Lewes Climate Change Study

Local Plan Evidence Base and Policy Recommendations

Lewes District Council

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Quality information

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1. Introduction

1.1 Purpose of this report

Lewes District Council (LDC) has commissioned AECOM to provide technical evidence and justification for clear, deliverable and ambitious policy recommendations to addresses climate change mitigation and adaptation within the emerging Local Plan.

LDC published a Climate Change and Sustainability Strategy (CCSS) in 2021 which identified the Local Plan as a key delivery mechanism for addressing climate change. This evidence base study will be used primarily to develop the Local Plan and will also support the Council's work to deliver the CCSS across the district.

This report describes the current situation with regards to climate change mitigation and adaptation in Lewes District. It reviews the carbon emissions baseline to identify the key drivers of emissions within the district and also provides a climate change risk assessment to identify the risks to and vulnerabilities of the district as a result of a changing climate.

The study discusses and takes account of some of the anticipated changes that may arise in the coming years as a result of the development proposed in the emerging Local Plan, national policy and wider changes, and presents a series of options for responding to and delivering these through planning policy.

The aim of this report is to support LDC in ensuring the new Local Plan will adopt a proactive strategy to mitigate and adapt to climate change, to meet the requirements of legislation and the National Planning Policy Framework (NPPF), as well as contributing to the district's response to the climate emergency.

The study provides an evidence base, and from this, a series of recommendations for LDC to take forward into the new Local Plan and through its subsequent delivery. This study may also be used to provide evidence to inform technical notes, supplementary planning documents and development management decisions, as well as contributing to the quantitative understanding of future emissions and energy use.

The following diagram describes the process used in this study:

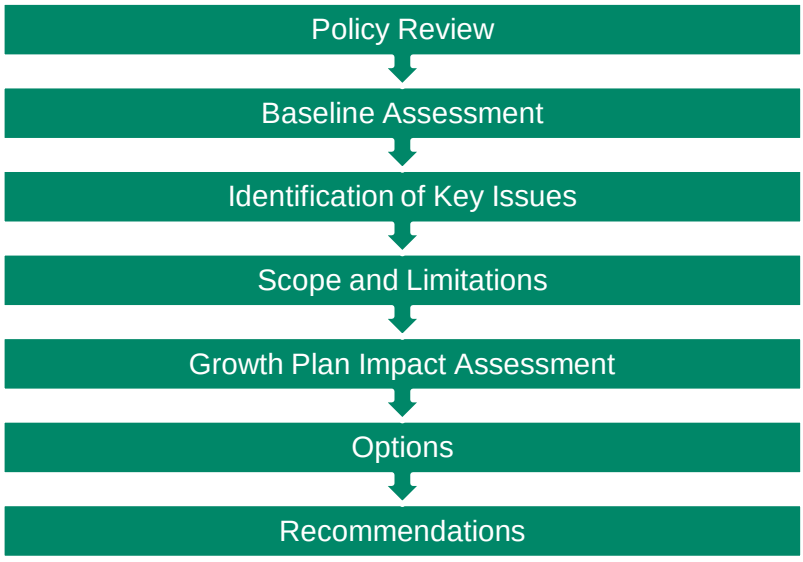


Figure 1: Summary of report approach

2. Policy Review

The following chapter provides a summary of the key policies and drivers informing this study at the international, national and local level.

2.1 International policy

The Paris Climate Agreement

On 12 December 2015, the United Nations Framework Convention on Climate Change (UNFCCC) members, including the United Kingdom, reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. The UK ratified the Paris Climate Change Agreement in November 2016. The Agreement's central aim 'is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C'.

The Tyndall Centre has produced reports to support Local Authorities in understanding the implications of the UN Paris Agreement for local emission reductions, this includes a study for LDC[1] which states that:

"The results in this report show that for Lewes to make its fair contribution to delivering the Paris Agreement's commitment to staying "well below 2°C and pursuing 1.5°C" global temperature rise, then an immediate and rapid programme of decarbonisation is needed. At 2017 CO2 emission levels, Lewes will exceed the recommended budget available within 7 years from 2020. To stay within the recommended carbon budget Lewes will, from 2020 onwards, need to achieve average mitigation rates of CO2 from energy of around -13.3% per year. This will require that Lewes rapidly transitions away from unabated fossil fuel use."

UN sustainable development goals

The UK is also committed to achieving the UN's Sustainable Development Goals (Figure 2) which were set out by the UN in 2015 to eradicate extreme poverty, fight inequality and injustice and leave no one behind. They cover a wide range of topics that are relevant to development in Lewes District, including but not limited to:

- Goal 6. Ensure availability and sustainable management of water and sanitation for all.
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all.
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialisation, foster innovation.
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable.
- Goal 13. Take urgent action to combat climate change and its impacts.
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

[1] https://carbonbudget.manchester.ac.uk/reports/E07000063/

Figure 2: UN Sustainable Development Goals

2.2 National policy

Climate Change Act 2008

Through the Climate Change Act (2008), as amended in 2019, the UK Government is legally committed to a 100% reduction in greenhouse gas (GHG) emissions by the year 2050, compared with a 1990 baseline. As part of this Act, the UK Government is also required to meet interim legally binding targets, known as carbon budgets, which act as steppingstones to 2050. In December 2020, the Government announced that they would increase their 2030 GHG emissions reduction target, from achieving a 57% reduction relative to the 1990 baseline, to a 68% reduction[2]. Subsequently, the Committee on Climate Change has also recommended an additional reduction target of 78% by 2035, which will in effect, bring forward the UK's previous 80% target by nearly 15 years.

Net Zero Strategy

The UK Government published its Net Zero Strategy in October 2021[3], this sets out the plan to achieving the net zero target. With regards to new buildings the strategy states that:

"[the Government] will introduce regulations from 2025 through the Future Homes Standard to ensure all new homes in England are ready for net zero by having a high standard of energy efficiency and low carbon heating installed as standard. This should mean that all new homes will be fitted with a low carbon heat source such as a heat pump or connected to a low carbon heat network. To reinforce this, we will consult on whether it is appropriate to end new gas grid connections, or whether to remove the duty to connect from the Gas Distribution Networks"

Heat and Buildings Strategy

The Government also published its Heat and Buildings Strategy in October 2021[4]. One of the key elements of this strategy is the ambition to phase out the installation of natural gas boilers beyond 2035. This means that any gas boilers installed in new buildings now would need to be replaced by low carbon heating systems at the end of their life. Alongside this the Government has a commitment to rapidly increase the installation of heat pumps with a

[2] https://www.gov.uk/government/news/uk-sets-ambitious-new-climate-target-ahead-of-un-summit
[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf
[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1044598/6.7408_BEIS_Clean_Heat_Heat___Buildings_Strategy_Stage_2_v5_WEB.pdf

minimum market capacity of 600,000 heat pumps per year by 2028, up from 35,000 per year in 2020.

For new buildings the strategy has the following key commitment: "Ensuring all new buildings in England are ready for Net Zero from 2025: We are bringing in the Future Homes Standard and have consulted on the Future Buildings Standard for new-builds in England. Government's ambition is to build 300,000 new homes a year by the mid-2020s. We anticipate at least a third of our 2028 heat pump target to be installed in new-build domestic properties annually. To enable this, we will introduce new standards through legislation (such as Building Regulations) to ensure new homes and buildings will be fitted with low-carbon heating and high levels of energy efficiency, so that new buildings do not have to be retrofitted in the future. We will also consult on ending new connections to the gas grid"

National Planning Policy Framework

The NPPF, initially published in 2012, sets out Government planning policy for England and provides guidance for local planning authorities drawing up local plans and is a material consideration for those determining applications. The NPPF was most recently updated in 2021.[5] The NPPF (2021) states that, *'the purpose of the planning system is to contribute to the achievement of sustainable development.'* The most relevant points for plan-making around climate change are that:

- Plans should take a proactive approach to mitigating and adapting to climate change in line with the objectives and provisions of the Climate Change Act 2008.
- New development should be planned for in ways that avoid increased vulnerability to the range of impacts arising from climate change and can help to reduce greenhouse gas emissions.
- Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.
- National Planning Policy Guidance (NPPG) clarifies, 'In their development plan policies, local planning authorities: Can set energy performance standards for new housing or the adaptation of buildings to provide dwellings, that are higher than the building regulations, but only up to the equivalent of Level 4 of the Code for Sustainable Homes. Are not restricted or limited in setting energy performance standards above the building regulations for non-housing developments[6].
- To help increase the use and supply of renewable and low carbon energy and heat, plans should:
    a. provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
    b. consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
    c. identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for collocating potential heat customers and suppliers.

The NPPF contains the majority of National Planning Policy for England with regards to Plan Making and material considerations for determining planning applications. The NPPF states at Paragraphs 152-153 that:

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in

[5] Ministry of Housing, Communities and Local Government, National Planning Policy Framework (2021), Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2
[6] https://www.gov.uk/guidance/climate-change Paragraph: 012 Reference ID: 6-012-2019031

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.

"Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure."

The Local Plan plays a crucial role in shaping places for the future and contributing *"to the achievement of sustainable development" (NPPF Para 7)*. Local Authorities have an opportunity to make tangible improvements to the built and natural environment that will help support communities as they develop and respond to current and future climate challenges. As a result, measures to address climate change will be found throughout the Local Plan.

The National Planning Practice Guidance (NPPG) provides additional guidance on the measures by which climate change can be addressed through a Local Plan. It states that:

"Addressing climate change is one of the core land use planning principles which the NPPF expects to underpin both plan making and decision making." (Paragraph: 001 Reference ID: 6-001-20140306).

The following table summarises key sections that relate to climate change.

Topic	Potential Climate Change Measures	NPPF Paras	NPPG Ref
Growth strategy	Promoting sustainable patterns of growth which help to: • reduce the need to travel, • promote low carbon movement • make best and most efficient use of land • support efficient redevelopment and regeneration • promote climate resilient communities • avoid areas most at risk to climate change	105, 119,120,152,154, 161	Climate Change; Plan-making
Building Standards	Building design standards to: • ensure energy efficiency • reduce overheating • reduce greenhouse gas emissions • increase onsite renewable and low carbon energy generation	152, 153 154	Climate Change
Sustainable Transport	Design that promotes and supports active travel and reduces reliance on private vehicles. Promote cycling and walking opportunities. Supporting public transport and electric vehicle charging infrastructure. Travel plans	104, 106, 107,112	Climate Change; Transport evidence bases; Travel Plans, Transport Assessments and Statements

Renewable and Low Carbon Energy Generation	Proactively and positively increase the use and supply of renewable and low carbon energy and heat. Identify suitable land to deliver renewable and low carbon energy generation and storage. Support community initiatives.	155	Climate Change; Renewable and low carbon energy
Water resources and flooding	Avoid development in areas liable to flood and reduce surface water flooding, Mitigate, manage and adapt to coastal change Promote water efficiency, protect water resources, water quality and reduce the impact of droughts	153, 159,171	Climate Change; Flood risk and coastal change; Housing: optional technical standards Water supply, wastewater and water quality
Infrastructure	Support infrastructure to promote sustainable patterns of behaviour and use. Promoting climate resilient infrastructure	114, 152. 153	Climate Change; Plan-making
Natural Environment and Biodiversity	Conserve and enhance land for different uses including: • Biodiversity value • Flood mitigation • Carbon sequestration • Food production	120(b), 174, 179	Climate Change; Natural environment
Design	Promote sustainable design features that reduce carbon emissions and promote climate resilience including: • Incorporating multifunctional green infrastructure, • use of materials, • orientation and layout	130, 131, 157	Climate Change; Natural environment

Table 1: Climate Change measures within the NPPF

UK Proposed Planning Reforms

The UK Government has made many different proposals for national planning reforms since the 2019 general election, reflecting the fact that there have been six Ministers for Housing since the start of the Parliament and five of those since the start of 2022. Although the approach to reform has undergone frequent changes the Government has indicated that the national housing target to build 300,000 net new homes each year by the mid-2020s in England remains unchanged.

The Planning for the Future consultation White Paper was published by the Ministry of Housing, Communities and Local Government on 6th August 2020. This consultation set out a package of proposed measures that, if implemented, would comprehensively transform the current planning system in England. The stated aim is to streamline and modernise the planning process to build homes quicker, including to improve design and sustainability

outcomes. It included the introduction of a quasi-zoning system, whereby the Local Plan would designate land as growth, renewal or protected area.

A revised approach was adopted in the Levelling-up and Regeneration Bill in May 2022, including plans for 'a genuinely plan-led system' and a focus on speeding up the plan-making process for local authorities, with tools such as National Development Management Policies (NDMPs) and voluntary spatial development strategies.

On 6 December 2022, the Government made a written ministerial statement, announcing its intention, subject to consultation, to make local housing targets "an advisory starting point, a guide that is not mandatory", and to "end the obligation on local authorities to maintain a rolling five-year supply of land for housing where their plans are up-to-date". Following this the Government launched the consultation on its proposed reforms, alongside a revised version of the NPPF with indicative changes to reflect the Government's proposed policy change. Chapter 7[7] of the consultation states that *"The planning system should, as a whole, reflect the government's ambition to help business and communities protect and enhance the environment for future generations, build a net zero carbon future, and adapt to the impacts of climate change."*

The consultation states that the NPPF already addresses climate change and that this is supported by the Environment Act and the new National Design Guide and forthcoming design codes. It goes on to state that:

- *'3. The government wants to build on these existing protections to make sure that protecting and improving the environment and tackling climate change are central considerations in planning. In principle, pla*nning policies and decisions can support this in 6 main ways:

- *protecting important natural, landscape and heritage assets, whilst also incorporating nature, landscape and public space into development and its surroundings;*

- *supporting habitat creation and nature recovery in ways which benefit nature and people. For instance, nature based solutions can store carbon, assist adaptation (e.g. by reducing water run-off rates) and protect and enhance ecology;*

- *promoting locational and design decisions that reduce exposure to pollution and hazards and respond to changing climate conditions, for example the risk of overheating, surface-water flooding, and water scarcity;*

- *enabling renewable and low carbon energy production and distribution, at both a commercial and household scale; and policies for regulating carbon-generating extraction and energy generation;*

- *promoting development locations, and designs and layouts, that contribute to healthier lifestyles, energy and resource efficiency consumption, for example by reducing the need to travel, increasing public transport connectivity and accessibility and promoting active travel i.e. walking, wheeling and cycling; and*

- *bringing together the spatial strategy for a place in a way which addresses these in a holistic way and reflects its unique characteristics, whilst also providing a clear framework for development and regeneration.'*

The consultation closed on 2 March 2023 and received around 26,000 responses. The Government was due to publish the consultation outcome and NPPF revisions in 'spring 2023', but it has not yet done so.

[7] https://www.gov.uk/government/consultations/levelling-up-and-regeneration-bill-reforms-to-national-planning-policy/levelling-up-and-regeneration-bill-reforms-to-national-planning-policy#chapter-7--protecting-the-environment-and-tackling-climate-change

Building Regulations

Part L of the Building Regulations is the key mechanism for implementing the Building Act (1984) with regard to the conservation of fuel and power in buildings in the UK. In June 2022 an updated Part L 2021 came into force replacing the previous Part L 2013 version. This is intended as an interim step before the adoption of the Future Homes Standard (FHS) and Future Buildings Standards (FBS) in 2025.

The recently updated Part L 2021 is intended to deliver an average 31% and 27% reduction in regulated CO_2 emissions, compared to the previous Part L 2013 regulations, for domestic and non-domestic buildings respectively. The updated building regulations set a Target CO_2 Emission Rate (TER) and Target Primary Energy Rate (TPER) based on a notional building with an improved fabric specification, waste-water heat recovery and a gas boiler. They also set a minimum Target Fabric Energy Efficiency (TFEE) standard.

A key change to the Part L 2021 Approved Document was to amend the transitional arrangements for when new Building Regulations are implemented to close an existing loop-hole where multi-phase developments could be developed out under historic building regulations. Transitional arrangements are now applicable at a building, rather than site, level, meaning that buildings within phased developments may be required to meet different editions of the Building Regulations. The Standard Assessment Procedure (SAP) calculation process that underpins Part L has also been substantially updated.

The Standard Assessment Procedure (SAP) is the methodology used by Government to assess and compare the energy and environmental performance of dwellings. The SAP methodology is used for Part L of the Building Regulations, which is in turn used to demonstrate CO_2 emission performance of new development proposals against local authority planning policy targets. A key change in the latest version, SAP 10.2, is that the grid electricity CO_2 emission factor has been reduced to 0.136 $kgCO_2$ per kWh; this is a quarter of the 0.519 $kgCO_2$ per kWh figure that was used in SAP 2012. This reflects a rapid reduction in the carbon intensity of grid electricity in the period since the last adopted SAP update. These lower emission factors for grid electricity have reduced the CO_2 savings from electricity generation technologies such as PV and CHP but have substantially increased the carbon savings for technologies such as heat pumps which use electricity. Progressive reduction in grid electricity CO_2 emission factors combined with electrification of heating and transport, is one of the primary routes for the UK to meet its net zero targets and as noted above the Government has committed to decarbonise the electricity grid by 2035.

Provisions in the Planning and Energy Act (2008) allow local planning authorities to set energy efficiency standards in their development plan policies that exceed the energy efficiency requirements of the Building Regulations. It also allows Local Authorities to impose reasonable requirements for a proportion of energy used in development in their area to be energy from renewable and/or low carbon energy sources in the locality of the development (sometimes referred to as the 'Merton Rule').[8]

Since 2015 the UK Government has indicated that some of these powers might be removed in future, making it uncertain whether local planning authorities can continue to apply their existing or new planning policies. The Housing Standards Review undertaken in 2014/15 proposed to standardise performance requirements nationally, and this was codified by the Deregulation Act (2015), but the relevant provision was never enacted. In March 2019, new Planning Policy Guidance was issued, which confirmed that, for domestic buildings, Local Authorities can require new buildings to achieve up to a 19% improvement in CO_2 emissions compared with Part L 2013; and for non-domestic buildings, Local Authorities are 'not restricted or limited' in the standards they can set.[9]

[8] *Planning and Energy Act* (2008). Available at: https://www.legislation.gov.uk/ukpga/2008/21/pdfs/ukpga_20080021_en.pdf
[9] Ministry of Housing, Communities & Local Government and The Rt Hon Lord Pickles, *'Planning update'* (March 2015). Available at: https://www.gov.uk/government/speeches/planning-update-march-2015

In January 2021 the Government reiterated that, 'local planning authorities will retain powers to set local energy efficiency standards for new homes' for the time being, but emphasised that this could change in future.[10] According to the Government's Future Homes Standard (FHS) Consultation document:[11]

> *'As we move to the higher energy standards required by Part L 2020 and the Future Homes Standard, there may be no need for local authorities to seek higher standards and the power in the Planning and Energy Act 2008 may become redundant.'*

To summarise, although Local Authorities are currently able to set higher standards of building energy performance than those outlined in the Building Regulations, it is unclear whether this will remain the case.

Future Homes Standard and Future Buildings Standard

Under the Future Homes Standard (FHS), new buildings would be required to meet significantly higher targets for energy efficiency and carbon savings. In the consultation paper The Government states that "As part of the journey to 2050 we have committed to introducing the Future Homes Standard in 2025. This consultation sets out what we think a home built to the Future Homes Standard will be like. We expect that an average home built to it will have 75- 80% less carbon emissions than one built to current energy efficiency requirements (Approved Document L 2013). We expect this will be achieved through very high fabric standards and a low carbon heating system. This means a new home built to the Future Homes Standard might have a heat pump, triple glazing and standards for walls, floors and roofs that significantly limit any heat loss.'

The Future Buildings Standard is a similar plan for decarbonising new non-domestic buildings, the consultation paper published in January 2021[12] states that: "Our vision for the Future Buildings Standard is designed to transition non-domestic buildings to use low-carbon heat sources for heating and hot water. This in turn means that new buildings constructed to the standard will be fit for the future with the ability to become carbon neutral over time as the electricity grid and heat networks decarbonise". The paper describes how this will be achieved through performance-based standards around higher levels of fabric and energy efficiency standards and the use of low carbon heating technologies, particularly heat pumps and heat networks.

The UK Climate Change Act 2008 (2050 Target Amendment) Order 2019 legally commits the UK Government to deliver net-zero emissions by the year 2050, compared with a 1990 baseline.[13] Each Local Authority is expected to contribute to meeting the targets set out in the Act, and to reducing overall demand for energy.

Planning and Compulsory Purchase Act 2004

Section 19(1A) of the Planning and Compulsory Purchase Act 2004 (PCPA04) puts a statutory duty on Local Authorities to include policies in the Local Plan designed to tackle climate change and the impacts. This will be tested through the examination in public.

Planning and Energy Act 2008

[10] Ministry of Housing, Communities & Local Government, *'The Future Homes Standard: Consultation on changes to Part L and Part F of the Building Regulations for new dwellings: Government response'* (2021). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/956094/Government_response_to_Future_Homes_Standard_consultation.pdf

[11] Ministry of Housing, Communities & Local Government, *'The Future Homes Standard: Consultation on changes to Part L and Part F of the Building Regulations for new dwellings'* (2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/852605/Future_Homes_Standard_2019_Consultation.pdf

[12] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/956037/Future_Buildings_Standard_consultation_document.pdf

[13] The original (2008) target of 80% was amended through subsequent legislation in 2019. See 'The Climate Change Act 2008 (2050 Target Amendment) Order 2019': http://www.legislation.gov.uk/uksi/2019/1056/contents/made

The Planning and Energy Act 2008 provides the legislative basis for local planning authorities to exceed the minimum energy efficiency requirements of the Building Regulations where they are not inconsistent with relevant national policies for England.

Written Ministerial Statement of 25 March 2015

The Planning and Energy Act 2008 includes provisions for Local Plans to exceed the minimum energy efficiency requirements of the Building Regulations where they are not inconsistent with the relevant policies for England.

The Written Ministerial Statement of 25 March 2015 (WMS 2015) clarified that at the time, in relation to energy performance of residential dwelling, Local Plans could include policies which require compliance with energy performance standards that exceed the energy requirements of Building Regulations (up to a prescribed level) until commencement of amendments to the Planning and Energy Act 2008 in the Deregulation Bill.

However, the provisions in the Deregulation Act 2015, have not been enacted, and the Government has confirmed that they will not do so in their response to the Future Homes Standard consultation. It has further been confirmed by the Department for Levelling up, Housing and Communities (DLUHC) and the Department for Business, Energy and Industrial Strategy (BEIS) during the examination into the Local Plan Partial Update for Bath and North East Somerset Council, that *"Plan-makers may continue to set energy efficiency standards at the local level which go beyond national Building Regulations standards if they wish"*[14] for new homes.

It is clear that Local Planning Authorities can require higher energy efficiency standards in the Local Plan, however the NPPG paragraph 12 (ID: 6-012-20190315) states that these can only be "up to the equivalent of Level 4 of the Code for Sustainable Homes" and this was confirmed by the WMS 2015.

The amendments to Part L of the Building Regulations in 2021, which have now come into force in respect of energy efficiency standards, now require energy efficiency standards to a level which exceeds that in Level 4 of the Code for Sustainable Homes (Part L 2021 is a 31% reduction over Part L 2013 and Code for Sustainable Homes Level 4 is a 19% reduction over Part L 2013). In addition, the Government has stated that this is an interim measure before the Future Homes Standard is enacted in 2025. Therefore, it is clear that the WMS 2015 is now out of date and does not reflect the Government's action to meet the legal commitments set out in the CCA2008.

We are therefore able to conclude that buildings standards above what was set out in the WMS 2015 can be including in Local Plan policy, subject to viability testing, as they support the provisions within the NPPF to mitigate climate change as well as the Government commitment to reducing energy demand. This has further been confirmed by the recently adopted policies for Bath and North East Somerset[15] and Cornwall[16] and in the report of the Inspectors.

UK Climate Adaptation

In the UK to date, strategic climate change adaptation planning has occurred at the national level although in recent years local authorities have taken an active role in identifying climate risks and initiating plans. In 2008, the Climate Change Committee (CCC) was established as part of the 2008 Climate Change Act[17], as an independent statutory body responsible for providing advice to the UK Government. Their responsibilities also include updating

[14] EXAM10 Note on Local Energy Efficiency Targets 4 July 2022 https://beta.bathnes.gov.uk/sites/default/files/EXAM%2010%20Note%20on%20Local%20Energy%20Efficiency%20Targets%20FINAL.pdf

[15] https://beta.bathnes.gov.uk/sites/default/files/2023-01/Adopted%20LPPU%20Jan%202023.pdf Policy SCR6; https://beta.bathnes.gov.uk/local-plan-partial-update-lppu-public-examination

[16] https://www.cornwall.gov.uk/planning-and-building-control/planning-policy/adopted-plans/climate-emergency-development-plan-document/

[17] The Climate Change Act was updated in 2019.

Parliament on climate programmes, such as the National Adaptation Plan, and their implementation.

The CCC published the third UK Climate Change Risk Assessment (CCRA) Technical Report in June 2021, which identifies the priority climate change risks to the UK and some potential opportunity areas which could be unlocked through changing conditions.[18] The National Adaptation Programme (to be updated for the 2021 CCRA), indicates how the UK will respond to the risks and opportunities.

More broadly, adaptation must be incorporated and mainstreamed through other national legislation and guidance, including such as the Civil Contingencies Act (2004), Flood and Water Management Act (2010), the Town and Country Planning Regulations (2012), the National Planning Policy Framework, the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and within section 19 (1A) of the Planning and Compulsory Purchase Act 2004, as amended under the Planning Act 2008.[19]

While there is a structure to national level climate adaptation planning, local authorities have had limited involvement. However, they have an essential role to plan in local adaptation through:

i) providing local leadership;

ii) adapting local services, infrastructure and assets; and

iii) collaboration with local partners.[20]

2.3 Local policy

Local Plan Issues and Options 2021

Lewes District Council published the Local Plan Issues and Options document for public consultation during July to September2021. The consultation was accompanied by a topic paper entitled “Tackling Climate Change”. The topic paper sets out broad ways in which the new Local Plan should seek to address climate change, and this is reflected in the Issues and Options consultation. Tackling climate change is identified as a strategic issue and the consultation considers potential ways the Local Plan could address both mitigation and adaptation, the outcomes of which are summarised in the following table:

Issues and Options Topic	Potential Policy Areas
Energy efficiency, sustainable construction, and renewable energy	Reducing emissions from domestic and industrial buildings Opportunities for renewable energy and CHP Circular Economy
Climate adaptation measures	Carbon Sequestration Nature Based solutions

[18] Betts, R.A. and Brown, K. 2021. Introduction. In: The Third UK Climate Change Risk Assessment Technical Report. Prepared for the Climate Change Committee, London.
[19] ADEPT, Defra and Local Adaptation Advisory Panel (2019). Preparing for a changing climate: good practice guidance for local government.
[20] Ibid.

	Trees and other green infrastructure Water efficiency measures in new development
Modal Shift	Maximising accessibility to new development by walking, cycling and public transport Electric Vehicle Charging Points requirements
Flooding and Coastal Change	Restrict development in areas likely to flood Incorporate Sustainable Drainage Systems Potential Coastal Management Areas
Biodiversity	Biodiversity net gain target minimum 20%
Creating healthy sustainable communities with infrastructure	Infrastructure to help tackle climate change 10 or 20 minute Neighbourhoods

Table 2: Policy areas identified in the Issues and Options Paper

The role of Local Authorities in climate adaptation

Increasingly local authorities face pressures to reduce spending while providing more services to larger populations. Adaptation can enable local authorities to achieve their strategic objectives while reducing the long-term financial burden, for example identifying and assessing climate risks to future projects will likely attract investment, ensure the longevity of projects, deliver co-benefits to the community, and certainly meet any statutory requirements which increasingly include adaptation.[21]

Locally led adaptation is critical now to adequately preparing for climate risks; local authorities have a responsibility to incentivise and support communities and businesses to adapt and enable opportunities to be exploited. At the local level there is a need to:

(i) share knowledge on climate risks among public and private stakeholders as well as vulnerable communities;

(ii) prepare and develop adaptation initiatives; and

(iii) (iii) develop planning and policies which consider climate risk.

Comprehensively addressing climate change within the Local Plan will deliver multi benefits for the local community.

[21] Ibid.

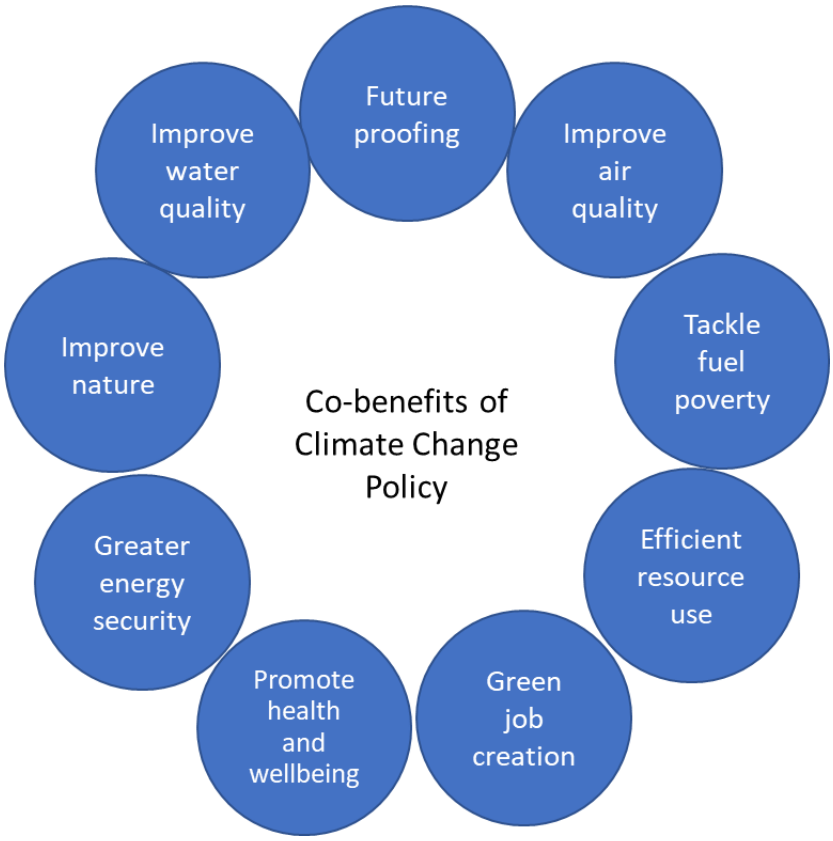


Figure 3: Diagram illustrating the co-benefits of climate change policy

3. Baselines

This chapter sets out the baseline position for Lewes District, both in relation to climate change mitigation and climate change adaptation. For climate change mitigation the baseline position for the district is the current emissions of carbon (CO_{2e}) from the district and for climate adaptation it is the level of risk to the district from the anticipated impacts of climate change.

3.1 Climate Change Mitigation

The carbon emission baseline used in the LDC Climate Change and Sustainability Strategy 2021[22] was the baseline developed by Anthesis using their SCATTER tool[23], a summary of which is shown in the diagram below.

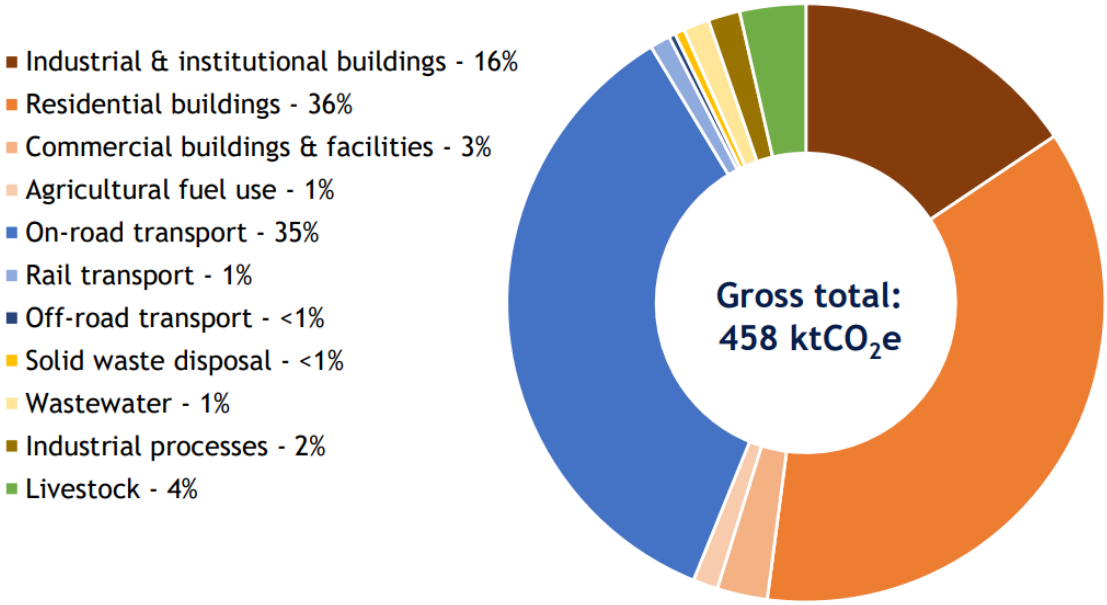


Figure 4: SCATTER baseline emissions from the Anthesis report based on 2017 (2020)

This data shows that the predominant emissions in the district arise from the buildings and transportation sectors, within which the residential buildings and on-road transport (primarily private vehicles) subsectors are the most important.

This baseline was developed in 2020 and was based on the latest national dataset available at the time, which was for 2017. The SCATTER methodology involves a number of additional assumptions, so the emissions data differ slightly from that reported in the Government subnational data sets.

The most recent set of subnational carbon emission data is for 2021 which was published in July 2023. The following graphs show the carbon emissions for Lewes District from this updated data set.

[22] https://www.lewes-eastbourne.gov.uk/_resources/assets/inline/full/0/310115.pdf

[23] https://www.lewes-eastbourne.gov.uk/_resources/assets/inline/full/0/291623.pdf

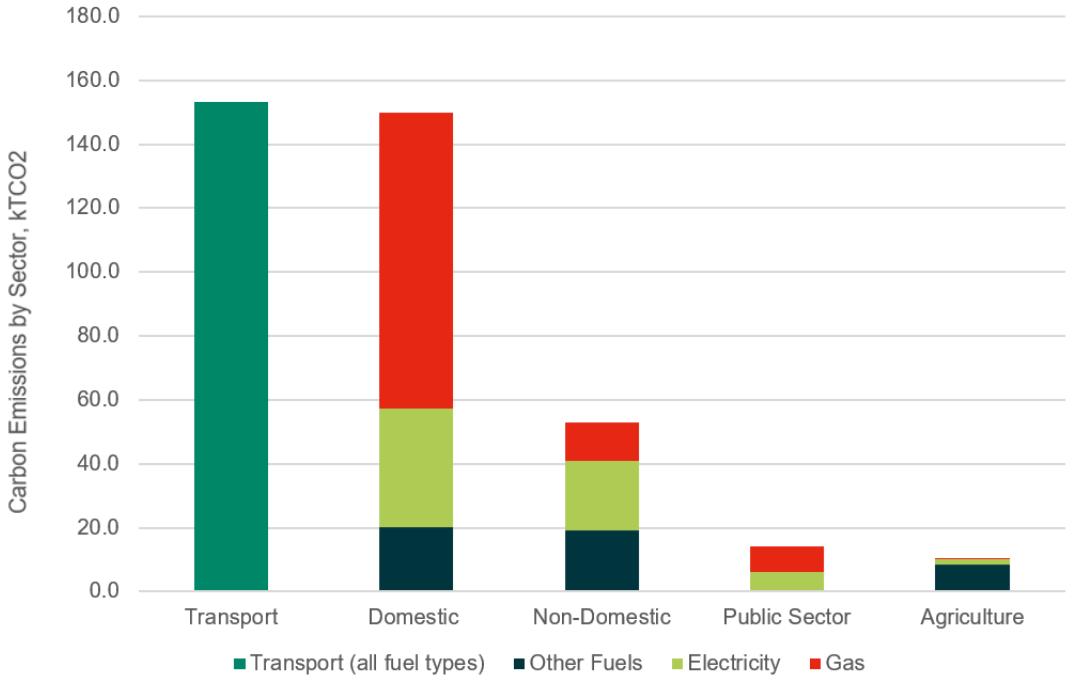


Figure 5: Annual carbon emissions for Lewes District, associated with different sectors and fuel types (DESNZ subnational emissions data 2021)

In terms of energy consumption, the distribution by sector and fuel type is shown in the following graph, again this shows the transport and domestic building sectors being by far the most significant component of the overall emissions from the district.

Looking at the trend over time, all sectors have shown a decrease since 2005 with the most significant decrease seen in the domestic sector, assumed to be due to improvements in energy efficiency and grid decarbonisation. The Transportation emissions have only decreased slightly since 2005 apart from the significant decrease between 2019 and 2020 which was the result of the covid restrictions which impacted on people's movement. The data for 2021, for which only the first half of the year involved lockdown restrictions, shows an uptick in emissions for transport as well as domestic and industry.

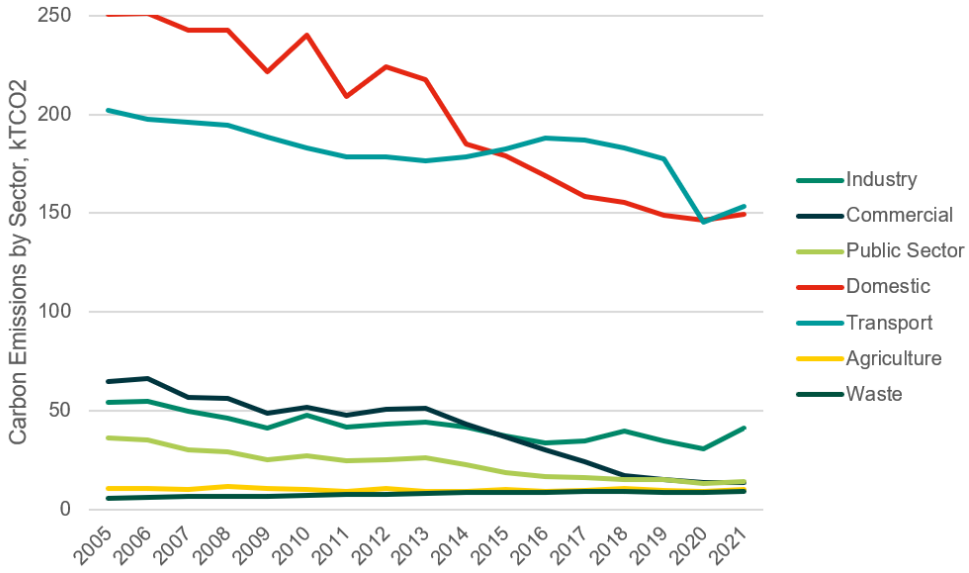


Figure 6: Annual energy consumption for Lewes District associated with different sectors and fuel types (DESNZ subnational emissions data 2021)

The following graph shows the per capita emissions over time, which show that as the population of Lewes District has increased by around 6,000 since 2005 the per capita emissions have decreased from around 7.5tCO_2/year to just over 4.5tCO_2/year. Again this is assumed to be largely due to the significant decrease in emissions associated with electricity.

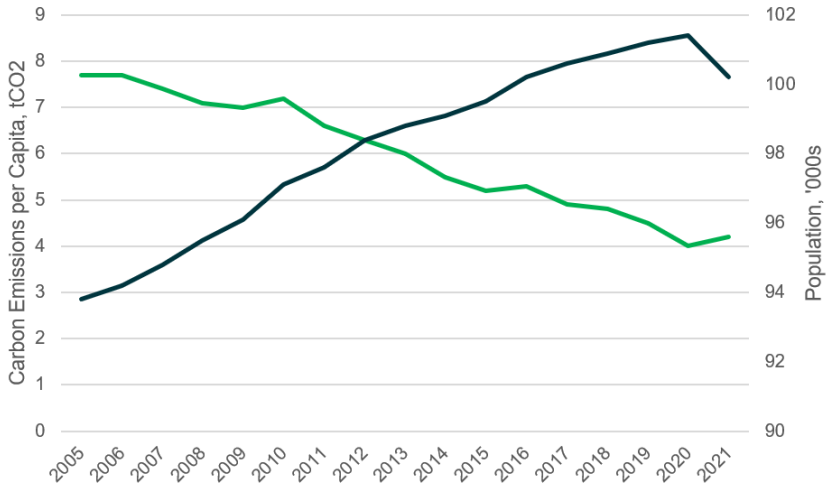


Figure 7: Annual emissions per capita (DESNZ subnational emissions data 2021)

3.2 Additional emissions

The Lewes District (Outside of the South Downs National Park) Five Year Housing Land Supply (2023-2028) Annual Position Statement at 1st April 2023 (published May 2023)[24] gives a locally derived housing requirement of 601 homes per year for the part of the district outside the SDNP. Using this quantum we have made an assumption on the split of residential development between houses and flats based on 75% houses and 25% flats. In regard to phasing we have assumed an equal amount of development each year over the plan period. New non-domestic emissions have not been assessed because at this point in time there is insufficient detail and/or confidence as to the exact scale of potential development, the use types and/or the timing to enable it to be modelled.

In order to estimate the CO_2 emissions associated with this new housing development we have applied assumptions based on the predicted energy demands and CO_2 emissions associated with compliance with Building Regulations. This takes account of the planned changes to Building Regulations so assumes buildings comply with Part L 2021 from now until 2025 and then from the anticipated Future Homes Standard or Future Buildings Standard from 2026 (assuming 12 month transition period in line with previous changes in regulations). It has been assumed that the New Local Plan would be in place from 2024 so this has been taken as the start year for the modelling. The graph on the following page shows the results of this modelling and the anticipated impact of the emissions associated with the planned development both with and without grid decarbonisation for a 'Business as Usual' scenario that assumes complying with Building Regulations. This shows that the emissions associated with the planned new development could be around 25ktCO_2e per year by the end of the plan period. Compared to the total District emissions of 425ktCO_2 per year these additional emissions represent an increase of around 5%. The impact is limited because most of the development is anticipated to happen after 2025 when the new Future Home and Future Building Standards will be in force and effectively make new development closer to net zero in operational carbon as long as the electricity from the national grid is fully decarbonised by 2035 or sooner as is planned.

https://www.lewes-eastbourne.gov.uk/media/2503/Lewes-District-Five-Year-Housing-Land-Supply-Note-March-2023/pdf/Lewes_District_Five_Year_Housing_Land_Supply_Note_March_2023.pdf?m=638203712741700000

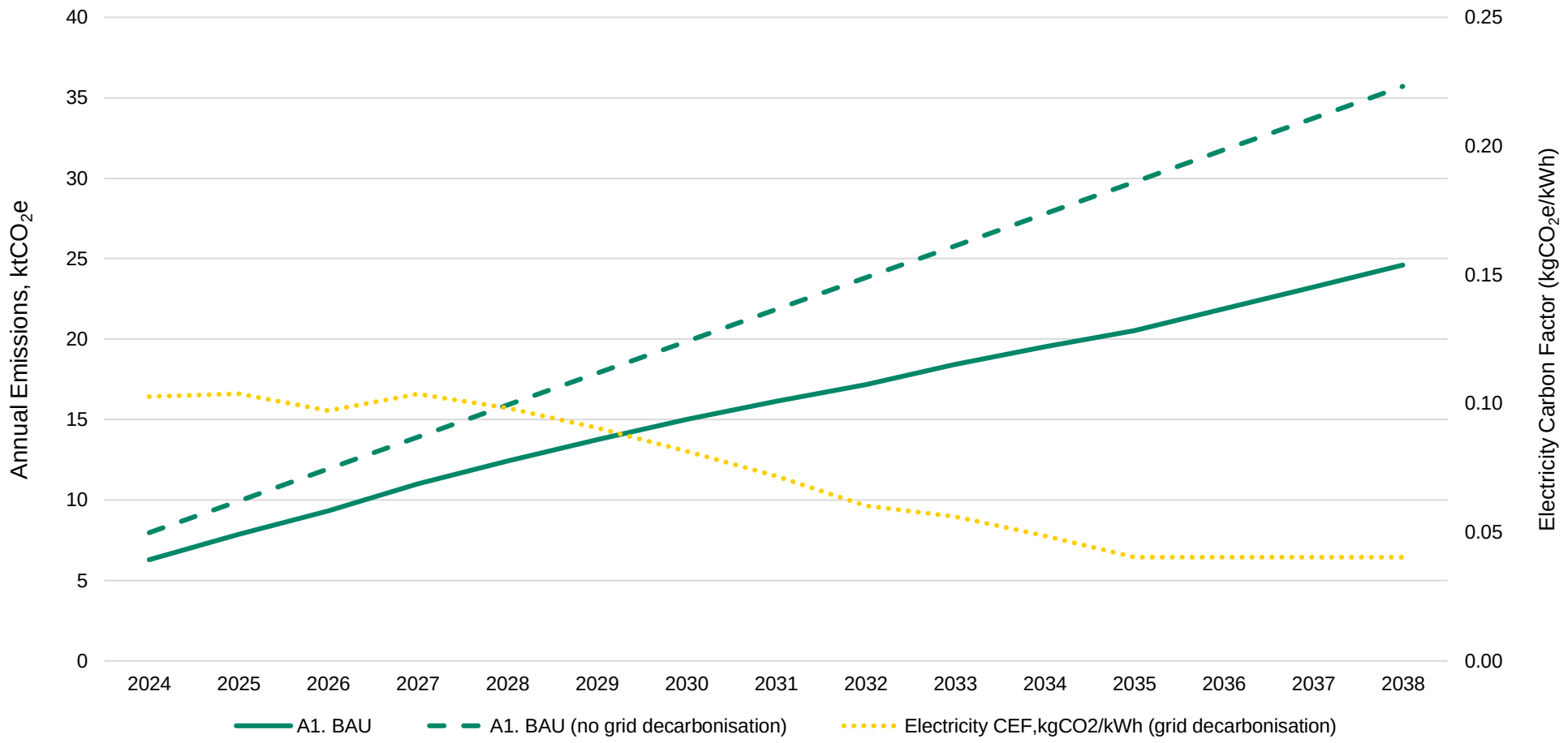


Figure 8: Cumulative carbon emissions projections associated with new buildings between 2024 and 2038 assuming a Business as Usual (BAU) approach which just assumes compliance with national requirements showing the impact both with and without grid decarbonisation

One reading of this graph, and the scale of these emissions relative to the district total, is that it might be possible to rely on building regulations to decarbonise future development and not set any additional standards beyond this. However it should be noted that there are two key risks associated with this position:

1. Future Building Regulations does not come forward as anticipated – If the Future Homes Standard and Future Buildings Standard do not go as far as anticipated or take effect later than 2025 then emissions from new development would be significantly higher.

2. Grid decarbonisation does not happen as anticipated – If electricity from the grid is not decarbonised or this process happens at a slower rate than anticipated then the emissions from new development would be significantly higher.

Furthermore, if both of these scenarios happened together then the effects would be even greater.

Also, because of the effects of grid decarbonisation, carbon emissions are likely to become a less useful metric for determining the relative performance of new buildings in the near future. The focus is already turning to overall energy consumption as a better metric for this in order to account for the impacts on the following:

Operational costs – Buildings with lower energy demands and systems to generate, store and manage energy will cost users significantly less to run.

Future retrofit costs – It will be more significantly more challenging and expensive for homeowners to install fabric, energy efficiency and equipment than for it to be installed upon construction.

Local grid resilience – Reduced energy demands from new development will have lower impact on the capacity of the local power network thereby allowing capacity for wider decarbonisation (for existing buildings and vehicles) and reducing the extent and cost of upgrade work.

Building resilience – Homes designed with low demands, generation, storage and demand management systems will be much more resilient to supply issues as well as energy price fluctuations.

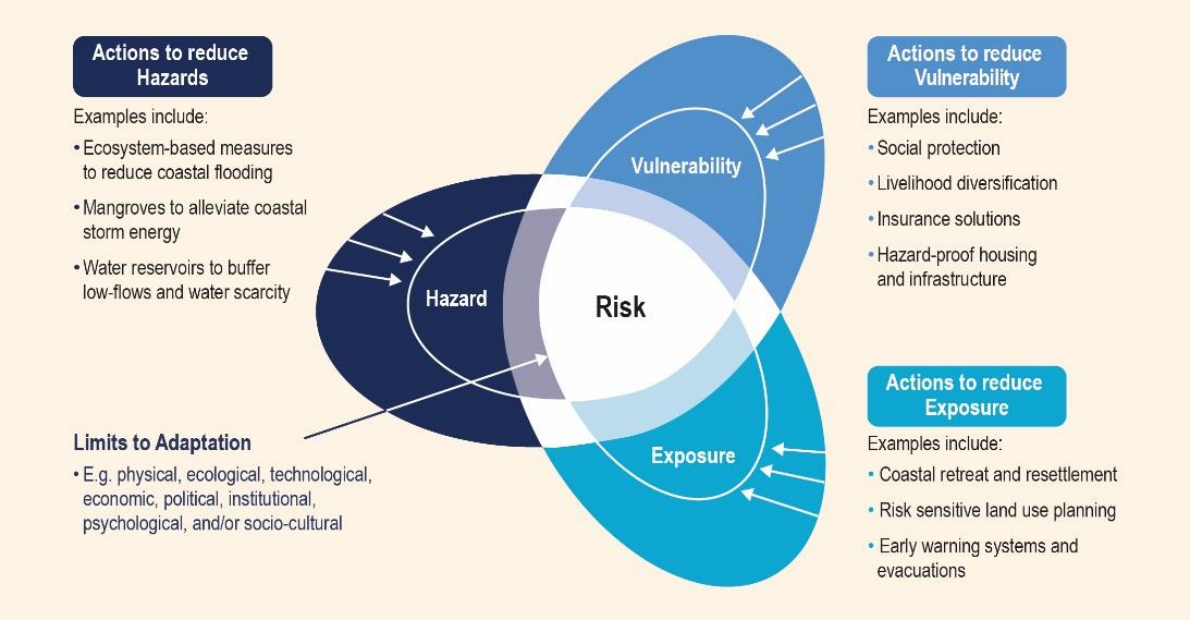
For these reasons the policy options over the following pages should be considered not just through a lens of carbon emissions reductions but also in regard to the benefits listed above that would be delivered by reducing overall energy consumption.

3.3 Climate change adaptation

For the purpose of this study the baseline for climate change adaptation will be taken as the existing exposure of Lewes District to the risks posed by climate change. This has been determined by undertaking a climate risk assessment.

The Intergovernmental Panel on Climate Change's (IPCC) definition of climate risks is based on the following three components as shown in the diagram below:

- The hazard (i.e. flooding or extreme heat),
- The level of exposure of a population, infrastructure or asset to the hazard (i.e. a population living in an urban area with extreme heat), and
- The level of vulnerability to the hazard (i.e. an elderly population more susceptible to extreme temperatures).



Source IPCC. 2019.

Figure 9: IPCC Definition of Risk

For this study, climate risk has been assessed through an evaluation of the historic and projected climate trends, with some spatial exploration of challenges within Lewes District. The climate projections shown later in this report, are aligned with the RCP 6.0 scenario, using the UK Met Office UKCP18[25] data. The following assessment of hazards covers:

- Flood risk and rainfall intensity projections,
- Drought risk and rainfall total projections,
- Extreme heat risk and maximum temperature projections,
- Extreme cold and minimum temperature projections; and,
- Sea level rise and coastal erosion.

[25] The UK Climate Projections (UKCP) is a set of tools and data that shows you how the UK climate may change in the future. The UK Climate Projections 2018 (UKCP18) builds on the 2009 predictions, providing updated data for assessing exposure to climate risk.

3.4 Flood risk

Flooding can occur through several means, firstly riverine flooding (fluvial flood risk), which occurs when water levels rise beyond bank levels and spill into adjacent land. Pluvial Flooding from surface water can occur during periods of intense rainfall, usually within a short duration, which cannot quickly infiltrate into the ground or enter the drainage system. Another type of flooding is groundwater flooding, which can occur when the natural underground drainage system cannot drain rainfall away quick enough. This results in the water table rising above the ground surface level causing subsequent flooding.

The primary river system in Lewes District is the River Ouse, with a large catchment area of 647m^2 and is fed by a number of small streams. The tidal limit can be found at Barcombe Mills, around 6.5km upstream of Lewes and downstream of the confluence with the River Uck. The River Uck is the main tributary in the upper catchment of the River Ouse with the middle sections of the river joined by the Longford Stream, the Iron River and the Bevern Stream.[26]

East Sussex County Council are the Lead Local Flood Authority, responsible for managing local flood risk. Within Lewes District, this includes managing surface water, groundwater and ordinary watercourses. The Environment Agency has responsibility for strategic reduction of flood risk from main rivers. For Lewes District, the Environment Agency assign flood risk from surface water as 'high' (chance of flooding is greater than 3.3% annually), flood risk from rivers or the sea as 'medium' (chance of flooding is between 1 and 3.3% annually).[27]

Flood risk is a product of the rainfall intensity. In the following figures, the 100-year return period (1% Annual Exceedance Probability (AEP)) for Summer and Winter is presented with 1-day and 5-day maximum precipitation.

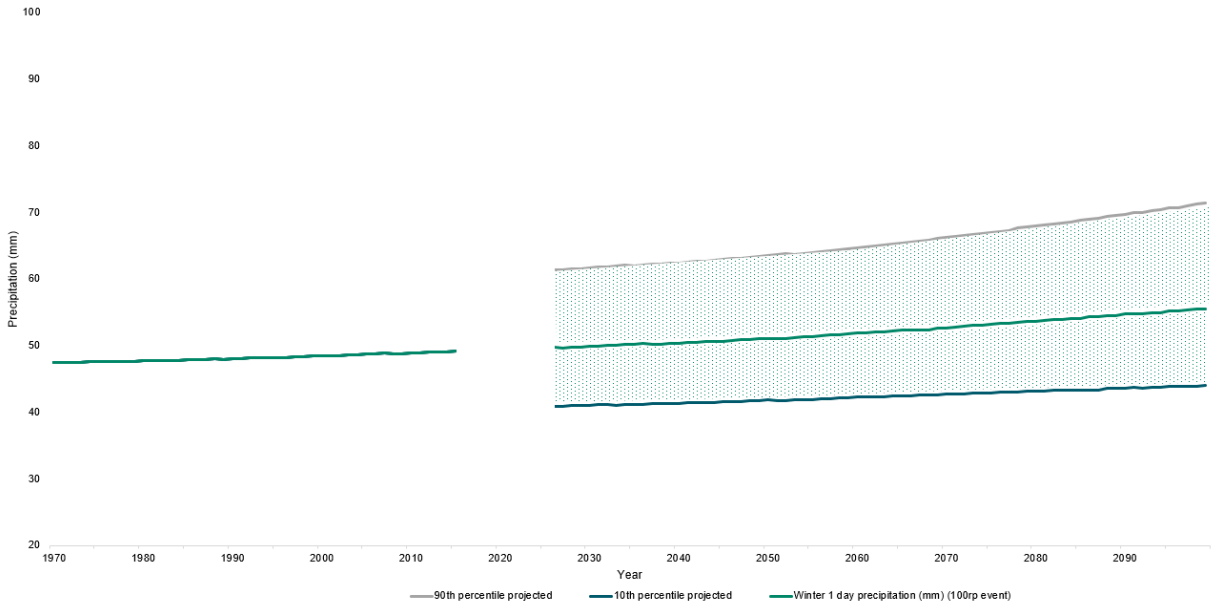
- The 1-day max figures (Figure 10 and Figure 12) give an indication of the flood risk resulting from small catchments and urban settings, known as the pluvial flood risk.
- In the longer 5-day maximum precipitation (Figure 11 and Figure 13), these indicate the likelihood of fluvial flooding, resulting from larger catchment areas, such as the River Ouse, which could cause flooding as a result of exposure to the longer hydrological response time in a larger catchment.

Using UKCP18 data, Figure 10 and Figure 11 below, present the historic and projected precipitation (in mm) for a 1% AEP event during the winter season, and are laid out for a 1-day and 5-day event respectively (pluvial and fluvial flood risk). These figures illustrate the slight increase in rainfall intensity for the district since 1970, it is likely this trend will steepen in the future with climate change, which would result in a higher likelihood of a 1% event occurring.

Currently, the 100-year return period 1-day and 5-day maximum rainfall for the Winter season is estimated to be around 50mm and 91mm, respectively. By 2100, maximum 1 day rainfall is projected to increase to 56mm (12% increase), while maximum 5-day rainfall is projected to increase to 100mm (10% increase).

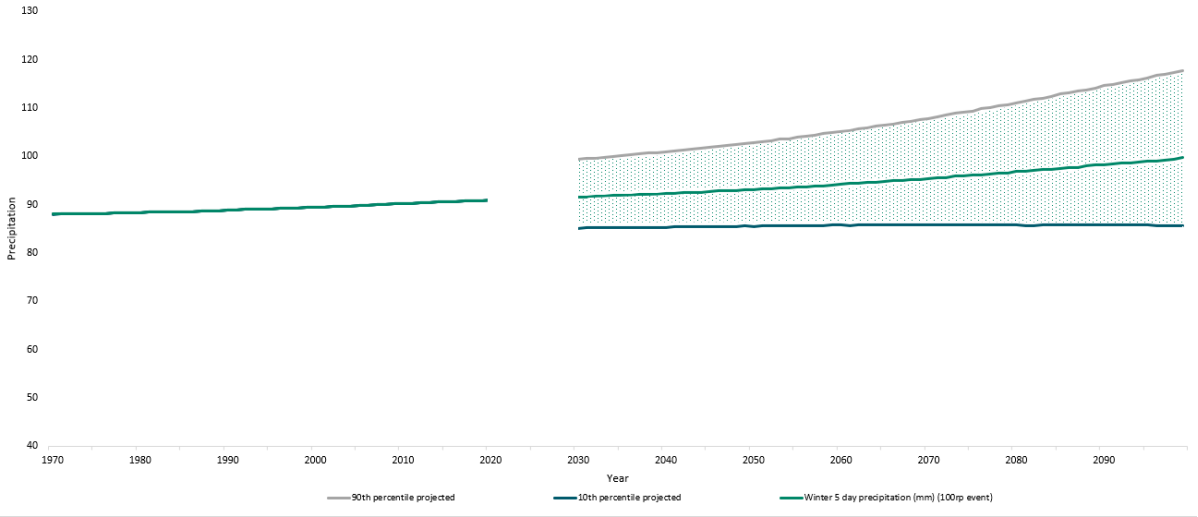
Figure 12, and Figure 13 show projections for summer 1-day and 5-day rainfall events, which are anticipated to remain at current levels, so this increase in flood risk is predominantly seasonal – i.e. according to the projections, flood risk in winter will increase and flood risk in summer will, with some levels of uncertainty, remain the same.

[26] Lewes District Council. 2023. Level 1 Strategic Flood Risk Assessment.
[27] Gov.uk. Learn more about this area's flood risk. Available: Learn more about this area's flood risk - GOV.UK (check-long-term-flood-risk.service.gov.uk). [Accessed 02 April 2023].



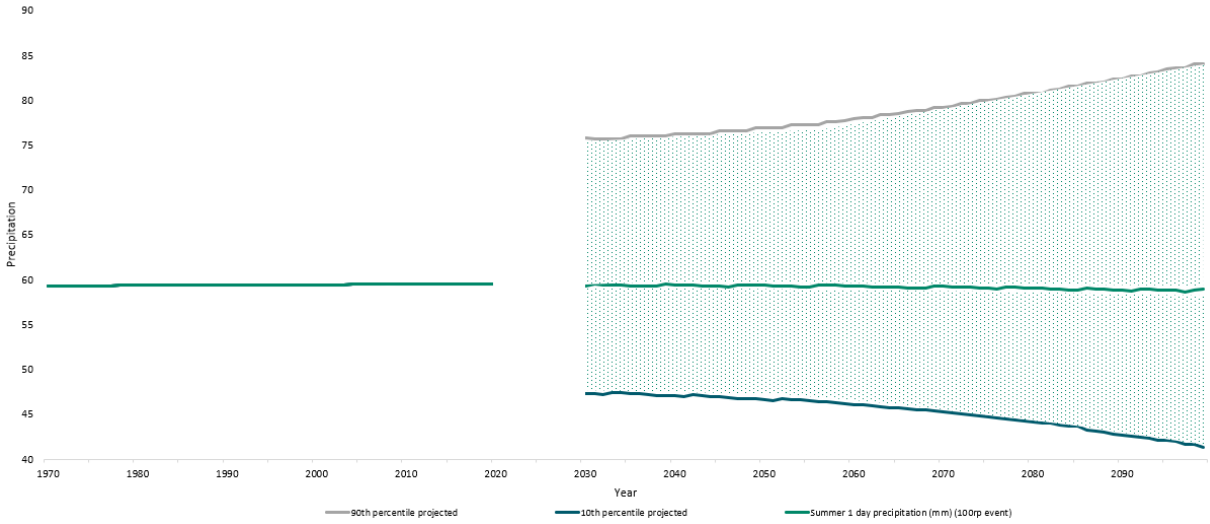
Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 10: Winter 1 day precipitation, historic and predicted future change (100rp event) (mm)



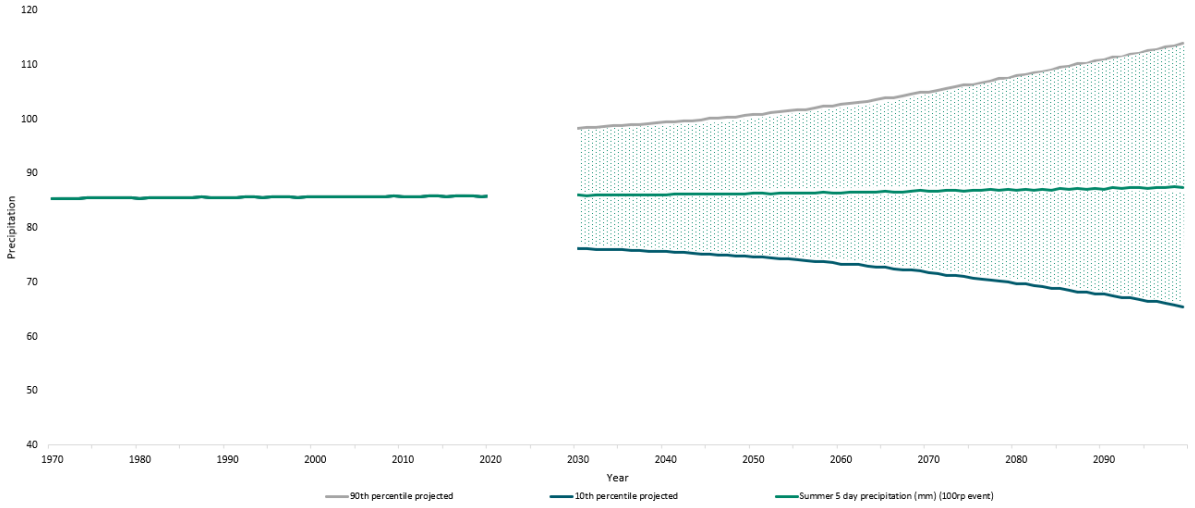
Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 11: Winter 5-day precipitation, historic and predicted future change (100rp event) (mm)



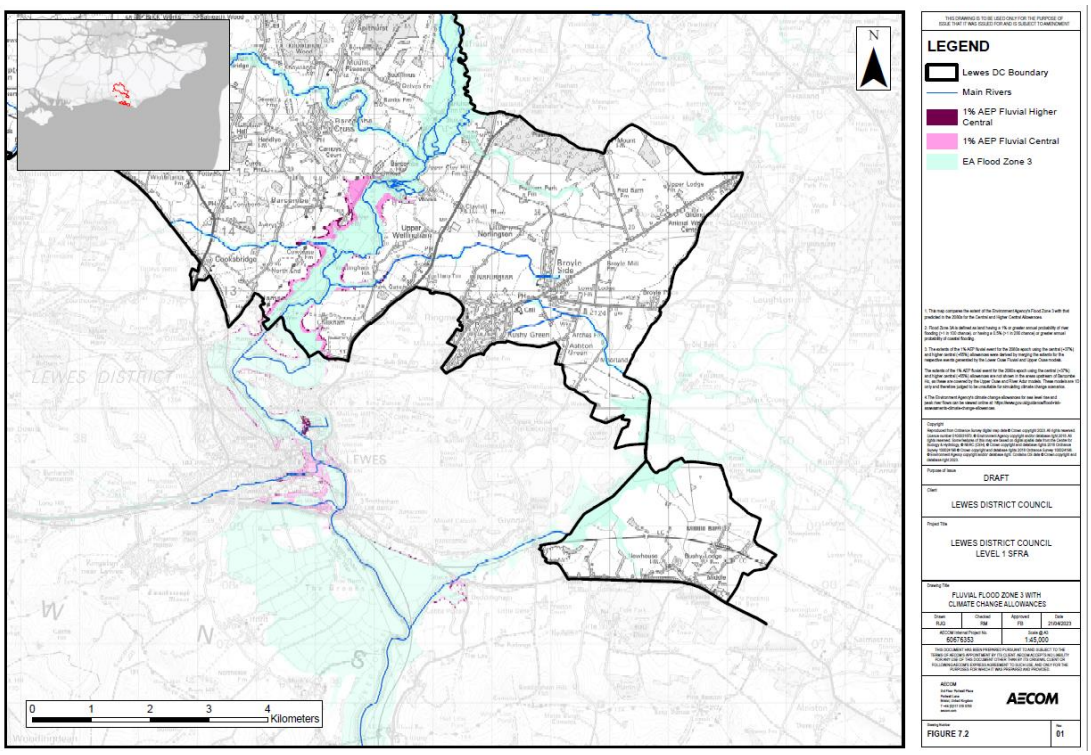
Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 12: Summer 1 day precipitation, historic and predicted future change (100rp event) (mm)



Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 13: Summer 5-day precipitation, historic and predicted future change (100rp event) (mm)



Source: AECOM. 2023. [Turquoise shading indicates the current extent of Flood Zone 3, with light purple shading indicating the new extent of flood zone 3 with a Central 1% AEP Fluvial and dark purple for a Higher Central 1% AEP estimate.]

Figure 14: Change in flood risk zone 3a in Northern Lewes District with Central and Higher Central climate change scenarios

3.5 Coastal flooding and erosion

Coastal flooding is a persistent problem in the UK, and particularly in the South of England. Climate change is causing sea levels to rise, an increase in storm surges, and increasing the severity of storm conditions e.g. strong winds, which in turn is exacerbating the rate of coastal erosion and increasing coastal flooding. These enhanced storm conditions create stronger and higher waves which have greater capacity to wash over sand dunes, carry sand and sediment offshore, damage natural ecosystems e.g. saltwater intrusion[28], and cause flooding to coastal areas (residential and green spaces).

Shoreline Management Plans (SMPs) are part of the Department for Food and Rural Affairs' (DEFRA) strategy for flood and coastal defences. The SMPs relevant to LDC is the Beachy Head to Selsey Bill (2006), which notes that the shoreline throughout much of the area covered in the plan has been retreating for centuries and continues to retreat today.[29] SMP areas have been further divided into frontages, each of which is has been assigned one of the four policies described above for three time periods; short term (0-20 years), medium term (20-50 years), and long-term (50-100 years). The SMP policies defined by Defra are:

- Hold the line – maintain or upgrade the level of protection provided by defences,
- Advance the line – build new defences seaward of the existing defence line,
- Managed realignment – allowing retreat of the shoreline with management to control or limit the movement, and
- No active intervention – a decision not to invest in providing or maintaining defences.

[28]Coastal systems and low-lying areas. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of IPCC https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf

[29] 2006. Beachy Head to Selsey Bill Shoreline Management Plan Final Document.

Strong coastal defences have been installed along the coastline to limit the progression of this retreat however, over the centuries communities have suffered severe losses from breaches, including via the tidal River Ouse at Lewes.[30] The preferred short-term, medium-term, and long-term policies for each coastal frontage section in the LDC area are presented in Table 3.

Frontage	Short Term Policy (0-20 years)	Medium Term Policy (20-50 years)	Long Term Policy (50-100 years)
Seaford Head to Cuckmere Haven	No Active Intervention	No Active Intervention	No Active Intervention
Seaford Town to Newhaven West Breakwater	Hold the Line	Hold the Line	Hold the Line
Newhaven West Breakwater to Peacehaven Heights	No Active Intervention	No Active Intervention	Managed Realignment
Peacehaven Heights to Saltdean	Hold the Line	Hold the Line	Hold the Line

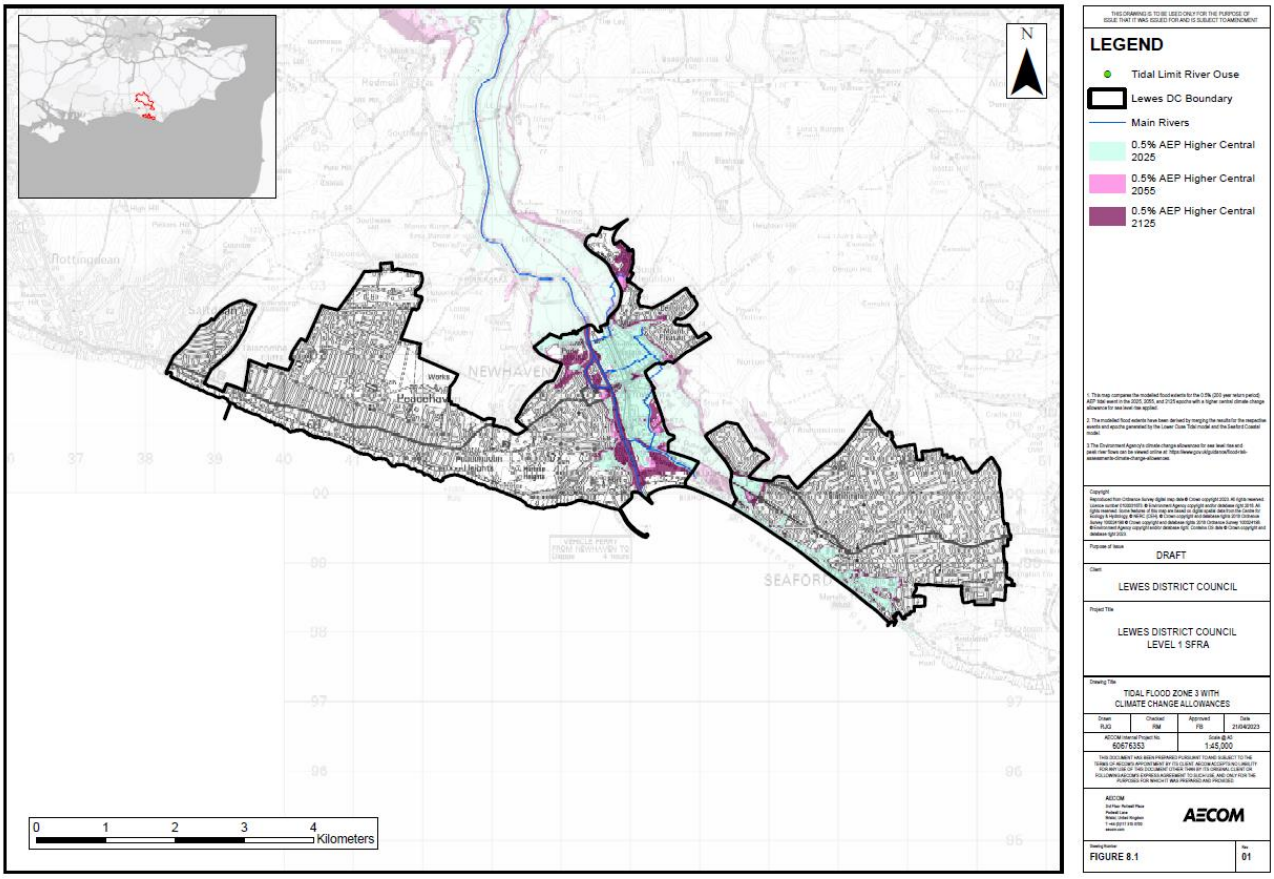
Source: Lewes Level 1 SFRA

Table 3: SMP Policies for Coastal Frontages in the LDC area[31]

The Government's Flood and Coastal Erosion Risk Management (FCERM) scheme has already proposed two schemes for managing coastal erosion and flooding in the LDC's administrative remit for the 6-year period 2021-2027.[32] The two schemes are Phase 2 of the shingle recycling at Seaford Beach, and the Southease Parish and Southease to A27 tidal embankment rebuilds. The Phase 2 shingle recycling at Seaford Beach is complete, this complimented with a buried seawall has resulted in tidal flooding protection for 459 properties in east Newhaven and Seaford.[33] The Southease Parish and Southease to A27 tidal embankment rebuilds scheme is due for completion in 2024. When complete, it will protect land within the Parish of Southease from coastal and fluvial flooding. [34]

The IPCC's Fifth Assessment Report (AR5), published in 2014, estimates a likely range of 26 to 82cm of sea level rise globally by 2100, compared to averages from the reference period of 1986-2005.[35] In the UK CCRA (2017) it is stated that under a high emissions scenario (RCP8.5), the UK could experience a sea level rise of up to 1.15m by 2100 compared to the reference period and under a medium scenario (RCP 4.5) sea level could rise 0.61m by 2100.[36] On top of sea level rise, climate change is expected to augment the frequency, extent and impact of tidal flooding including heightening the severity and frequency of storm surges. Figure 15 shows the possible extent of a coastal flooding event for a 1 in 200-year flood event for the years 2025, 2055 and 2125 epochs (flood zone 3a). There is estimated to be increased tidal flooding, particularly in the Newhaven area.

[30] Ibid.
[31] National Coastal Erosion Risk Mapping 2018-2021 (2022); https://www.data.gov.uk/dataset/7564fcf7-2dd2-4878-bfb9-11c5cf971cf9/national-coastal-erosion-risk-mapping-ncerm-national-2018-2021 [Accessed March 2023].
[32] Programme of flood and coastal erosion risk management (FCERM) schemes: https://www.gov.uk/government/publications/programme-of-flood-and-coastal-erosion-risk-management-schemes [Accessed March 2023].
[33] Environment Agency Shingle moved to improve flood protection in East Sussex: https://www.gov.uk/government/news/shingle-moved-to-improve-flood-protection-in-east-sussex [Accessed March 2023].
[34] River Ouse to Seaford Head Coastal Defence Strategy Appraisal Report (May 2012): https://southerncoastalgroup-scopac.org.uk/wp-content/uploads/2018/11/River-Ouse-to-Seaford-Head-Strategy-Appraisal-Report-2012.pdf [Accessed March 2023].
[35]
[36]



Source: AECOM. 2023.

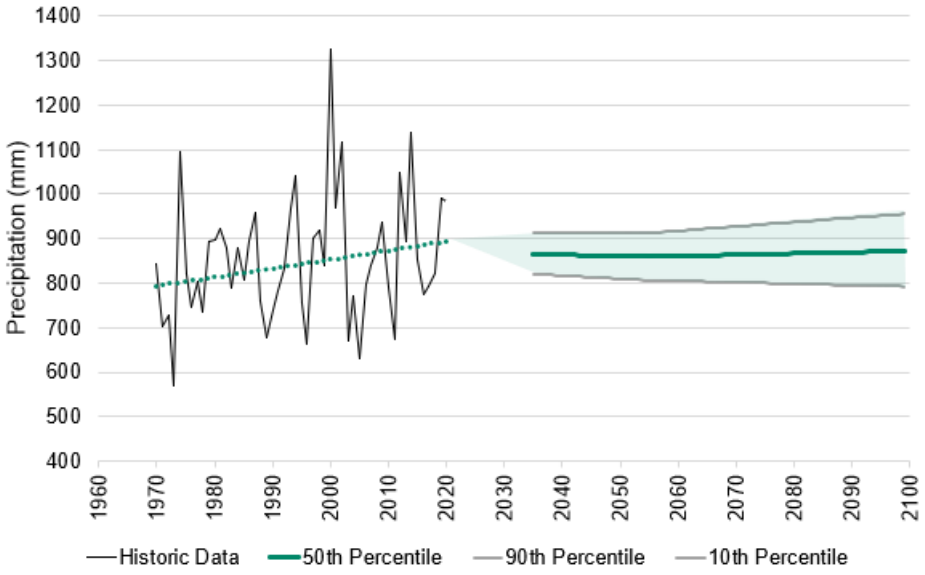
Figure 15: Extent of Future Coastal Flooding in Southern Lewes District

3.6 Water resources and water quality

To determine future drought risk, we evaluated UKCP18 projections in future rainfall. While we can see from Figure 16 average annual rainfall is not projected to change significantly, when we consider seasonal expected rainfall patterns, we can see that average summer rainfall (Jun-Jul-Aug), which is expected to increase from around 180mm to 210mm by 2100 (Figure 17).

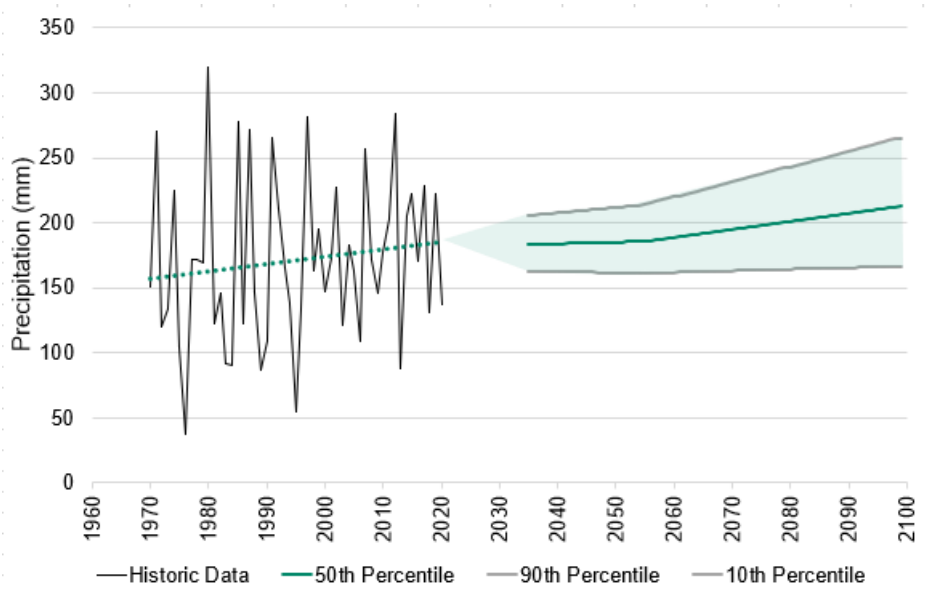
This is contrary to winter rainfall (Dec-Jan-Feb) which is expected to decline from around 235mm to approximately 155mm by 2100 (Figure 18) *[note the projections are for the average and show uncertainty bounds – the 90th and 10th percentile and do not account for the inter-annual variability that can be seen in the historic data plotted in* Figure 18*]*.

As previously noted, lower than average winter rainfall has a greater impact on drought in the UK due to the lower temperatures (thus lower evaporation rates) and lower evapotranspiration from vegetation during winter months – it is the period when aquifers (natural groundwater storage) in the UK are replenished each year. The climate change projections for rainfall therefore indicate a trend of increasing drought risk in Lewes District, as there will be less water available to replenish the aquifers during these recharge periods.



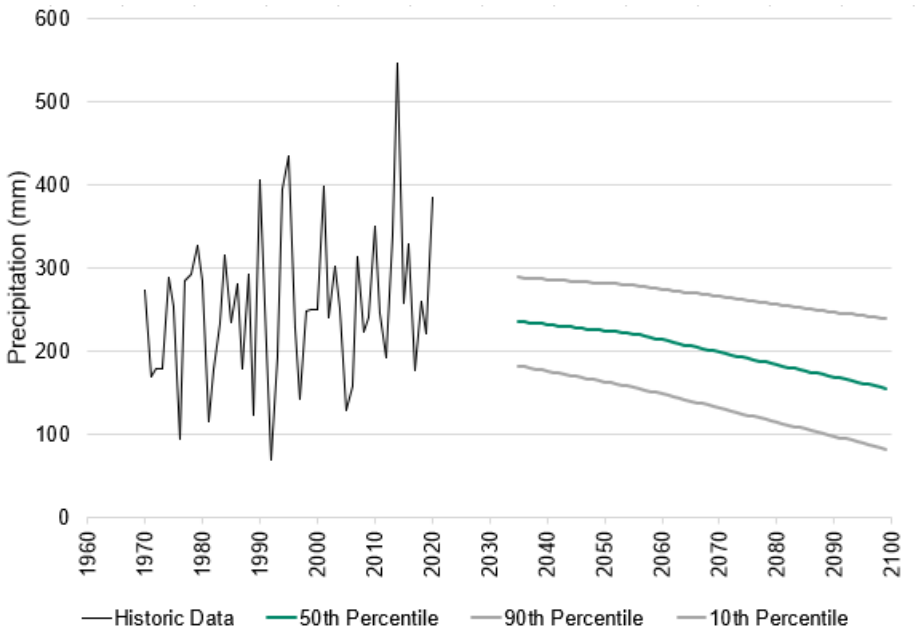
Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 16: Historic and Projected Total Annual Precipitation (mm)



Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 17: Historic and Projected Summer Total Precipitation (mm)

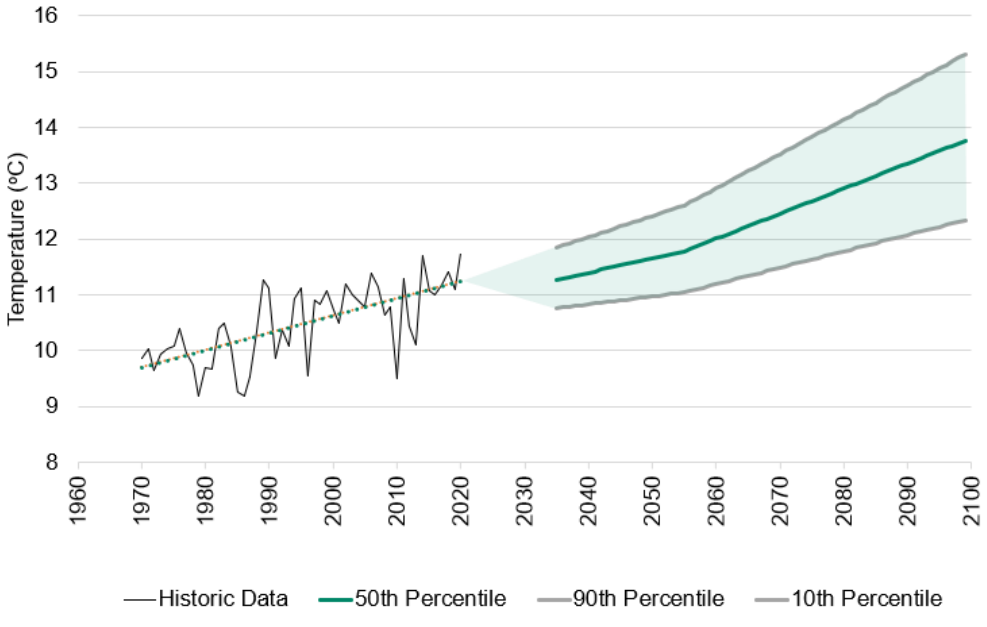


Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 18: Historic and Projected Average Winter Precipitation (mm)

3.7 Extreme heat

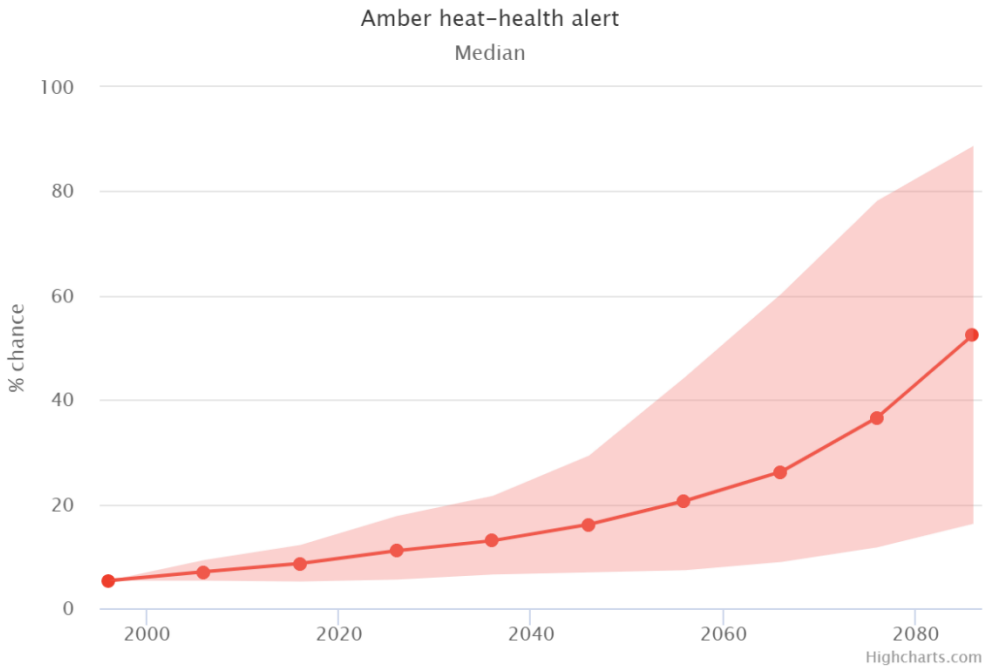
Mean annual temperature (Figure 19) has been projected to rise from approximately 11°C to just under 14°C by 2100. Higher mean annual temperature will have implications particularly to businesses and communities. For agriculture, higher mean annual temperatures will generally have positive outcomes, including longer growing seasons, higher yields and options for new crop varieties but could also have detrimental impacts on water availability and soil quality.



Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 19: Historic and Projected Mean Annual Temperature

Figure 20 shows the projection of the likelihood of an amber related heat-health alert (as defined by the Met Office) occurring in the Sussex throughout the decades. The Public Health Service responds to heatwaves based on the Amber Heat Health alerts issued by the Met Office, the threshold for which is 30°C. In the figure below, it is apparent that the occurrence of heat waves will increase with climate change and the frequency and severity of heatwaves will increase.



Source: UK Climate Risk Indicators. Accessed 2023.[37]

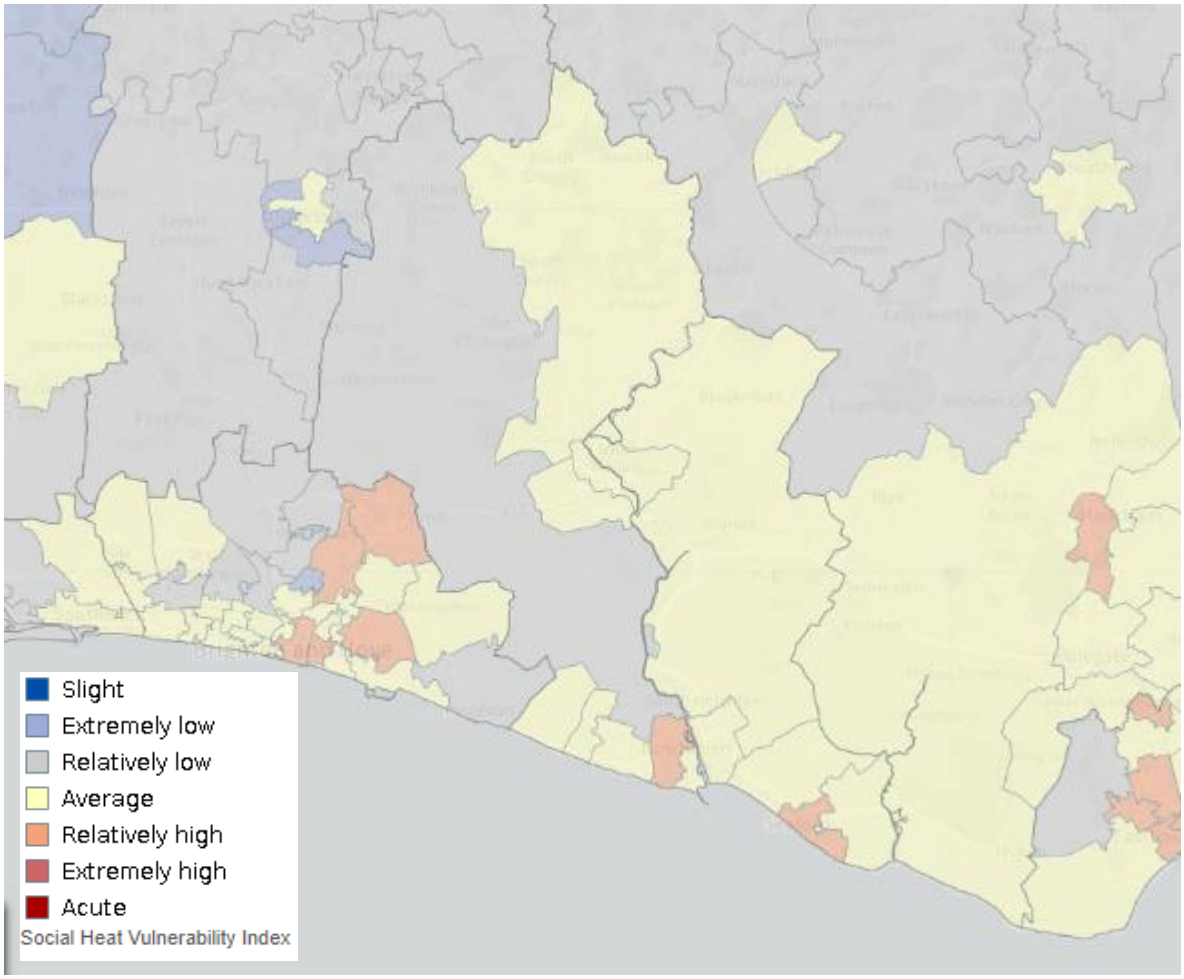
Figure 20: Annual probability of an amber heat-health alert projection

Heat socio-spatial vulnerability mapping displays how social vulnerability in the UK intersects with potential exposure to heat related events, which can disproportionately affect vulnerable communities (these may include marginalised or at-risk communities like the elderly, children and low-income communities). In Lewes District there are few areas with extreme risks, likely due to the high proportion of rural, coastal and agricultural land as well as green spaces (such as gardens, parks and trees) (See Figure 21).

Generally, the risk across the district is average or relatively low however hotspots occur in urban areas like Newhaven and Seaford which have relatively high-risk areas where deprivation and high exposure to extreme heat could result in an urban heat island effect. Generally cities and areas with little to no green spaces experience higher temperatures, this phenomenon is known as Urban heat island effect. This occurs as these areas are built of materials which absorb and retain heat, oppositely green spaces have a cooling effect by absorbing and regulating temperatures.

Green spaces are multifunctional and provide an abundance of benefits, to the environment, community and local economy. Green spaces are beneficial to people's health and wellbeing, as they help to filter air pollutants, regulate temperatures, and promote physical activities. The environment and local ecosystems also benefit from increased green spaces as they allow for habitat creation and support local biodiversity. Green areas can create a natural attraction, such as a park (recreational space), in an area which can help increase business for the local community and give a boost the local economy.[38]

[37] UK Climate Risk Indicators. Available: https://uk-cri.org/
[38] Ireland EPA (2015) https://www.epa.ie/publications/research/environment--health/Research_Report_328.pdf



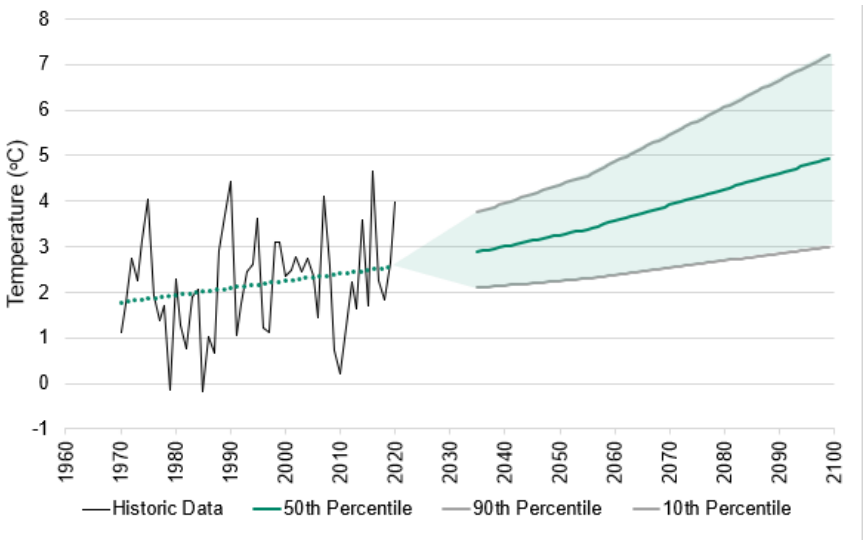
Source: Climatejust. Accessed 2023.[39]

Figure 21: Heat socio-spatial vulnerability for Lewes District

3.8 Extreme cold

Extreme cold occurs during a period of icing days, when daily temperatures remain below 0°C. Associated hazards with extreme cold include frost, ice and snow, which impacts transport, infrastructure, and public health, including mortality (and other services, assets and communities). The number of extreme cold events have always been unlikely in Lewes District, with two historic events c.1979 and c.1985 with no recorded events past this date. Winter minimum temperature has increased by around 1°C in the last 50 years, with temperatures generally remaining above 1°C (excluding 3 historic events where minimum winter temperatures were approximately 0°C). It is expected that the number of extreme cold events will reduce further to a negligible risk as a result of rising temperatures. UKCP18 projections illustrate an expected increase in Winter minimum temperature (Figure 22) and the likelihood of extreme cold will continue to reduce, to become a less likely risk.

[39] Sayers, P.B., Horritt, M., Penning Rowsell, E., and Fieth, J. (2017). Present and future flood vulnerability, risk and disadvantage: A UK scale assessment. A report for the Joseph Rowntree Foundation published by Sayers and Partners LLP.



Source: AECOM. 2022. [Data downloaded from the Met Office UKCP18]

Figure 22: Historic and Projected Winter Minimum Temperature (ºC)

3.9 Climate risk assessment results

The UK Committee on Climate Change's Adaptation Sub-committee's Climate Change Risk Assessment lays out to UK understanding of climate risk. The assessment includes 51 potential climate change risk and opportunity areas across 5 areas. Certain risks within this assessment are relevant to LDC, with the exclusion of the international dimensions which were deemed not relevant to a Local Plan. The high priority risks that are deemed relevant to the local plan are listed in the table below and the full, detailed assessment can be found in Appendix A.

Key climate change risks for Lewes District identified in the Climate Change Risk Assessment
Risks to terrestrial species and habitats from changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)
Risks and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion)
Risks to aquifers and agricultural land from saltwater intrusion
Risks to infrastructure services from coastal flooding and erosion.
Risks to transport from high and low temperatures, high winds and lightning
Risks to health and wellbeing from high temperatures
Risks to people, communities and buildings/infrastructure services from flooding
Risks to viability of coastal communities from sea level rise
Risks to business sites from increase in flood risk
Risks to coastal business locations and infrastructure from coastal flooding, extreme weather, erosion and sea level rise

Source: AECOM. 2023.

Table 4: Summary table of high priority climate risks deemed relevant to the Lewes District Local Plan

4. Scope and limitations

This chapter discusses the scope and limitations associated with the ability to address climate change and deliver the measures required for mitigation and adaptation through the Local Plan.

4.1 Mitigation scope

As described in the SCATTER report and the Climate Change and Sustainability Strategy (CCSS), the Local Plan is one of several mechanisms used to address climate change mitigation.

The following diagram shows the Summary of Measures proposed in the Carbon Emissions Analysis and Pathways report[40] produced by Anthesis in 2020. Of the measures identified arguably only part of one of these is directly and solely in the control of the Local Plan, this is the new-build component of "More energy efficient homes and new builds". There are a number of others that the Local Plan will support alongside other programmes and initiatives, including those related to Agriculture, forestry and other land use (AFOLU) category, some elements of those within the Transport category and potentially also those within the Energy Supply category. All of the other measures will be delivered by other programmes and initiatives driven by policy and funding at the national level.

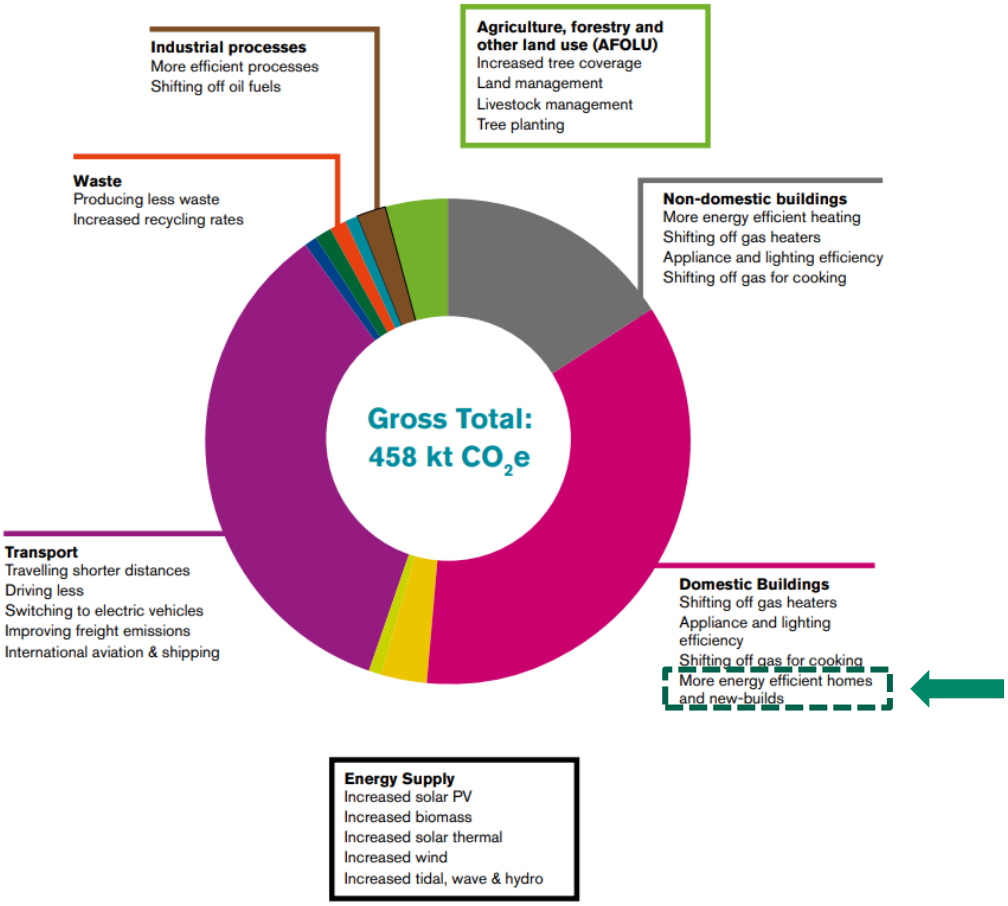


Figure 23: Summary of carbon emission reduction measures proposed in the SCATTER report (Anthesis, 2020)

[40] https://www.lewes-eastbourne.gov.uk/_resources/assets/inline/full/0/291623.pdf

4.2 Climate adaptation scope

There are also limitations on how the Local Plan can influence Lewes District's climate adaptation risks. The following table provides a summary of the highest priority climate adaptation risks for Lewes District and their relevance to the local plan.

Risk	Relevance to Local Plan
Risks to terrestrial species and habitats from changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)	Low
Risks and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion)	Moderate
Risks to aquifers and agricultural land from saltwater intrusion	High
Risks to infrastructure services from coastal flooding and erosion.	High
Risks to transport from high and low temperatures, high winds and lightning	High
Risks to health and wellbeing from high temperatures	High
Risks to people, communities and buildings/infrastructure services from flooding	High
Risks to viability of coastal communities from sea level rise	High
Risks to business sites from increase in flood risk	High
Risks to coastal business locations and infrastructure from coastal flooding, extreme weather, erosion and sea level rise	High

Table 5: Summary Table of Climate Adaptation Risks and relevance to the Local Plan

4.3 Spatial limitations

A further limitation to the way in which the Local Plan can address climate mitigation and adaptation within the district relates to the part of the district that comes outside of the jurisdiction of the Local Plan.

The Lewes District Local Plan only covers the area within the district that is outside the South Downs National Park (SDNP), this includes the area to the north of the national park and coastal settlements of Peacehaven, Newhaven, Telscombe, Saltdean and Seaford. The plan area is shown in Figure 24.

Figure 24: Map showing the Lewes District Local Authority Boundary and the area within this covered by the South Downs National Park

The South Downs National Park Authority are the statutory planning authority for the national park and have their own Local Plan covering the area within the SDNP boundary.

The climate mitigation and adaptation baselines described in Section 2 are for the whole district and as such, there is a spatial limitation on policies within the Local Plan for Lewes District that restricts its impact and influence on both of these.

4.4 Policy limitations

The impact and influence of the Local Plan is also limited in regard to the powers associated with planning policy. There are things that fall under the direct control of planning policy, things that can be influenced by planning policy and other things that planning policy will have no impact on and which will need to be delivered by other policy and programmes at the national or local level or delivered privately by individuals and organisations.

To illustrate this, in regard to climate mitigation, the following diagram provides a summary of the broad areas of intervention and the relative impact and level of influence that a Local Plan has on four discreet areas of potential intervention. New buildings are the area of greatest influence given the powers within the Local Plan to determine the scale, type and location of development as well as the standards to which it is built but, as described in Section 2, this represents a very small proportion of the overall District emissions. At the other end of the scale, existing buildings and infrastructure are responsible for much of the existing emissions but planning policy has very limited powers to influence these.

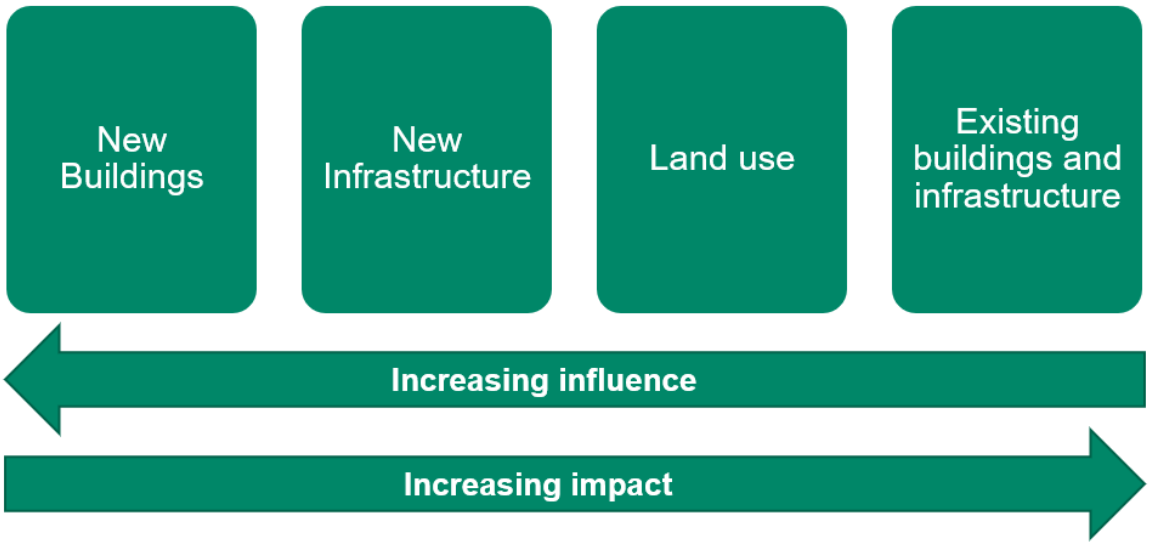


Figure 25: Relationship between influence and impact of a Local Plan on climate mitigation in four key areas

5. Growth strategy appraisal

This chapter assesses how the climate mitigation adaptation impacts associated with development proposed within the Local Plan would vary depending on the type of growth strategy adopted and how these could be addressed.

5.1 Categorising types of growth

For the purposes of this study we have identified four distinct types of growth that would have materially significantly different implications for climate mitigation and adaptation. It is anticipated that most sites proposed within the Local Plan would fit within one of these four types.

Growth Type A	Growth Type B	Growth Type C	Growth Type D
Urban infill	**Urban expansion**	**Rural expansion**	**New settlement**
Expansion within main settlements	Expansion at the edge of main settlements	Expansion of minor settlements	Creation of new towns/villages

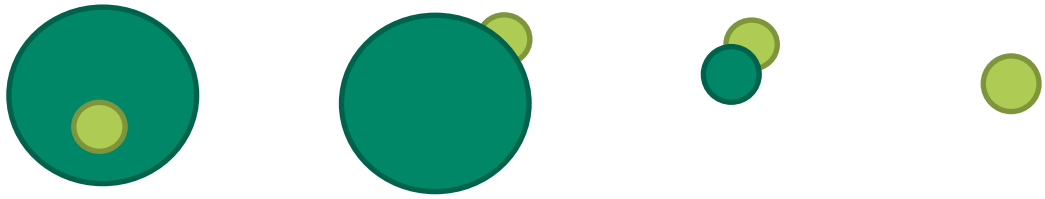


Figure 26: Summary of the four distinct growth types assumed in this comparative assessment

5.2 Assessing the climate impacts

In order to undertake a comparative assessment of the climate impacts of the different growth types described above, we have identified the following areas where there are likely to be significant differences in the scale of the impacts.

Mitigation

- Building and infrastructure embodied carbon – The relative scale of emissions associated with materials used in construction. It should be noted that embodied carbon is not counted in the District's baseline emissions, which only account for territorial emissions associated with operational activities within the district.
- Building operational carbon – The relative scale of emissions associated with the operational carbon of the new development.

- Transportation carbon – The relative impact on emissions associated with transport, primarily the use of private vehicles.
- Onsite renewable energy generation – The relative potential to deploy on-site renewable energy generation, primarily the use of PV and heat pumps (either individual systems or within communal/district heat networks).
- Competition with land for sequestration and renewable energy infrastructure – The relative impact on land availability for other mitigation measures such as renewable energy and sequestration.

Adaptation

- Flooding – The relative impact on flood risk, including river flooding, coastal and ground water flooding.
- Overheating – The relative ability to mitigate the risk of overheating within buildings
- Surface-water runoff – The relative ability to manage surface water runoff from the site.
- Water consumption – The relative impact on water consumption
- Impact on ecosystems and biodiversity – The relative impact on natural capital and biodiversity as well as the potential loss of opportunity for using the site for ecosystem improvements and biodiversity gain.

5.3 Comparative assessment of climate impact

The four growth types were assessed against the criteria described above. The assessment was conducted on a generic level without quantification or weighting so the scoring is purely relative, with 1 being the best and 4 the worst. Assumptions were made as to what would be typical in each case but we recognise that in practice there is likely to be variation between specific sites. The results of this assessment are shown in the following table, with comments to provide a guide to the assumptions made in each case.

	Relative scoring				Comments
Growth Type	**A**	**B**	**C**	**D**	
Mitigation					
Building and infrastructure embodied carbon	**1**	**2**	**3**	**4**	Development outside of major settlements is likely to be lower density and also require a lot more infrastructure associated with roads and utilities, so the embodied energy is likely to be greater. It should be noted that embodied carbon is not counted in the baseline emissions, which only account for operational emissions within the district.
Building operational carbon	**4**	**3**	**2**	**1**	Development on brownfield and more constrained sites is likely to have greater constraints and viability issues associated with delivering higher energy performance standards.
Transportation carbon	**1**	**2**	**4**	**3**	Development within existing urban locations that have access to good public transport, cycling and walking infrastructure and essential amenities is likely to lead to lower emissions associated with private vehicles. Larger new settlements may

					be able to support more public transport and local amenities than rural development in existing minor settlements.
Onsite renewables	**4**	**3**	**2**	**1**	The potential to deploy on-site renewable energy generation is likely to be more restricted on infill sites due to greater technical, spatial and viability constraints.
Competition with sequestration and renewables	**1**	**2**	**3**	**4**	Development on greenfield sites is likely to be lower density and might use land that could potentially be used for other purposes including renewable energy generation and sequestration schemes needed to support wider climate change mitigation.
Adaptation					
Flooding	**n/a**				Flood risk is considered to be more impacted by the specific location of individual developments rather than the growth type.
Overheating	**4**	**3**	**2**	**1**	This ranking assumes that the impacts of overheating would be higher in urban areas not only because of the urban heat island effect but also the ability to mitigate the impacts through the design due to potential constraints like space and noise.
Runoff	**4**	**3**	**2**	**1**	This ranking assumes that more rural development would have less of an issue from surface water run off due to lower proportion of hard surfaces, more space and less constraints for incorporating sustainable urban drainage measures.
Water consumption	**1**	**2**	**3**	**4**	This ranking assumes that although all dwellings/buildings can be designed with low water use appliances, the additional infrastructure required to serve rural or new settlements could lead to higher overall usage.
Impact on ecosystems and biodiversity	**1**	**2**	**3**	**4**	This ranking assumes that rural and new settlements would have a higher impact on ecosystems and diversity due to the use of more valuable land.

Table 6: Comparative assessment of different growth types against climate mitigation and adaptation criteria

5.4 Key implications

The delivery of the Local Plan is likely to involve a number of different types of development that may fall into all of the identified growth types. However as shown above, the potential impact of the proposed new development could be significantly different depending on the relative proportions of the different growth types adopted.

Based on the comparative assessment the following table sets out the potential mitigation measures that should be considered when adopting each of these growth options.

Type	Measures to address specific opportunities	Measures to address specific risks
Growth Type A: Urban infill	• Promote refurbishment of existing buildings and use of	• Additional checks on overheating risks

	circular economy principles to reduce embodied carbon • Promote good connectivity with existing cycling and walking infrastructure • Opportunities for new integrated cycle/walking infrastructure. • Communal cycle storage and e-bike charging provision. • Reduce or avoid the provision of car parking spaces • Promote the potential for heat networks	• Design to maximise the use of PV • Additional requirements around surface water runoff
Growth Type B: Urban extension	• Promote good connectivity with existing cycling and walking infrastructure • Reduce car parking spaces where viable • Increased public and private EV charging • Promote the potential for heat networks	• Additional checks on overheating risks • Design to maximise the use of PV • Additional requirements around surface water runoff
Growth Type C: Minor settlement expansion	• Maximise the potential for onsite PV through design • Maximise potential for sustainable urban drainage systems	• Requirement to assess and minimise embodied carbon • Provide cycling and walking connections to amenities • Improve public transport • Provide private EV charging
Growth Type D: New settlement	• Maximise the potential for onsite PV through design • Consider site-wide energy systems • Maximise potential for sustainable urban drainage systems	• Requirement for a whole lifecycle carbon assessment • Provide local amenities • Provide cycling and walking infrastructure with connections to local amenities • Provide good public transport infrastructure • Provide private and public EV charging • Assessment of opportunity loss for renewable energy generation • Assessment of opportunity loss for sequestration and possible compensation • Requirement for higher biodiversity net gain targets

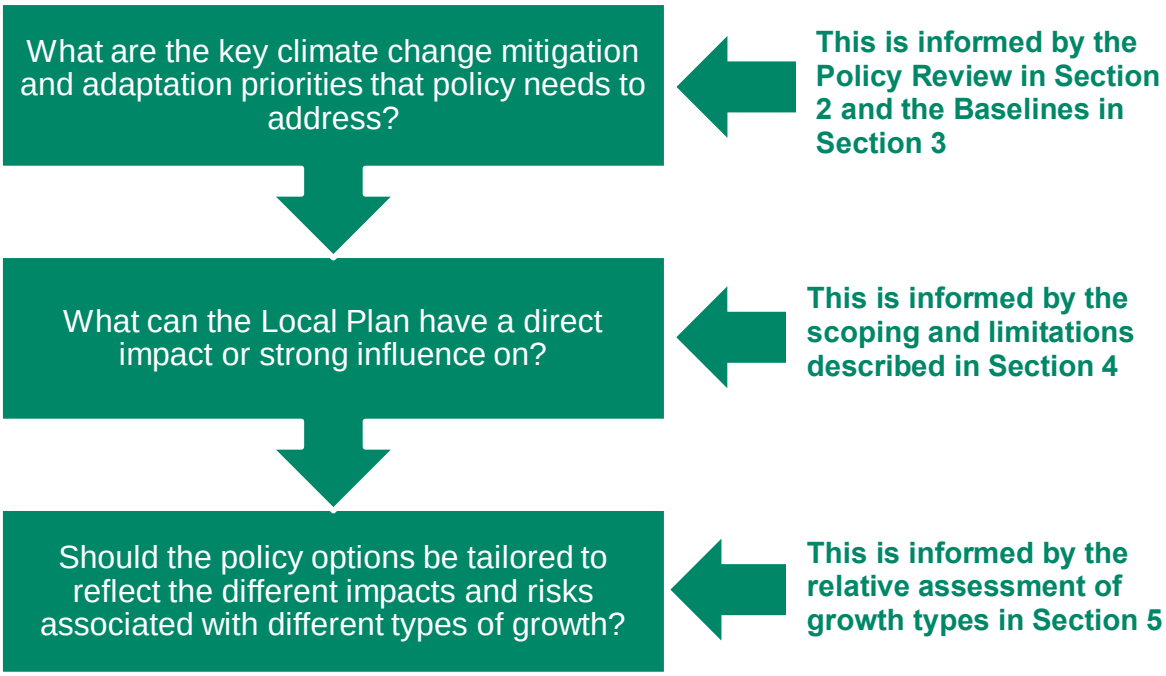
Table 7: Potential mitigation measures to address the relative opportunities and risks associated with different growth types

6. Policy options assessment

This chapter provides a summary of the assessment of potential options for setting policies within the Local Plan to address climate change

6.1 Scoping potential options

We have used the process described in the following diagram to scope out the potential options to assess as part of this study



6.2 Policy options for climate mitigation

Applying the scoping process described above we have identified the following areas to focus on

- Strategic priorities
- New buildings
- Existing buildings
- Transport
- Infrastructure
- Sequestration

6.3 Strategic priorities

The Local Plan has been identified by Lewes District Council as key to the delivery of the Council's net zero ambitions however, it does have limited scope. The Plan is just one way to

help bring forward the transition to a lower carbon future and it works in partnership with other strategies, legislation, organisations, and the local community.

The Plan can have a positive impact on the district through enabling positive development, creating opportunities, joint working and helping to remove barriers to sustainable development. The long-term focus of the Plan, looking forward to 2040, and even beyond, allows the Council to put in place long term strategies, and influence the development and delivery of partner strategies including those of infrastructure providers and the County Council.

The Local Plan has the greatest influence on new development, particularly larger scale development. For new development the plan can influence:

- Location
- Density, layout and orientation
- Building design and materials
- Green infrastructure and biodiversity
- Delivery of new onsite infrastructure
- Connections to existing infrastructure
- Onsite movement and travel

For existing buildings the influence lessens significantly but there are still positive impacts the plan can make, such as improving building standards through retrofit and improvements to the surrounding environment and infrastructure.

National Policy places emphasis on the reuse of previously developed land (also known as brownfield land) and land in sustainable locations where there is supporting infrastructure in place. The majority of the sites in the Lewes Brownfield Land Register are within the settlements of Newhaven, Peacehaven, Seaford and Ringmer. These settlements have a wide range of services and facilities and are therefore, some of the most sustainable locations within the Local Plan area.

Development on previously developed land can often be less viable than greenfield development due to the potential costs of site remediation and redevelopment. Such sites can also have less flexibility in terms of layout, design and orientation, making it potentially more difficult and costly to create low carbon developments. However, reuse and retrofit of appropriate existing buildings can help to keep the overall whole lifecycle carbon emissions of the redevelopment at a lower level compared to demolition.

Greenfield land is generally considered easier to develop and can provide an excellent opportunity to build low carbon development. Although, infrastructure and services would need to be brought in, the layout and design and level of such services can be planned in advanced to support low carbon development and make the most of opportunities such as renewable energy, active travel and green infrastructure. The design and layout of buildings and streetscape is also more flexible, allowing for different building types, shapes and orientation to minimise energy consumption and maximise roof solar energy generation.

Taking account of the baseline analysis, local context and scoping exercise we have identified the following priorities to be addressed by the Local Plan with regards to Climate Change mitigation.

- Strategy for sustainable and low carbon growth
- Ensure new development is sustainable, energy efficient and low carbon
- Reducing the reliance on private transport and the combustion engine
- Encourage the retrofit of existing buildings to reduce carbon emissions

- Support suitable opportunities for low carbon energy generation and storage to serve the district
- Improve infrastructure to support sustainable development and help existing residents to reduce emissions
- Work with the natural environment to help reduce emissions

The priorities are intended to address the full scope of climate change mitigation measures available to the Local Plan. These priorities, along with those for adaptation, can be used to formulate the strategic policy for tackling climate change within the Local Plan.

There are many different policy options available to Lewes District Council to tackle the causes of climate change, primarily carbon emissions. However, as shown in previous sections, the Local Plan will have the greatest influence on how new development is delivered and therefore this is the primary focus of the options identified within this section.

6.4 New buildings

The following diagram provides a summary of the different ways of potentially setting higher standards for new buildings to reduce carbon emissions. These are organised under the following four headings:

- Focus – What the requirement is focussed on
- Type – The type of requirement that is used
- Scope – What the requirement applies to
- Implementation – What processes and support are needed to accompany the requirements

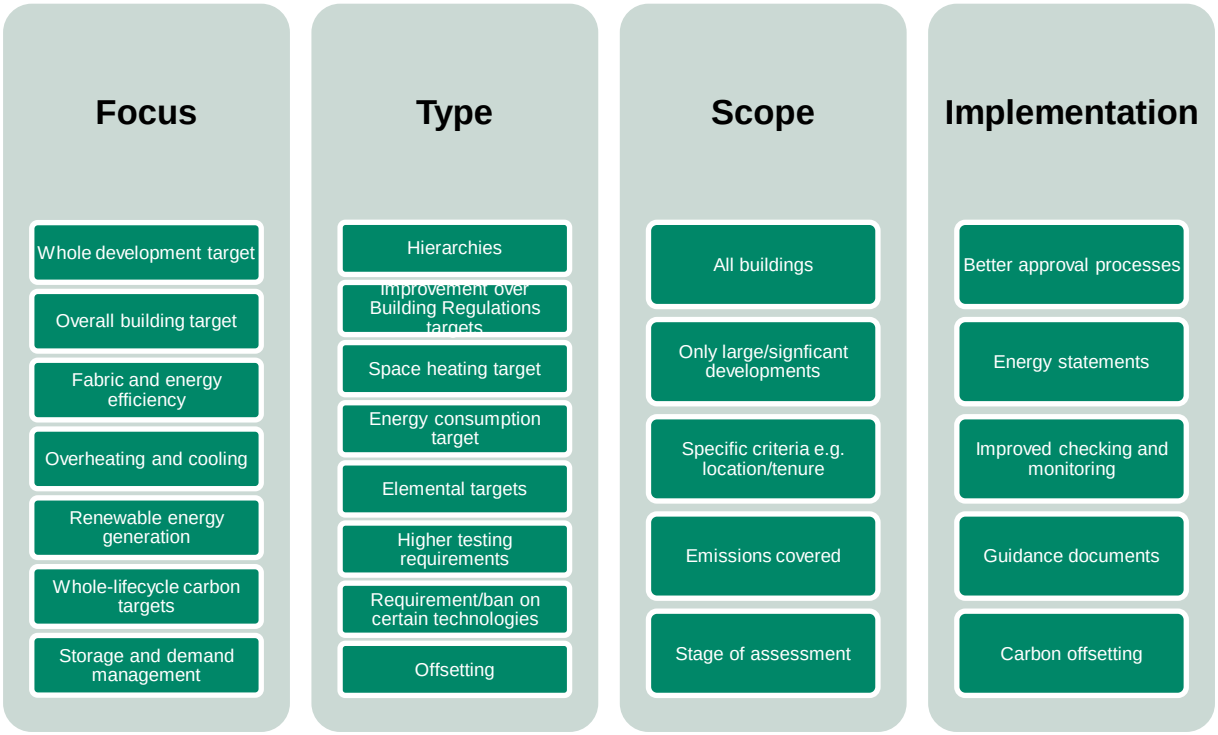


Figure 27: Range of different ways of setting requirements for improved standards around building energy performance

Based on discussions and workshops with LDC around these potential different approaches to setting requirements we have focussed on investigating the following options for new buildings:

- Overall building targets;
- Fabric and demand reduction requirements;
- Overheating and cooling requirements;
- Heating systems requirements;
- Renewable energy requirements;
- Energy storage and management;
- Whole lifecycle carbon requirements;
- Carbon offsetting; and
- Improved processes.

Overall building targets

A common approach to setting higher performance standards is to focus on the overall performance of the whole building. This is the approach that is taken by the Target Emission Rate (TER) requirement within Part L of the Building Regulations, which assesses each individual building or dwelling and generates targets based on a carbon emission rate using a set of standard values. This approach provides a level of flexibility in how the target is achieved because it enables improvements to be made in different aspects of the specification and as preferred by the builder.

One option would be to require developments to go beyond the Part L TER by setting a percentage improvement target on that value. The advantage to this is that developers can use the standard calculation software to do this, which is checked by a 3rd party. The Greater London Authority (GLA) adopt this approach in the London Plan. A downside to this approach is that it would be difficult to prove the viability, especially at the current time when Part L has changed and with further changes planned but not yet confirmed.

Targets linked to Part L are also rather abstract in that they relate to comparisons with a notional building rather than absolute carbon emissions. An alternative approach could be to set a target for overall carbon emissions, in some cases this has been set at zero for the regulated emissions, however challenges associated with this have tended to mean that an offset scheme is required to enable the target to be achieved in most cases.

Another alternative option is to look at the overall energy consumption and set targets for the Energy Use Intensity (EUI) of each dwelling or building, which would assess the overall energy use of the building in kWh per square meter. This makes increasing sense as buildings become fully electrified and there are no complications of multiple fuel types. As the national grid is decarbonised it makes carbon counting a less useful way of determining building performance when the differences would become very small or, in the case of zero carbon grid electricity, non-existent. The Passivhaus scheme has targets related to overall energy consumption and targets have also been proposed by groups like Low Energy Transformation Initiative (LETI) however this is likely to require alternative calculations and additional resources both for developers to run the calculations plus Planning and Building Control departments to check the work.

There are also wider sustainability assessments which assess energy alongside a range of other sustainable development indicators to determine the relative performance of whole buildings, such as BREEAM and the Home Quality Mark (HQM). Both of these include energy, looking at the overall performance of the building as well as specific measures, with

targets linked to improvements beyond Part L. However, the nature of these assessments is that there is flexibility in the overall score, with minimum performance standards in some areas, so a target for a specific overall rating wouldn't guarantee the performance in the energy section of the assessment. The following table provides a comparison of some of these options.

	BREEAM 'Outstanding'	Home Quality Mark (HQM)	Energiesprong	Passivhaus	Passivhaus Plus
Description	BREEAM 'Outstanding' requires a reduction in regulated CO_2 emissions, compared with Part L 2013 standards. Additional credits can be achieved for a 100% reduction (i.e. Net Zero) regulated emissions.	HQM was developed by the BRE as a rating system that can signal to householders how well the building performs based on various sustainability indicators, including energy use and CO_2 emissions.	Originally developed by the Dutch government to promote energy efficient retrofitting, this is a performance standard for new build and refurbishment.	Originally developed in Germany, this is a performance standard that aims to meet annual heating requirements with very low energy input.	Similar to the Passivhaus Standard, this scheme also requires renewable energy generation on-site or nearby, resulting in Net Zero emissions.
Relevant building types	Non-domestic only [separate standards for domestic refurbishment]	Domestic only	Domestic only	Domestic and non-domestic	Domestic and non-domestic
Scope	Core requirements relate to regulated energy use, but additional credits can be achieved for reducing unregulated energy use. There is consideration of lifecycle CO_2 emissions from certain materials, but no set target.	Regulated and unregulated energy use .	Regulated and unregulated energy use	Regulated and unregulated energy use	Regulated and unregulated energy use
Target values	A bespoke metric is used which accounts for its regulated operational heating and cooling energy demand, primary energy consumption and CO_2-eq emissions	A bespoke metric is used which accounts for fabric performance, system efficiency and Total resulting CO_2 emissions.	Space heating demand <30 kWh/m²/yr Net Zero delivered energy over the course of the year	Space heating demand <15 kWh/m²/yr Primary energy demand <60 kWh/m²/yr	Space heating demand <15 kWh/m²/yr Primary [renewable] energy demand <45 kWh/m²/yr
Fabric energy efficiency standard	None	None	Minimum performance standards for building elements and fixed services	Space heating demand <15 kWh/m²/yr	Space heating demand <15 kWh/m²/yr
Renewable energy requirement?	No	No	No	No, but this would typically be required to meet the targets	Yes, renewable energy generation >60 kWh/m2/yr of building footprint

Table 8: Comparison of some whole building energy assessment schemes and standards

Fabric performance and demand reduction

An alternative or additional policy option would be to set a requirement to address purely the fabric performance of a building. Again, this is something that is covered in Part L as part of the Fabric Energy Efficiency (FEE) target but there is the potential to develop a more challenging target in this area.

The case for doing so is that this would address the costs associated with space heating and the component of the energy demand that is arguably where the developer has greatest influence, since it is determined by the specification and quality of construction and would be extremely difficult and expensive for the home-owner to address in the future. Reducing energy demand will have a direct benefit for the eventual homeowner in regard to their energy costs and also deliver greater energy security and insulation from the impacts of future price rises.

Another important case for targeting space heating is that in the future, as more heating is electrified, it is likely to represent one of the most significant contributions to the overall peak power demands across the electricity network, particularly in towns and cities due to the scale of demand and the coincidence of use. Increasing demands and higher peaks will require much greater grid reinforcement which will have both direct cost implications and implications for capacity, which may restrict or delay the roll out of heat pumps and Electric Vehicles (EVs).

	Part L 2021 Notional	Indicative 2025 (consultation)[41]
Floor U-value (W/m^2.K)	0.13	0.11
External wall U-value (W/m^2.K)	0.18	0.15
Roof U-value (W/m^2.K)	0.11	0.11
Window U-value (W/m^2.K)	1.2	0.8
Door U-value (W/m^2.K)	1.0	1.0
Air permeability (m^3/h.m^2)	5.0	5.0
Heating appliance	Gas boiler	Low carbon (electric heat pump)
Heating system	Low temperature	Low temperature
Ventilation System type	Natural	Natural
Photovoltaics	Yes	No
Waste-water heat recovery	Yes	No
Thermal bridging (y-value)	SAP Table R	0.05-0.09

Table 9: Performance metrics of the notional dwelling for Part L 2021 and the proposed values for the Future Homes Standard anticipated in the 2025 revision

The space heating demands associated with construction to the Part L 2021 standard are likely to be approximately 40-50 kWh/sqm/yr and this could drop to 30-40 kWh/sqm/yr with the proposed 2025 revision based on the indicative specifications that have been published. The Committee on Climate Change, in their report "UK housing: Fit for the future"[42]

[41] At time of writing this is under review and the specification may change
[42] https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/

recommended achieving space heating demands of 15-20 kWh/sqm/yr in new dwellings while the Passivhaus standard requires less than 15 kWh/sqm/yr.

There are costs associated with these improvements and diminishing returns mean that the costs can rise significantly as for achieving higher savings, for example the impact on wall build-ups and overall thicknesses to achieve the very low wall u-values. The upfront costs would be outweighed by the cost savings over the lifetime of a building. This is why Passivhaus is popular with self-builders who stand to benefit from the investment; where these benefits are split in the usual case of commercial developers the incentives don't align so regulation or other means for sharing the benefit is needed. If setting a requirement for space heating then a maximum value between 15kWh-30 kWh/sqm/yr, subject to viability, is likely to represent a future proofed approach.

Overheating and cooling

Overheating is recognised as a key risk in the built environment in the future as a result of climate change and the impact of increasing temperatures and frequency of heat waves. Relative to other parts of the UK this is an issue that is likely to be more important in Lewes District due to both its location and demographic. High temperatures have been linked to mortality and wellbeing impacts. The UK Climate Change Risk Assessment 2017 projects that UK heat-related deaths could more than double by the 2050s from the 2,000-death per year baseline if there is no adaptation[43] This would be a substantial human cost, and DEFRA predictions from 2012 estimate that the economic cost associated with heat-related deaths would rise by £15-100 million per year.

There is a link between the energy performance of a building and the overheating risks. Increasing the fabric performance can lead to increasing overheating risks however this can be mitigated through design. Some of the mitigation measures like orientation can be simple if they are addressed from the outset of a project through the masterplan and building layouts, others can be achieved through the specification of glazing and ventilation strategies, or in the case of external shading from trees through landscape planning, but again need to be considered in the early stages of design to be effective. The latest revision of Building Regulations includes more stringent requirements in the new Approved Document Part O to assess overheating in new residential buildings.

A potential policy option would be to include a requirement to complete an early risk assessment and submit this with the planning application showing that the overheating risks have been identified and how these have been addressed in the plans. The Good Homes Alliance have published a risk tool to assist new homes developers in understanding the level of overheating risk and promoting the consideration of mitigation measures. Requiring developers to complete this at the pre-planning stage will give developers and design teams the information to inform those early decisions.

[43] Climate Change Committee, 'UK Climate Change Risk Assessment' (2017). Available at: https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf

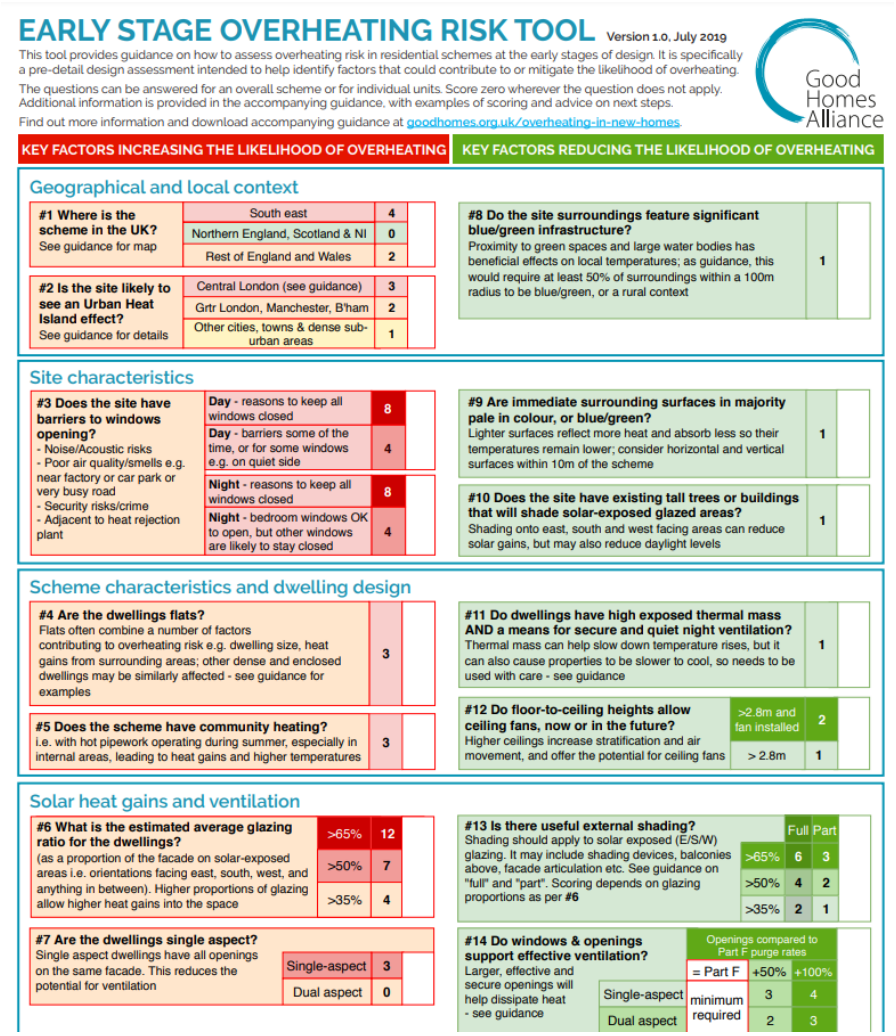


Figure 28: Good Homes Alliance Overheating Risk Tool

Another option would be to require developers to undertake additional modelling beyond what is required for Part O. This could be a requirement to undertake dynamic simulation modelling in line with the guidance and data sets in CIBSE TM59[44] as well as additional weather data sets to reflect extreme overheating events. Such modelling would have additional costs associated both with running these models and any mitigation requirements that follow. This may be difficult to apply to all development sites but could be an extra requirement to significant developments or those with higher risks.

Heating systems

The choice of heating and hot water system will have the most significant impact on the operational carbon emissions of the building. The decarbonisation of electricity with plans for supply from the national grid to be net zero by 2035 means that heating from systems that use electricity, which will principally be heat pumps, will not only be lower carbon now but will continue to reduce over the lifespan of the building and become net zero once the grid is fully decarbonised. In contrast the carbon emissions associated with the combustion of gas will remain unchanged and any buildings that are designed with gas boilers now are likely to retain those for at least the expected lifespan of that product which in most cases will be about 15 years.

[44] https://www.cibse.org/knowledge-research/knowledge-portal/technical-memorandum-59-design-methodology-for-the-assessment-of-overheating-risk-in-homes

The following graph, from a study undertaken by Currie & Brown and AECOM for the Committee on Climate change (CCC)[45], shows the cumulative carbon emissions of a house with a gas boiler compared to one with an electric Air Source Heat Pump (ASHP) and also the scenario in which a gas boiler is installed first and replaced with an ASHP after 10 years. This shows a significant difference in the cumulative emissions between the gas boiler and the ASHP. This is because the ASHP uses electricity from the grid which is expected to be negligible/zero carbon within the next 10-15 years. It also shows that in the replacement case the lifetime emissions for the building are potentially three times higher due to the initial use of a gas boiler.

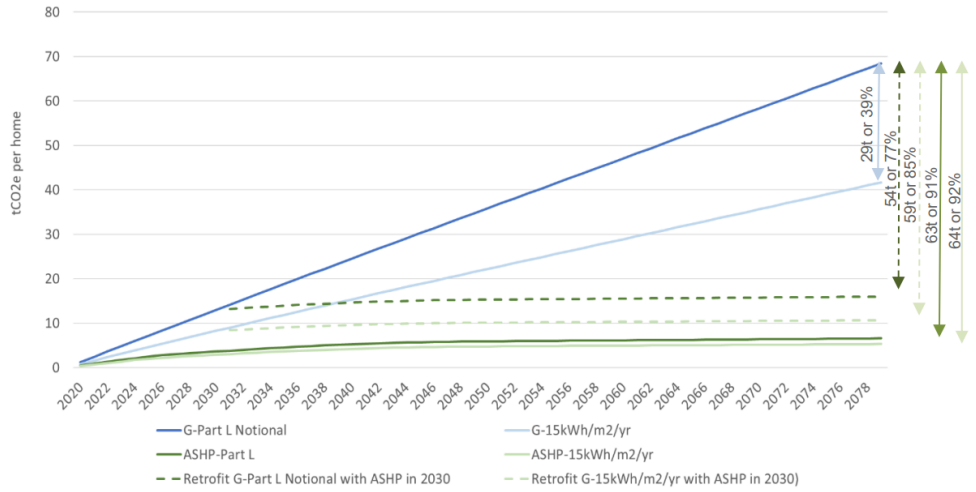


Figure 29: Graph showing the cumulative carbon emissions from a semi-detached house built to different space heating standards (Part L 2021 notional or Passivhaus) with either a gas boiler (G), an ASHP or a gas boiler retrofitted to an ASHP after 10 years.

The Future Homes Standard scheduled for 2025 proposed a ban on new gas boilers and includes an electric Air Source Heat Pump (ASHP) as the reference heating system. The Future Building Standard proposes similar changes to the reference heating system however it has an assumption on the use of direct electric systems for some building types where point-source heating is more appropriate. The new Regulations will therefore enforce the switch from gas boilers to electric heat pumps and deliver this change. Though the reference system is ASHP, the developer has the option to use other electric heat pump or low carbon technologies such as connection to low carbon heat networks.

However, this policy is still under development and could be changed or delayed. Also, even if it is delivered as planned and on schedule there may be transitional arrangements that mean that the policy doesn't take effect until 2026 or later. As such, there may be a gap between the publication of the Local Plan and the enforcement of the Future Homes and Future Buildings Standards which means that gas boilers are still being installed in new developments in the district, leading to significantly higher carbon emissions as described above. Another issue is that the costs for replacing the gas boiler in the future will be passed onto the homeowner. The Government has signalled that it will also seek to replace existing gas boilers, with an aim of phasing out the installation of new gas boilers after 2035. Homes that are delivered with gas boilers today will therefore need to replace these with electric heat pumps in the near future, the cost of which will be borne by the homeowner. These costs, and additional costs of retrofitting fabric improvements, can be significant as shown in the following graph.

[45] https://www.theccc.org.uk/wp-content/uploads/2019/07/The-costs-and-benefits-of-tighter-standards-for-new-buildings-Currie-Brown-and-AECOM.pdf

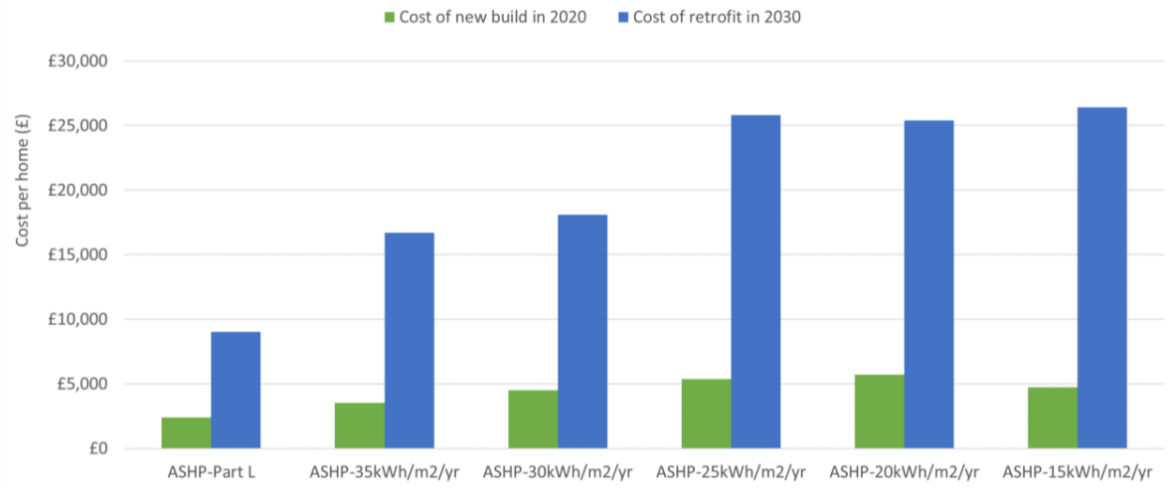


Figure 30: Graph showing the additional costs of installing ASHP and meeting space heating standards in a new semi-detached house compared to retrofitting these after construction.

In regard to direct electric heating the indication is that the Future Homes Standard will seek to make this challenging to comply unless heating demands are extremely low. While direct electric heating is relatively low cost to install, it would have much higher running costs. Heat pumps are 2.5 to 3 times more efficient, so their use leads to much lower energy consumption and therefore lower costs and lower impact on network capacity. As previously noted, some non-domestic buildings with localised and very small heat demands might be more appropriately served by point-course rather than centralised heating and therefore direct electric systems would be expected.

The other key option for decarbonising heat is through the use of heat networks. There are no existing or planned work on strategic heat networks in the district so there is less of an evidence base to support a policy requiring connection to heat networks when the infrastructure is not there to connect to. However, the Government is currently developing a Heat Network Zoning Policy[46] which would provide local authorities with the power to designate areas as heat network zones if it can be demonstrated that a heat network would offer the best route to decarbonisation; that being the lowest cost and lowest carbon option. Given that this policy might be enacted in late 2024 it would be prudent to reference heat networks within the Local Plan so that there is a link for future work that might be undertaken to define and designate a zone.

Policy options to address heating systems should include the use of a heat hierarchy to prioritise the most appropriate solution and place the burden of responsibility on the developer to prove that this is not technically feasible or financially viable. A blunt approach would be to effectively ban the use of new gas boilers and direct electric systems for residential developments. In regard to heat networks, more specific policy requirements are likely to require some further evidence from detailed studies with defined project opportunities or the modelling to identify and support the designation of a heat network zone.

Renewable energy generation

Aside from heat pumps, which can be considered as a renewable energy technology, there is also a strong case to promote other renewable energy generation. The most relevant technologies for application at the building -scale would be solar photovoltaics (PV) and solar thermal systems. PV should be applicable for almost all buildings whereas solar thermal would be applicable for residential buildings and non-residential buildings with significant hot water demand. Lewes District has some of the highest irradiance across the

[46] https://www.gov.uk/government/consultations/proposals-for-heat-network-zoning

whole of the UK, so properties here stand to gain the most from the use of solar technologies.

With both the decarbonisation of electricity and the electrification of heat, these technologies will have less of an impact on carbon emissions over time. Previously the main case for PV has been the high carbon savings but as this declines the main driver will be on reducing the energy costs and providing energy security both for the building and wider local power networks.

While the notional building used in Part L 2021 includes PV in the reference specification, the indicative specification for the planned Future Homes Standard notional building doesn't. The interpretation is that it would be possible to comply through a combination of good fabric and energy efficiency specification and the use of an electric heat pump. As such, given that the developer must factor in the up-front costs of the PV and doesn't realise the longer-term benefits, they might decide not to include PV (or solar thermal) if there is no need to do so to comply with Building Regulations. As previously described for the fabric performance and heat pumps, the costs of installing PV or Solar Thermal systems during construction are significantly lower than retrofitting these so there is a case for the Local Plan to include requirements for these technologies.

One option for a policy on renewable energy generation would be to focus on PV and have a requirement or presumption for all developments to incorporate PV or go slightly further and have a presumption to maximise the amount of PV installed. This would put the onus on the developer to either comply with this or do the work to justify why they haven't, on either technical or financial grounds, both of which are likely to be challenging given the ease and low costs of installing at least some PV. An alternative option would be to set minimum targets, which could either be measures by % improvements on Part L targets (as per the old Merton Rule) or minimum sqm/capacity (kWp) or yield (kWh) from PV relative to building footprint (as per Passivhaus plus). The benefit of setting a planning target based on the building footprint is that it will likely encourage building design to optimise solar PV generation before the design is fixed through planning approval.

Solar thermal is a little more complicated and while this would offer some advantages, the decision to incorporate it will be more nuanced and therefore it would be harder to set a requirement other than to assess the opportunity for solar thermal in the energy strategy.

Energy storage and demand management

Although they would not contribute directly to carbon reduction or reducing overall energy demands, the use of energy storage systems, both batteries and thermal storage, and demand management systems like smart meters and controllers can have a significant impact on building running costs and the impact on wider energy systems.

Both thermal stores and batteries can help to maximise the benefits of solar generation from solar thermal and PV systems respectively as well as enabling load shifting which will be increasingly important with the use of electric heat pumps. Coupled with dynamic pricing of power, which is now moving into the residential market through the use of smart metering, they have the potential to make significant impacts on occupants overall running costs.

One of the key benefits of smart meters is improving transparency and user access to their own energy data, making it easier to identify areas of waste. Although it is not clear to what extent this affects user behaviour in the long term, the improved data collection could also facilitate the introduction of demand side response, and on a broader scale, help to balance energy demand and supply, which is particularly important at peak times. In principle, therefore, these have the potential to reduce energy consumption. Initial studies on the success of smart meters in domestic properties indicate average savings of around 4% for customers fitted with smart meters compared to those without. It was seen in some cases that these savings could increase to 11% for homes installed with real-time display smart meters. The impact may be small, but smart metering can still offer wider benefits both to

energy consumers and power companies, by providing a more detailed understanding of the quantity and timing of energy demands.

It would be difficult to mandate the use of specific systems but a viable policy option here would be to require developers to show that they have assessed the options for storage and demand management and the justification for the approach taken.

Embodied carbon and lifecycle carbon

The manufacture and construction of buildings results in a significant amount of energy use and CO_2 emissions. Further CO_2 emissions will be produced from these buildings due to the materials and equipment required for maintenance, renovations and demolition. This assessment has not considered the Whole Life-Cycle (WLC) carbon emissions of the building stock in the district, which is outside the scope of this report. We can however demonstrate the significance of embodied carbon through housing averages. Embodied carbon can represent 30-70% of the total CO_2 emissions, as illustrated in Figure 31, which is adapted from the UK Green Building Council report.[47] To reach Net Zero across the whole of the UK, it will be necessary to implement policies that address a broader range of emissions that occur over the building's lifecycle, at all stages of the supply chain.

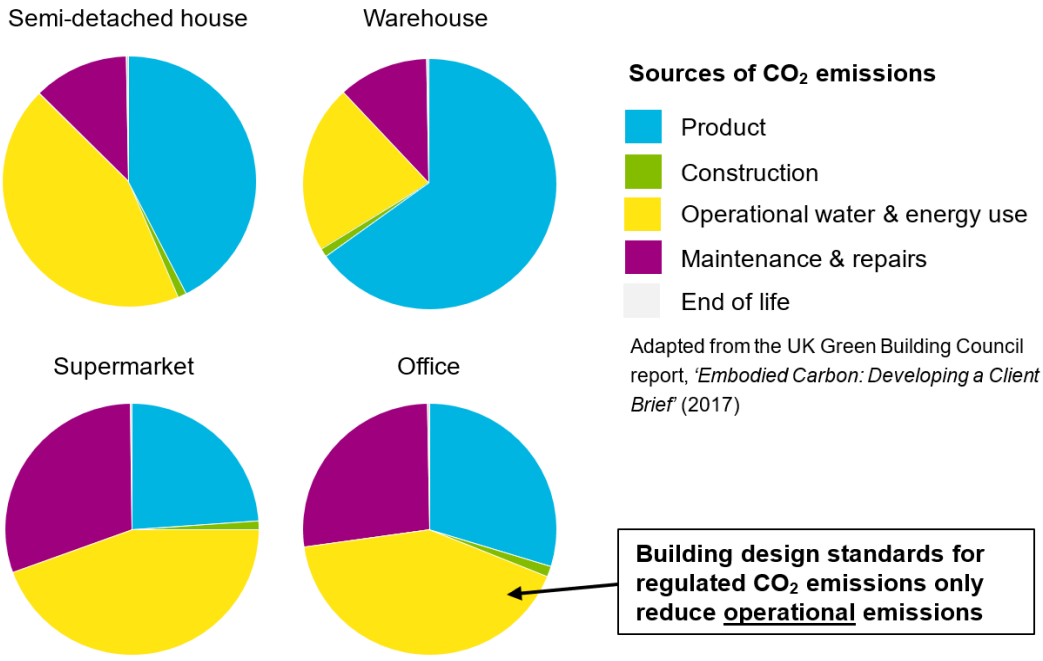


Figure 31: Illustration showing the relative proportion of CO_2 emissions from operational carbon (in yellow) compared with embodied carbon (other colours) over a 30-year period. Source: UK-GBC (2017)

Embodied carbon is not the focus of this study and currently not covered by Building Regulations. However, it is clear that embodied carbon represents a significant proportion of the whole-life cycle carbon emissions of a building. This will increase over time as the grid decarbonises and heating is electrified meaning that operational emissions will reduce further. Though the embodied carbon supply chain is also expected to decarbonise, it is less clear when and how quickly this can be achieved in practice.

The subject of embodied carbon is complicated and there is a much smaller existing evidence base and precedents for setting standards in this area. The GLA has recently introduced some requirements on whole-lifecycle carbon for major developments, but these are limited to assessing and reporting whole-lifecycle emissions, presumably with the intention of gathering data that could inform a stronger policy and targets in the future.

[47] UK Green Building Council, 'Embodied Carbon: Developing a Client Brief' (2017).

Without further work, opportunities to address embodied carbon within the Local Plan are limited to encouraging developers, to carry out an assessment of whole life-cycle carbon emissions as part of the energy strategy and show how they have considered and taken measures to minimise these. This could potentially focus on the most significant developments or those in which LDC has some involvement.

Offsetting

In the context of building performance standards for new developments, carbon offsetting schemes have been developed by local authorities to provide an alternative route for developers to meet higher carbon reduction targets. In some cases, this is used as a mechanism to deliver 'net-zero' development that would be very challenging to do through on-site measures. Some offsetting schemes, like the one operated by Milton Keynes City Council, have been around for some time so there is a strong precedent. In addition to enabling a route to higher targets the schemes are used to generate funds that can be spent on other carbon reduction projects, particularly those that are challenging to fund, like retrofitting existing buildings.

The principal critique of offsetting schemes is that they are effectively an accounting trick and might allow developers to avoid doing more on their developments if it is simpler and cheaper to pay into the offset. To ensure that this is not practiced, it is required for other policies to set minimum on-site targets. A further challenge is that the funds generated may be used for projects that should happen anyway as part of wider decarbonisation schemes. Tests for additionality to address and avoid double counting should therefore be required

There are a number of challenges around the creation and operation of these offsetting schemes. Firstly, they require a strong evidence base to support the price of carbon and justify this against the impact on the viability of the project. Another issue is the resource implications associated with running the offset fund, both in terms of assessing and collecting the payments from developers and spending the money to deliver the emissions that are being offset. It can be very challenging to deliver a 1:1 ratio of carbon savings due to the high admin and delivery costs associated with the types of projects that such a scheme would need to fund given that these would need to ensure additionality i.e. not be projects that would happen anyway.

A further factor is that as carbon emissions drop with the use of electric heat pumps and decarbonisation of electricity then the residual carbon emissions will be very small and could be zero after 2035 if the grid is fully decarbonised. As such the case for a scheme could disappear and the value of the funds collected might not represent good value for the effort involved, even if the price of carbon was increased.

Given the complexities around setting up an offsetting scheme and the uncertainties around the value of such a scheme under future changes to Building Regulations and the implications for residual carbon emissions, we would suggest not progressing this as a policy option for the Local Plan.

Improvement in processes

A final area for consideration is to improve the Council's internal processes around energy strategies for new developments. As illustrated below. this is partly about setting clear requirements for what developers are required to do, having a thorough check through the pre-planning and planning approval process and carrying out checks though to construction.

Figure 32: Illustration of the potential elements of an improved process

A key component of an improved process would be a standardised energy statement format for each development that requires developers to document the energy strategy and the relevant information related to the specific policy requirements chosen for inclusion in the Local Plan. The relevant measures and components that need to be assessed can be found in Appendix B.

Some guidance would need to be produced to assist developers in producing the energy statement, which could be a simple document or go into detail and include standardised tables, graphs, templates, and examples. The energy statement could be either a standard requirement for all schemes or a simpler checklist could be required for minor schemes. More guidance material would incur additional resources but should deliver efficiencies in the longer term and improved outcomes if developers have a better understanding of the process and the strategies are in a consistent format as well as making the approval process easier. As a minimum, the guidance would need to clearly explain how the energy statement should be structured and what information is required to demonstrate compliance with each policy.

An improved process would have some cost and resource requirements for the Council. Additional resources would be needed to perform these checks and those members of staff would need sufficient knowledge of energy systems and calculation software to appraise the statements which would either involve hiring new staff, training existing staff or paying for external support.

The extent to which additional monitoring and checking are carried out between planning and completion could be potentially scaled to suit the development. The standard Building Control checks might suffice for smaller schemes but additional checks throughout the process could be applied to larger schemes.

New building policy options summary

Application	Minimum standard across Lewes District	Higher standard applied to specific sites or growth types
Fabric Standards	**Stronger processes** Requirement to specify fabric standards within the energy statement, Standard methodology to quantify performance, more checking through the planning process. Current fabric standards to 2026 (assuming transition period for Part L 2025) then Part L improved standards from 2026 onwards. Improved checking through Planning and Building Control including requirement for an energy statement with standardised methodology. Support for developers to make improvements through guidance and information.	**As minimum but with specific target** Space heating target 30 kWh/m^2/yr for residential. Potential to go further and require Passivhaus standard on specific sites **[Could be applied to sites in Growth Types C and D on basis of greater opportunity and need to offset higher embodied carbon emissions]**
Heat source	**Heat hierarchy** Requirement to follow a heat hierarchy which would require developers to prove alternative options. Enforce hierarchy through the approval of energy strategies with some flexibility to assess on a site-by-site basis.	**Low carbon heat requirement** Requirement for all new developments to include low carbon heating, effectively banning gas boilers in advance of Part L 2025.
Low carbon generation	**Presumption of PV on all developments** Requirement for developers to include PV and seek to maximise this on all sites (within technical and financial constraints) or to present a clear case where PV is not installed.	**Targets for minimum PV** Set specific targets for the minimum amount of PV to be installed, linked to the roof area or building footprint. **[Could be applied to sites in Growth Types C and D on basis of greater opportunity and need to offset higher embodied carbon emissions]**
Demand management	**No requirement**	**Requirement to assess** Requirement to report on consideration of thermal storage, batteries and smart systems as part of energy statement. Support for developers on potential options through guidance and information As Minimum - unlikely to be sufficient evidence to require hard targets
Whole-Lifecycle carbon	**No requirement**	**Requirement to assess** Requirement to calculate and report on Whole-lifecycle carbon for larger schemes. Potential to use energy strategy process and guidance to support developers to look at options to reduce. As Minimum - unlikely to be sufficient evidence to require hard targets

Table 10: Summary of new building climate change mitigation policy options

Policy option testing

For several of the policy options described above we have been able to model the potential impact on carbon emissions and energy demands to provide a comparative assessment. In order to enable the quantification we have made some assumptions on the different scenarios as described in the following table:

Scenario Ref	Details
BAU	Business as usual assuming all new developments meet current Part L 2021 up to and including 2025 but Part L 2025 from 2026 onwards (allowing for a transition period)
ASHP	All new developments install Air Source Heat Pumps (so ASHP is adopted ahead of Part L 2025)[48]
Min PV	All new developments are required to install a minimum amount of PV (for modelling purposes this has been limited to residential buildings with an assumption of 3 kWp per house and 1.5 kWp per flat (where this would be the share of a larger array)
Passivhaus 10%	10% of new residential developments meet the Passivhaus standard
Passivhaus 100%	100% of new residential developments meet the Passivhaus standard

Table 11: Scenarios defined for testing

These scenarios were used in the model described in Section 3 to determine the impact on the carbon emissions and energy demand calculated for the development proposed in the Local Plan, the results of which are shown in the graph on the following page.

This graph shows that all policy options lead to a significant decrease in the carbon emsisions associated with new development compared to the Buisiness as Usual case of not going further than the current Building Regualtions standards and those that have been proposed for 2025 (although it should be noted that the proposals for 2025 are subject to change).

[48] In practice this would include all electric heat pump solutions, however, for illustration the performance specification for ASHPs only has been modelled.

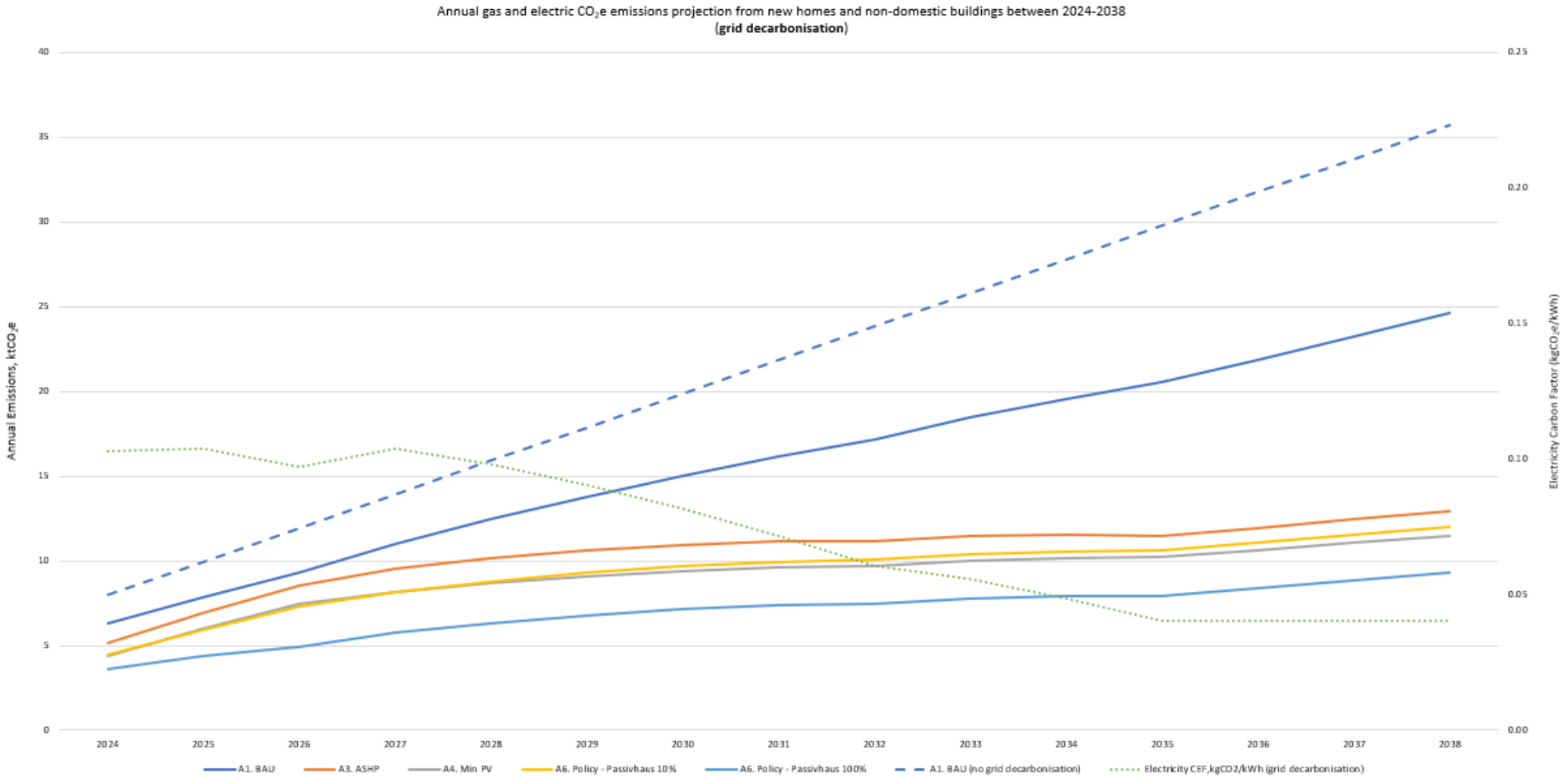


Figure 33: Carbon emissions associated with the new development anticipated during the Local Plan period under different policy options

6.5 Existing buildings

Existing buildings account for the majority of CO_2 emissions in Lewes District and therefore represent a key challenge when it comes to reaching the decarbonisation target. LDC will inherently have less influence over existing buildings than new buildings. The Local Plan and associated guidance should emphasise the importance of carrying out energy efficiency upgrades and incorporating low and Zero Carbon technologies wherever possible, and make it explicitly clear that LDC considers this to be a priority. LDC should also ensure that any relevant guidance documents and evidence are kept up-to-date to reflect current policies and best practices.

Technical opportunities for installing energy efficiency measures in existing buildings will depend on the construction and existing fabric. Generally, it is not considered practical for existing buildings to improve insulation levels to match performance of new build standards due to spatial limitations (e.g. insufficient gap in a cavity wall), and practical considerations (e.g. cost or disruption to occupants). There is also a risk of retrofitting measures having unintended consequences, e.g. causing condensation and moisture issues, which may affect the types of measures that can be implemented. Nonetheless, it is always possible to improve the performance of the building to some extent, even if this simply means adopting low-cost, no-regret measures such as double or triple glazing, draughtproofing and loft insulation.

There are existing standards and approaches set out (e.g. BREEAM Domestic Refurbishment, Passivhaus / EnerPHit, or Energiesprong) that are applicable to existing buildings and could therefore be encouraged through planning policy or associated guidance. Although those generally represent best practice, they are often cost-prohibitive for individual property owners, and are unlikely to be widely adopted without significant Government incentives. However, LDC could consider requiring these for major refurbishment schemes where planning permission is required.

More broadly, while it may be difficult for the Council to actively promote uptake through its role as a Local Planning Authority, it can passively promote uptake by loosening restrictions on certain energy and CO_2 reduction measures where appropriate. One option would be to adopt a presumption in favour of certain measures such as roof-mounted PV, air source heat pumps and external wall insulation, which could be done e.g. by issuing a Local Development Order (LDO) or otherwise extending permitted development rights, or implementing a 'fast track' that reduces the burden on applicants of submitting a full planning application.

However it may be that the Local Plan is not best placed to address the existing building stock because this is mostly reliant on policies, programmes and funding from central Government. In the meantime areas outside planning that Lewes District could focus on include:

- Enforcing the Minimum Energy Efficiency Standards;
- Continuing to actively work to identify and secure funding for retrofitting measures; and
- Lobbying the Government to promote further improvements in this area.

The UK Green Building Council (UKGB) has developed *'The Retrofit Playbook'* for Local Authorities to advise on different methods for supporting residents in increasing the energy performance of their homes.[49] LDC can refer to the Retrofit Playbook for further information.

6.6 Transport

[49] UK Green Building Council, '*The Retrofit Playbook'* (2020). Available at: https://www.ukgbc.org/ukgbc-work/driving-retrofit-of-existing-homes/

Along with residential buildings, transport is responsible for the largest share of carbon emissions within Lewes District. The location of new development directly contributes to carbon emissions from transport. To address this, the location and overall layout of a development should ensure that a mix of amenities are within easy walking or cycling distance of peoples' homes, to minimise the amount of travel required. In addition, wherever possible, developments should provide access to a range of public transport options such as bus and rail services. This has already been discussed in the growth strategy options assessment.

Transport emissions can also be reduced through careful design and by encouraging a switch to active travel modes. The design and layout of developments should provide safe and attractive pedestrian and cycle routes that link destinations both within, and between, neighbourhoods or developments. This should include making the most of existing connections and incorporating infrastructure to enable active travel to be a genuine alternative.

East Sussex County Council have published a Local Cycling and Walking Infrastructure Plan for the County. It identifies priority routes to make cycling and walking easier and safer. New developments should help to deliver and connect to these routes either through onsite infrastructure if appropriate or through financial contribution. Sustainable and active travel options will also have benefits for health and wellbeing as well as air quality. For example, where a development may have air quality implications due to combustion vehicle movements there is an opportunity to integrate additional active travel principles which will reduce emissions further.

The Local Plan should promote Active Travel through the design of new development and both the development of new and upgraded transport infrastructure. As well as reducing vehicle movements and associated carbon emissions, active travel measures will also improve air quality and public health and enable people to save money. In practice this means ensuring good walking and cycling connectivity to schools and amenities. As of 1st June 2023 Active Travel England is officially a statutory consultee on all planning applications for developments equal to or exceeding 150 housing units, 7,500 m^2 of floorspace or an area of 5 hectares[50].

Although, cycling and walking will be the preferred method of travel with regards to reducing congestion and emissions, it is recognised that vehicle transport will still be necessary, therefore it is important to encourage the transition to ultra-low emission vehicles (ULEVs) wherever possible. Electric vehicles will play an important role in the transition away from combustion engines however, the shift to electric vehicles will rely on a significant increase in the availability of charging infrastructure and will put additional pressure on electrical power networks. One of the key constraints to adoption of ULEVs, particularly plug-in electric vehicles, is the availability of suitable charging infrastructure. Although the Council cannot directly require the consumers to purchase ULEVs, they can help to support uptake through ensuring charging facilities are installed in new developments and in Council-owned parking spaces. The recent changes to building regulations now ensure that new developments have EV charging points installed. Part S – Infrastructure for charging electric vehicles requires the installation of charging points in the following circumstances:

- **New residential homes -** each home with onsite parking must have its own charging point.
- **New residential buildings with parking in a covered car park** – each dwelling with a parking space must have a charging point.
- **Buildings converted for residential use and which have a car park** – each dwelling with a parking space must have a charging point.
- **Residential buildings undergoing major renovation work which will have more than 10 parking spaces** – each dwelling must have one charging point and all other parking spaces cable routes.

[50] https://www.gov.uk/government/news/active-travel-england-to-be-consulted-on-all-large-planning-applications

- **New non-residential buildings with more than 10 parking spaces** – must have a minimum of 1 charging point and cable routes for at least 20% of the remaining spaces.
- **Mixed-use buildings** - the requirements for residential buildings above and non-residential buildings above apply. Calculations are required based on the number of parking spaces designated for use by the respective classes of occupant.

Local authorities could still impose a greater provision, and type, of charging points from a range of different developments and can also facilitate public charging facilities to serve existing communities.

Another method to reduce car use is to use car parking standards as a way of reducing car use in locations where there are lots of amenities and public transport connections within close proximity and therefore where there is less requirement for private vehicles. Given the nature of Lewes District this might be limited to specific developments within the main settlements and would need to make provisions for people with reduced mobility.

Transport policy options summary

Application	Minimum standard across Lewes District	Higher standard applied to specific sites or growth types
Electric Vehicle charging Infrastructure	**Fully comply with Building Regulations requirement** 2021 Building regulations requirement for EV charging facilities in new development are fully complied with and integrated into the design at the earliest opportunity Better monitoring and checking of compliance	**Higher EV Charging Infrastructure targets** Allocate land for EV public charging hubs including publicly owned land, existing sites and new sites. Require rapid charging (min 50kW) to be installed in all public car parks and fuelling stations. All new and renovated car parking spaces for residential and non-residential development to have EV charging facilities, also applies when any electrical work is undertaken on an existing car park or associated building. Higher requirements for both private and public charging on new development sites **[Could be applied to sites in Growth Types C and D on basis of greater impact on transport emissions]**
Active Travel – cycling and walking	**Support Active Travel** Require new developments to demonstrate that active travel has been fully incorporated into the design including, delivery of and connections to, routes identified in the Local Cycling and Walking Infrastructure Plan.	**Higher standards for cycling and walking** All new development to include adequate secure cycle storage in line with BREEAM , Home Quality Mark[51] or the East Sussex County Council standards whichever provides the greater provision . New and refurbished commercial development to include secure cycle storage and showering facilities. Identify potential strategic cycling infrastructure improvements within the Local Plan. Prioritise cycling and walking infrastructure projects for CIL funding and in the Infrastructure Funding Schedule. **[Could be applied to sites in Growth Types C and D on basis of greater impact on transport emissions]**
Parking standards	No additional standards	**Reduce car parking provision and require new public transport provision** Maximum parking standards for restricted provision to encourage cycling and walking and public transport. Best implemented in conjunction with active travel and in locations close to public transport hubs. No car parking provision in the most sustainable locations close to public transport hubs **[Could be applied to sites in Growth Types A and B on basis of greater opportunity]**
Transport Carbon Emission Assessment	**Demonstrate sustainable travel principles** Require new development and change of use to demonstrate how sustainable travel principles have been incorporated into the design	**Requirement to assess** Requirement to calculate and report on transport carbon emissions for larger schemes. Support for developers on potential options to reduce emissions. **[Could be applied to sites in Growth Types C and D on basis of greater impact on transport emissions]**
Public Transport and shared transport clubs	No additional standards	**Improved public and shared transport provision** Developments should make provision for mobility hubs for shared bike/car use either to be delivered immediately or to meet future needs. Include public transport provision in new development and consider ways to encourage use such as vouchers and tokens for residents. All major developments should incorporate a car and/or bike/e-bike club.

[51] https://www.homequalitymark.com/wp-content/uploads/2018/09/HQM-ONE-Technical-Manual-SD239-.pdf

	[Could be applied to sites in Growth Types C and D on basis of greater opportunity and need to offset higher embodied carbon emissions]

Table 12: Summary of new building climate change mitigation policy options

6.7 Infrastructure and land use/allocation

A transition to a low carbon district will involve a change in the way existing infrastructure is used and may require new infrastructure. The Local Plan must be accompanied by an Infrastructure Delivery Plan setting out the infrastructure needed to deliver the policies, objectives, and vision of the Plan. For climate change mitigation this could include:

- potential electrical infrastructure upgrades to move away from fossil fuel transport and heating systems to electrical alternatives
- renewable energy generation and storage infrastructure
- public transport infrastructure
- cycling and walking infrastructure

This infrastructure will not only support new low carbon development but also help existing communities to transition to lower carbon alternatives such as heat pumps and electric vehicles.

Large development allocations should incorporate infrastructure which will help the development to be low carbon, this includes local renewable energy generation, active travel, and electric vehicle charging. The Local Plan can also allocate land for new infrastructure, identify areas suitable for renewable energy or electric vehicle charging.

As a Community Infrastructure Levy (CIL) charging authority, LDC can use CIL funding collected to help deliver infrastructure to support climate change mitigation (and adaptation). LDC can identify these types of infrastructure as a priority through the Infrastructure Delivery Schedule, Infrastructure Funding Statement and governance arrangements.

Land allocation will also be a significant issue given a likely increase in competing demands on land to support measures to address carbon mitigation and adaptation including:

- Land for large scale renewable energy generation including solar farms and wind turbines
- Land for supporting energy infrastructure including power transmission, distribution and storage systems
- Land for ecological enhancement to deliver multiple objectives including carbon sequestration
- Land for dealing with climate adaptation risks such as river catchments

Future national planning policy and requirements on future local plans is likely to increase the focus on balancing the competing demands for land and identifying and assessing the best use of land for meeting different objectives.

The Renewable Energy Study for Lewes District which accompanies this climate change study identifies the potential for delivering solar PV and wind turbines across the district. The outputs of the assessment have been incorporated into the potential policy options, including where sites can be identified and allocated within the Local Plan for renewable energy generation and storage.

Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide. This can occur naturally through natural carbon storage such as forests, grasslands, soil and bodies of water. The Local Plan can include policies to help increase levels of natural sequestration through increasing and targeting onsite green infrastructure, protecting existing carbon sinks and even identifying land specifically for sequestration. Carbon sequestration measures can be combined with green infrastructure and biodiversity net gain.

Infrastructure and land use/allocation policy options summary

Application	Low	Medium	High
Renewable generation	Identification of renewable energy potential	**Support carbon sequestration projects** Work with partners to develop carbon sequestration projects, identify specific projects in policy.	**Allocate land for renewable energy generation** Taking account of evidence base documents, notably the renewable energy study, specifically allocate land for renewable energy projects during the plan period.
Heat Networks	**Policy support for connection to heat networks**	**Active support for developing heat network zones**	**Safeguarding sites to support heat network zone development**
Carbon Sequestration Sites	**Policy support for sequestration elements within developments and through individual projects** Support sequestration in new development as part of the green infrastructure plan for the scheme.	**Support carbon sequestration projects** Work with partners to develop carbon sequestration projects, identify specific projects in policy.	**Allocate land for carbon sequestration** Taking account of evidence base documents including the biodiversity and landscape assessments, specifically allocate land for carbon sequestration projects during the plan period.
Carbon sequestration potential	No additional standards	**Assessment of carbon sequestration** Requirement for developers to assess the carbon sequestration potential of the site before and after the proposed development and show how the masterplan has been designed to address this	**Assessment and offsetting of carbon sequestration loss and loss of potential improvement** Potential to take this further to assess what could otherwise have been delivered on the site and the potential to set up an offset scheme that could support other carbon sequestration projects.
Offsetting	No additional standards	**Carbon offsetting policy** Require promoters to demonstrate how any remaining carbon emissions from new development have been offset through projects within the District.	**Carbon offsetting financial contribution** Collect a financial contribution via an appropriate legal agreement of a value sufficient to enable the LPA to offset any remaining carbon emissions from new development.

Table 13: Summary of infrastructure and land use climate change mitigation policy options

6.8 Policy options for climate change adaptation

The Government's 25 Year Environmental Plan outlines the criticality of new development to happen "*in the right places*" to deliver maximum economic benefit while avoiding damage to the environment. Within this, there is a commitment to protect ancient woodlands and grasslands, high flood risk areas and productive agricultural land.[52]

Related to the spatial strategy, LDC must address climate risks and increase resilience of the district, its communities and assets by avoiding, limiting and offsetting development which might exacerbate flood risk, harm ecological health and connectivity, or enable coastal erosion and flooding.

6.9 Strategic Policies

Based on the results of the climate change risk assessment we have developed options for strategic policies that could be adopted within the Local Plan to address the following key priority areas:

- Flood risk
- Water resources
- Biodiversity
- Coastal communities
- Cross-cutting issues

6.10 Flood Risk

The current Lewes District Local Plan[53] was adopted in 2016 and outlines core areas related to flood risk in Core Policy 12 – *Flood Risk, Coastal Erosion, Sustainable Drainage and Slope Stability.* Evidence demonstrates that climate change will exacerbate various types of flooding in the district, threatening urban areas, sites of biodiversity, agriculture and businesses. In the existing Local Plan, LDC has an opportunity to limit activities which might increase flood risk and, with some activities, reduce flood risk.

Avoid development in flood risk zones

The National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) clearly mandates that development should be avoided in flood risk zones. Due to land constraints in the UK, development in flood zones can sometimes be unavoidable. LDC should ensure that a robust Sequential Test is undertaken for all development sites. With this, development should be reduced to areas with low risk of fluvial, surface water, groundwater, sewer or coastal flooding. The Sequential Test is a decision-making tool which was created to ensure development is directed away from flood risk areas, and instead is situated on low flood risk sites. More information on the Sequential and Exception Tests can be found in the SFRA.

Additionally, climate projections indicate an increased risk of flooding in the district through the century. The Local Plan should account for the climate change uplifted Flood Risk Zones, which are outlined in the Strategic Flood Risk Assessment, beyond current the existing Flood Risk Zones. With this, development sites will be more sustainable and resilient to future climate changes, under medium-high emissions scenarios (see projections in Chapter 3).

[52] HM Government, 'A Green Future: Our 25 Year Plan to Improve the Environment' (2018). Available at: https://www.gov.uk/government/publications/25-year-environment-plan
[53] Lewes District Local Plan (2016). Available online at: https://www.lewes-eastbourne.gov.uk/_resources/assets/inline/full/0/257159.pdf (accessed September 2022)

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 10, 11	1, 2, 3, 4	3	1, 2

Safeguard areas with high adaptation potential including protecting and restoring catchments upstream of high flood risk areas

Protecting areas of high adaptation potential, for example land that is critical for groundwater recharge or water storage, will enable development to be directed towards areas with lower adaptation value (i.e. areas with limited attenuation potential). In allocating development, consideration must be given to the impact of the development on flood risk in existing sites. New development will increase the impermeable surface area of a site, which results in increased surface run off, potentially increasing the likelihood and severity of flooding elsewhere.

By safeguarding areas with the highest potential for adaptation, these sites can be maximised and direct development towards areas with lower adaptation productivity (i.e. areas which have limited attenuation potential). For example, planting of riparian woodland will enable floodplain storage, reduce runoff and both delay the onset of flooding and the impact of floods in the district. Simultaneously, floodplains and riparian woodland will create new high-biodiversity habitats and increase canopy and shading for temperature regulation. Sites of high adaptation potential can be identified using Working with Natural Processes (WWNP)[54] data sets. This data informs which sites should be strategically selected for riparian woodland restoration, reconnecting floodplains, catchment woodland restoration or for runoff attenuation. The SFRA has already identified such areas, including around the River Ouse (Newhaven and its Goldstrow) and along some of its tributaries (Glynde Reach, Bevern Stream, Longford Stream and Pellingford Brook).

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 4, 5, 6, 10, 17	2, 3, 4, 5, 8	3, 11	1, 2

Promote soft densification to minimise sprawl

While the purpose of the Growth Strategy for Lewes District seeks to produce approximately 10,000 new homes in the district, there is a need to ensure that land critical for infiltration and groundwater recharge, flood resilience and water storage is protected. In this sense, promoting densification prevents urban sprawl and encroachment on natural spaces. However, dense urban development and tall buildings are out of character in Lewes District; they can also aggravate existing climate impacts, for example by creating an urban heat island or increasing flood risk. Therefore, development should focus on the “gentle density” which should prioritise medium-rise buildings over both single stories and high-rise buildings. Enabling soft densification in urban spaces like Lewes, Newhaven and Seaford will alleviate pressure on greenfield sites which provide upstream flood storage, biodiversity provision and

[54] UK Government. 2017. Working with natural processes to reduce flood risk. Available: Working with natural processes to reduce flood risk - GOV.UK (www.gov.uk)

infiltration functions. Densification can also be an affordable and sustainable option for developers by linking new housing to existing social and utility infrastructure. Soft densification could be complemented by in-fill development[55] where possible, to utilise existing land within urban areas.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1	2, 8	1, 3, 7	1

6.11 Water resources

Support strict controls on source protection zones

Water is supplied in Lewes District entirely from groundwater sources, with one Water Framework Directive (WFD) groundwater body in the area, Brighton Chalk Block. The Water Cycle Study (2022)[56] identifies that abstraction and poor nutrient management are pressures on the Brighton Chalk Block waterbody, classified as WFD 'Poor' status; and in terms of availability, there is restricted water available. The Local Plan should further protect and support strict controls on source protection zones to ensure adequate availability of water in the area, particularly given the future pressures on water availability and quality with climate change. Further information can be found in the water cycle assessment (2022).

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	10	1, 8	10	N/A

New stormwater not to connect to combined systems

Southern Water is responsible for the management of wastewater in the District, and within the LDC area, the sewage network is mostly made up of combined gravity sewers (which treat both foul water and urban runoff), including within Lewes town and Seaford.[57] However, combined sewers are known to have harmful consequences, including resulting in combined sewer overflows (CSOs). Under UK legislation, water utility companies are entitled to infrequently discharge untreated water during periods of heavy rainfall into nearby water bodies. CSOs severely impacts water quality, biodiversity and public health and safety. With the evidence of more intense and frequent heavy rainfall with climate change, CSOs are likely to become more frequent. Where possible, new developments should seek to manage all surface water runoff at the source, using natural approaches such as Sustainable Urban Drainage Systems (SuDS). Moreover, new developments should avoid connecting to combined sewers and use of alternative means of managing surface water should be sought.

This policy would address the following risks from the Climate Change Risk Assessment:

[55] Infill development is the process of developing vacant plots in existing urban areas to new construction.
[56] Lewes Water Cycle Study
[57] Southern Water. 2022. Drainage and Wastewater Management Plan.

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	10	1, 8	10	N/A

6.12 Biodiversity

Climate change and biodiversity are inextricably linked; changes to the climate or abiotic factors have direct implications for biodiversity by impacting seasonal life cycle events like hibernation, migration or reproduction as well as the distribution and abundance of species.

Avoid sites of high biodiversity potential

There is a well-documented record of well established, designated protected areas in the District, including the South Downs National Park (further detailed in the Biodiversity Assessment, 2023). These must continue to be protected and enhanced, where possible. The Local Nature Recovery Strategies (LNRS) will also play a vital role in identifying priorities and opportunities for nature recovery at a local level; the LNRS are currently being developed by the Sussex County Council.

Further, development should not have an impact on non-designated land which is equally of biodiversity value, and which contributes to connectivity and green infrastructure in the local area. This could be achieved through tools and data sets such as the national data showing areas of priority habitat (magic.gov.uk) which identifies ecological clustering through spatial patterns which likely suggests areas that could be utilised to enable connectivity. Additionally, Natural England's National Habitat Networks map also highlights some non-priority areas, which could be of value for connectivity. These areas should be identified to prevent development in these areas.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 2, 3, 5, 7, 8, 11, 13, 17	2, 3, 4, 5	1, 3, 7, 10	1, 2

Mandate biodiversity net gain for all new developments

The Environment Act 2021 legislates that all development consented by the Town & Country Planning Act must deliver 10% Biodiversity Net Gain (BNG), this is also outlined in the Lewes District Council Biodiversity Strategy 2021-2025.[58] With this, biodiversity improvements on a proposed site are encouraged however, if not possible, developers must pay a levy for habitat creation or improvement elsewhere. Where BNG is not possible on a development site, the Lewes Biodiversity Assessment (2023) has identified potential areas, unsuitable for development which could be reallocated to habitat creation or restoration.

This policy would address the following risks from the Climate Change Risk Assessment:

[58] Available at: Lewes Biodiversity Strategy - Appendix 1 (lewes-eastbourne.gov.uk) [accessed 03/02/2023]

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 2, 3, 5, 7, 8, 11, 13, 17	2, 3, 4, 5	1, 3, 7, 10	1, 2

Compulsory habitat connectivity where a site has the potential to connect two existing designated or identified habitats

To support the migration of species between different habitats, the Local Plan can promote the reconnection of habitats across the District. Connected habitats are known to have higher genetic diversity, healthier fauna and flora and species are proven to occupy a larger range. Healthy ecosystems provide a multitude of services to human populations including regulating temperature (reducing temperature extremes), purifying air and water, controlling erosion, and maintaining healthy soils for agriculture. In Lewes District, this could take the form of a riparian corridor to minimise flooding and improve water quality for urban areas. Connectivity could also involve connecting distinct habitat types. For example, if a site overlaps two habitats identified as *floodplain grassland* and *hedgerow* it will be mandatory for the design of the site to include a green or blue corridor to connect these habitats. Therefore, new developments will have the opportunity to connect fragmented habitats. A robust habitat survey should be conducted to identify suitable and impactful wildlife corridors in the District. For the corridor to function fully, a habitat management plan should be introduced.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 2, 3, 5, 7, 8, 11, 13, 17	2, 3, 4, 5	1, 3, 7, 10	1, 2

6.13 Coastal communities

Safeguard undeveloped coastline areas

Critical coastal habitats play an important role in the protection of the coastline from storm surges, coastal erosion and flooding. Some of these are marine, such as seagrass, kelp and oyster beds which proficiently reduce wave energy and the severity of wave action on the coast. On land, sand dunes, salt marshes and mudflats play a similar role as the first line of coastal defence to protect inland sites from erosion and saltwater instruction. Grey infrastructure, like sea walls and groynes seek to replicate these actions, however, have limited co-benefits, and can have a high capital and operational cost, as well as a shorter longevity.

Where possible, all development should be avoided within critical coastal habitats to preserve the natural functioning of coastal areas and preserve the first line of coastal resilience.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 6, 10, 17	3	3, 4, 11	1, 2

Avoid development within the immediate coastline and areas at risk of coastal flooding or erosion

Coastal roads and paths are particularly exposed and vulnerable to climate-related hazards, like sea level rise, coastal flooding, coastal erosion and storm surges. Development within the immediate vicinity of the coastline (further assessment is needed to determine the distance) should be avoided; this would include (but limited to):, housing, transport and public infrastructure etc.. Where the development of infrastructure must be located within this area, the design specifications should sufficiently and directly consider resilience (for example, for salt-tolerance, subsidence and coastal flooding) and demonstrate that the development does not exacerbate coastal flooding or erosion in other areas.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 6, 10, 17	3	3, 4, 11	1, 2

Adopt a Coastal Change Management Area

It is known that the coastal area of Lewes District is at risk from coastal erosion and shoreline retreat, hold the line measures have been effective to date but are not a permanent solution for a changing coastline. In paragraphs 167-169 of the NPPF, coastal councils are invited to identify areas which are likely to be impacted by physical changes as Coastal Change Management Areas (CCMAs). Specifically, the NPPF defines a Coastal Change Management Area as *'an area identified in plans as likely to be affected by physical change to the shoreline through erosion, coastal landslip, permanent inundation or coastal accretion*'.[59] The NPPF delineates that within a CCMA, plans should; a) be clear as to what development will be appropriate in such areas and in what circumstances; and b) make provision for development and infrastructure that needs to be relocated away from Coastal Change Management Areas. Therefore, development will only be possible if it can be proven that a) it will be safe over its planned lifetime and not have an unacceptable impact on coastal change; b) the character of the coast including designations is not compromised; c) the development provides wider sustainability benefits; and d) the development does not hinder the creation and maintenance of a continuous signed and managed route around the coast. As such a CCMA will be beneficial to LDC as an area sensitive to coastal environmental drivers.

This policy would address the following risks from the Climate Change Risk Assessment:

59

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 6, 10, 17	3	3, 4, 11	1, 2

6.14 Crosscutting areas

Safeguard sites of high agricultural productivity potential

The UK has a high proportion of good quality agricultural land (with 34% of land classified as grade 1 or 2). Historically, the ambition through planning has been to retain all agricultural land as the default. However, with completing pressures on the limited space (including the need for good quality housing, protected areas for biodiversity, space for flood mitigation), sites of lower agricultural productivity could be reclassified to more purposeful uses, including carbon sequestration. To achieve this, further protections are required on productive agricultural land, as such it is recommended that these sites of grade 1, 2 and 3a agricultural land are safeguarded from development.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	4, 5, 6, 7, 9, 10	N/A	N/A	N/A

6.15 Development Management Policy Options

Building on the strategic policies outlined above we have also assessed options for development management policies that could be adopted within the Local Plan against the following key priority areas from the Climate Change Risk Assessment:

- Flood risk
- Water resources
- Biodiversity
- Cross-cutting issues

6.16 Flood Risk

Mandatory enforcement of NPPF greenfield runoff rate requirements and seek to achieve 100% infiltration

Enhancing infiltration and reducing runoff can be achieved through SuDS, which provide an alternative to the traditional urban approach of channelling surface water through a networked system of pipes and sewers. SuDS are an adaptable approach to achieving 100% infiltration and vary based on the specific site, but can operate by conveying surface water, slowing and holding runoff, enabling evapotranspiration and infiltration into the ground. The approach could include a combination of green roofs and walls, bioretention ponds, swales and permeable pavements. SuDS also have added benefits for temperature regulation, water quality and biodiversity. SuDS should be implemented in such a way as to slow, reduce and treat surface water flow. To maximise opportunities, SuDS should focus on

water storage and infiltration, while also improving water quality and biodiversity in line with the WFD, any 'end-of-pipe solutions' where runoff is discharged into waterbodies like wetlands or ponds must be avoided. Using SuDS all development should aim to achieve greenfield runoff-rates and ensure runoff is managed as close to the source as possible using the following drainage hierarchy, where feasible:

- store rainwater for later use
- use infiltration techniques, such as porous surfaces in non-clay areas
- attenuate rainwater in ponds or open water features for gradual release
- attenuate rainwater by storing in tanks or sealed water features for gradual release
- discharge rainwater direct to a watercourse
- discharge rainwater to a surface water sewer/drain
- discharge rainwater to the combined sewer

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 2, 3, 5	2	1, 3, 6, 7	1, 5

6.17 Water resources

Mandate water consumption standards

Building Code (G) requires that the average water usage of a new home (including those created by a change of use) is no more than 125 litres per person per day or 110 litres/person/day if required as part of the planning permission. Currently, the Lewes District Local Plan[60] requires all new dwellings to achieve water consumption of no more than 110 litres per person per day.

Regarding water efficiency, the South-East Water, with the Environment Agency, plan to reduce water consumption through a number of demand management measures. These include reducing consumption from the current 150 litres per head per day (l/h/d) in 2017/18[61] to 139l/h/d by 2025, 118l/h/d by 2045 and 90l/h/d by 2080. One of the 'Greater Brighton Water Plans' key objective is to adopt a region wide target of 100 litres per person per day by 2040, to help and sustainably reduce overall consumption of water in the region. Aligned with this, reducing water consumption to the greatest extent feasible will be critical in the South-East region and, as such, mandating all new developments to achieve a water efficiency rate of 110l/h/day and with incentives to go beyond this is recommended, unless proven to not be technically or financially feasible.

This policy would address the following risks from the Climate Change Risk Assessment:

[60] Lewes District Local Plan (2016). Available online at: https://www.lewes-eastbourne.gov.uk/_resources/assets/inline/full/0/257159.pdf (accessed December 2022)

[61] South East Water Resources Management Plan (2019). Available online at: https://cdn.southeastwater.co.uk/Publications/Water+resources+management+plan+2019/south-east-water-final-wrmp-2020-2080.pdf (accessed September 2022)

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 6, 11	8	10	3

Mandate restoration of degraded water courses within the site

Healthy rivers and water courses are an essential component of human health and wellbeing, as well as providing various ecosystem services. In recent figures from the environment agency, only 14% of rivers in England met 'good' ecological status and none met 'good' chemical status, indicating the cruciality of the issue.[62]

In Lewes District, all waterbodies are categorised as either 'moderate' or below, with one (Little Horsted Stream Water Body) achieving a 'bad' rating and 4 achieving 'poor'. All waterbodies are classified as a 'fail' in terms of their chemical status. Degraded water courses have formed as a result of anthropogenic pressures on the environment, namely urban and agriculture pollution and plastic products, housing development and population growth as well as climate change.[63] In Lewes District, WFD cites sewage discharge, poor livestock and nutrient management, drought and poor soil management as some of the reasons for not achieving a good status. Unless proven to be technically, financially or environmentally unfeasible, developers should demonstrate efforts made to restore degraded watercourses, with poor biological or physical status.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 3, 5, 11, 12, 13	8	10	3

6.18 Biodiversity

Retain all trees and critical hedgerows on site

Trees, woodland and hedgerows are a key part of the landscape in both rural and urban environments and supply a range of services to people and the natural environment. In Lewes District, they serve to connect Areas of Outstanding Natural Beauty, creating wildlife corridors and contribute to the character of the landscape and offsetting carbon emissions. With the numerous proven benefits of trees and vegetation, it is essential that existing trees and critical hedgerows are retained as the default for any new development by integrating and designing them into the space, in a manner which ensures their survival. This should be informed by an appropriate survey carried out to inform the development and green infrastructure plan.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and	Business and Industry

[62] UK Parliament. 2022. Water quality in rivers. Available: Water quality in rivers - Environmental Audit Committee (parliament.uk)
[63] Ibid.

			the Built Environment	
Risk ID	1, 2, 3, 5	2	1, 3, 6, 7	1, 5

Compulsory tree planting in new developments

With trees and other green infrastructure providing such vital services as temperature regulation, reducing runoff rate, water storage, not only should existing trees be protected but, where possible, additional trees should be planted within a development area. Consider selecting species which are drought tolerant or have resilient characteristics such as root strength, disease resistant, fast growth. With species selection, consider appropriate species which serve the function of ecosystem restoration including, where possible, selecting native species and consulting the Global Invasive Species Database and berry rich species.[64] Within this, choose a variety of tree species to restore plant diversity and protect soils. Moreover, the strategic location of the species on the site should optimise opportunities for shading, for example by planting saplings to create an overlapping canopy once the trees have reached maturity, which in future will reduce temperatures. Appropriate management and maintenance measures should be in place to ensure the trees become fully established.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 2, 3, 5	2	1, 3, 6, 7	1, 5

6.19 Cross-cutting issues

All new developments to use high risk criteria for glazing/ opening areas for passive temperature control and include passive heating and cooling in the design.

Building Regulations Part O (2021)[65] determines certain urban areas as high risk of buildings overheating, such as central Manchester and London. These regulations for high-risk areas prescribe a maximum glazing area of 18% of floor area on East and West facing sides. While Lewes District does not suffer the same urban heat island effect as dense urban areas like London, it could be useful for LDC to consider increasing the maximum glazing area from the moderate risk to the high-risk criteria. In particular, this could be applied to buildings which shelter vulnerable people, including social housing, schools, and care homes. Resisting additional solar radiation in buildings will reduce the need for mechanical cooling systems, which are known to be energy intensive and expensive to use, creating a cost saving while protecting vulnerable people and the community from extreme heat.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 6, 9, 13	N/A	N/A	5

[64] Green-Grey Community of Practice. 2020. Practical Guide to Implementing Green-Grey Infrastructure.
[65] HM Government. 2021. The Building Regulations 2010: Requirement O1: Overheating mitigation.

Designate a proportion of the development to green space

The Town and Country Planning Association define 'green infrastructure' as "a network of multi-functional green space and other green features, urban and rural, which can deliver quality of life and environmental benefits for communities".[66] With the myriad of benefits associated with different types of green infrastructure including reversing biodiversity loss, reducing flood risk and heat stress, reducing embodied and operational carbon as well as social benefits for health and wellbeing. In a development, green infrastructure could include any combination of green roofs and walls, living walls, tree facades, green space between buildings with complimentary bio-building materials. A combination of blue and green infrastructure could be considered within this target to include construction of ponds, lakes and swales to support the provision of biodiversity while reducing the risk of flooding.

This policy would address the following risks from the Climate Change Risk Assessment:

Risk category	Natural Environment and Assets	Infrastructure	Health, Communities and the Built Environment	Business and Industry
Risk ID	1, 2, 3, 5	2	1, 3, 6, 7	1, 5

[66] TCPA. 2023. What is Green Infrastructure? Available: What is Green Infrastructure? (tcpa.org.uk).

7. Recommendations

7.1 Summary of recommendations

The following table provides a summary of the recommendations made in this report. These are described in more detail over the following pages, with specific information on:

- Description and evidence base – a description of the policy and the supporting evidence base;
- Approach – an overview of how it could be implemented, considering variables for applying the policy and key implications or challenges;
- Evidence and viability – the evidence underpinning the recommendations and an overview of viability; and
- Implications for implementation – an evaluation of the implications for effective implementation, compliance and monitoring and examples of similar policies where available.

Ref	Focus	Area	Subject	Detail
1	Mitigation & Adaptation	n/a	Strategic	Overall strategic approach to mitigating and adapting to climate change
2	Mitigation	New Buildings	Energy Hierarchy	Require all new developments to follow a clear energy hierarchy
3	Mitigation	New Buildings	Demand reduction	Require all new developments to reduce energy demands and consider introducing targets where practical and viable
4	Mitigation	New Buildings	Overheating	Set requirements for assessing overheating risks and mitigating these through design, avoiding the use of active cooling systems unless essential.
5	Mitigation	New Buildings	Heating systems	Require all development to install heating systems that align with carbon neutral policy, and which are designed to maximise efficiency
6	Mitigation	New Buildings	Solar generation	Require all development to install PV and seek to maximise the potential scale of installation and assess the potential for Solar Thermal if appropriate
7	Mitigation	New Buildings	Energy Storage and Management	Require all developments to assess the potential to introduce storage and smart energy management systems
8	Mitigation	New Buildings	Whole lifecycle carbon	Where appropriate ask developers to consider whole life-cycle carbon emissions and demonstrate steps to minimise these.
9	Mitigation	New Buildings	Energy strategy process	Require all new developments to complete an Energy Statement, that is checked, enforced and monitored through the planning approval and building control process, to demonstrate compliance with the requirements

10	Mitigation	New Buildings	Guidance	Produce a technical guidance document and consider further materials to support developers in complying the requirements
11	Mitigation	Transport	Electric Vehicle charging	Require new development to install EV charging and allocate land for public EV charging points across the District
12	Mitigation	Transport	Active Travel, cycling and walking	Require new developments to incorporate active travel measures into the design of new development and improve connectivity of existing infrastructure
13	Mitigation	Transport	Parking standards	Set maximum parking standards for all new development subject to local sustainability
14	Mitigation	Transport	Transport Carbon Emission Assessment	Require developments to calculate the level of carbon emissions generated from transport
15	Mitigation	Transport	Improved Public Transport and shared transport clubs	Require new development to include connections to public transport and consider shared transport opportunities
16	Mitigation	Infrastructure	Renewable Energy	Land identification and allocation for large renewable energy projects
17	Mitigation	Infrastructure	Heat Networks	Support for heat network zones
18	Mitigation	Sequestration	Sequestration potential	Proactive support and land identification for sequestration projects and requirement for developments to minimise and compensate for loss in carbon sequestration potential
19	Adaptation	n/a	Strategic policy	Safeguard areas with high adaptation potential including protecting and restoring catchments upstream of high flood risk areas
20	Adaptation	Biodiversity	Habitat connectivity	Compulsory habitat connectivity where a site has the potential to connect two existing designated or identified habitats
21	Adaptation	Coastal flood risk	Coastal Management Area	Adopt a Coastal Change Management Area
22	Adaptation	Water resources	Water consumption targets	Set water consumption targets for new developments
23	Adaptation	Ecosystem services	Tree planting	Compulsory tree planting in new developments

Table 14: Summary of recommendations

2.1 Policy recommendation 1: Strategic Climate Change Policy

Description and evidence base

We recommend that the Local Plan includes a strategic policy setting out the overall approach to mitigating and adapting to climate change. The policy should include the areas of priority for the district and be supported by development management policies to provide additional detail and delivery mechanisms.

Approach

Taking account of the baseline analysis, local context and scoping exercise we have identified the following priorities to be addressed by the Local Plan with regards to Climate Change mitigation and adaptation.

- A growth strategy that reduces carbon emissions and addresses climate change risks
- Ensure that new development is sustainable, energy efficient and low carbon
- Reducing the reliance on private vehicles and the emissions associated with transport
- Encourage the retrofit of existing buildings to reduce carbon emissions
- Support suitable opportunities for low carbon energy generation and storage to serve the district
- Improve infrastructure to support sustainable development and help existing residents to reduce emissions
- Ensure new development is designed to address the risks associated with climate change
- Work with the natural environment to help reduce emissions and risks associated with climate adaptation alongside other benefits like improving biodiversity

These priorities should be incorporated into a strategic policy for tackling climate change within the Local Plan similar to the Climate Change Principles policy in the Cornwall Council Climate Emergency DPD[67]. The Council may wish to bring some of the elements set out in other recommendations into the strategic policy, for example the sustainable building standards for new development. This approach has been taken in Central Lincolnshire where the majority of the policies within their new Local Plan have been classified as strategic including those related to climate change[68].

Evidence and viability

Climate change is a strategic issue which should be considered and addressed where possible in every development. A strategic policy setting out the high level principles will allow the Local Plan to update the detailed development management policies, where and when appropriate, without losing the essential principles to tackle climate change. Neighbourhood Plan policies will also need to be in line with the strategic policy. The evidence within the study will unpin the strategic policy and there are unlikely to be any viability implications.

Implementation

The strategic policy approach should form part of the Council's Duty to Co-operate discussions with neighbouring authorities.

[67] https://www.cornwall.gov.uk/media/uxgjk4jn/climate-emergency-dpd.pdf
[68] https://www.n-kesteven.gov.uk/sites/default/files/2023-04/Local%20Plan%20for%20adoption%20Approved%20by%20Committee.pdf

2.2 Policy recommendation 2: Energy Hierarchy – Require all new developments to follow a clear energy hierarchy

Description and evidence base

We recommend including a requirement for all developers to follow a clear energy hierarchy when developing an energy strategy for all new developments in Lewes District. This should be documented in an Energy Statement that would be checked by the Council to check this as part of the planning and building control approval process (see Policy recommendation 8).

For the UK to reach its Net Zero target and for Lewes District to become carbon neutral by 2030, energy demands need to be reduced and energy generation needs to be switched to renewable energy sources. Any increase in energy consumption or additional use of non-renewable energy sources from new development will make these targets more difficult to achieve.

Approach

Developments would be required to follow a standard approach to developing an energy strategy that follows the following hierarchy:

- Reduce energy demands
- Use energy efficiently
- Generate and store renewable energy
- Monitor energy use

Measures should be incorporated at the earliest design stage of a development and maintained throughout the design, construction and operation of a proposal. All opportunities to maximise compatibility with current and future use of local and onsite zero and low carbon energy technologies must be identified and pursued. The approach should be documented in an Energy Statement (see Policy recommendation 7) to allow the Council to review this.

Evidence and viability

Many councils have followed the energy hierarchy approach as a framework for driving better standards in new building, examples include the GLA, Salford and Brighton. This is a standard approach to structuring the energy strategy process and helps provide the context for the subsequent policy requirements and the structure of the energy statement. In itself this requirement doesn't have any direct impact on costs so should not directly affect viability

Implications for implementation

This requirement would have indirect resource implications for the developer in relation to the work required to follow this process and document the results in the Energy Statement, which depending on the complexity of the project could require the assistance of a technical consultant. It would also have indirect resource requirements for the Council in relation to the checking and approval processes.

2.3 Recommendation 3: Demand reduction – Require all new developments to reduce energy demands and consider introducing targets where practical and viable

Description and evidence base

We recommend that, in line with the energy hierarchy described in Policy Recommendation 1, all new development is required to demonstrate how energy demands and carbon emissions have been reduced through the design and specification. This would need to be documented in the Energy Statement described in Policy Recommendation 8. The evidence provided in this report demonstrates there is a need for buildings to transition away from fossil fuels and towards electrical systems. To support this, it is essential to lower overall energy demands and limit demands on the electrical infrastructure both locally and nationally. Fabric and energy efficiency measures are the most cost effective and reliable way to reduce energy demands, as well as lower CO_2 emissions and costs for occupants of new buildings.

Approach

As a base requirement, developers would be required to present the demand reduction measures and specifications in their Energy Statement, which can then be assessed through the planning approval and building control processes. As described in Section 3, the current requirements in Part L 2021 should provide a decent standard of fabric performance and these are expected to be improved further in the next revision. In addition to the more general requirement for all developers to reduce demands and document performance, we recommend that Lewes District consider setting a higher specific target for developments in Growth Types C and D, where both the need to make further reductions in lifecycle emissions is greater (to offset higher embodied carbon) and the viability is better. In terms of specific options a maximum space heating demand of 30kWh/sqm/yr could be adopted to reflect an improvement on where the Building Regulations is expected to be in 2025 (at roughly 40kWh/sqm/yr). A higher target could be the requirement to meet the Passivhaus standard which sets a maximum space heating target of 15kWh/sqm/year.

Evidence and viability

In the long term, targets on improved fabric performance will have less of an impact on carbon emissions as the heat is provided by heat pumps that use electricity which will be decarbonised over the next 10-15 years. However, they will reduce energy consumption and deliver reduced energy costs for residents as well as reducing demands of the local electricity network and potentially improving the heat pump performance. There would be a cost to meeting these standards which would need to be accounted for in the viability assessment. In terms of an option to apply this standard to some specific sites then this could be applied to larger schemes where the economies of scale will be better or social housing where the energy cost savings will be more important.

Implications for implementation

This requirement would involve additional modelling work to demonstrate the fabric performance and is also likely to require some improvements to the specifications beyond Building Regulations. There would also be additional resources required to check this at the planning approval stage through assessment of the Energy Statement, and building control through the SAP and SBEM assessments. In terms of precedents, the GLA has long had a policy requiring improvements in the Fabric Energy Efficiency of 10% and 15% beyond Building Regulations requirements for residential and non-residential buildings respectively, which they have recently confirmed will apply to the Part L 2021 FEE target. Guidance is also available from LETI[69] and others on meeting the higher targets.

[69] https://www.leti.uk/

2.4 Recommendation 4: Set requirements for assessing overheating risks and mitigating these through design, avoiding the use of active cooling systems unless essential.

Description and evidence base

We recommend that all new developments are required to demonstrate how they have assessed and mitigated potential overheating risks associated with the planned development. Overheating risks are increasing as a result of climate change and designing homes with improved fabric and air tightness. Part of the district is also likely to have greater risks associated with its location and demographic and therefore greater need to mitigate those risks and avoid these being passed onto future residents.

Approach

All developments should complete the Good Homes Alliance Overheating assessment tool as part of their planning application. They should then assess the overheating risks as required by Part O of the buildings regulations and follow an approach to mitigating these through the design, avoiding the use of active cooling systems if possible.

The Good Homes Alliance (GHA)[70] tool is an effective way for residential developers to understand the level of overheating risk and demonstrate where there is a need to undertake more detailed analysis. This approach has the benefit of highlighting key principles that are known to elevate or reduce risk such as size of windows and proximity of the site to sources of noise that could impact the practical use of window openings for ventilation.

More important developments or those with a significant overheating risk could be required to undertake additional assessments such as those described in CIBSE TM52[71] and TM59[72].

The assessment should be documented in the Energy Statement as it is intrinsically linked to the wider energy and heat management strategy. More details about the requirements for what analysis to undertake could be included in the policy guidance documents.

Evidence and viability

Measures to address overheating in the design of buildings in construction are likely to me more effective and will be much cheaper to implement than retrofitting these in the future. Many of the measures, particularly the passive design options can be delivered at zero or negligible costs if they are implemented early enough in the design.

Implementation

It would be relatively straightforward for the Council to review the GHA tool assumptions made by the developer and challenge these where necessary to ensure constraints are considered and mitigated. Building regulations Part O requirements would be assessed by Building Control in the usual way along with any additional assessments if that option was taken.

There may be an element of conflict if the Local Plan seeks to promote the development of brownfield sites as these can have more constraints related to passive measures and ventilation options so may need some degree of active cooling to mitigate ventilation limits. Cooling, although less preferrable and will increase energy demand, could be considered as a useful technology to enable greater use of brownfield sites and minimise development on virgin land. Using cooling heat recovery solutions to convert waste heat into energy for domestic hot water services can help to mitigate some of the issues that cooling systems bring.

[70] Good Homes Alliance, 'Overheating tool and guidance'. Available at: https://goodhomes.org.uk/overheating-in-new-homes
[71] CIBSE TM52: The Limits of Thermal Comfort: Avoiding Overheating in European Buildings (2013)
[72] CIBSE TM59: Design methodology for the assessment of overheating risk in homes (2017)

2.5 Recommendation 5: Low carbon heating systems - Require all development to install heating systems that align with carbon neutral policy, and which are designed to maximise efficiency.

Description and evidence base

We recommend that all new developments are required to install heating systems that are aligned with the Councils carbon neutral target and to ensure that these systems are selected and designed to be as efficient as possible.

The Government have said that they plan to ban the use of gas in new homes from 2025 and proposals for the future homes standard and future buildings standard signalling the use of heat pumps as the most likely compliant solution.

Approach

A heating hierarchy could be adopted to drive this policy which could include the following

1. Connection to low carbon heat networks (where these offer improvements over onsite heat pumps)
2. Heat pumps, with the choice of systems designed to maximise efficiency (through consideration of the assessment of configuration, operational temperatures, heat sources)
3. Electric heating (where demands are low or where point sources are more effective and where this wouldn't not result in higher running costs for occupants compared to the use of heat pumps)
4. Alternative low carbon heat sources (such as biomass) where other options are not possible and where these can be shown to be appropriate and any related issues (such as air quality, fuel sourcing, running costs etc) have been addressed.

The use of gas boilers (and other fossil fuel heating systems) would not be possible unless there was an exceptional case and it can be proven that none of the other options are technically or financially viable.

Consideration should also be given to the use of solar thermal systems, which although they would not be sufficient to provide all the heating demand by themselves, could be used to improve overall performance of the heating system.

Evidence and viability

In practical terms this requirement should mean that most buildings are installed with most developers to use heat pumps which will be required by building regulations from 2025 onwards. However as described in this report depending on the timing of the adoption of the Local Plan and both the adoption and implementation of the Building Regulations (allowing for any transition period), there might be a window when gas boilers are still being installed across the district.

The use of heat networks reflects the fact that these could offer benefits over individual heat pumps but only where they are available. We are not aware of any strategic low carbon heat networks in Lewes District but mindful of the Heat Network Zoning Policy coming into effect in 2025, which could result in the development of new projects.

Implementation

Developers would need to demonstrate in their Energy Statement that they have adopted the highest viable option in the hierarchy. As noted in almost all cases this would be expected to be a heat pump unless heat networks are brought forward in some areas across the district. There may be some unique cases where an electric heating solution may be appropriate (such as where heat demands are very low) but it will be for the developer to prove this.

2.6 Recommendation 6: Solar generation – Require all development to install PV and seek to maximise the potential scale of installation and assess the potential for Solar Thermal if appropriate.

Description and evidence base

We recommend that there is an expectation that all new developments install PV, and that developers demonstrate how this has been maximised, unless it can be demonstrated that it is not viable or has been limited for genuine technical feasibility or financial viability issues.

Although PV is likely to have less of an impact on the carbon emissions from new development it will have a big impact on the total energy consumption and as a result the running costs for the occupants. Also, the cumulative impact of PV on all new development will have a significantly positive impact on local grid resilience at a time when increasing pressure will be put on grid capacity and reliability.

We would also recommend adding a requirement for developers to consider solar thermal for developments with a significant hot water demand as part of their energy strategy assessment.

Approach

This policy aims to put the onus on the developer to show how they have maximised the installation of PV across the site thereby giving them the responsibility of assessing and proving the potential or providing evidence where it cannot be installed, or the installation has been limited.

The assessment of the potential for Solar Thermal would also need to be included within the Energy Statement where relevant.

Evidence and viability

Solar PV will deliver carbon saving in the short term as well as longer-term benefits for residents and building owners in terms of energy costs and resilience. Based on the current understanding of proposals for the Future Homes Standards PV may not be required to deliver compliance and therefore developers may not choose to install it.

Assuming the use of PV isn't part of the specification to meet Building Regulations an additional requirement to install PV would have a cost and therefore an impact on viability. However, wording of the policy around an expectation to maximise within technical and financial constraints would allow the developer to address viability issues but put an onus on them to demonstrate this. Developers could also look into alternative approaches to financing the PV that might better incentivise the installations such as though pricing arrangements of the units or alternative ownership arrangements in the case of installations on blocks of flats.

We recommend that higher expectations, which could include a minimum amount of PV, be included for growth types C and D where both the technical feasibility and financial viability of installing PV will be much greater.

Implementation

This requirement would require the developer to show in their Energy Statement that they have installed PV and roof plans to demonstrate how this has been maximised on the available roof space. If a developer proposed no PV or where it was clear that additional suitable roof area has not been used then the developer would have to demonstrate in their Energy Statement that there were either technical or financial reasons for this, which can then be assessed as part of the planning approval process. This should be relatively straightforward for planning officers to assess as part of the approval process.

2.7 Recommendation 7: Storage and demand management - Require all developments to assess the potential to introduce storage and smart energy management systems.

Description and evidence base

We recommend that all new developments are asked to consider the potential for thermal and battery storage as well as smart metering and other demand management systems.

The use of these systems will provide long terms benefit for the building owners in both energy costs and resilience as well as providing wider benefits to the local power networks.

Approach

This requirement is more of a prompt for developers to consider the use of these systems as part of their energy strategy process. They would be expected to consider the options relevant for their development and document this within their Energy Statement.

This requirement is also a potential hook to allow the planning authority to push for more if, as expected within the industry, the case for these systems improves over the period of the local plan as they become cheaper and/or energy prices increase.

Evidence and viability

Given the soft wording proposed here it is assumed that this would not require significant additional work and not force additional costs that might impact on viability. It would be difficult to use stronger requirements or specific targets as there are a range of potential options that would be suitable for different building types and also less precedent and existing evidence base.

Implementation

Developers would be required to document their assessment of storage and demand management systems in their Energy Statement and this would be checked at application stage.

2.8 Recommendation 8: Whole lifecycle carbon – Where appropriate ask developers to consider whole life-cycle carbon emissions and demonstrate steps to minimise these.

Description and evidence base

We recommend that, where deemed to be appropriate, developers are asked to consider the whole-lifecycle carbon emissions associated with the development.

Part L of the Building Regulations and most of the recommended requirements described above only address the regulated operational emissions associated with the development. It does not include the unregulated emissions or the embodied emissions which make up a significant share of the whole lifecycle emissions of a building. In particular, embodied emissions are in many cases the most significant component and this will only increase as the decarbonisation of electricity reduces the operational emissions to zero over time.

Approach

This requirement could be applied where the implications of embodied carbon are deemed to be most significant, specifically development in growth types C and D which will have more infrastructure and lower density development as well as higher levels of viability.

Given the complexities around calculating whole lifecycle carbon we would anticipate this requirement to be applied to larger developments where the extra costs and resources to undertake the assessment can be made cost effective and the impacts are greater.

Where applied it would require developers to calculate the WLC for the development. There are software tools like OneClick LCA and eTool LCD that can be used to do the calculations.

Evidence and viability

There is limited existing evidence and precedent to support a more definitive target around whole lifecycle carbon. Undertaking these calculations this is likely to impose a cost on the developer as they are likely to need to appoint experts to undertake them and provide resource to collect the relevant information.

Implementation

Where required the developer would be required to document both the results of the WLC assessment and the steps taken to mitigate these through the design within the Energy Statement, which would then be reviewed by the planning officer.

2.9 Recommendation 9: Energy strategy and process - Require all new developments to complete an Energy Statement, that is checked, enforced and monitored through the planning approval and building control process, to demonstrate compliance with the requirements.

Description and evidence base

We recommend requiring all new developments to produce an Energy Statement to accompany their planning application which would include the information necessary to assess all of the other recommended requirements. The Energy Statement would need to be part of an improved process to assess the performance of new developments throughout both the planning and building control systems.

There are known issues with what is known as the performance gap, the difference between modelled and real-world performance. Part of this can be addressed through better processes, checking and monitoring through to construction.

Approach

The Energy Statement could be a standardised document that each developer would complete with a set structure. This would be supported by the guidance material proposed in Recommendation 9 which could include a template and standard tables and figures. This document would form the basis of the checks on the compliance with the requirements of the other recommendations set out above both at the planning stage and through to practical completion.

Evidence and viability

Although not delivering building performance benefits in its own right, better processes improve the confidence in the real-world performance of the building.

It is assumed that, while there would be some cost and resource implications in producing an energy strategy this won't be significantly more work than would be required to comply with Building Regulations requirements and relatively insignificant.

Implementation

The energy strategy work and production of an Energy Statement could either be undertaken by the M&E engineers on the design team or expects could be appointed to complete this. There are numerous examples of Councils that ask for such reports and the GLA has been doing so for over 15 years.

This requirement could be simplified for smaller developments through the use of a standardised Energy Statement Checklist or shorter reporting format.

2.10 Recommendation 10: Guidance and support – Produce a technical guidance document and consider further materials to support developers in complying the requirements

Description and evidence base

We would recommend that if adopting the previous recommendations, that guidance materials are produced to support developers to meet the requirements and also improve the consistency and quality of submissions to make the council approval processes more efficiency.

Approach

An SPD or technical guidance document could be prepared that would set out the structure and content of the Energy Statement and also potentially provide a template and standardised content such as tables and figures for the report.

Evidence and viability

The guidance document and support materials would hopefully improve viability by helping developers to complete their Energy Statements and avoiding delays to approvals.

Implementation

The guidance material would need to be produced in advance such that it is ready for when the Local Plan is published.

2.11 Policy Recommendation 11: Electric Vehicle Charging Infrastructure – Require new development to install EV charging and allocate land for public EV charging points across the District

Description and evidence base

Developments should be required to install EV charging infrastructure to support the rollout and uptake of EVs. Individual charging points are covered in Building Regulations. but additional public charging points should also be included within plans.

We also recommend allocating land for new EV public charging facilities within new developments and within existing settlements. A proportion of these public charging points should be appropriate for rapid charging (min 50kW) in suitable locations. These facilities will provide access to charging for residents without off street parking and for visitors to the district. Improvements in public charging infrastructure will encourage the uptake of electric vehicles as an alternative to traditional combustion vehicles.

Approach

Developers should be required to demonstrate the provision of private and public charging points in their development plans. The Council should identify and allocate areas for public charging hubs in existing locations in line with the East Sussex Electric Vehicle Strategy, which could include:

- Existing public car parks
- On-street charging areas
- New hub areas within settlements, close to visitor attractions or the key road network
- Areas within new development to serve the existing community as well as the new.

Priority should be given to areas without off-street car parking, land that is already available and/or in public ownership.

Evidence and viability

Approximately 35% of existing households within Lewes District do not have access to off street parking and only 15% of these have access to a public charger within 5mins walk[73]. Providing additional public EV charging facilities within and close to existing settlements, as well as within new developments, will help to increase in the uptake of electric vehicles across the district. Rapid Chargers (50kW+) are required to support the en-route charging that is needed to complete a journey. Visitors to and through the district are those most likely to take advantage of these chargers. This will encourage the use of EV vehicles travelling through the district and when placed in appropriate areas such as town centres can have positive economic impacts. The switch to electric vehicles will help reduce transport related carbon emissions as well as help to improve air quality within the district.

Implementation

For private developments the provision of EV charging points should be specified in plans that can be checked at planning approval and by Building Control on completion.

The need for public charging facilities, in line with the East Sussex Electric Vehicle Strategy, should be included in the Infrastructure Delivery Plan and Infrastructure Funding Statement and be considered when reviewing priorities for the Community Infrastructure Levy. Delivery of the hubs could be achieved in collaboration with the Air Quality Management Plan due to be updated shortly. The Council should consider the best locations for public charging with a focus on where the need is greatest and where a high number of users will be served. Electric vehicle charging infrastructure should form part of wider Duty to Cooperate discussions with the Highways Authority.

[73] https://onstreetcharging.acceleratedinsightplatform.com/ Research from Field Dynamics

2.12 Policy Recommendation 12: Active Travel, cycling and walking – require new developments to incorporate active travel measures into the design of new development

Description and evidence base

Active travel measures should be prioritised within the local plan through supporting strategic improvements and projects as well as careful design requirements for new development.

The design and layout of developments should provide safe and attractive pedestrian and cycle routes that link destinations both within, and between, neighbourhoods or developments. This should include making the most of existing connections and incorporating infrastructure to enable active travel to be a genuine alternative.

East Sussex County Council have published a Local Cycling and Walking Infrastructure Plan for the Lewes District. It identifies priority routes to make cycling and walking easier and safer. New developments should help to deliver and connect to these routes either through onsite infrastructure if appropriate, or through financial contribution. Sustainable and active travel options will also have benefits for health and wellbeing, as well as air quality. For example, where a development may have air quality implications due to combustion vehicle movements there is an opportunity to integrate additional active travel principles which will reduce emissions further.

Approach

The Council should promote active travel in the following ways:

- Require new developments to demonstrate active travel principles have been fully incorporated into the design and layout of new development including delivery of, and connections to, existing routes and routes identified in the LCWIP
- All new development to include adequate secure cycle storage in line with BREEAM standards
- New and refurbished commercial developments to include adequate secure cycle storage and showering facilities
- Identify and support strategic cycling infrastructure projects, include them within the Infrastructure Delivery Plan and consider how such projects could be funded in partnership with the Highways Authority
- Prioritise cycling and walking infrastructure projects for CIL funding.

Evidence and viability

42% of carbon emissions within Lewes District arise from transport and encouraging a switch to cycling and walking will help to mitigate the existing and future transport emissions. Active travel is not a new concept and has been incorporated into nationally recognised design standards such as Building for a Healthy Life. This standard places emphasis on integrated connectivity through a range of measures, such as routes that respond to pedestrian and cyclist desire lines, protected cycle ways, design legibility to streets and integrating navigable features for those with mobility limitations.

Adequate and secure cycle storage has been promoted in new developments for many years and the BREEAM standards set out requirements that can be incorporated into local policy.

Incorporating active travel design principals and supporting walking and cycling infrastructure is expected to have little impact on development viability.

Implementation

Development allocation policies should include active travel requirements within the development criteria.

Support for appropriate strategic cycling infrastructure projects should also be incorporated into development management policies.

Strategic cycling and walking infrastructure should form part of wider Duty to Cooperate discussions with the Highway Authority.

2.13 Policy Recommendation 13: Maximum Parking Standards – set maximum parking standards for all new development subject to local sustainability

Description and evidence base

We recommend the use of maximum parking standards within allocations and through development management policy where appropriate.

Approach

The Council should determine maximum parking standards for new developments, this includes bespoke standards for individual allocations as well as standards set out in development management policies to guide future development. These may vary in different locations and be lower in more sustainable locations served by good public transport and with good access to services and facilities. Targets could be higher for development in growth types A (urban infill) where transport connections can be demonstrated to be good.

Evidence and viability

Within Lewes District there is a reliance on the private car to access services and facilities with over 80% of the district population owning at least 1 car or vehicle[74]. Residents can be encouraged to use alternative transport options through the use of appropriate maximum parking standards.

Implementation

The maximum parking standards should be proportionate to the sustainability of the development site and determined in conjunction with the Highways Authority. Provision will need to be made to account for people with reduced mobility.

[74] NOMIS Census 2021

2.14 Policy Recommendation 14: Transport Carbon Emission Assessment – requirement to calculate the level of carbon emissions generated from transport

Description and evidence base

We recommend all developments undertake an assessment of the likely transport carbon emissions resulting from the scheme. The results of the assessment should be reported to the Council alongside an explanation of how sustainable travel principles have been incorporated into the scheme to reduce transport related carbon emissions.

We recommend that the Council also encourage the use of transport carbon management plans for new developments setting out all the measures taken to reduce transport carbon emissions including physical infrastructure, methods to encourage behaviour change and future proofing.

Approach

There is currently no standard methodology for calculating transport carbon emissions from new developments however it is expected that trip generation modelling methodology like that used for air quality assessments is likely to be acceptable. The assessment should be carried out early enough in the process to influence design and infrastructure choices and therefore it should be available during pre-application discussions.

This requirement could be targeted at development in growth types C and D where the potential impact on transport emissions is higher.

Evidence and viability

There is little evidence to support setting a transport emissions target for new development, however by undertaking an assessment developers can consider if there are any ways to reduce transport emissions further.

Implementation

The Council will need to review the assessments and should do so in conjunction with the Highways Authority where appropriate. Any transport carbon management plans should also be reviewed by the Highways Authority.

2.15 Policy Recommendation 15: Public and shared transport – Require new development to include connections to public transport and consider shared transport opportunities

Description and evidence base

We recommend promoting the delivery of new public transport and the provision of car/e-bike/bike clubs within allocations and through development management policy. We also recommend identifying strategic public transport improvements that would support the existing population and future growth within the district.

The local plan can ensure new development is well served by public transport as a genuine alternative to a private vehicle. Large scale developments should include the provision of public transport, either through new services or extending existing services. They should also prioritise access to rail stations and provide genuine and appropriate "first and last mile" access to and from public transport hubs in conjunction with active travel measures.

Where appropriate, and in more rural or less sustainable locations, developments should incorporate car/e-bike clubs for residents to use. Such clubs should be set up such that they are a genuine alternative to the private vehicle with maintenance and management measures in place.

Approach

Promoting public transport through:

- New services to serve new development and extended to existing development where possible, including on demand services in rural locations
- Car/e-bike/bike clubs in larger developments (with appropriate ongoing management in place)
- Consider the use of public transport vouchers and tokens to encourage residents to switch

Evidence and viability

Large scale developments can provide an opportunity to improve public transport options and deliver car/e-bike/bike clubs. Public transport vouchers and tokens can also be used to encourage the switch from individual vehicles and has been successful in some developments in the east of England. On demand bus services are also increasingly being delivered in rural locations.

Implementation

The Council should work with the Highways Authority and public transport providers to identify appropriate requirements for allocations. A development management policy should also include requirements to guide future developments.

Improved public transport infrastructure should also be included in the IDP and Infrastructure Funding Statement and be considered when reviewing priorities and arrangement for Community Infrastructure Levy Governance.

Public transport provision should form part of wider Duty to Cooperate discussions with the Highway Authority and we recommend proactive discussions with transport infrastructure providers.

2.16 Policy Recommendation 16: Renewable energy infrastructure – Proactive support and land identification and/or allocation for renewable energy infrastructure

Description and evidence base

We recommend supporting renewable energy generation and storage in policy and through allocating land for new development. The Lewes District Renewable Energy Assessment (REA) identifies areas of land that might be suitable for wind and solar energy generation and these wider areas should be identified on the policy map.

The Council should also allocate specific sites for renewable energy development, this could be sites submitted to the council through the call for sites with the landowner consent or proactively identified by the council using the REA and via the Regulation 18 consultation. The sites should be assessed for suitability and be included in the plan with development criteria.

The Council can also support the transition to renewable energy and low carbon heat by supporting electricity infrastructure upgrades. The local plan can identify specific upgrades and include them in the Infrastructure Development Plan after consultation with the electricity infrastructure provider.

This will help to ensure renewable energy delivery within the plan period to support the existing and new population.

Approach

The Council should support renewable energy development within the District by:

- Supporting the principal of renewable energy generation and storage within the District through strategic policy and setting out local development management criteria, taking account of local constraints,
- Supporting and encouraging community led renewable energy and low-carbon heat schemes particularly in areas of fuel poverty and off grid supplies,
- Identifying land on the policy map, where renewable energy development could be feasible, as “Areas of Renewable Energy Opportunity” guided by the findings of the Lewes District Renewable Energy Assessment,
- Allocating sites for renewable energy development within the plan period; and,
- Identifying and supporting electricity infrastructure upgrades.

Evidence and viability

The Lewes District Renewable Energy Assessment (LEA) identifies areas of land where renewable energy is likely to be feasible and the level of renewable energy that can be generated across the District. This evidence can be used to identify the “Areas of Renewable Energy Opportunity” and potential sites for development allocation.

Discussions should be held with the local electricity infrastructure provider during the Regulation 18 consultation to identify where upgrades may be required and how these can be achieved.

Implementation

Renewable energy should be supported through policy and through site specific allocations.

The need for renewable energy and electricity infrastructure upgrades should also be included in the Infrastructure Delivery Plan and Infrastructure Funding Statement and be considered when reviewing priorities for the Community Infrastructure Levy (CIL).

2.17 Policy Recommendation 17: Heat Networks – Support the identification of heat network zones and the development of heat networks and require development to connect to these

Description and evidence base

The Government is currently consulting on the Heat Network Zoning Policy as part of the Energy Bill. This policy would give powers to Local Authorities to designate heat network zones where it can be demonstrated, through a standard national methodology, that connection to the heat network would be the lowest cost and lowest carbon solution to deliver heat. Although we are not aware of any existing or planned strategic heat networks we would recommend that a policy is included to act as a hook for future development in this space.

Approach

As part of the heat hierarchy described in Policy Option 2, the first option in the hierarchy is for connection to low carbon heat networks where these are present and offer a better option than on site heat networks. This can only be triggered if there is an existing network, or one is being planned with sufficient detail and confidence.

Evidence and viability

The evidence to support this policy would be the Heat Network Zoning Policy and the Heat and Buildings Strategy which provide details of the potential extent of heat network deployment across the UK that the Government modelling believes will be needed to decarbonise heat supply.

Implementation

As described above this policy is unlikely to have any material implications due to the lack of existing strategic heat networks and the time to the ratification of the Energy Bill but it would be a hook for future development of policy if/when a heat network zone is designated in Lewes District. Together with the heat hierarchy this would also ensure that developers of large strategic allocations would need to consider if a low carbon heat network is the best solution for providing heat (and potentially also cooling) to a new development.

2.18 Policy Recommendation 18: Require developments to minimise and compensate for loss in carbon sequestration

Description and evidence base

This policy would aim to address the impact of development on the potential for carbon sequestration, either directly through changes to the land use or, going further, the loss in opportunity for alternative use of the land for additional carbon sequestration.

Approach

Developers would be required to assess the existing carbon sequestration associated with the existing site, based upon the use of published values associated with different land uses. Going one step further, developers could also be asked to assess the sequestration of the site if improvements were made in order to understand the potential that would be lost by developing the site.

The sequestration potential for the proposed development should then be calculated using a similar approach to biodiversity net gain. Measures should be taken by the developer to improve this both through the quantity and quality of the green infrastructure proposed. In some cases this can could be delivering additional benefits, such as SUDs and amenity spaces, or could be using the development footprint such as with green roofs/walls and street trees/raingardens.

This policy could potentially be applied to land in growth types C and D where the existing and potential sequestration would be much more significant.

The difference between the before and after could then be calculated and potentially used to inform an offset arrangement addressed either through payment or commitments to deliver equivalent sequestration improvements elsewhere.

Evidence and viability

Further work would be required both to develop the evidence base for this policy and to assess the viability and set the payment/penalty cost. We are not aware of any similar policies so do not believe there is a precedent for this type of scheme. One option might be to start with a policy that requires the assessment but without the penalty of an associated offset scheme and then use this to drive improvements on the sites while also collecting the data that could inform and provide an evidence base for an offset arrangement.

Implementation

Although we are not aware of this being done before we believe this assessment could be relatively straightforward as it could use the same methodology as the biodiversity net gain calculations with the additional carbon sequestration calculations established from national data sets used to assess Land Use Land Use Change and Forestry (LULUCF) emissions. However, if adopted further work would be required to confirm this and standardise the methodology and values to be used in any calculations.

2.19 Policy Recommendation 19: Adaptation opportunity – Safeguard areas with high adaptation potential including protecting and restoring catchments upstream of high flood risk areas

Description and evidence base

We recommend protecting areas of high adaptation potential, for example land that is critical for groundwater recharge or water storage, will enable development to be directed towards areas with lower adaptation value (i.e. areas with limited attenuation potential). In allocating development, consideration must be given to the impact of the development on flood risk in existing sites. New development will increase the impermeable surface area of a site, which results in increased surface run off, potentially increasing the likelihood and severity of flooding elsewhere.

By safeguarding areas with the highest potential for adaptation, these sites can be maximised and direct development towards areas with lower adaptation productivity (i.e. areas which have limited attenuation potential). For example, planting of riparian woodland will enable floodplain storage, reduce runoff and both delay the onset of flooding and the impact of floods in the District. Simultaneously, floodplains and riparian woodland will create new high-biodiversity habitats and increase canopy and shading for temperature regulation.

Approach

The Local Plan should identify and support any existing natural flood management (NFM) or catchment improvement projects. It should also encourage and support future projects and commit to working with partners, including the Environment Agency and the lead local flood authority, to bring forward projects within the plan period. Any landscape scale projects supported by the Council should include elements of natural flood management wherever appropriate.

Areas identified within the SFRA should be identified on the policies map as areas "safeguarded for flood management potential". Development should be avoided in such locations and any adjoining development should include assessments to show the development will not have a negative impact on the ability to bring forward natural flood management projects in the safeguarded areas.

The Council should also consider whether these sites are suitable for biodiversity net gain offsetting and identify potential projects that will deliver multi-benefits.

Evidence and viability

The SFRA provides detailed evidence of areas to safeguard and provides the evidence base for the benefits that would be derived for this. In regard to viability the Council would need to assess the practical implication of safeguarding this land on development areas and other demands on land allocation. In regard to funding to support specific project it might be possible to apply to the Natural Flood Management (NFM) Fund administered by DEFRA or source this through the Community Infrastructure Levy (CIL).

Implementation

Sites of high adaptation potential can be identified using Working with Natural Processes (WWNP)[75] data sets. This data informs which sites should be strategically selected for riparian woodland restoration, reconnecting floodplains, catchment woodland restoration or for runoff attenuation. The SFRA has already identified such areas, including around the River Ouse (Newhaven and its Goldstrow) and along some of its tributaries (Glynde Reach, Bevern Stream, Longford Stream and Pellingford Brook).

[75] UK Government. 2017. Working with natural processes to reduce flood risk. Available: Working with natural processes to reduce flood risk - GOV.UK (www.gov.uk)

2.20 Policy Recommendation 20: Compulsory habitat connectivity where a site has the potential to connect two existing designated or identified habitats

Description and evidence base

To support the migration of species between different habitats, the Local Plan can promote the reconnection of habitats across the District. Connected habitats are known to have higher genetic diversity, healthier fauna and flora and species are proven to occupy a larger range. Healthy ecosystems provide a multitude of services to human populations including regulating temperature (reducing temperature extremes), purifying air and water, controlling erosion, and maintaining healthy soils for agriculture. In Lewes District, this could take the form of a riparian corridor to minimise flooding and improve water quality for urban areas. Connectivity could also involve connecting distinct habitat types. For example, if a site overlaps two habitats identified as *floodplain grassland* and *hedgerow* it will be mandatory for the design of the site to include a green or blue corridor to connect these habitats. Therefore, new developments will have the opportunity to connect fragmented habitats. A robust habitat survey should be conducted to identify suitable and impactful wildlife corridors in the District. For the corridor to function fully, a habitat management plan should be introduced.

Approach

The design of new development should take account of the surrounding habitat and must provide connections where possible. This should be incorporated into the onsite green infrastructure plan.

Adopted development allocations should seek to create and strengthen habitat connectivity, these should be set out in the development criteria and identified graphically. The Council could consider identifying “habitat connectivity opportunity areas” on the policies map using the biodiversity evidence base.

Evidence and viability

The Biodiversity Study provides an evidence base to support this policy as well as helping to identify the key habitats within the district and where suitable connections can be made as well as the most appropriate type.

Implementation

The Council should co-operate with the Local Nature Partnership and reflect the Nature Recovery Strategy in the Local Plan. Cross boundary connections and key habitats on close to neighbouring authorities should be included in duty to co-operate discussions.

2.21 Policy Recommendation 21: Adopt a Coastal Change Management Area

Description and evidence base

It is known that the coastal area of Lewes District is at risk from coastal erosion and shoreline retreat, hold the line measures have been effective to date but are not a permanent solution for a changing coastline. In paragraphs 167-169 of the NPPF, coastal councils are invited to identify areas which are likely to be impacted by physical changes as Coastal Change Management Areas (CCMAs). Specifically, the NPPF defines a Coastal Change Management Area as *'an area identified in plans as likely to be affected by physical change to the shoreline through erosion, coastal landslip, permanent inundation or coastal accretion*'.[76] The NPPF delineates that within a CCMA, plans should; a) be clear as to what development will be appropriate in such areas and in what circumstances; and b) make provision for development and infrastructure that needs to be relocated away from Coastal Change Management Areas. Therefore, development will only be possible if it can be proven that a) it will be safe over its planned lifetime and not have an unacceptable impact on coastal change; b) the character of the coast including designations is not compromised; c) the development provides wider sustainability benefits; and d) the development does not hinder the creation and maintenance of a continuous signed and managed route around the coast. As such a CCMA will be beneficial to LDC as an area sensitive to coastal environmental drivers.

Approach

To support a CCMA, a policy could be adopted which supports the aims of the area. This could include considerations such as;

1) Prohibiting any development which could aggravate existing physical impacts on the coast.

2) Any new development and infrastructure should be located in an area less at risk of erosion.

3) Where development must take place, developers must demonstrate adequate sea defence and prove that the defences, and new development will not exacerbate physical risks in other locations.

Evidence and viability

With a coastal change management area, development would be prohibited where it could exacerbate any coastal physical change risks, allowing vulnerable areas to be protected. The Plymouth and South West Devon Council include CCMA's in their local plan, noting that where development and infrastructure must be relocated away from the CCMA, it must then subjected to certain criteria, including being relocated in an area less at risk from coastal erosion.

Implementation

Further evidence may be needed to justify a CCMA but this should be incorporated into the emerging Local Plan process.

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2.22 Policy Recommendation 22: Mandate water consumption targets

Description and evidence base

Building Regulations Part G requires that the average water usage of a new home (including those created by a change of use) is no more than 125 litres per person per day or 110 litres/person/day if required as part of an adopted plan policy. Currently, the Lewes District Local Plan[77] requires all new dwellings to achieve water consumption of no more than 110 litres per person per day.

Regarding water efficiency, South-East Water, with the Environment Agency, plan to reduce water consumption through a number of demand management measures. These include reducing consumption from the current 150 litres per head per day (l/h/d) in 2017/18[78] to 139l/h/d by 2025, 118l/h/d by 2045 and 90l/h/d by 2080. Aligned with this, reducing water consumption to the greatest extent feasible will be critical in the South-East region and, as such, mandating all new developments to achieve a water efficiency rate of below 110l/h/day and encouraging further improvement down towards 90l/h/day is recommended.

Approach

As a base requirement, developers for major developments and commercial developments, could be required to display the BREEAM 'Very Good' standard or 'excellent' standard for water efficiency. This should be applied to major developments, but could be considered for some residential developments in severely water constrained areas, such as within the South East. For each developer, a water calculator should be completed (such as http://www.thewatercalculator.org.uk/) to demonstrate that the 110 litres/ person/ day is being met or exceeded, and where possible lower targets are achieved.

Evidence and viability

In the London Plan, residential developments must be designed so that mains water consumption meets 105 litres or less per head per day. Embedding BREEAM, is more common in local planning in the UK, particularly in areas of the South West of England. The South Downs National Park Authority defines strict water consumption values of 110 litres/ person/ day for all residential development, further, they outline requirements for major non-residential and multi-residential development that on water consumption they must *meet at least 2 credits (a 25% improvement on the baseline based on Part G of building regulations)*. LDC Local Plan should therefore support and encourage these requirements through alignment. Achieving lower water consumption targets down to 90l/h/d are possible but can be challenging. Technical solutions to reduce consumption to this level or below, such as grey and rainwater harvesting systems, can have significant cost, design or operational implications and the use of very low flow rates for showers and taps can risk them being retrofitted by homeowners if those flow rate are perceived to be too low.

Implementation

Development proposals should set out the water usage for each building showing how water efficiency measures have been incorporated into the specifications and a calculation (which could adopt standard calculator tools such as those used in Building Regulations Part G, Code for Sustainable Homes, Home Quality Mark or BREEAM). This can then be checked at the planning approval stage and by Building Control at completion.

[77] Policy LPP1 Core Policy 14: Renewable and Low Carbon Energy and Sustainable Use of Resource Lewes District Local Plan (2016). https://www.lewes-eastbourne.gov.uk/_resources/assets/inline/full/0/257159.pdf (accessed December 2022)

[78] South East Water Resources Management Plan (2019). Available online at: https://cdn.southeastwater.co.uk/Publications/Water+resources+management+plan+2019/south-east-water-final-wrmp-2020-2080.pdf (accessed September 2022)

2.23 Policy Recommendation 23: Compulsory tree planting in new developments

Description and evidence base

With trees and other green infrastructure providing vital benefits such as temperature regulation, reducing runoff rate and water storage, existing trees should be protected and, where possible, additional trees should be planted within a development area. Consider selecting species which are drought tolerant, have resilient characteristics such as root strength, disease resistant, fast growth and species without existing restrictions . With species selection, consider appropriate species which serve the function of ecosystem restoration including, where possible, selecting native species and consulting the Global Invasive Species Database and berry rich species.[79] Within this, choose a variety of tree species to restore plant diversity and protect soils. Moreover, the strategic location of the species on the site should optimise opportunities for shading, for example by planting saplings to create an overlapping canopy once the trees have reached maturity, which will reduce temperatures in the future.

Approach

This requirement aims to have developers demonstrate where they have integrated additional tree cover into their design. It could also include demonstrating how trees have been strategically placed to provide shading and habitat connectivity and how these will be managed until they are established.

Evidence and viability

Surrey Heath Local Plan[80] requires applicants to demonstrate how their landscaping plan has taken into consideration the impacts of climate change, which includes in the selection of species and the location of the planting. Additionally, they must demonstrate that new trees and landscaping in the development have a strategic climate change purpose, including for mitigating climate change and adapting to the consequences, for example by integrating planting with SuDS provision. Likewise, rural councils like Perth and Kinross insist on preservation of existing woodland, the developer must *enhance the condition of existing woodland cover and expand them to develop habitat networks that complement the landscape character.*

Implementation

This could be incorporated into the green infrastructure plan and form part of wider requirements such as Biodiversity Net Gain.

[79] Green-Grey Community of Practice. 2020. Practical Guide to Implementing Green-Grey Infrastructure.
[80] Policy DM9 Adopted Core Strategy (2011-2028).pdf (surreyheath.gov.uk)

Appendix A Climate Change Risk Assessment

The following climate change risk assessment is the basis of the climate change adaptation study. The risks were selected from the UK Climate Change Risk Assessment, with the exception of risks less relevant to the local plan, such as the international dimensions. Each risk was evaluated in terms of the current 'likelihood' of that risk occurring and the severity of its' 'impact' on a score of 1-5, primarily through secondary sources and other ongoing assessments including the SFRA, biodiversity assessment and water cycle assessment. Multiplying these figures produced an overall risk score with justifications from secondary sources. The highest risks are shown in Table 16. The risk assessment also includes a short description of the impact of climate change on the risk, generally whether climate change will diminish or exacerbate the risk in Lewes District. The high priority risks were presented to selected members of LDC on 06 December 2022 (via teams).

Table 15: Risk Score Key

Risk Rating	Score
Positive/ Neutral	N/A
Low	0-8
Moderate	9-14
High	15+

Table 16: Summary of High Priority Risks

Risk	Relevance to Local Plan	Relevant Options
Natural Environment and Assets		
Risks to terrestrial species and habitats from changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)	Low	1.A., B, C 3.A. B, C 4.A, B, C 6.A 7.A., B 8.A., B, C 9.A
Risks and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion)	Moderate	1.B, 4.A, B, C 5.A 7.A 8.B.,

Risks to aquifers and agricultural land from saltwater intrusion	High	1.A, B 2.A, B 4.A, B, C 5.A
Infrastructure		
Risks to infrastructure services from coastal flooding and erosion.	High	1.A., B 3.A., B, C 4.A, B, C
Risks to transport from high and low temperatures, high winds and lightning	High	
Health, Communities and the Built Environment		
Risks to health and wellbeing from high temperatures	High	1.C., 3.A., B., C 6.A 8.A., C 9.A.
Risks to people, communities and buildings from flooding	High	1.A., B, C 3.A. B, C 4.A., B, C 6.A. 8.A., C 9.A.
Risks to viability of coastal communities from sea level rise	High	4.A., B, C
Business and Industry		
Risks to business sites from increase in flood risk	High	1.A., B, C 3.A., B, C 4.A., B, C 6.A. 8.A., C 9.A.
Risks to coastal business locations and infrastructure from coastal flooding, extreme weather, erosion and sea level rise	High	1.A., B. 3.A., B, C 4.A., B, C

Natural Environment and Assets

Table 17: Assessment of possible climate change risks and opportunities to Lewes District based on UK National Climate Change Risk Assessment and local sources - Natural Environment and Assets

ID	Risk/ Opportunity	Climate Change impact	Likelihood of Risk		Impact From Risk		Risk Rating	Relevance to Lewes Local Plan
			Score	Explanation and references	Score	Explanation and References		
Natural Environment and Assets								
N1	Risks to terrestrial species and habitats from changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)	Climate change will cause higher temperatures and more frequent extreme events	High [5]	Species and habitats are highly sensitive to abiotic factors such as temperature and precipitation. Species are adapted to seasonal fluctuations however, extremes including prolonged droughts, flooding and high temperatures, which are expected to increase, are unfavourable to species which have adapted to specific conditions.	High [5]	Changes in climatic conditions threatens the survival of sensitive species. Species which cannot adapt to new conditions will perish, for example species which are saline intolerant will be unable to survive with high sea levels and saltwater intrusion in Lewes District.	High [25]	Low
N2	Risks to terrestrial species and habitats from pests, pathogens and invasive species	Climate change will likely cause higher temperatures and precipitation changes which could be favourable to	Moderate [3]	Climate projections indicate changes in temperature and precipitation which may increase the incidence of pests, pathogens or invasive species.	Moderate [3]	Increase in invasive species, pests and pathogens will likely outcompete or negatively harm native ecosystems, severely harming ecosystem health.	Moderate [9]	Low

		pests and invasive species.						
N3	Opportunities from new species colonisations in terrestrial habitats	Climate change will likely cause higher temperatures and precipitation changes which could be favourable to new species.	Moderate [3]	Climate projections indicate changes in temperature and precipitation, which are likely to enable new species colonisations.	No net change / positive	With the colonisation of new species, overall biodiversity would increase, improving ecosystem health and strengthening ecosystem services. Note that changing conditions could also have a negative impact on native species.	No net risk	Low
N4	Risks to soils from changing climatic conditions, including seasonal aridity and wetness.	Higher temperatures, changes in the frequency and severity of rainfall as well as evapotranspiration changes are likely with climate change.	High [5]	Temperature, precipitation, evapotranspiration and wind changes, have a considerable impact on soil productivity. Combined with existing agricultural practices, the likelihood of poor soil condition is high.	Moderate [3]	Erosion and soil degradation from agricultural practices and climate drivers, negatively affects the quantity and quality of soils which hinders agricultural productivity and therefore negatively impacts food security, livelihoods and the local economy.	High [15]	Moderate
N5	Risks and opportunities for natural carbon stores, carbon sequestration and GHG emissions from changing climatic conditions,	Climate change will result in higher temperatures and reduced water availability	Moderate [3]	Climate projections indicate temperature and precipitation changes which are likely to impact species and habitats which store carbon. Changes will be gradual.	High [5]	Lewes District covers a large area of the South Downs including sites of Ancient Woodland, providing critical carbon services.[81] Changing water availability and temperature will impact the health of these areas and	High [15]	Moderate

[81] Magic Map Application (defra.gov.uk)

	including temperature change and water scarcity	in Lewes District.				subsequently their ability to provide a carbon capture and storage function.		
N6	Risks and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion)	Climate change will result in water scarcity, drought, higher temperatures and saltwater intrusion.	High [5]	Climate projections indicate more frequent and intense drought and flooding events which will likely impact the agriculture and forestry sector frequently. Incidences of wildfires and extreme events are likely to increase, given recent trends.	High [5]	Water scarcity and reduced winter rainfall will reduce the recharge of groundwater and aquifers thereby reducing agricultural and forestry productivity and overall system health. Destruction of agricultural and forestry systems will have significant social, economic and environmental impacts in the District.	Very High [25]	Moderate
N7	Risks to agriculture from pests, pathogens and invasive species.	Climate change will likely establish new climatic conditions including higher temperatures, more favourable to certain species.	Moderate [3]	Climate projections indicate changes in temperature and precipitation which may increase the incidence of pests, pathogens or invasive species in new climatic conditions.	Moderate [3]	Invasive species, pests and pathogens will significantly harm agricultural systems and decrease productivity and health of systems and lead to increased expenditure on pesticides and insecticides with a higher economic burden for farmers.	Moderate [9]	Moderate
N8	Risks to forestry from pests,	Climate change will likely establish new climatic	Moderate	Climate projections indicate changes in temperature and precipitation which may	Moderate	Invasive species, pests and pathogens will significantly harm forestry, decreasing productivity and forest health.	Moderate	Moderate

	pathogens and invasive species.	conditions including higher temperatures, more favourable to certain species.	[3]	increase the incidence of pests, pathogens or invasive species in new climatic conditions.	[3]	There could be a large economic impact from loss of forest systems with biodiversity and economy implications.	[9]	
N9	Opportunities to agricultural and forestry productivity from new/alternative species becoming suitable.	Higher temperatures and precipitation changes will create new climatic conditions which could be suitable for new species.	Moderate [3]	Climate projections indicate changes in temperature and precipitation which are likely gradually change suitability of land used for agriculture and forestry in some locations. Changing conditions will likely enable new species to be established.	Positive	Changes in the conditions of land for agriculture and forestry will likely enable new species of trees and crops to be established, with social, economic and environmental benefits.	No net risk/ positive	Low
N10	Risks to aquifers and agricultural land from saltwater intrusion	Climate change is projected to cause the sea level to rise in Lewes District and coastal flooding to be more frequent and severe. It is extremely likely that agricultural land and	High [5]	Lewes District is located by the coast and currently is susceptible to coastal flooding of agricultural land. 39% of water is supplied by groundwater sources[82] and groundwater vulnerability data[83] shows that across the district most groundwater sources and aquifers are classed as high and	High [5]	Farmland and aquifers will be severely affected by coastal flooding and sea level rise. Agriculture will be impacted by saltwater intrusion, resulting in loss of crops and reduced productivity. Salt tolerant marsh species will move inland reducing available agricultural land. Saltwater can affect aquifers	Very High [25]	High

[82] Water Cycle Study
[83] British Geological Society. 2020. Groundwater vulnerability data. Available: Groundwater vulnerability data - British Geological Survey (bgs.ac.uk) [accessed 17 May 2023]

		aquifers will be affected.		some medium vulnerability.		by decreasing that availability of freshwater.		
N11	Risks to freshwater species and habitats from changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts	Climate change will result in higher freshwater temperatures and more frequent and extreme events, likely to affect freshwater conditions.	Moderate [3]	Climate projections suggest higher summer ambient temperatures and an increase in the frequency of very hot days. These changes are very likely to impact freshwater temperatures and therefore freshwater species. There is limited riparian forest cover in Lewes which would increase the likelihood of heating. Changes will be gradual.	Moderate [3]	Higher water temperatures will significantly impact freshwater species, including spawning, growth rates and behaviour. These changes will affect angling and any small-scale aquaculture businesses in Lewes. Healthy freshwater ecosystems are essential for improving water quality, any negative impacts to biodiversity will therefore affect water quality of rivers and water bodies. The River Ouse already has “moderate” ecological status.[84]	Moderate [9]	Moderate
N12	Risks to freshwater species and habitats from pests, pathogens and invasive species	Climate change will result in higher freshwater temperatures and changes in precipitation and hydrology which are likely to change conditions to be more favourable for pests and	Moderate [3]	Climate projections suggest higher summer ambient temperatures and an increase in the frequency of very hot days. These changes are very likely to impact freshwater temperatures and therefore freshwater species. There is limited riparian forest cover in Lewes which would increase the likelihood of	Low [1]	Pests, pathogens and invasive species are more likely to become established when ecosystems are unhealthy, if freshwater ecosystems suffer under new conditions the risk is higher. Pests are likely to damage native ecosystems and impact angling or fisheries in Lewes.	Low [3]	Low

[84] Sussex | Catchment Data Explorer | Catchment Data Explorer

		invasive species.		heating. Changes will be gradual.				
N13	Opportunities for freshwater species and habitats from new species colonisations	Climate projections suggest higher summer ambient temperatures alongside projected changes in precipitation are likely to change freshwater conditions and therefore the species which can inhabit watercourses in Lewes.	Moderate [3]	Climate projections suggest higher summer ambient temperatures and an increase in the frequency of very hot days. These changes are very likely to impact freshwater temperatures and therefore freshwater species. Other factors such as decrease in Summer rainfall and increase in Winter rainfall are likely to create new freshwater conditions, suitable for new species.	No net risk/ positive	Changing temperatures and conditions, including higher water temperatures, higher Winter river flows could enable the establishment of new freshwater species. These could improve ecosystem health and support higher water quality, quantity and biodiversity.	No net risk/ positive	Low
N14	Risks to marine species, habitats and fisheries from changing climatic conditions, including ocean acidification and higher water temperatures.	Under a medium emissions scenario pH is expected to decrease by 0.3 units relative to 100 years ago[85] and therefore negative implications of	Moderate [3]	There has been a steady historic decline in pH of seawater around the UK which is projected to continue into the future.[85] Sea temperatures are known to be increasing with climate change.	High [5]	Acidification of seawater around Lewes will severely impact marine species including molluscs and crustaceans, which could imbalance marine ecosystems and deplete fisheries stock with impacts for the local economy. Acidification and higher temperatures could increase	High [15]	Low

[85] Government Office for Science. 2017. Future of the Sea: Ocean Acidification. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/645500/Ocean_Acidification_final_v3.pdf

		OA are more likely. Sea temperature is expected to continue to rise with climate change.				the incidences of algal blooms, depleting oxygen levels and damaging ecosystems. Note that there could also be positive impacts for species such as seagrasses.		
N15	Opportunities for marine species, habitats and fisheries from changing climatic conditions.	Sea temperature, pH and salinity are projected to fluctuate with climate change with seasonal variations likely. With condition changes, opportunities for new species to establish will be more likely.	Low [1]	Changing climatic conditions including storms (increasing turbulence), warmer water temperatures, increased mixing of fresh and salt water could enable the establishment of new marine species and support healthier habitats and ecosystems.	No net risk/ Positive	New conditions, such as lower saline concentrations, higher turbulence and higher water temperatures could create new marine conditions enabling the migration and establishment of new species in the English Channel to support marine biodiversity, fisheries and recreation. Note that positive opportunities are likely outweighed by negative implications to marine ecosystems.	Positive	N/A
N16	Risks to marine species and habitats from pests, pathogens and invasive species.	Sea temperature, pH and salinity are projected to fluctuate with climate change with seasonal variations likely. With condition changes, pests, pathogens and	Moderate [3]	Changing climatic conditions including storms (increasing turbulence), warmer water temperatures, increased mixing of fresh and salt water could enable the establishment of pests, pathogens and invasive species in more	High [5]	Pests, pathogens and invasive species are more likely to become established when ecosystems are unhealthy, if marine ecosystems suffer under new conditions the risk of establishment is higher. Each are likely to damage native ecosystems by outcompeting and/or predating on native	High [15]	N/A

		invasive species will be more likely.		favourable marine conditions.		species. Further, there will be negative economic implications on local fisheries and potentially beach goers and recreational water users.		
N17	Risks and opportunities for coastal species and habitats from coastal flooding, erosion and climate factors	Coastal flooding in Lewes will become more frequent and intense with climate change, likely accelerating erosion.	High [5]	Coastal erosion is common along the shoreline of Lewes District at a rate of between 0.28 -0.48m per year[86] although coastal management planning seeks to reduce this. Likewise, coastal flooding is common, maps and details are available in the updated SFRA (2023).	Positive / Negative	Coastal erosion is part of a natural coastal succession process which can lead to new habitats for species but can also damage existing habitats and ecosystems. Likewise coastal flooding will have both positive and negative impacts on coastal species and habitats by likely both creating and destroying ecosystems.	Positive / Negative	Low
N18	Risks and opportunities to landscape character from climate change	Climate projections indicate changes in temperature and precipitation including changes in frequency and severity of precipitation.	Moderate [3]	Climate projections indicate changes in temperature and precipitation which are likely to affect the landscape character of the local area.	Low [1]	Climate changes are likely to have minor negative or minor positive impacts on the landscape character.	Low [3]	Moderate

Source: AECOM. 2022. (Based on the United Kingdom Climate Change Risk Assessment)

[86] Lewes District Council. No Date. Coastal Management Implementation Plan (CMIP) – East Saltdean to Newhaven Western Harbour Arm Ways of Working. [Information sharing event]

Infrastructure

Table 18: Assessment of possible climate change risks and opportunities to Lewes District based on UK National Climate Change Risk Assessment and local sources - Infrastructure

ID	Risk/ Opportunity	Climate Change Impact	Likelihood of Risk		Impact from Risk		Risk Rating	Relevance to Lewes Local Plan
			Score	Explanation and References	Score	Explanation and References		
Infrastructure								
I1	Risks of cascading infrastructure failures across interdependent networks (water, energy, transport, ICT)	Climate projections indicate that extreme weather events are likely to increase in severity and intensity.	Moderate [3]	Climate projections for Lewes indicate that extreme weather events including flooding, heatwaves and storms are likely to increase in severity and intensity, making interdependent infrastructure more vulnerable to failure.	High [5]	Failure of infrastructure networks and cascading failures will significantly impact community services and businesses, including emergency services, transport, energy and water, which could lead to injuries and fatalities.	High [15]	Moderate
I2	Risks to infrastructure services from river, surface water and groundwater flooding	Climate change is likely to increase the occurrences and severity of flooding from a multitude of sources including river, surface and groundwater.	High [5]	Climate projections indicate that increased flooding is likely, including fluvial flooding and groundwater flooding and will therefore impact local infrastructure. Capacity of existing drainage is insufficient for both current and future flood water, apparent by	Moderate [3]	Lewes District has significant flood risk areas, with local infrastructure affected by fluvial and surface water flooding, including major transport infrastructure like A roads including the A27 and railway lines. Apart from transport, there is limited critical infrastructure located in fluvial flood zones.	High [15]	Moderate

				regular combined sewer overflows.[87]				
I3	Risks to infrastructure services from coastal flooding and erosion.	Sea Level Rise estimates project that Lewes District will be severely affected by coastal flooding and erosion in the future.	High [5]	Coastal flooding is highly likely in Lewes District due to a combination of increased precipitation, more severe storm surges and sea level rise.	High [5]	Some infrastructure in Lewes District is located in Flood Zone 2 and 3, including A, B and minor roads. In towns such as Seaford, major residential, businesses and community infrastructure are also located within flood zones and likely to be severely impacted by coastal flooding.	Very High [25]	High
I4	Risks to bridges and pipelines from flooding and erosion	Climate change is likely to exacerbate all types of flooding with the intensification of the hydrological cycle.	Moderate [3]	Increased rainfall projected from climate change will likely increase river flows and hydraulic scour potential, damaging near-by bridges and pipelines, causing sediment build up and likely reduce conveyance.	High [5]	Flooding could severely damage bridges and pipelines which will impact the local economy, with commuters and supply chains disrupted, as will as increasing emergency service response times. Water and energy distribution will also be impacted.	High [15]	Moderate
I5	Risks to transport networks from slope and embankment failure	Climate change will likely cause higher precipitation levels, with higher water flows	Low [1]	Increased rainfall is anticipated with climate change which can lead to landslides and slope failures, but as there are not widespread areas of	Moderate [3]	Landslides and embankment failures are localised. They can have severe local impacts on transport networks, particularly rail due to the	Low [3]	Low

[87] Surfers Against Sewage (SAS). 2021. Water Quality Report.

		causing hydraulic failure.		steep/unstable slopes within Lewes District it is likely to be localised and infrequent.		steep embankments due to outdated design. This would result in expensive damage and disruption to commuter, leisure and supply connections.		
I7	Risks to subterranean and surface infrastructure from subsidence	Climate change projections indicate higher ambient temperatures and extremes during the summer months, likely to cause subsidence.	Low [1]	Higher temperatures and longer periods of heat and drought are projected to be more frequent, however, Winter rainfall is projected to increase in Lewes District. Combined with a low risk of land movement, subsidence is not likely to occur in Lewes District.	Moderate [3]	Where incidences of subsidence do occur near transport, energy, water or ICT networks, there are likely negative impacts including damage and disruption, with expensive and long-term impacts.	Low [3]	Low
I8	Risk to public water supplies from reduced water availability	Higher temperatures combined with reduced precipitation at certain times of year are expected to reduce water availability.	Moderate [3]	The likelihood of drought is increasing due to changing rainfall patterns and increasing temperature. However, in Lewes District, Winter rainfall is projected to increase which will recharge critical groundwater flows. Additionally, Southern Water accounts for climate change in water	Moderate [3]	Water supply planning by Southern Water considers projected climate changes and prepares for water availability changes, which should reduce the impact of severe drought to restrictions rather than large scale interruptions of water supply. Severe droughts will cause reduced quality and quantity of water in public water supplies which could	Moderate [9]	High

				supply planning and therefore possible lower flows and changes in demand will be accounted for.		harm public health, businesses, community services and agriculture.		
I9	Risks to energy generation from reduced water availability	Higher temperatures combined with reduced precipitation at certain times of year are expected to reduce water availability.	Low [1]	Climate projections indicate changes in rainfall patterns and droughts which may affect hydro-power generation in the UK. However, there are no major hydroelectric powerplants in Lewes District, and therefore disruption locally is unlikely.	Low [1]	There is limited reliance on hydropower in the national energy supply system and no major local hydroelectric generation.	Low [1]	Low
I10	Risks to energy from high and low temperatures, high winds and lightning.	Climate change is likely to cause higher ambient temperatures as well as raise temperature extremes, although there are expected to be fewer extreme cold events.	Moderate [3]	Climate projections suggest temperature changes and increased heatwave incidence which may expose infrastructure to heat stress. However, extreme cold days are projected to decrease over the century, which will likely relieve pressure on energy infrastructure.	Moderate [3]	Overheating of energy infrastructure is likely to cause disruptions to energy generation and supply to businesses, industry and communities, including hospitals and emergency services.	Moderate [9]	Moderate
I11	Risks to offshore infrastructure from	It is known that storm surges are likely to be come	Moderate	Storm occurrences have remained constant and occur annually in the UK	Low	Damage to offshore from storms and high waves can incur costly damage to	N/A	N/A

	storms and high waves	more frequent and severe with climate change, caused by sea level rise, higher temperatures and higher precipitation levels.	[3]	which risks costly damage to offshore infrastructure. There is no offshore infrastructure relevant to Lewes District.	[1]	infrastructure and cause intermittent supplies of products such as energy. There is no offshore infrastructure relevant to Lewes District.		
I12	Risks to transport from high and low temperatures, high winds and lightning	Climate change is likely to cause higher ambient temperatures as well as raise temperature extremes, although there are expected to be fewer extreme cold events.	High [5]	Climate projections suggest temperature changes and increased heatwave incidence which may expose infrastructure to heat stress. However, extreme cold days are projected to decrease over the century, which will likely relieve pressure on transport infrastructure and services. High winds and lightning are likely in areas where transport infrastructure is exposed, such as coastal roads, bridges and train lines.	High [5]	Damage to transport infrastructure will have negative impacts to communities, businesses and emergency services by impeding communication systems and physical access. Extreme heat will have a severe impact on transport operators, constructions workers as well as the public using transportation systems.	Very High [25]	High
I13	Risks to digital infrastructure from high and low temperatures, high winds and lightning	Climate change is likely to cause higher ambient temperatures as well as raise temperature	Moderate [3]	Climate projections suggest temperature changes and increased heatwave incidence which may expose infrastructure to heat	Moderate [3]	Overheating or damage from high winds to digital infrastructure will cause significant disruption to communications, including impacting businesses,	Moderate [9]	Moderate

		extremes, although there are expected to be fewer extreme cold events.		stress. However, extreme cold days are projected to decrease over the century, which will likely relieve pressure on transport infrastructure and services.		community and emergency services.		

Source: AECOM. 2022. (Based on the United Kingdom Climate Change Risk Assessment)

Health, Communities and the Built Environment

Table 19: Assessment of possible climate change risks and opportunities to Lewes District based on UK National Climate Change Risk Assessment and local sources – Health, Communities and the Build Environment

ID	Risk/ Opportunity	Climate Change Impact	Likelihood of Risk		Impact from Risk		Risk Rating	Relevance to Lewes Local Plan
			Score	Explanation and References	Score	Explanation and References		
Health, Communities and the Built Environment								
H1	Risks to health and wellbeing from high temperatures	High temperatures and heatwaves are projected to become more frequent and severe with climate change.	High [5]	Climate projections suggest increased heatwave incidence which is highly likely to impact public health and wellbeing. Extreme heat is likely to be a major challenge in urban areas like Newhaven and Seaford due to the urban heat island effect.	High [5]	High temperatures will cause heat related illnesses and mortalities including dehydration and heat stroke, with severe impacts for vulnerable communities in particular the elderly and children. Level 4 heatwaves will also cause illness and fatalities among healthy adults. Illness and fatalities will impact the workforce and productivity.	Very High [25]	High

H2	Opportunities to health and wellbeing from high temperatures	Fewer extreme cold days and higher ambient temperatures are expected with climate change.	Moderate [3]	Climate projections indicate Lewes District will experience higher ambient temperatures, and therefore there will be more opportunities for outdoor activities although on days of high temper extremes this will be reduced. There will also be a reduction in the incidences of extreme cold, to an almost negligible level which will likely reduce the risk to health.	Positive	There will be a generally positive impact from higher ambient temperatures and reduced extreme cold events, reducing the occurrences injuries and fatalities from the extreme cold and reducing pressure on the emergency services and healthcare. However, extreme high temperatures also have severe impacts to public health.	Positive	N/A
H3	Risks to people, communities and buildings from flooding	Climate change is likely to exacerbate all types of flooding with the intensification of the hydrological cycle.	High [5]	Climate projections suggest that increased fluvial and coastal flooding is likely to impact some areas of the local community, particularly around the River Ouse including within Lewes, Seaford, and small towns.	High [5]	Flooding events can result in a range of severe social, environmental and economic impacts for a local community, including property damage, and delays and disruption to transport and utility services including emergency services as well as risk of injuries and fatalities to people.	Very High [25]	High
H4	Risks to viability of coastal communities from sea level rise	Sea level rise will likely occur around the coast of Lewes District with climate change,	High [5]	Sea level risk is expected around the coast of Lewes District.	High [5]	Sea level rise will severely impact coastal towns and communities, including in Newhaven, Seaford, Peacehaven and Saltdean particularly in areas where	Very High [25]	High

		likely causing erosion and flooding to towns.				there is a significant population percentage aged over 65 years.		
H5	Risks to building fabric from moisture, wind and driving rain	Climate change will likely increase the frequency and severity of extreme events like storm surges, flooding and intense precipitation.	Moderate [3]	Climate projections indicate that extreme weather events including flooding, and storms are likely to increase in severity and intensity, although specific data on storms are limited. However more frequent, intense rainfall events may lead to greater moisture inside buildings.	Low [1]	Higher moisture inside buildings is anticipated to have minor impacts, such as damage to furniture and carpets as well as indoor air quality impacts from mould, although this is more likely to occur in vulnerable households.	Low [3]	Moderate
H6	Risks and opportunities to household energy demand from summer and winter temperature changes	Climate projections indicated that there will be higher ambient temperatures and Winter minimum temperatures are expected to rise.	Moderate [3]	Summer and winter temperatures are likely to change, with higher annual temperatures, and higher Winter and Summer temperatures. Occurrences of extreme cold temperatures are likely to decrease while extreme high temperatures are likely to increase which will change energy demand patterns	Moderate [3]	Lower extreme winter temperatures can have a positive impact on energy demand, reducing the need for indoor heating in residential and social buildings. However, higher Summer temperatures are likely to increase energy demand for cooling measures like air conditioning.	Moderate [9]	High
H7	Risks to health and wellbeing from changes in	Climate change is likely to increase extreme heat	Moderate	Climate projections indicate an increase in the intensity and severity of heatwaves and wildfires	Moderate	Poor air quality can have considerable impacts on the health and wellbeing of communities leading to	Moderate	Moderate

	indoor and outdoor air quality	and annual average temperatures.	[3]	which will impact outdoor air quality conditions, particularly in urban areas. Changing moisture levels could also impact indoor air quality.	[3]	respiratory diseases and disproportionately impact vulnerable people such as children, the elderly, people living with co-morbidities and low-income people. Impacts are likely to be more severe in densely populated inland urban areas, which are few in Lewes District.	[9]	
H8	Risks to health from vector-borne diseases	Climate change is likely to increase ambient air temperatures, including during summer months and increase precipitation.	Low [1]	Global changes in both temperature and precipitation may lead to a greater risk of vector borne diseases (VBD) if changes create favourable conditions for survival of the vectors.	Moderate [3]	With favourable conditions, vectors are more likely to be established and VBDs more prevalent. VBDs will have significant impact on public health, increasing illness and fatalities and increasing the burden on health care providers. It will likely also increase mental stress among the population.	Low [3]	Low
H9	Risks to food safety and food security from higher temperatures (food safety) and extreme weather (food security)	Climate change is likely to increase ambient air temperatures.	Moderate [3]	Projected increases in temperature may lead to greater risk of food borne diseases, particularly in extreme heat, which accelerates bacterial growth.	Moderate [3]	Food-borne diseases can cause sickness and fatalities in extreme cases. There are negative health and wellbeing implications which increase the burden on public and health services.	Moderate [9]	Low
H10	Risks to health from poor water quality and	Climate change is likely to increase the	Low	Water supply planning by Southern Water considers projected climate changes	Moderate	Poor water quality and interrupted public water supplies have negative	Low	Moderate

	household water supply	intensity of precipitation and therefore increase surface runoff and flooding.	[1]	and prepares for water availability and quality changes therefore mitigation measures in place will prevent poor water quality and there is a low risk of interruption to household and business water supply.	[3]	public health and wellbeing implications and causes increased burden to public health services.	[3]	
H11	Risks to cultural heritage from changes in temperature, precipitation, groundwater, land, ocean and coastal change	Climate change is likely to result in temperature changes, including higher temperatures as well as increasing frequency and intensity of rainfall.	Moderate [3]	There are projected changes in temperature, precipitation and extreme weather including higher temperatures, more frequent and intense rainfall, sea-level rise and coastal erosion which are likely to impact cultural or historical environments.	Moderate [3]	Culturally valued structures and historic areas are generally sensitive to environmental hazards. Heatwaves, floods and droughts are likely to cause irreversible damage. Damage to cultural structures will have less of an impact on the public than housing or businesses, however there will be a negative impact on tourism, and therefore the local economy. There could also be emotional or psychological distress to residents.	Moderate [9]	Moderate
H12	Risks to health and social care delivery from extreme weather	Extreme events including storm surges, flooding and extreme temperatures are likely to become more	Moderate [3]	Projected increases in all extreme weather, particularly heatwaves and flooding would likely to impact delivery of health and social care.	High [5]	Disruptions in the delivery of health and social care due to extreme weather will have severe negative impacts for the community including higher fatality rates. The severe impacts	High [15]	High

		frequent with climate change.				will be disproportionately borne by vulnerable people including the elderly and low-income communities.		
H13	Risks to delivery of education and prison services from extreme weather	Extreme events including storm surges, flooding and extreme temperatures are likely to become more frequent with climate change.	Moderate [3]	Extreme temperatures are likely to impact the provision of education services including children and school workers accessing schools. Similarly, prison services at HMP Lewes are likely to be affected by extreme heat.	High [5]	Extreme temperatures can have severe impacts, particularly for vulnerable people like children in schools. Public transport temperatures can also impede children accessing schools. High indoor temperatures in prisons like HMP Lewes, can have severe health impacts for prisoners and staff, including heat stress requiring emergency and health services.	High [15]	High

Source: AECOM. 2022. (Based on the United Kingdom Climate Change Risk Assessment)

Business and Industry

Table 20: Assessment of possible climate change risks and opportunities to Lewes District based on UK National Climate Change Risk Assessment and local sources – Business and Industry

ID	Risk/ Opportunity	Climate Change Impact	Likelihood of Risk		Impact from Risk		Risk Rating	Relevance to Lewes Local Plan
			Score	Explanation and References	Score	Explanation and References		
B1	Risks to business sites from	Flood risk is likely to increase with climate	High	Climate projections indicate there will be increased frequency and	High	Valuable business sites can face severe damage and loss of income from flood	Very High	High

	increase in flood risk	change, with more areas exposed to more severe flooding as a result of higher precipitation rates and shorter durations of rainfall.	[5]	severity of fluvial and coastal flooding. The Environment Agency estimates that 376 residential and commercial properties are at risk (rising to 490 by 2100).[88]	[5]	events. Flooding would likely impact business located in Flood Risk Zones 2 and 3 (and adjacent to as climate change exacerbates flooding) and the supply chains and operations of many businesses.	[25]	
B2	Risks to coastal business locations and infrastructure from coastal flooding, extreme weather, erosion and sea level rise	Coastal flooding and erosion are likely to accelerate with climate change, including more frequent and severe storm surges and sea level rise.	High [5]	Seal level rise and coastal flooding are likely to affect large areas of Newhaven, Seaford, Saltdean and Peacehaven.	High [5]	Businesses located in coastal flood risk zones are likely to experience damage to properties as well as disruption to supply chains and challenges for employees to access workplaces due to extreme weather and coastal flooding. This would have a negative impact on the local economy. Additionally, seaside towns dependent on tourism are likely to see a negative impact on visiting tourist numbers and loss of business. However, warmer ambient temperatures could result in higher tourist numbers visiting coastal areas.	Very High [25]	High

[88] Environment Agency. 2009. River Ouse Catchment Flood Management Plan: Summary Report.

B3	Risks to business production processes from water scarcity	Water availability is likely to decrease with the higher temperatures estimated with climate change with lower groundwater recharge from reduced Winter rainfall.	High [5]	Water availability is expected to reduce with climate change and therefore impact any water related business processes. As Lewes District is entirely a groundwater fed district this is likely.	Moderate [3]	Drought and reduced water availability can severely impact water dependent industries including manufacturing and industrial processes which will disrupt and delay business operations.	High [15]	Low
B4	Risks to business access to finance, investment and insurance from extreme weather	Extreme events including storm surges, flooding and extreme temperatures are likely to become more frequent with climate change.	Low [1]	Increases in global and national extreme weather events may reduce business access to capital, however this is unlikely.	Moderate [3]	With climate change, certain businesses may experience negative financial impacts.	3	N/A
B5	Risks to reduced employee productivity in business from infrastructure disruption and higher temperatures in working environments	Ambient temperatures are expected to increase throughout the year, including higher numbers of extremely hot days throughout the Summer months.	Moderate [3]	Projected temperature and precipitation changes likely influence the frequency and severity of flooding, heatwaves and droughts, which are all likely to effect employee productivity. While the workforce represents a less vulnerable sector of the demographic to heatwaves and extreme	Moderate [3]	Extreme temperatures are known to impact health and wellbeing, and will decrease productivity of workers. Extreme weather also limits access to workplaces and will result in closure of schools and community/ social infrastructure.	Moderate [9]	Low

				weather, level 4 heatwaves will also impede healthy adults.				
B6	Risks to disruption to business supply chains and distribution network from extreme weather	Extreme events including storm surges, flooding and extreme temperatures are likely to become more frequent with climate change.	Moderate [3]	Global and national changes in temperature, precipitation and extreme weather are likely to disrupt supply chains and distribution networks.	Moderate [3]	Disruption to supply chains and distribution network is likely to have financial implications for businesses by delaying and disrupting business operations, with a particular impact on small, local businesses. Andy disruptions could have ramifications on the local economy.	Moderate [9]	N/A
B7	Opportunities for business from changes in demand for goods and services	Climate change is likely to change precipitation and temperature patterns over future decades.	Moderate [3]	Changes in local, national and global climate will likely change demand patterns towards certain goods and services, for example and increased demand for air conditioning and a reduced demand for heaters.	Low [1]	There will likely be minor positive or negative impacts to businesses in Lewes District driven by changes in demand with long-term climate change.	Low [3]	N/A

Risk	Relevance to Local Plan	Relevant Options
Natural Environment and Assets		
Risks to terrestrial species and habitats from changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)	Low	1.A., B, C 3.A. B, C 4.A, B, C 6.A 7.A., B 8.A., B, C 9.A
Risks and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion)	Moderate	1.B, 4.A, B, C 5.A 7.A 8.B.,
Risks to aquifers and agricultural land from saltwater intrusion	High	1.A, B 2.A, B 4.A, B, C 5.A
Infrastructure		
Risks to infrastructure services from coastal flooding and erosion.	High	1.A., B 3.A., B, C 4.A, B, C
Risks to transport from high and low temperatures, high winds and lightning	High	
Health, Communities and the Built Environment		
Risks to health and wellbeing from high temperatures	High	1.C., 3.A., B., C 6.A 8.A., C 9.A.

Risks to people, communities and buildings from flooding	High	1.A., B, C 3.A. B, C 4.A., B, C 6.A. 8.A., C 9.A.
Risks to viability of coastal communities from sea level rise	High	4.A., B, C
Business and Industry		
Risks to business sites from increase in flood risk	High	1.A., B, C 3.A., B, C 4.A., B, C 6.A. 8.A., C 9.A.
Risks to coastal business locations and infrastructure from coastal flooding, extreme weather, erosion and sea level rise	High	1.A., B. 3.A., B, C 4.A., B, C

Appendix B Energy Statement Contents Summary

The following table sets out a summary of the content and requirements of the Energy Statement described in Policy Recommendation 9 and how this links to the other relevant policy recommendations.

Policy Ref	Subject	Energy Statement Requirement	Applicability
2	Energy Hierarchy	Show how the energy strategy has been developed in line with the energy hierarchy.	All schemes
3	Demand Reduction	Present demand reduction measures and specifications. Demonstrate how energy demands and carbon emissions have been reduced through the design and specifications. Specify fabric standards and space heating targets.	All schemes
4	Overheating	Complete the Good Homes Alliance Overheating assessment and describe the mitigation approach. For developments with significant overheating risk, additional assessments (such as those described in CIBSE TM52 and TM59) should be documented.	All schemes Only schemes where a higher risk is identified
5	Low Carbon Heating	Demonstrate how the choice of heating system has followed the heating hierarchy.	All schemes
6	Solar Generation	Provide roof plans and system specifications to demonstrate how the use of PV has been maximised on the available roof space. If a developer has proposed no PV, they must demonstrate that there were technical or financial reasons for this. Document the assessment of the potential for Solar Thermal, where relevant.	All schemes
7	Storage and Demand Management	Document consideration of storage and demand management systems.	All schemes
8	Whole Lifecycle Carbon	If required, document the results of the WLC assessment and the steps taken to mitigate these through the design.	Only major schemes where a higher risk is identified