bring forward policies that go beyond current Building Regulations standards" and that "it supports authorities bringing forward policies using energy efficiency standards set out or endorsed in national policies or guidance (such as those focused on reducing regulated carbon emissions and any energy efficiency standard recognised as part of an assessment of whole life energy costs of whole life-

[1] Regulated energy use is the energy used for the heating, hot water, lighting and cooling of the building
[2] Unregulated energy use is the energy used for any appliances, lifts and anything plugged into sockets

cycle carbon assessments) that go beyond current Building Regulations standards".

2.17 The Advice goes on to clarify that:

"So long as there is a robust evidence base – a reasoned and robustly costed rationale – it is open to Examining Inspectors, in the exercise of their planning judgement, to determine that policies using metrics and methods of calculation other those specified in the 2023 WMS are sound. Such policies would be consistent with national policy on climate change mitigation, adaptation and the net zero obligations.

2.18 Therefore, setting energy efficiency standards is consistent with the duties of the Climate Change Act 2008 and the Planning and Compulsory Purchase Act 2004 and aligns with the NPPF.

2023 Written Ministerial Statement

2.19 Since the publication of the 'Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex' on which the policy is based, a Written Ministerial Statement has been made entitled 'Planning – Local Energy Efficiency Standards Update' (13 December 2023).

2.20 The WMS states that:

"the Government does not expect plan-makers to set local energy efficiency standards for buildings that go beyond current or planned building regulations".

2.21 The WMS goes on to advise local examiners that:

"Any planning policies that propose local energy efficiency standards for buildings that go beyond current or planned buildings regulation should be rejected at examination if they do not have a well-reasoned and robustly costed rationale that ensures:

- That development remains viable, and the impact on housing supply and affordability is considered in accordance with the NPPF.
- The additional requirement is expressed as a percentage uplift of a dwellings' Target Emissions Rate (TER) calculated using a specified version of the Standard Assessment Procedure (SAP)."

2.22 Although the tone of the WMS is negative, it does not preclude including the policy in the Local Plan because the policy is based on a substantial evidence base which provides a 'well-reasoned and robustly costed' rationale.

2.23 The first bullet point reflects the current policy position in that all local plans are viability tested and ensure deliverability of supply, so is effectively a moot point.

2.24 The second bullet point prescribing the 'TER approach' represents a change in approach from that already accepted and found sound by the Planning Inspectorate. It also goes against the growing consensus, evidence-led, body of opinion in industry and some 70 local authorities that the energy metrics approach to delivering net zero carbon development is the best approach if we are to meet climate and energy targets and deliver wider social benefits.

2.25 The Government has provided no evidence, reasoning or justification with the WMS to explain why the TER approach is considered necessary or is preferable to any other way of expressing policy requiring higher energy efficiency standards. No consultation with local authorities has been carried out on this matter.

2.26 The TER approach is considered by industry experts to be a substandard approach as it is not a measure of energy efficiency and cannot be measured in-use. Alternatively, the energy metrics approach set out in the policy uses 'Energy Use Intensity' (EUI) that can be estimated at the design stage of a building and very easily monitored and verified in-use. CIBSE, RIBA, UKGBC, and UK Net Zero Carbon Buildings Standard and LETI all support the use of energy metrics.

2.27 Industry experts, LETI, in their statement on the WMS advise that EUI: "is a metric that can be used to compare buildings of a similar type and is far more practical for the construction industry and consumers to understand".

2.28 The Town and Country Planning Association (TCPA) have issued a statement on the WMS, and advise that the weight of the WMS should not be exaggerated – "the WMS is subservient to primary legislation and cannot be interpreted in a way that undermines the legislative requirements placed on LPAS or undermine the powers that are granted to LPAs through primary legislation..."

2.29 Legal advice on the 2023 WMS has been sought by the Essex Climate Action Commission. This advice provides an update to the legal justification already published to support the 'Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex' (November 2023). The advice concludes that: "the 2023 WMS cannot be interpreted to prevent LPAs from putting forward, and planning inspectors from finding sound, policies which are justified and evidenced and which use

metrics other than the TER metric and/or do not require calculation by SAP, such as the Essex net zero evidence base and model policy."

2.30 The Essex net zero evidence base, supplemented by the initial Colchester viability assessment, demonstrates that the policies are technically feasible, financially viable and legally justified. The policy is therefore considered reasonable and accords with the provisions of the PEA 2008.

2.31 Further clarity has been provided to local authorities on the setting of local energy efficiency standards in planning policy in the 30 January 2024 Chief Planner newsletter. It confirmed that:

"The Written Ministerial Statement does not revoke the ability of local plan-makers to set energy efficiency standards at the local level that go further than the Building Regulation, which was established by the Planning and Energy Act 2008."

2.32 Therefore, under the powers provided by the PEA 2008, it is entirely reasonable and legally justified to continue to progress the evidence-led energy metrics policy approach to achieving net zero carbon homes and buildings in Greater Essex. This approach aligns with local and national climate targets and delivers wider benefits to communities.

NPPF

2.33 All policies in the Local Plan must be positively prepared, justified, effective and consistent with national policy. The National Planning Policy Framework (NPPF) sets out the overarching planning policy framework, supported by the National Planning Practice Guidance (PPG).

2.34 The NPPF says:

'The planning system should support the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.' (NPPF paragraph 161)

2.35 Paragraph 164(b) says: 'Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.'

National Policy Guidance

2.36 Paragraphs 001 Reference ID: 6-001-20140306 to 012 Reference ID: 6-012-20190315 of the PPG set out the relevant climate change evidence base required to support plan making and decision taking in full. The following is a summary of the points for consideration.

2.37 Addressing climate change is one of the core land use planning principles which the NPPF 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 NPPF. 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 of the Climate Change Act 2008 and co-operate to deliver strategic priorities which include climate change.

2.38 In addition to the statutory requirement to take the NPPF into account in the preparation of Local Plans, there is a statutory duty on local planning authorities to include policies in their Local Plan designed to tackle climate change and its impacts.

2.39 The PPG includes the following as examples of how the challenges of climate change could be addressed through a Local Plan:

2.40 Examples of mitigating climate change by reducing emissions:

• Reducing the need to travel and providing for sustainable transport

• Providing opportunities for renewable and low carbon energy technologies

• Providing opportunities for decentralised energy and heating

• Promoting low carbon design approaches to reduce energy consumption in buildings, such as passive solar design

2.41 Examples of adapting to a changing climate:

• Considering future climate risks when allocating development sites to ensure risks are understood over the development's lifetime

• Considering the impact of and promoting design responses to flood risk and coastal change for the lifetime of the development

• Considering availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality

• Promoting adaptation approaches in design policies for developments and the public realm

2.42 Policies which set energy efficiency standards beyond Building Regulations are already in place in three local planning authorities (LPAs) in England having been subject to examination, recommended for approval by an Independent Inspector and subsequently adopted in their development plan documents. A similar approach is also being progressed by a large number of other LPAs and are at various stages of the Local Plan process. This is discussed further in section 3.22, including reference to the Tendring Colchester Borders Garden Community Development Plan Document which had higher energy efficiency standards included in it which were approved by the inspector.

2.43 The planning policy position, developed by Essex County Council, is based on a comprehensive evidence base that has been collaboratively established between the Essex Climate Action Commission, Essex County Council and the local planning authorities of Greater Essex. The aim of the evidence base is to provide a clearly defined, consistent planning policy approach to net zero carbon development in Greater Essex providing much needed certainty and clarity to the development industry and other stakeholders. The content of the planning policy position is similar to that included in adopted policies at other LPAs referred to above. Similar Policies underpinned by the same evidence base were tested at the Examination of the Uttlesford Local Plan earlier this year. When the findings of the Inspector's report are available any implications on the Policy approach proposed will be considered.

2.44 The planning policy position developed for net zero carbon homes and buildings is published on the Essex Design Guide and is based on the 'energy metrics' approach[3] which aligns with best practice advocated by leading industry bodies and experts and the Net Zero Hubs (linked to the Department of Energy Security and Net Zero) and aligns with the 'net zero' energy metrics policies adopted by other local authorities. The approach also aligns with the advice of the Climate Change Committee who advised in 2019 that:

"new homes should deliver ultra high levels of energy efficiency as soon as possible and by 2025 at the latest, consistent with a space heat demand of 15-20 kWh/m2/yr. Designing in these features from the start is around one-fifth of the

[3] This approach sets an energy usage per m^2 per year of the property. This target for energy use is measurable so can be checked to see if it is met when the property is occupied, and actually promotes energy efficiency rather than being focussed on a % reduction in CO_2 levels when compared to Part L building regulations (2013) that the current 2021 building regulations are based on.

cost of retrofitting to the same quality and standard." (Page 14, UK Housing Fit for the Future Report 2019).

Local Policy and Guidance

2.45 Colchester City Council declared a climate emergency in 2019. Since then, a Climate Emergency Action Plan was adopted and has been regularly reviewed to keep it up to date. The Climate Emergency Action Plan includes details of key projects and actions that will reduce emissions and produce positive environmental impacts for the city. The Action Plan has many different themes and actions, which are listed below:

- Our buildings and fleet vehicles
- Produce renewable energy
- Enhance biodiversity and protect our natural environment
- Supporting active travel and improving air quality
- Supporting you to reduce, reuse and recycle
- Working with others to take environmental action
- Sustainable planning, economy and energy efficient homes
- Changing the way we work

2.46 In July 2021, the Essex Climate Action Commission (ECAC) published its report 'Net Zero: Making Essex Carbon Neutral' which set out a series of recommendations, that were adopted in full by Essex County Council and endorsed by Essex LPAs. Among these was the recommendation that all new homes and commercial buildings granted planning permission in Essex should be zero carbon by 2025, and carbon positive by 2030.

2.47 ECAC acknowledges that nature is our most effective ally in reversing climate change, playing a vital role in carbon absorption and storage. The report suggests that the risks posed by changing weather patterns – including increased flooding, overheating, soil degradation, subsidence, and water shortages – can be addressed by creating space for green infrastructure and preserving our natural world. The report emphasises that if Essex is to become a net zero county by 2050, the majority of the work needs to be accomplished in the next decade. ECAC provides

recommendations in the report that are both necessary and achievable for Essex to be net zero by 2050. Many of these measures must be implemented, or at least well underway, by 2030 if not before. ECAC believes that the measures detailed in the report will also lead to an enhanced natural environment for public enjoyment and a thriving economy that benefits local employment and livelihoods. By transforming Essex into a net zero county, it can evolve into a sustainable, flourishing place to live, work, and enjoy leisure activities.

2.48 ECAC recommended setting up a Climate and Planning Unit to drive action across the Essex LPAs. An extensive evidence base has been prepared and has been used to prepare a planning position document, which sets out a model policy approach for Essex to net zero carbon development along with explanatory text and reasoned justification. The published model policy, is in line with best industry practice and is recommended to LPAs in Greater Essex to embed in their Local Plans (and other associated planning documents). The model policy is currently being embedded in emerging Local Plans across Essex. The model policy uptake into Local Plans ensures that all new homes and buildings in Essex will achieve a consistent, clearly defined, net zero carbon (in operation) standard that aligns with local and national climate targets and delivers high quality, healthy, energy efficient, climate resilient homes and buildings.

2.49 The model policy for net zero carbon homes and buildings, published in the Essex Design Guide, aligns with best practices recommended by leading industry bodies and experts (such as the South West Energy Hub), by incorporating easily understandable, measurable and verifiable energy metrics. Furthermore, it harmonizes with the net zero energy metrics policies adopted by other local authorities as well as the UK Net Zero Carbon Buildings Standard which is being developed by BBP, BRE, the Carbon Trust, CIBSE, IStructE, LETI, RIBA, RICS, and UKGBC. Essex County Council, through its Climate Action Planning Unit and commissioned by the Essex Climate Commission, has drafted net zero policies for homes and buildings. Policies cover net zero buildings and embodied carbon. These policies have been drafted based on an extensive evidence base. This includes technical feasibility, viability appraisal and legal justification.

2.50 The Whole Life Carbon impact of a development is made up of carbon emissions from the operation or use of a home or building, and carbon emissions that are embodied in the materials, processes, and construction of a home or building. The ‘placeholder’ policy for embodied carbon is included in the Preferred Options Local Plan. This has now

been superseded by the first draft of the Planning Policy Position for Lower Embodied Carbon Homes and Buildings in Greater Essex, which takes forward the recommendations of the Embodied Carbon Policy Study for Essex.

2.51 The Council supports these policies and have included the Planning Policy Position for Net Zero Carbon Development Homes and Buildings in Greater Essex and placeholder policy for embodied carbon in the Preferred Options Local Plan. The evidence base commissioned by Essex County Council is relied on to justify these policies. The evidence shows that delivering net zero carbon homes and buildings now is technically feasible, financially viable and legally justified.

3. Evidence Base

3.1 The evidence base for the model policies included in the Preferred Options Local Plan is open source and is available on the Essex Net Zero Evidence page of the Essex Design Guide (EDG). It is supplemented by each Essex LPA's own local plan evidence base, particularly with regard to local plan viability.

3.2 The evidence documents are:

- Essex Open Legal Advice A – Energy policy and Building Regulations by Estelle Dehon KC, Cornerstone Barristers, July 2025
- Report 1: Essex Net Zero Policy – Technical Evidence Base by Introba, Etude, Currie & Brown, July 2023
- Report 2: Essex Net Zero Policy – Summary of Policy, Evidence and Validation Requirements by Introba, Etude, Currie & Brown, July 2023
- Net Zero Carbon Viability and Toolkit Study by Three Dragons Qoda Ward Williams Associates, August 2022
- 'Essex Embodied Carbon Policy Study'– technical evidence base by Levitt Bernstein, Etude, Introba, Hawkins/Brown, Currie and Brown, June 2024
- Essex Net Zero Specifications – Specification Guidance by Introba, Currie and Brown, Etude, Levitt Bernstein July 2024

3.3 The evidence base demonstrates that the model policies are technically feasible, financially viable and legally justified.

3.4 To complement this evidence, practical design advice is provided (and being added to) on the Essex Design Guide focusing on how to design developments (of all scales and types) to meet the net zero carbon and energy standards, mitigate potential overheating risk and to address other inter-related sustainability issues. The aim is to ensure new development mitigates, adapts and is resilient to a changing climate.

3.5 Evidence commissions are underway led by the Climate and Planning Unit analysing supply chain and skills development factors and identifying potential opportunities for supporting interventions.

3.6 Energy performance targets incorporated into planning policy also aligns with evidence from industry bodies and government agencies including the UK Green Building Council, the Low Energy Transformation Initiative, the South West Net Zero Hub (together with the Greater South East Net Zero Hub – guidance note) and the Government Property Agency and the Climate Change Committee.

3.7 The ‘Net Zero’ evidence base established for Essex includes a Net Zero Carbon Viability Study by Three Dragons consultants which provided a high-level financial viability assessment of building to higher energy efficiency standards (similar to Passivhaus) and incorporating non fossil fuel heating and renewable energy technology. The Study findings indicated that it was viable to build to this standard for most development types assessed in the majority of Essex.

3.8 The ‘Net Zero Policy Study for Essex’ by Introba, Etude and Currie & Brown progressed the recommendations of the Three Dragons study and explored the technical feasibility of building to a clearly defined net zero carbon in operation standard that aligned with climate targets and addressed both regulated and unregulated energy uses of a building. The Study included detailed costings of the policy approach recommended. These costings will be used in the Colchester Local Plan viability assessment.

3.9 The Essex Open Legal Advice documents help to outline the legal justification for local authorities to set higher energy efficiency standards in policies than those outlined in building regulations. The evidence is comprehensive, explaining how setting higher energy efficiency standards in policy is supported by many legislative documents including the Planning and Compulsory Purchase Act 2004, Planning and Energy Act 2008 and Climate Change Act 2008, alongside policy guidance included in the NPPF and PPG.

3.10 The embodied carbon study is groundbreaking, being one of only a few similar studies prepared across the country and prepared collaboratively by five consultants. It identifies the carbon emissions associated with production, construction and end of use (e.g. reuse, demolition) of a building. It establishes several key principles for the consideration and reduction of embodied carbon such as through building design, following a retrofit first approach and using low carbon materials. Embodied carbon is a newer concept within the building industry, but standards for limiting and reducing it are emerging as part of a cross industry working group establishing the ‘Net Zero Carbon Building Standard’.

Engagement – Issues and Options

3.11 As part of the Local Plan iterative Issues and Options engagement, the Council asked if the Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex is suitable and appropriate to include in the Colchester Local Plan. The Council included links to the policies and evidence base and we asked the question: Is the Planning Policy

Position for Net Zero Carbon Homes and Buildings in Greater Essex suitable and appropriate to include in the Colchester Local Plan Review?

3.12 Consultation ran between 16 April 2024 and 30 May 2024. A total of 43 representations were received. Responses were mixed with generally positive responses from the public and statutory consultees.

3.13 Objections came from developers who largely suggested that planning policies should reflect Building Regulations as they establish a uniform approach which prevents confusion in understanding the approach to be taken. They also outlined concerns associated with the increased costs of building to a net zero standard, the new skills and training requirements that would be required from developers to build to a net zero standard and where responsibility lies for the maintenance of renewable energy systems that are installed in buildings.

3.14 There were a number of comments supporting the net zero policy but strongly objecting to including Middlewick Ranges in the Local Plan. People made the point that Middlewick Ranges Local Wildlife Site is a significant carbon sink.

3.15 Responses from developers are covered in more detail in section 4, along with the justification of policies included in the Preferred Options Local Plan.

3.16 The inclusion of the net zero policies in the Preferred Options Local Plan is supported by an extensive evidence base (as outlined above). Explanation and justification for its use with backing information from the evidence base is outlined in more detail below under the following sections: Building Regulations; technical feasibility; financial viability; implementation and compliance, monitoring and enforcement including resource implications; skills and training; renewable energy and maintenance; regulatory burden; and embodied carbon. The following justification addresses the comments made from developers/agents to the Issues and Options engagement and summarises the key points from the evidence base.

Building Regulations

3.17 The Building Regulations set minimum standards that must be achieved for energy performance in new homes and buildings. These are a ‘floor’ and not a ‘ceiling’.

3.18 Planning policy is necessary to address the shortcomings within the Building Regulations 2021 and the proposed Future Homes Standard 2025. The Net Zero Carbon Viability Toolkit study outlines that these standards do not adequately address operational carbon emissions from

new development as they only cover a proportion of energy use of a building, namely regulated energy use and they rely on grid decarbonisation to achieve 'net zero'. Relying on grid decarbonisation is a flawed approach as it does not incentivise further improvements in energy efficiency, it does not deliver net zero immediately (which evidence shows is possible now and is necessary now), it does not reduce the energy costs of residents by making sure energy demand is minimised, and it puts unnecessary burden on the electricity grid at a time when pressure is increasing due to the electrification of transport and heating from existing buildings. In addition, because the compliance models are a relative improvement over a 'notional' building then a key element of energy efficient design – the building form – is not rewarded. Performance gap issues and the use of rapidly out of date carbon factors also make it difficult to compare the performance of buildings constructed at different times.

3.19 Using the energy metrics approach in planning policy addresses these issues and ensures that the policy is 'future proofed' by continuing to incentivise and drive forward energy efficiency improvements and renewable energy generation even when the grid is fully decarbonised. This approach is recommended within the Essex Net Zero Policy: Technical evidence base.

3.20 There is a wide body of evidence (LETI, UKGBC, etc) and consensus around the approach set out in the policy based on energy metrics to deliver truly net zero carbon and net zero energy homes and buildings in a way which is best for residents/ occupiers, the climate and the grid. It is an approach which is being progressed in many local authorities and regions across England – including Cambridgeshire, Oxfordshire, Central Lincolnshire, Norfolk, Suffolk, Hertfordshire, the West of England, the South-west Region, Greater Manchester and numerous London Boroughs. The Town and Country Planning Association (TCPA) indicates currently that around 70 local authorities, including those with adopted or in consultation plans, are adopting this approach.

3.21 Within Essex, Uttlesford District Council included the full ECC model policy, with some minor amendments[4], when updating their Local Plan which was submitted to the Secretary of State for independent examination on 18 December 2024. The inspector outlined some initial

[4] The policy was included with some minor amendments, the main one being a clause associated with Energy Use Intensity (EUI) limits achieved in residential developments. The EUI limits outlined in the ECC Planning Policy Position for residential developments should be 35 kWh/m2 GIA/yr. The Uttlesford Policy includes this but the extra clause states that on larger sites the energy use intensity limits may be met as a site wide average, rather than for each property, provided that no single dwelling has an EUI of >60kWh/m2 /yr. ECC are currently reviewing this clause for its suitability.

questions associated with the policy at examination hearings in June 2025 focussed on the level of consistency with national policy and implications for housing delivery. These points were addressed during the hearings with evidence, but the inspector is still considering the policy and its requirements with an initial report from the inspector due in August 2025

3.22 The Essex Open Legal Advice A outlines that homes built to higher standards have shown to be feasible and viable at a local authority level across England, having passed tests of Local Plan inspection, notably Cornwall (Technical Evidence Base) and (Viability Report), Central Lincolnshire and Bath and North East Somerset. Additionally, GC Policy 8 Part A within the Tendring Colchester Borders Garden Community Development Plan Document included the energy metrics approach in order to achieve net zero housing on site. The Inspector's report on this document, published on 31 March 2025, stated that the policy was appropriate and justified and that there is "no evidence to suggest that, in this case, the longstanding aspiration for the garden community to meet the highest standards of sustainable design and construction measures would therefore make the development unviable or undevelopable over the plan period".

3.23 For developers that are striving to improve standards and are committed to meeting climate targets and delivering healthy, more energy efficient and climate resilient homes then the policy standards are not burdensome as they are part and parcel of good design practice. Developers should be understanding of the energy performance of buildings and striving to continuously improve the energy efficiency of them.

3.24 The Climate Change Act 2008 sets the UK statutory target for reducing greenhouse gas emissions to at least 100% lower than 1990 levels by 2050. The Climate Change Committee warns that the UK is currently off target and rapid and deep cuts to emissions must be made in all sectors.

3.25 It is therefore imperative that the built environment sector plays its full role in tackling climate change, and the new build sector must not delay action and add to the problem by increasing emissions unnecessarily. The Essex 'Net Zero' evidence base provides a comprehensive and robust technical feasibility and costings evidence to justify the proposed policy approach.

3.26 Local Authorities have statutory powers to set planning policies which require energy efficiency standards that are better than Building Regulations as long as these are evidenced and justified. The legal

justification is set out in the Essex Open Legal Advice A which should be read alongside the TCPA resource page (16 July 2024) which addresses the latest situation regarding the WMS 2023, including a guest blog by Estelle Dehon KC.

3.27 The planning policy will help ensure that new homes and buildings are designed and built so that energy demand is minimised; where energy is needed it is used as efficiently as possible; and opportunities for on-site renewable energy generation are maximised. It uses the best practice, measurable, clearly defined, absolute, energy metrics approach of setting space heating and energy use intensity limits and a target for 100% of the energy used on site to be supplied by renewable energy generation on-site (incorporating an energy offsetting mechanism which will deliver off-site renewables in order to provide flexibility for instances where the on-site target is not technically possible).

3.28 By achieving these measures, homes and buildings will be more resilient to a changing climate; are highly energy efficient and generate renewable energy to achieve an operational energy balance on site over the course of a year (for both regulated and unregulated energy use); are truly net zero carbon in operation from the outset; and align with local and national climate targets.

3.29 Energy performance targets incorporated into planning policy also align with evidence from industry bodies and government agencies including the UK Green Building Council, the Low Energy Transformation Initiative, the South West Net Zero Hub (together with the Greater South East Net Zero Hub – guidance note) and the Government Property Agency and the Climate Change Committee.

3.30 There is no confusion or complication. The policy approach aligns with industry best practice and delivers homes and buildings by simply setting energy limits for space heating and a buildings total energy use expressed in kWh per m2 and by requiring renewable energy generation to match demand and hence delivering net zero now. It is easily predictable throughout the design development stages and as-built.

Technical feasibility

3.31 The Essex Net Zero Policy Study (Reports 1 and 2) led by Introba alongside industry experts Etude (sustainability engineers specialising in low energy building design and net zero carbon strategy) and construction and cost management consultants Currie and Brown provides the technical evidence to support the specific policy requirements identified to ensure that new development in Essex is built to be net zero carbon in operation from the outset and aligns with climate

targets. Report 1 sets out the technical and financial evidence to support the recommended Net Zero policy requirements for all new residential buildings based on the 6 prominent residential typologies: terrace block, bungalow, semi-detached house, block of flats (low rise), block of flats (mid-rise), block of flats (high-rise). In addition, analysis has also been undertaken for the following 3 non-domestic typologies: office, school and industrial. The Essex Net Zero Specifications Guide adds to this, outlining the technical and fabric solutions for building to a net zero standard. Predictive energy modelling using Passive House Planning Package (PHPP) for domestic, and CIBSE TM54 for non-domestic typologies, was carried out to support the technical evidence base and inform local planning policies. The accuracy of energy modelling is important to ensure it provides a reasonable indication of real-world performance. While behaviours may vary once a building is occupied, energy modelling can be used to reliably establish predicted energy use and therefore drive suitable design and construction decisions.

Financial Viability

3.32 High level capital cost analysis was undertaken by Currie & Brown to benchmark the likely capital cost for the typologies under the modelled specifications for complying with the proposed net zero policy. The uplift costs associated with each specification option were estimated based on Currie & Brown's cost datasets for energy efficient and low carbon technologies which incorporate information from market prices, specific market testing and first principles cost planning by their specialist quantity surveyors. To meet the Net Zero policy energy use intensity and space heating demand limits, the total capital cost uplift over Part L 2021 Building Regulations (does not include running cost) ranges between 3% - 7% for residential typologies and between 2% - 12% for non-residential typologies.

3.33 Furthermore, section 3.0 of the Essex Net Zero Specifications Guide covers the topic of achieving net zero at a low cost, identifying the cost saving areas which can balance any potential uplift areas, whilst demonstrating how Net Zero design can be lower cost through improved form factors, optimising solar gains for more consistent heating of homes, whilst avoiding overheating and moderating the areas for heat loss and gain through optimised window to wall arrangements.

3.34 This information on costs and viability has been provided to the Viability Consultants for the Colchester Local Plan and will be considered as part of the whole plan viability assessment.

Implementation and Compliance & Monitoring and Enforcement, including Resource implications

3.35 The Climate and Planning Unit and Essex County Council alongside Colchester and the Local Planning Authorities within the Greater Essex Area are collaboratively developing a framework for Monitoring and Implementation to sit alongside the Net Zero New Build Development Policy as a guide for industry, with key reporting templates and checklists to ensure information is presented which is deemed sufficient to provide the evidence to meet the policy requirements, both in design, and at an as built stage. This is currently being developed whereby long-term monitoring of buildings may not be considered as a mandatory requirement. It is deemed as built modelling evidence will be sufficient to demonstrate compliance with requirements. The guide will broadly follow the recommendations made within Report 2 of the Essex Net Zero Policy study, supplementing in areas identified by local authorities as requiring greater levels of consistency of reporting methodologies.

Skills and Training

3.36 The Net Zero New Development policies bring together elements understood across the sector as best practice to meet high energy efficiency standards. The policy requirements do not introduce any novel practices, products or technologies that are not utilised at this moment in time across the industry, instead relying on practices that are providing high quality design and build solutions.

3.37 Essex Design Guide Guidance such as The Essex Net Zero Specification Guidance provides technical information to support the delivery of Essex Net Zero development with consistent planning policy approach towards reducing carbon emissions from new development in Essex.

3.38 The Essex Net Zero Specifications guide contains outline packaged solutions that meet the net zero new build development requirements.

3.39 Within the main document, a 2-page guide has been developed for each housing typology which covers fabric and system options in addition to mechanical ventilation and heat recovery (MVHR) best practice design guidance. The document also includes high level guidance on design considerations and thermal bridging.

3.40 Within the supporting document the Essex Net Zero Specifications Guide brings background information on topics that are not covered in the 2023 Essex Net Zero policy supporting information such as high-level advice on the requirements regardless of meeting Net Zero, aesthetics of Net Zero and achieving Net Zero at low cost.

3.41 Outlining specifications that can be used to deliver net zero development will support in the reduction of carbon emissions, important for meeting local and national climate targets, including the Essex Climate Action Commission target for all new development to be carbon positive by 2030.

3.42 Where technical knowledge shortages are present during design, the Essex Design Guide can offer supporting information on key topics such as form, fabric, orientation, solar design, PV design and renewable energy for developments. Meanwhile, there are significant and well-respected industry guidance and standards on key topic matters relating to shading, energy modelling, overheating, embodied carbon and more. Where required the Climate and Planning Unit can facilitate upskilling on key topics for local authorities, as well as identifying and signposting where guidance is already readily available.

3.43 For upskilling for on-site construction practices to achieve the levels of design, there are numerous industry bodies that offer training for the technologies and the fabric installation practices that may be required to meet the designs. Primarily, construction sequencing of the practices for areas such as ensuring airtightness, clarifying and maintaining the thermal envelope/insulation layer and avoiding thermal bridging which may compromise the thermal line intention set out in design. Supporting heating, ventilation and energy generation technologies that work alongside these elements such as the Air Source Heat Pump (ASHP) systems, PV install and Mechanical Ventilation with Heat Recovery systems are becoming well known practices within the industry with many training providers across the county and more locally in Colchester such as the Colchester Institute offering training for key areas. Central Government are consistently offering training grants to upskill the industry, facilitating accessibility to new practices. It is also worth noting that ASHP installation will be part of Building Regulation standards from 2025 onwards, and the capacity of ASHP installers has already increased significantly from 3,000 trainers in 2022 to 8,000 in 2023 across the UK.

3.44 Where any further understanding is required as to the potential shifts to supply chains and skills for net zero new development, the Essex Net Zero Specifications Guide – Supporting document section 5.0 “Supply

chain and skills mapping", offers a perspective view on the current understanding of existing supply chain for materials required to built net zero homes, along with the skills required for building to this standard. It outlines that most of the materials required are either 'easy to find' or 'can be secured with little effort' and that many contractors are either 'very experienced and competent' or 'familiar and comfortable' with many of the technologies and building approaches.

3.45 At a council officer level, the policy requirements are being actively supported through supplementary guidance and templates to ensure that monitoring of conditions and understanding of information received in relation to meeting the policy can be readily understood, and, where non-compliance is identified, can be effectively communicated to the applicant where limitations exist in the application in order to meet the policy requirements.

Renewable Energy and Maintenance

3.46 Solar PV installation is relatively commonplace in the UK, with maintenance requirements well understood. 1.4 million homes now have solar panels in the UK, 4.9% of the UK's households. The East of England (covering Essex) has an above average 5.6% of households with PV. This is not surprising seeing as the South East and East Anglia benefits from the greatest average annual sunshine out of any region, making our county perfectly placed to make the most of this energy generation technique. January 2024 data showed that 36,085 homes in Essex have solar panels, with Colchester having 7,280 of those, the greatest percentage of homes at 9.13% of the districts households. It is understood that there is a necessity for clear guidelines and responsibilities to be allocated to ensure long-term energy generation for the developments, it should initially be assumed that the freeholder will be responsible for the upkeep and maintenance of dwellings. This could be either the freeholder of a single dwelling, landlord, building management company or other similar party. The responsibilities will be similar to the section "Replacement building services in existing dwellings" defined in Part L (2023 revision) "5.6 - If renewable technology such as a wind turbine or photovoltaic array is replaced, the new system should have an electrical output that is at least the same as that of the original installation."

Regulatory burden

3.47 Viability is the most significant consideration in relation to the implementation of new policies such as this, and as such the policy has been formed through the development of a specific and robust evidence

base in which the technical, financial and legal justifications for the policy have been sufficiently scrutinised. The policy approach is specific to the energy performance of the buildings for regulated and unregulated energy use, which is to ensure better representation of in use performance of a building. This alongside providing a net energy balance through on-site renewable energy generation is an approach that ensures net zero is achieved. Alternative standards such as BREEAM and Passivhaus certifications cover multiple areas, but do not provide a consistent approach to achieve net zero. BREEAM covers wider sustainability areas not defined within the policy and as such can be delivered alongside the policy. Passivhaus delivers high levels of performance, and there is a policy option integrated into the approach in which developers and housebuilders looking to achieve the accreditation can also meet the policy requirements through the additional installation of PV and low carbon heating systems.

3.48 The draft Colchester Whole Plan Viability Assessment considered the evidence base that supported the Net Zero Planning Policy and incorporated price uplifts of building to net zero standards within its appraisal.

Embodied carbon

3.49 Embodied carbon considers the emissions produced;

- in the supply of the materials to construct a property
- in the manufacture and transport of the materials
- during the construction process
- disposal or demolition of the associated materials

3.50 When combined with operational carbon (emissions produced during the lifetime of the property's use/occupation), the whole life carbon of the property is considered. Although operational carbon emissions are greater than those of embodied carbon, as buildings become more efficient, the proportion of emissions produced by embodied carbon increases to around 40-70% as outlined in the Essex Embodied Carbon Policy Study.

3.51 Embodied carbon is not currently measured as part of building regulations, however given its significance in contributing to a building's emissions several local authorities have already looked to include policies on embodied carbon within their local plan. The Environmental Audit Committee also urged Government to set embodied carbon targets in order to ensure that net zero targets are met.

3.52 The Embodied Carbon Study emphasises that through planning policies "there is a significant opportunity to reduce upfront embodied carbon through good design choices". Upfront embodied carbon refers to that which is produced during material supply, transport and manufacturing alongside emissions involved during construction of buildings. The policy outlines how buildings can be designed to use less materials, alongside materials that are lower carbon to supply and produce. This considers different parts of the building such as its sub-structure (foundations), super-structure (elements above ground level) and façades.

3.53 The study also identifies that approaches taken to reduce the embodied carbon of a building can help to reduce capital costs by reducing waste from improving efficiency of materials used and improving co-ordination of how buildings are designed and built by site teams. Reducing embodied carbon also helps to address other key issues by reducing waste production and maximising the use of space and existing buildings (by prioritising retrofit and reuse of existing buildings over demolition and creation of new builds where possible). Although use of some alternative materials may incur additional cost, many of these costs will decrease as supply chain scale increases.

3.54 The study outlines how several local authorities such as Bath and North East Somerset Council, Greater London Authority and City of London Council are already setting embodied carbon policies which require assessments of embodied carbon and that embodied carbon targets are met.

4. Approach to the Local Plan

Policy Implementation and Monitoring

4.1 Report 2 of the Essex Net Zero Policy Study (July 2023) by Introba (et al) supports LPAs and applicants with the implementation of the recommended policy approach through the development management process by setting out the information that needs to be submitted with planning applications. The report also includes design guidance and evidence checklists.

4.2 To supplement Report 2 and to provide clarity to LPAs and other stakeholders, a detailed Net-Zero Implementation and Monitoring Plan is being developed by the Climate and Planning Unit (CaPU) to sit alongside the 'Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex'. This will set out supporting documents including detailed validation checklist requirements, simple checklists for planners in assessing energy strategies, planning conditions, s106 clauses, and monitoring templates at various stages of the planning process.

4.3 A high-level implementation process of the net zero policy in terms of approximate planning stages as well as the RIBA Plan of Work stages is also being developed. This will assist applicants to understand what is expected and when through the planning process for minor and major applications as well as provide clarity to Development Management Officers.

The policies

Net zero carbon development (in operation)

4.4 The net zero carbon development (in operation) policy will help ensure that new homes and buildings are designed and built so that energy demand is minimised; where energy is needed it is used as efficiently as possible; buildings do not use fossil fuels; and opportunities for on-site renewable energy generation are maximised. It uses the best practice, measurable, clearly defined, absolute, energy metrics approach of setting space heating and energy use intensity limits and a target for renewable energy generation on-site (incorporating an energy offsetting mechanism which will deliver off-site renewables in order to provide flexibility for instances where the on-site target is not technically possible). It also details the requirement for contractors to submit as built performance information, confirming the building has been constructed to the relevant fabric standards, alongside requirements for developments

of more than 100 dwellings to report in use energy monitoring on a minimum of 10% of dwellings.

4.5 By achieving these measures, homes and buildings will be more resilient to a changing climate; are highly energy efficient and generate renewable energy to achieve an operational energy balance on site over the course of a year (for both regulated and unregulated energy use); are truly net zero carbon in operation from the outset; and align with local and national climate targets.

4.6 The policy is necessary to address the shortcomings within the Building Regulations 2021 and the Future Homes Standard 2025. These do not adequately address operational carbon emissions from new development as they only cover a proportion of energy use of a building, namely regulated energy use. In addition, because the compliance models are a relative improvement over a 'notional' building then a key element of energy efficient design – the building form – is not rewarded as referenced in the Essex Net Zero Policy Technical Evidence Base. Performance gap issues and the use of rapidly out of date carbon factors also make it difficult to compare the performance of buildings constructed at different times.

4.7 Using the energy metrics approach in the policy addresses these issues and ensures that the policy is 'future proofed' by continuing to incentivise and drive forward energy efficiency improvements and renewable energy generation even when the grid is fully decarbonised. Using this approach is supported by the detailed evidence in the Net Zero Carbon Viability and Toolkit Study and the Essex Net Zero Policy Technical Evidence Base.

4.8 The policy is necessary to ensure that new homes and buildings in Colchester align with local and national climate targets and contribute to wider energy system objectives (such as increased energy security and improved energy efficiency and decarbonisation of the grid). The policy will also deliver significant other benefits, for example by:

- Helping to alleviate fuel poverty for residents due to the significantly lower energy needed for space heating than a standard Building Regulations (or proposed Future Homes Standard) home.
- Delivering homes and buildings that are adapted and more resilient to a changing climate than standard Building Regulations (or proposed Future Homes/Buildings Standard) homes or buildings, which benefits the health, comfort and well-being of occupiers.

- Helping to stimulate supply chains and skills development that are necessary to support both new build net zero carbon development and retrofitting existing buildings.

4.9 The policy also responds to growing consumer demand for highly energy efficient, comfortable, climate resilient homes and buildings.

4.10 The policy adopts the principles and energy use limits outlined in the Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex developed by Essex Climate Action Planning Unit which was backed by the extensive evidence base outlined in section 3. The policy also aligns with requirements in the NPPF paragraph 162 for local plans to 'take a proactive approach to mitigating and adapting to climate change' alongside the legal mandate to contribute to the UK's target of reaching net zero by 2050 as established in the Climate Change Act 2008.

Embodied carbon

4.11 The embodied carbon policy is necessary to address the large proportion of emissions that are produced from the embodied carbon of a building, particularly those produced in the material supply, transportation and construction (known as 'upfront carbon') as outlined in the Essex Embodied Carbon Policy Study. It complements the net zero operational carbon policy by considering ways to make building design efficient and respond to a changing climate.

4.12 The policy also aligns with requirements in the NPPF paragraph 161 for the planning system to 'take full account of all climate impacts' and 'encourage the reuse of existing resources, including the conversion of existing buildings'.

4.13 The Policy adopts key principles and requirements referenced within the Essex Embodied Carbon Policy Study associated with reducing embodied carbon including:

- Priority given to re-using, renovating or retrofitting existing buildings.
- All new residential and non-residential buildings proposals to demonstrate upfront embodied carbon has been considered and reduced through good design and material efficiency.
- New major developments, major retrofits and rebuild developments will be required to meet specified embodied carbon targets (as outlined in the pilot of UK Net Zero Carbon Building Standards), demonstrated using a nationally recognised methodology. These vary by building type.

4.14 Overall, the Essex net zero evidence base, supplemented by the Colchester viability assessment, demonstrates that the policies are technically feasible, financially viable and legally justified. The policies are therefore considered reasonable, justified and consistent with national policy.