Huntingdonshire
Climate Change Evidence Base

Document B: Position statement and analysis of baseline and forecast future emissions

Huntingdonshire District Council

Final Report
Prepared by Aether
November 2024

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Contents

Glossary of key terms

Activity: an action that leads to emissions of greenhouse gases. Examples include combustion of fossil fuels for heat, generation of electricity and transport, treatment of waste and wastewater, industrial processes. Activity data represent how much of this activity is taking place and has a variety of different units e.g. kWh, passenger kilometres, tonnes of waste etc.

Carbon dioxide equivalent (CO_2e): carbon dioxide equivalent is a measure used to compare the emissions from various greenhouse gases based upon their global warming potential. For example, the global warming potential for methane over 100 years is 28. Therefore 1 tonne of methane released is equivalent to 28 tonnes of CO_2 (measured on a 100-year time horizon). Therefore, CO_2e works as a single 'currency' for greenhouse gases.

Carbon emissions: often used as a shorthand to refer to greenhouse gas (GHG) emissions that are included in the Kyoto Treaty. Carbon dioxide is the most common GHG and other gases can be measured in relation to it (see CO_2e).

Carbon neutral: the balancing of carbon emissions against carbon removals and/or carbon offsetting with the net result being zero (see also net zero carbon).

Carbon reduction: an activity that reduces carbon emissions compared to a baseline scenario.

Climate change: the large-scale, long-term shift in the planet's weather patterns or average temperatures.

Climate change mitigation: action taken to reduce the release of greenhouse gas emissions or increase the removal of emissions by enhancing sinks (e.g. increasing the area of forests).

Decarbonisation: usually refers to the electricity sector and refers to reducing the carbon intensity of electricity generated (emissions per kWh) by increasing efficiency of supply or changing the generation fuel mix from fossil fuel to renewables and low carbon sources.

Emission factor: the average emissions of a given GHG for a particular activity. Emission factors are also expressed as the average combination of GHGs for a particular activity, in units of $kgCO_2e$.

Global warming: refers to the recent and ongoing rise in global average temperature near Earth's surface. It is caused mostly by increasing concentrations of greenhouse gases in the atmosphere. Global warming is causing climate patterns to change. However, global warming itself represents only one aspect of climate change.

Greenhouse Gas (GHG): a gas in our atmosphere that absorbs and emits radiation within the thermal infrared range. There are naturally occurring greenhouse gases in our atmosphere which maintain surface temperatures in a range conducive to life. However, since the industrial revolution, anthropogenic sources of GHGs have increased hugely, leading to 40% increase in atmospheric concentration of carbon dioxide. This is causing increases in surface temperatures and is the main cause of climate change. There are seven GHGs covered by the Kyoto Treaty, but the main ones are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), and action needs to be taken to reduce emissions of these.

Greenhouse Gas Protocol: a joint initiative of the World Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), the GHG Protocol provides global standard frameworks for the measurement and management of greenhouse gas emissions.

Net zero carbon: the balancing of carbon emissions against carbon removals and/or carbon offsetting with the net result being zero (see also carbon neutral).

Project lifetime: anticipated lifetime of an energy efficiency technology or low carbon behaviour, used to calculate lifetime savings.

Removals: CO_2 removals refer to a set of techniques that aim to remove CO_2 directly from the atmosphere by either increasing natural sinks for carbon or using chemical engineering to remove the CO_2, with the intent of reducing the atmospheric CO_2 concentration.

Scope: a way of categorising emission sources in relation to the reporting organisation, used as a way of providing transparency in emissions accounting, making it clear the type of emission source and the level of control of the reporting organisation over the source. Three levels of scope have been defined and used on a global basis.

Sequestration: a natural or artificial process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form. The uptake of atmospheric carbon by plants and the growth of wood or increase of peat volume are examples of biological sequestration. Also see removals.

Executive Summary

Introduction

There is overwhelming scientific consensus that human activities are causing global temperatures to increase, with major knock-on effects for our atmosphere, land and oceans. In 2022, Huntingdonshire District Council (HDC) voted to declare a climate and ecological emergency and committed to taking urgent action to respond to this threat. This can be done by:

- reducing greenhouse gas (GHG) emissions, to mitigate the overall temperature rise and avoid even more extreme climate change, and
- making sure that our communities, economy, and infrastructure are resilient to the changes that are already underway.

Document B of the Climate Change Evidence Base addresses both issues. It is structured in two parts, as follows:

- **Huntingdonshire's climate:** Description of the current climate, projected changes in temperature and precipitation, and identification of locally-specific risks due to climate change
- **Greenhouse gas emissions and emission pathways to net zero in Huntingdonshire:** Description of the baseline emissions in the district, potential future emissions in a 'business as usual scenario' that accounts for national policies, and indicative decarbonisation pathways based on strategic GHG reduction measures

This sets the context in which the Local Plan Update will operate, and the trends that it will seek to influence in a positive manner.

Climate risks

Huntingdonshire sits within one of the warmest regions of the country. Its inland position means that it does not experience the cooling effects of the sea in hot weather, as more coastal locations do. According to the Met Office, summer temperatures in Eastern England are *'comparable with values found in the summer in the London area which tends to be the warmest part of the UK*[3]*.'* Temperatures have increased over the past decades, and nearby Cambridge set a national temperature record in 2019.

Going forward, this trend is expected to continue. The assessment considers two possible scenarios of future climate change; one where global warming reaches 2°C above pre-industrial levels by 2100 and one, more extreme scenario, where it reaches 4°C above pre-industrial levels by 2100[7]. This will make heatwaves more likely in summer, with serious impacts on human health, infrastructure, and the economy.

With 2°C of global warming…	
The hottest summer day in Huntingdonshire could be almost 2°C warmer.	There could be about 2 times as many summer days with temperatures above 25°C.
With 4°C of global warming…	
The hottest summer day in Huntingdonshire could be almost 6°C warmer	There could be nearly 4 times as many summer days with temperatures above 25°C.

In addition to being warmer than the national average, Huntingdonshire also tends to be drier, experiencing c. 600mm of annual rainfall, compared with the average for England of c. 870mm[7]. Despite this, Huntingdonshire also experiences severe flooding, which occurs when water cannot be drained away or absorbed by the soil during acute rainfall events. In recent decades, data show that Huntingdonshire has received increasing rainfall in autumn and winter, which is one of the factors that has contributed to flooding.

Climate change is expected to lead to continuing changes, both in terms of the annual average precipitation, and the frequency of intensely rainy days. This would result in a higher risk of water scarcity and drought *and* a higher risk of severe rainfall and flooding – effectively, raising the chances of extreme weather events at each end of the spectrum. Water scarcity is expected to be a significant risk to the East of England and dry conditions can also lead to other impacts such as wildfires, flash flooding if heavy precipitation falls on dry soil and increased rates of building subsidence.

With 2°C of global warming…

The wettest winter day in Huntingdonshire could see 35% more rainfall, leading to more serious flooding

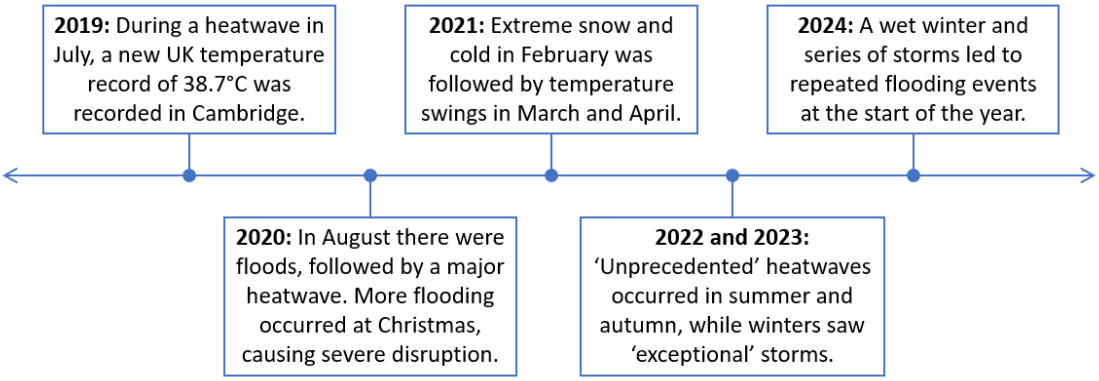
Summer rainfall could decrease by 10%, leading to droughts and water shortages, while also drying out the soil

With 4°C of global warming…

The wettest winter day in Huntingdonshire could see 40% more rainfall, leading to more serious flooding

Summer rainfall could decrease by 30%, leading to droughts and water shortages, while also drying out the soil

In Huntingdonshire, records from the Met Office and local newspapers suggest that heatwaves and flooding have had a serious impact on local communities in the District. These are indicative of the types of challenges that will become more common in future.



Document B: Position statement and analysis of GHG emissions

The UK Climate Change Risk Assessment (CCRA)[1] sets out a variety of prioritised risks, which have been screened for relevance to Huntingdonshire. Results of that analysis are summarised in Chapter 2 of this report. Not all of the risks are relevant to the Local Plan, but some are, where they merit a design response at the development or individual building level, or in terms of land use planning.

There are a variety of policies, regulations and guidance documents that promote climate change resilience and adaptation measures in Local Plan policies and the design of new developments. However, although planners and developers are required to consider climate change impacts, there are not many specific, measurable requirements for how this should translate into policy or design proposals. Given the serious risks posed by climate change, this represents a ‘gap’ that the Local Plan Update can and should seek to address.

The table below provides a list of suggested responses. These will form the basis for policy recommendations which will be set out in Document C following consideration of deliverability and applicability for Huntingdonshire.

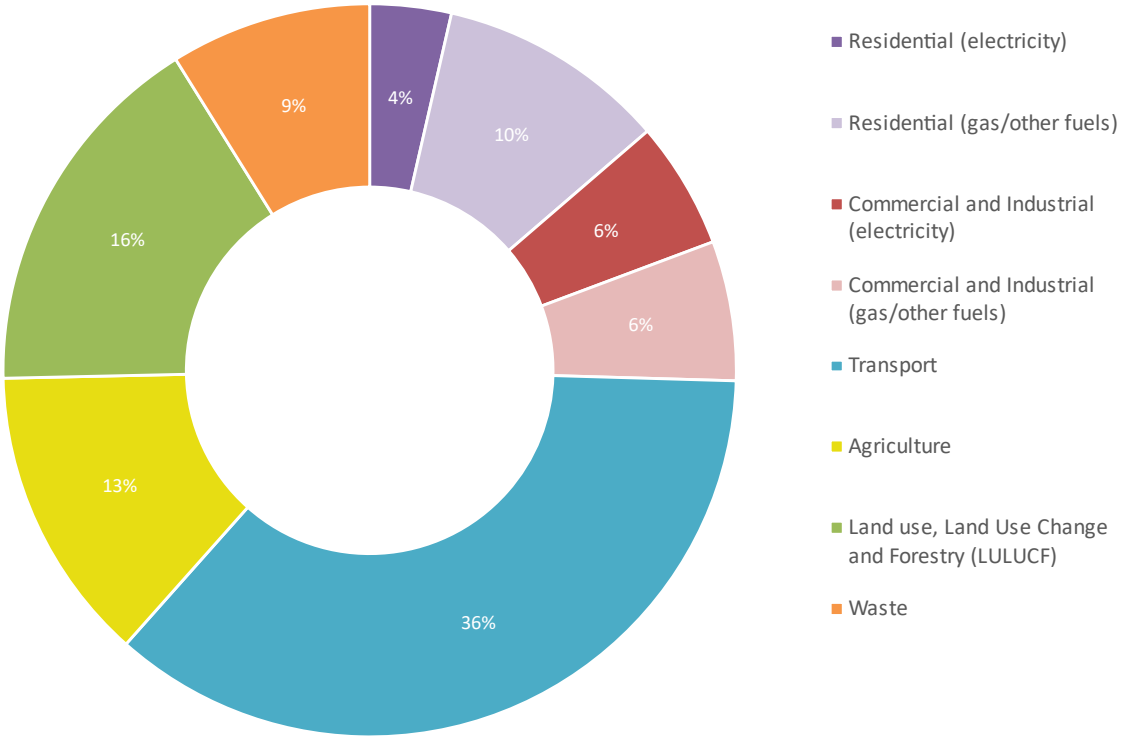
Issue	Response	Rationale
Higher temperatures, more frequent and severe heatwaves	Incorporate **green and blue infrastructure** to provide shade and evaporative cooling Incorporate **drought-resistant landscaping** that requires low supplementary irrigation and is designed to act as a natural firebreak **Design and orientation of developments** to provide shade for buildings and the public realm through use of overhangs or balconies, external shutters, street layout, landscaping, shaded external seating areas Building form and layout to promote **natural cross-ventilation** through use of dual-aspects and shallow plans Use **robust materials and construction techniques** in buildings, infrastructure and the public realm that are resilient to higher temperatures and heatwaves	Huntingdonshire is located in one of the warmest regions of the country, and climate projections suggest that average and maximum temperatures will increase significantly in future These measures will help ensure developments are resilient to extreme weather, protect occupant health and wellbeing, minimise exposure to extreme heat, and reduce knock-on impacts on society and the economy
More frequent and severe storms	Use **robust materials and construction techniques** in buildings, infrastructure and the public realm that are resilient to storm events and driving rain	These measures will help ensure developments are resilient to extreme weather.

Issue	Response	Rationale
More frequent acute rainfall events and severe flooding, particularly in winter	**Locate developments away from areas at risk of flooding** and incorporate suitable adaptation measures to improve resilience in the event of floods *(Note: this is covered by the Huntingdonshire Local Plan and requirements in the NPPF)* **Design of SuDS** to account for climate change **Flood risk assessments** to consider wider risks and impacts of flooding, including whether the site will be accessible to emergency services and the likelihood of floodwater being contaminated e.g. if there is an industrial or waste facility nearby. *Note:* Safety/ *emergency services access is part of the national flood policy, and so adherence to the NPPF should enable this.*	Evidence suggests that the risk of acute rainfall events and flooding will increase, which is important given that Huntingdonshire already experiences severe flooding
Changes in rainfall patterns, risk of drought	Require developments to achieve very **high levels of water efficiency**, through measures that could include e.g. water efficient fittings and/or greywater recycling Require **on-site rainwater collection** for use in irrigation and toilet flushing **Foundation design** to account for potential increased risk of subsidence. *Note: This falls within the remit of building regulations*	Huntingdonshire is in an area already classed as experiencing 'serious' water stress, and this problem is expected to increase in future due to higher demand and changes in rainfall patterns It is also an area at high risk of subsidence due to clay soil shrinkage
All of the above	Where appropriate, integrate **smart, renewable decentralised energy technologies** and battery storage	To provide greater energy security and resilience

This assessment also highlights the need for **a broader climate adaptation strategy for Huntingdonshire**, moving beyond land use planning, that covers both acute and chronic risks and sets out the proposed emergency response. As a planning authority and across broader policy remits, HDC will play a key role in coordinating Huntingdonshire's response to climate change.

GHG emissions

GHG emissions in Huntingdonshire as of 2021 are estimated to be 1,805 kt CO2e. A breakdown of emissions by sector is provided in the chart below.



Using 2021 as a starting point, District-wide GHG emissions have been projected forward to evaluate potential future pathways towards net zero emissions. Changes in the 'business as usual' (BAU) scenario are based on the DESNZ Energy and Emissions Projections (EEP)[36]. These account for wider trends (e.g. population and economic growth and energy prices) and adopted Government policies. Changes in the net zero scenarios are due to additional

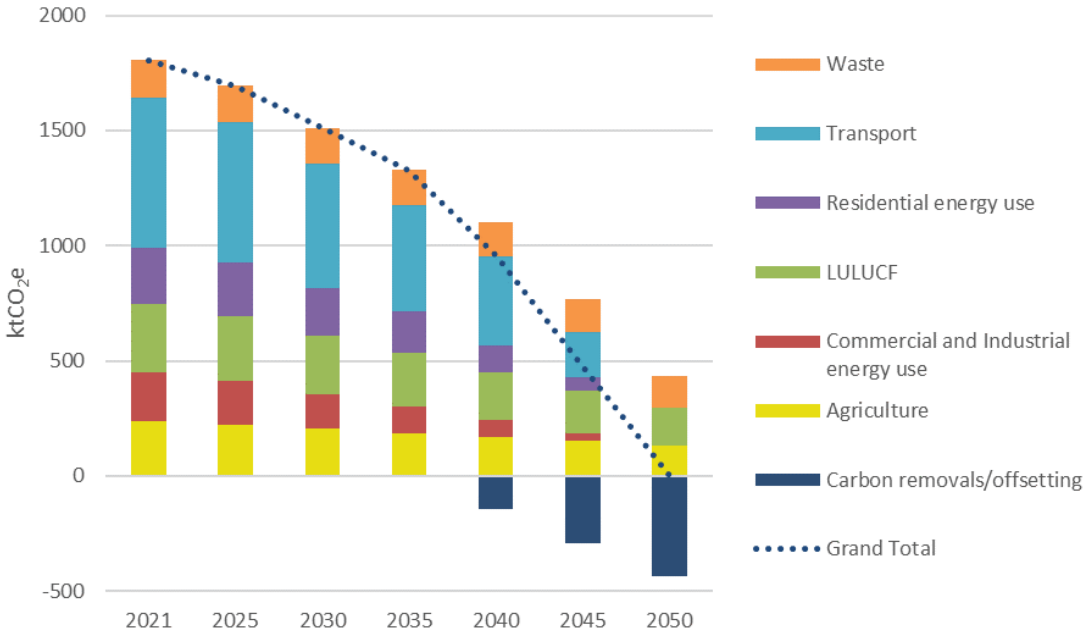
GHG reduction actions and policies that would need to be adopted either at a national or local level.

What this analysis shows is that reaching net zero will be particularly challenging for Huntingdonshire, due to the breakdown of emissions within the District.

Some emissions are associated with energy use in buildings and transport, for which there are already intervention measures – energy efficiency, behavioural change and new technologies – that can reduce the environmental impact. Broadly speaking, the strategic route to net zero for those sectors is to reduce demand for energy as much as possible, then switch to electric heating and electric vehicles, and finally supply electricity using renewable technologies.

However, for Huntingdonshire, a particularly high proportion of emissions are associated with agriculture, land use (due to emissions from drained peatland that is currently used for crops or grazing), waste, and heavy goods vehicles (HGVs). These emissions are considered 'hard to abate', either because they rely on large-scale changes in land use, agricultural practices, and dietary change; or because they rely on green hydrogen, carbon capture or other technologies which are not yet commercial available.

The graph below shows future emissions if Huntingdonshire broadly follows the recommendations set out in the Climate Change Committee's 'Balanced Pathway'[37], which underpins national GHG reduction targets.



This analysis shows that, even if all available mitigation measures were implemented, Huntingdonshire can only reach net zero if carbon removal technologies or some of other form of offsetting becomes available.

Given that some of these sources of emissions are outside of HDC's ability to control, it is recommended that the council should focus more on accelerating the GHG reductions that *can* be achieved within their local area, rather than solely focusing on net zero as an end goal. There are some clear steps the Council can take within the Local Plan process to ensure that the policy environment supports climate change mitigation and removes obstacles as much as possible. These are described in the table below and have informed the policy recommendations made in **Document C** (on sustainable design policy options) and **Document E** (on renewable energy).

Issue	Response	Rationale
Reduce emissions from existing buildings (new development is addressed separately, below)	Loosen or remove planning restrictions to make it easier to install energy efficiency measures and building-mounted renewables, including in conservation areas and listed buildings (provided that this would not harm features that are integral to their listed status). Require energy efficiency upgrades to be undertaken alongside other works. Also require extensions and conversions to demonstrate that the works will not result in any net increase in energy use – so, for example, a new extension would have to be highly energy efficient and/or meet all of its residual energy demands with on-site renewables. *Note that is only applicable for extensions where planning permission is required.* Give more weight to climate change and energy efficiency measures when determining applications.	Existing buildings comprise a significant portion of current emissions, and the Local Plan needs to use all available levers to promote decarbonisation in this sector

Issue	Response	Rationale
Promote a step-change in uptake of large-scale renewables	Adopt a presumption in favour of large-scale renewable energy developments provided that they meet minimum criteria. Decide how to balance the benefits of large-scale renewables against the potential negative visual or landscape impacts – bearing in mind that visual impacts are subjective and that Huntingdonshire District Council has voted to declare a climate emergency which requires an immediate response. Consider issuing Local Development Orders or expanding Permitted Development Rights to allow schemes to progress more easily (including standalone wind/solar farms and other solutions like installing PV canopies over parking lots or on the roofs of industrial buildings).	These actions are critical to support decarbonisation of the electricity grid, and enable the phase-out of fossil fuels. Without this, the shift to electrification of buildings and transport will not deliver the necessary GHG reductions for Huntingdonshire (and the country as a whole) to meet its targets
Reduce demand for private transport	Develop a long-term strategy for reshaping the built environment over time, so that the public realm prioritises active travel and public transport, and so that the mix and density of uses enables people to access facilities within an easy walking/cycling radius if they choose to do so. This is sometimes referred to as the 20-minute neighbourhood concept.	Even though individual development proposals may not have an impact on demand for private transport, they can have a beneficial *cumulative* impact
Facilitate the shift to EVs and low emission vehicles	Continue to engage with stakeholders to ensure that there is adequate charging infrastructure within the District.	This would make it easier for people to choose low-emission vehicles

Issue	Response	Rationale
New development	Strongly discourage 'demolish and rebuild' schemes and adopt a presumption against demolition except where the applicant can show that it is justified, having given regard to the whole life-cycle carbon impacts. New developments must have low embodied carbon and operate with net zero emissions from the outset, rather than simply being 'net zero ready'. To the greatest extent possible, choose site locations that have access to good public transport links. Require large-scale developments to deliver a density and mix of uses to make it easier for people to access shops, schools etc. by walking or public transport. *Note that **Document D** from this study provides an analysis of emissions from new development based on a number of spatial scenarios and policy options.*	New developments tend to increase local emissions, which is contrary to when the aim of decreasing emissions These measures will help to mitigate that increase

Conclusion

There are numerous actions HDC can take to ensure that the Local Plan contributes to climate change mitigation and adaptation. As stated above, the evidence presented in this chapter has been used to inform policy advice set out in the remaining documents under this study

Documents C (on sustainable design), **D** (on spatial strategies), **E** (on renewable energy) and **F** (on offsetting and sequestration) discuss the best ways forward for HDC to address mitigation and adaptation through new policy agendas.

Chapter 1
Introduction

1.1 There is an overwhelming scientific consensus that human activities are causing global temperatures to increase, with major knock-on effects for our atmosphere, land and oceans. According to the UK Climate Change Risk Assessment (2022), the impacts for England may include: [1]

- A greater risk of extreme heat and wildfires
- More severe and frequent storms and flooding
- Water scarcity, drought and ground subsidence
- Rising sea levels and coastal erosion
- Other changes in the natural environment that pose a risk to agriculture.

> *"Climate change is happening now. It is one of the biggest challenges of our generation and has already begun to cause irreversible damage to our planet and way of life."*
> – HM Government, 'UK Climate Change Risk Assessment' (2022)

1.2 The Committee on Climate Change set an ambition for the UK to "vigorously pursue an ambitious target to reduce greenhouse gas emissions (GHGs) to 'net-zero' by 2050" across the whole economy, and this target was set into law in 2019. The target was set in response to the scientific evidence compiled by the IPCC in the 1.5 degrees report in October 2018. Targets adopted to reduce greenhouse gas (GHG) emissions are considered "science-based" if they are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement i.e. to limit global warming to well below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C.

1.3 Local authorities are well placed to influence emissions in buildings, transport, and waste whilst holding the best knowledge of the needs and opportunities of their area. Housing is one area of particular influence, showing leadership, implementing building retrofits such as improving social housing, through ensuring compliance with housing energy regulations, and working with

housing developers to ensure compliance with buildings regulations. Local authorities can also drive emissions reductions in their areas through their role as community leaders and employers, and with their regulatory and planning powers. Through their planning role, local authorities can leverage change by enabling sustainable development and placemaking, establishing building energy efficiency standards, implementing sustainable travel programmes and infrastructure, approving renewable energy projects, pursuing district heating programmes and implementing sustainable waste management programmes. They can also make sure that new development is located so as to provide a range of sustainable travel choices and reduce car dependence.

1.4 In recognition of this, in 2022 **Huntingdonshire District Council (HDC) voted to declare a climate and ecological emergency** and committed to taking action on these urgent challenges. This can be done by:

- reducing greenhouse gas (GHG) emissions, to mitigate the overall temperature rise and therefore avoid even more extreme climate change, and
- making sure that our communities, economy, and infrastructure are resilient to the changes that are already underway.

1.5 Document B of the Climate Change Evidence Base addresses both issues, as it describes the district's position in terms of climate risk and GHG emissions. The document is structured in two parts, as follows:

- **Huntingdonshire's climate:** Description of the current climate, projected changes in temperature and precipitation, and identification of locally-specific risks due to climate change
- **Greenhouse gas emissions and emission pathways to net zero in Huntingdonshire:** Description of the baseline emissions in the district, potential future emissions in a 'business as usual scenario' that accounts for national policies, and indicative decarbonisation pathways based on strategic GHG reduction measures

1.6 This sets the context in which the Local Plan Update will operate, and the trends that it will seek to influence in a positive manner. The evidence

presented in this chapter has been used to inform LUC's policy advice, which is set out in the remaining documents under this study.

Chapter 2

Climate change risks in Huntingdonshire

2.1 This chapter focuses on the current and future climate in Huntingdonshire, to identify locally specific risks and inform policy responses.

2.2 First, it provides a brief summary of Huntingdonshire's current climate and describes potential future changes, based on regional and local information from the Met Office and the UK Climate Projections 2018 (UKCP18).[2] Then, it describes the key risks that those changes pose, drawing on the UK Climate Change Risk Assessment (UK CCRA). Risks are arranged by theme, and relevant links with the Local Plan are discussed in each case.

2.3 This evidence supports the policy measures presented in Document C (Sustainable Design) that would help ensure future developments are resilient to the impacts of climate change.

Current and future climate conditions

2.4 Huntingdonshire, like the rest of England experiences a temperate maritime climate. Compared with other locations around the world, there are fewer extreme conditions (heat, cold, drought, wind, and so on) and annual temperatures tend to stay within a relatively narrow range. However, day-to-day weather can be highly variable; the country sits in an area where air masses from polar and tropical regions meet and create weather fronts. The climate and weather also vary due to multi-year cycles in atmospheric pressure and ocean temperatures.[3]

2.5 Throughout this assessment, two possible scenarios of future climate change have been considered, one where global warming reaches 2°C above pre-industrial levels by 2100 and one, more extreme scenario, where it reaches

4°C above pre-industrial levels by 2100. The data and scenarios are taken from the UK Climate Risk Indicators website and based on the UKCP18 climate projections.[4] The choice of 2°C and 4°C scenarios aligns with the methodology used in the third UK Climate Change Risk Assessment and also follows the UK Climate Change Committee's ten principles for good adaptation which advise adapting to 2°C and assessing the risks for 4°C.[5] Projecting the future climate is inherently uncertain and the use of multiple scenarios allows the development of adaptation plans that are flexible to a range of plausible futures.

2.6 Current estimates suggest that, taking into account currently implemented global policies, the world is on track for about 2.7°C of global warming by 2100, though the uncertainty on this estimate means the range of plausible warming is from 2.2°C to 3.4°C.[6] These estimates may change as new climate science research and global mitigation policies develop but in the current context the 2°C scenario can be seen as an increase in present day climate action successfully mitigating global warming in line with the Paris agreement whereas the 4°C scenario represents a plausible worst case scenario where insufficient mitigation action leading to a more extreme future climate. Generally, local climate impacts are expected to be more costly and damaging for every incremental increase in global temperature which highlights the importance of effective emissions mitigation policies.

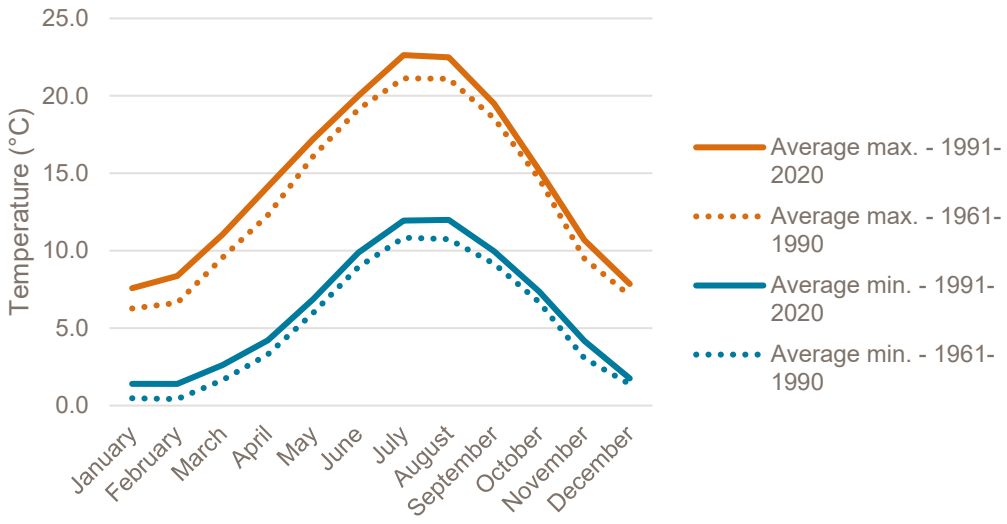
Temperature

2.7 Huntingdonshire sits within one of the warmest regions of the country. Its inland position means that it does not experience the cooling effects of the sea in hot weather, as more coastal locations do. According to the Met Office, summer temperatures in Eastern England are *'comparable with values found in the summer in the London area which tends to be the warmest part of the UK.'*[7]

2.8 Looking at trends over time, data from the Met Office indicates that there has been a notable increase in annual and maximum temperatures and more sunshine (i.e. periods of no cloud) in Huntingdonshire.[8] The average maximum temperatures in summer recorded at Monks Wood weather station (c. 5 miles

from Huntingdon) have already risen by more than 1.5°C since the period 1961-1990. Note that the 'average maximum temperature' is averaged over the course of a given time period, and it is different from the 'peak' temperature, which can be significantly higher. This highlights that the impacts of climate change are already being felt within the District.

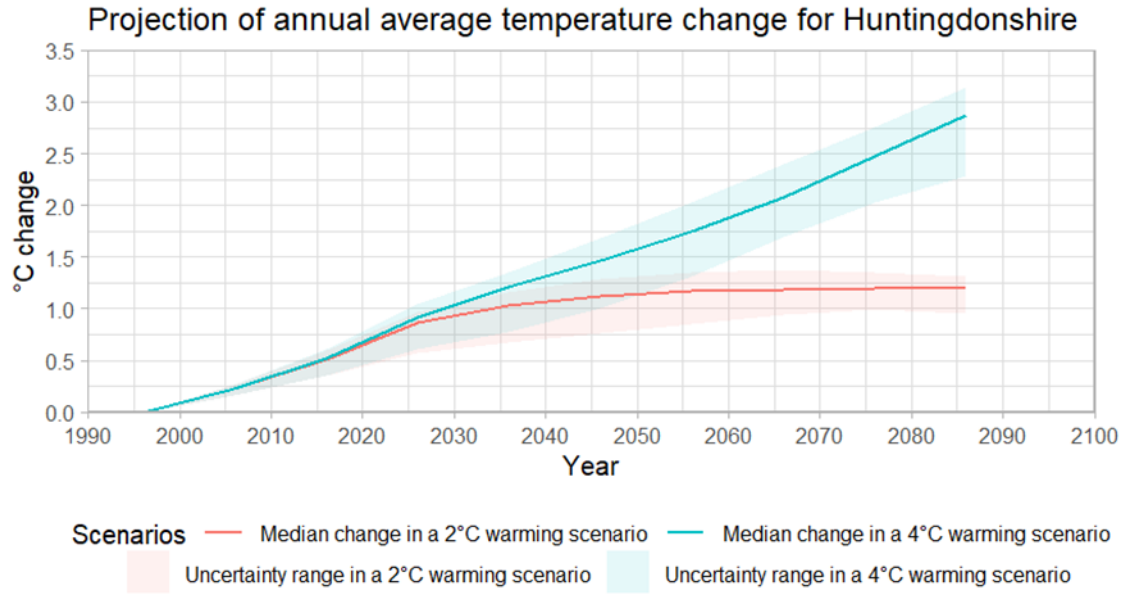
Figure 1. Average temperatures recorded at Monks Wood



2.9 Winter temperatures have risen as well; the past decade has set records for unseasonably warm weather in winter and there has been a decrease in the number of days of air frost.[9] Although this change could result in less disruption from extreme cold events, it has implications for the agriculture sector in Huntingdonshire, with potential impacts on food production.

2.10 The trend towards higher temperatures is expected to continue. Figure 2 shows a projected change in the annual average air temperature in Huntingdonshire, based on two global warming scenarios over the coming decades. It indicates that a typical day in this region could be several degrees warmer by the end of the century if global warming reaches 4°C. Even under a scenario where global efforts to reduce greenhouse gas emissions limit global warming to 2°C by 2100, the average temperature in Huntingdonshire may be expected to be over 1°C higher than the baseline period as early as 2035.

Figure 2. Change in the annual average temperature (°C) in Huntingdonshire relative to the 1981-2010 average. Source: UK Climate Risk Indicators[10]



2.11 Average temperatures have a major influence on the way that ecosystems function; for example, influencing species migration and plant growing seasons. In terms of human health, long-term exposure to higher temperatures can impact the prevalence of vector-borne diseases[11], and increase the risk of heat-related illnesses. All of these changes would have knock-on effects on society and the economy, highlighting the importance of considering climate impacts resulting from long term trends and changes as well as acute events such as heatwaves. The resulting risks and impacts will be explored in further detail from p. 29 onwards.

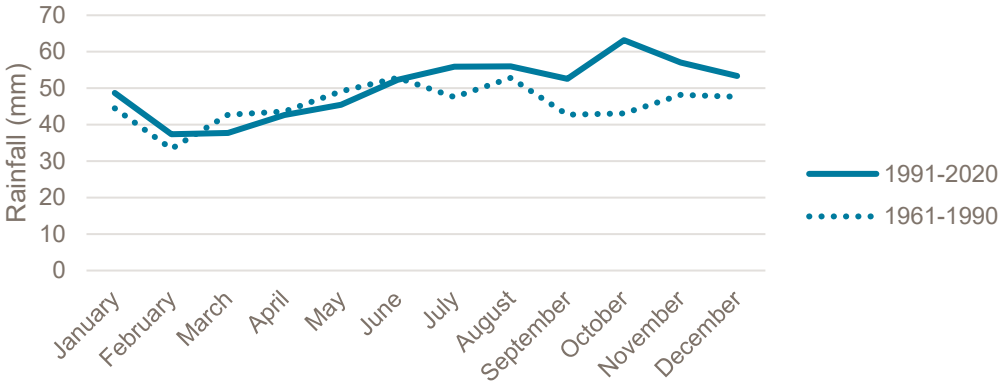
With 2°C of global warming…	
The hottest summer day in Huntingdonshire could be almost 2°C warmer.	There could be about 2 times as many summer days with temperatures above 25°C.
With 4°C of global warming…	
The hottest summer day in Huntingdonshire could be almost 6°C warmer	There could be nearly 4 times as many summer days with temperatures above 25°C.

Precipitation

2.12 In addition to already being warmer than the national average, Huntingdonshire also tends to be drier, experiencing c. 600mm of annual rainfall, compared with the average for England of c. 870mm. Again, this is due in part to its inland position: compared to other regions, Eastern England is relatively sheltered from Atlantic storms. The Environment Agency classifies it as experiencing 'serious' water stress, which means that household demand for water is very high in relation to the amount of effective rainfall available to meet demand.[12] Despite this, Huntingdonshire also experiences severe flooding (see p. 24 for more information), with the primary risk being fluvial flooding from the River Great Ouse and its tributaries although there is also a risk of pluvial or surface water flooding which occurs when water cannot be drained away or absorbed by the soil during acute rainfall events.

2.13 Data from the Met Office demonstrates that in the past few decades, seasonal rainfall patterns have changed, particularly in autumn and winter where average rainfall has increased, as shown in the graph below.

Figure 3. Average rainfall recorded at Monks Wood

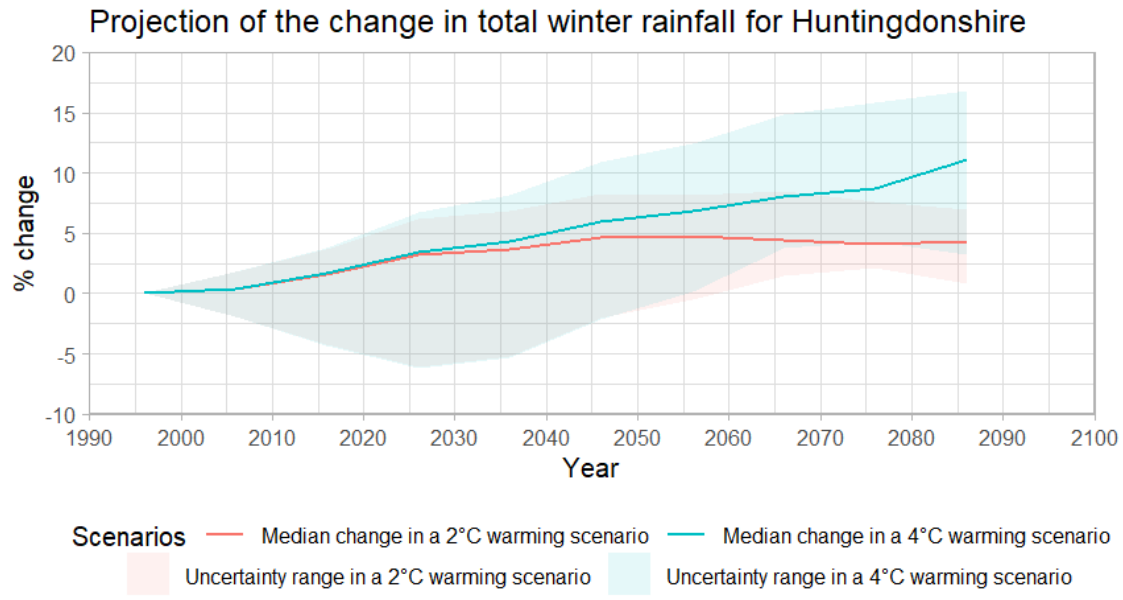


2.14 Climate change is expected to lead to continuing changes in precipitation, both in terms of the annual average, and the frequency of intensely rainy days. As the Met Office explains: *'Not every winter will necessarily be rainier than the one before, and not every summer will be dry, but both trends could have big impacts.'* [13]

2.15 In the period 1991-2020, the wettest winter days on average experienced 28mm of rainfall. This could increase to 38mm in a 2°C warming scenario or 40mm in a 4°C warming scenario, equating to more than a 40% increase on the wettest days. Given that Huntingdonshire already experiences severe flooding in winter, this is likely to increase the risk.

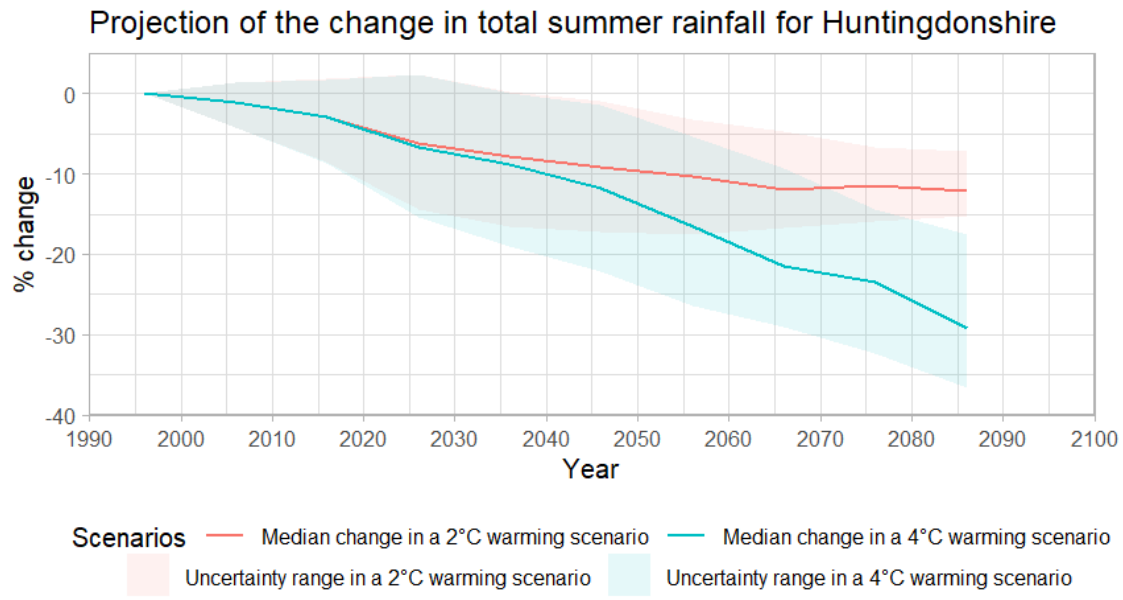
2.16 Figure 4 shows the % change in total winter rainfall expected under the two climate scenarios for Huntingdonshire. Overall, both scenarios show some increase in total winter rainfall which is fairly small in a 2°C scenario and more pronounced in the 4°C scenario. This could lead to increased flood risk. However, there is significant uncertainty associated with these results, in part due to significant interannual variability in precipitation. It is important to consider metrics such as the rainfall on the wettest days alongside seasonal totals as evidence suggests that both more wet and dry extremes are expected under a warming climate, due to the warmed atmosphere having an increased capacity to hold water.

Figure 4. The projected change in total winter rainfall compared to the average for 1981-2010 for Huntingdonshire. Source: UK Climate Risk Indicators



2.17 Summers, meanwhile, are overall expected to be drier, particularly in the long term as shown in Figure 5, the average rainfall during summer could decrease by over 10% in a 2°C scenario or around 30% in a 4°C scenario. Water scarcity is expected to be a significant risk to the East of England and dry conditions can also lead to other impacts such as wildfires, flash flooding if heavy precipitation falls on dry soil and increased rates of building subsidence.

Figure 5. The projected change in total summer rainfall compared to the average for 1981-2010 for Huntingdonshire. Source: UK Climate Risk Indicators



With 2°C of global warming…

The wettest winter day in Huntingdonshire could see 35% more rainfall, leading to more serious flooding

Summer rainfall could decrease by 10%, leading to droughts and water shortages, while also drying out the soil

With 4°C of global warming…

The wettest winter day in Huntingdonshire could see 40% more rainfall, leading to more serious flooding

Summer rainfall could decrease by 30%, leading to droughts and water shortages, while also drying out the soil

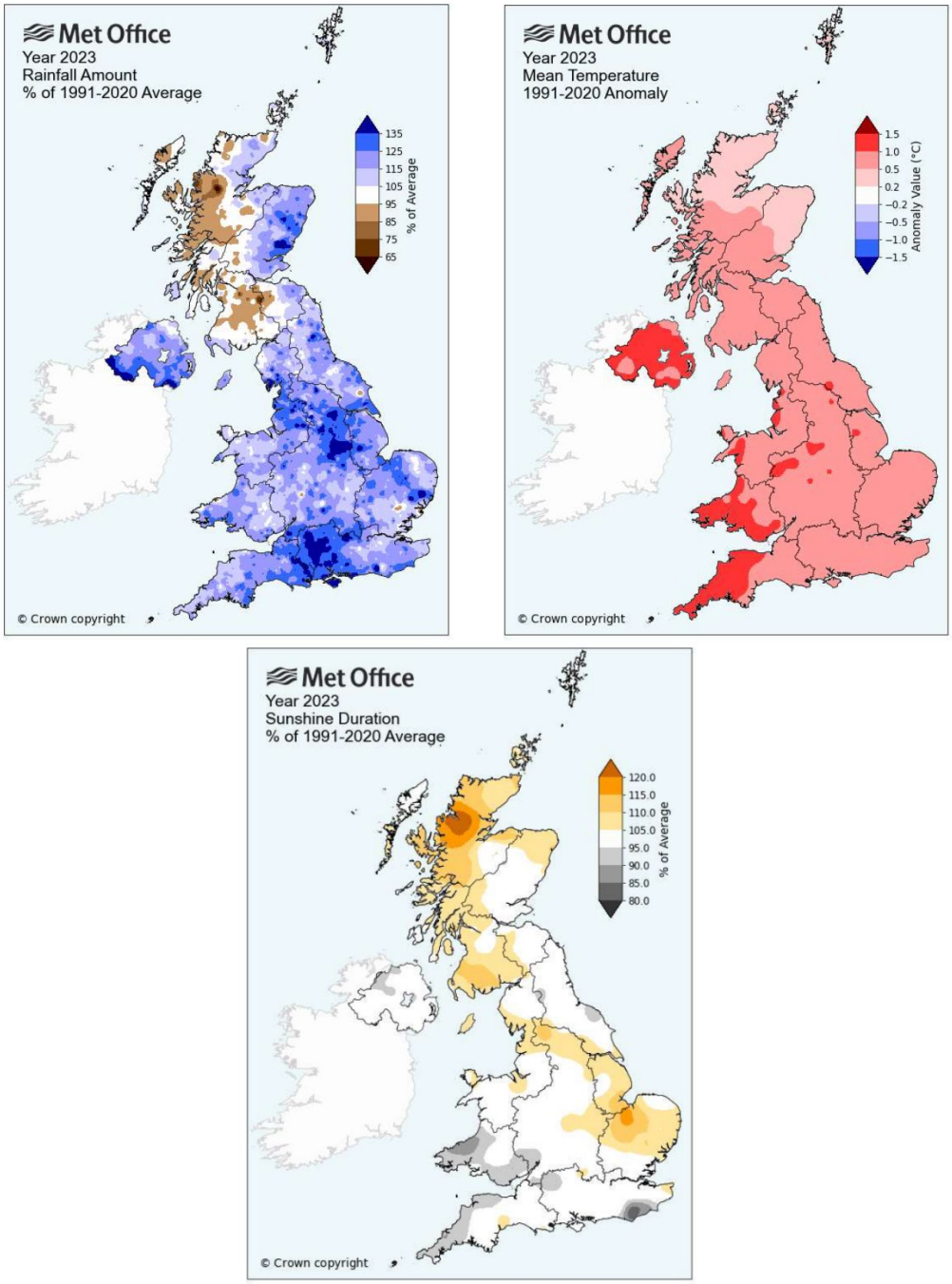
Extreme weather events

2.18 The recent observed trends in Huntingdonshire (see previous sections) are broadly consistent with those seen in England as a whole, which has experienced increases in annual average temperatures and longer periods of no cloud (i.e. sunshine), but also more short-term acute rainfall and wetter winters overall.[14]

2.19 Although it is difficult to attribute individual weather events to climate change, research shows that it does make those events much more likely. For example, scientists estimate that the 2019 heatwave, which saw a UK temperature record of 38.7°C in Cambridge, was roughly 10 times more likely to occur due to climate change, and according to the Met Office, *'The temperatures we saw were 1.5-3°C hotter than they would have been without human influence.'* [15]

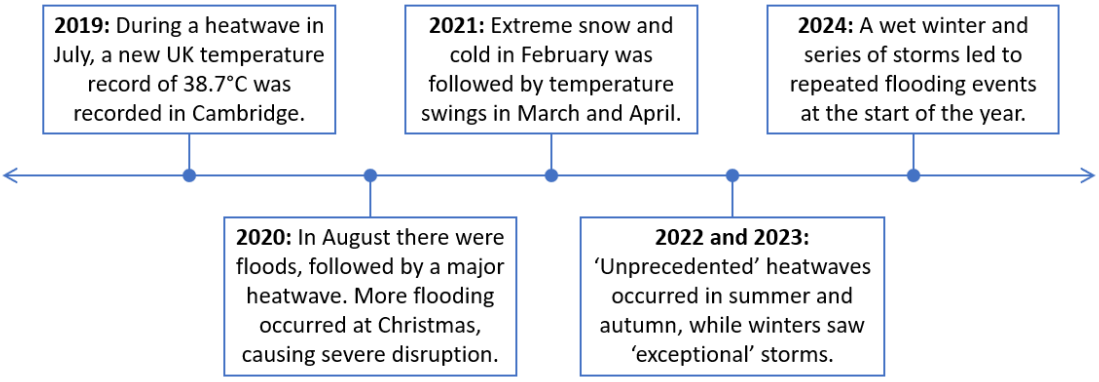
[2.20] In Huntingdonshire, records from the Met Office and local newspapers suggest that heatwaves and flooding have had a serious impact on local communities in the District.[16,17]

Figure 6. Anomalies in temperature, rainfall and sunshine in 2023 compared to the 1991-2020 average. Source: Met Office



"The UK annual mean temperature [in 2023] was 9.97°C, 0.83°C above the 1991-2020 long term average and the second-warmest year for the UK in the series from 1884, behind 2022 (10.03°C)." – Met Office, 'Annual Summary'(2023)

Figure 7. Examples of recent extreme weather events in Huntingdonshire and nearby



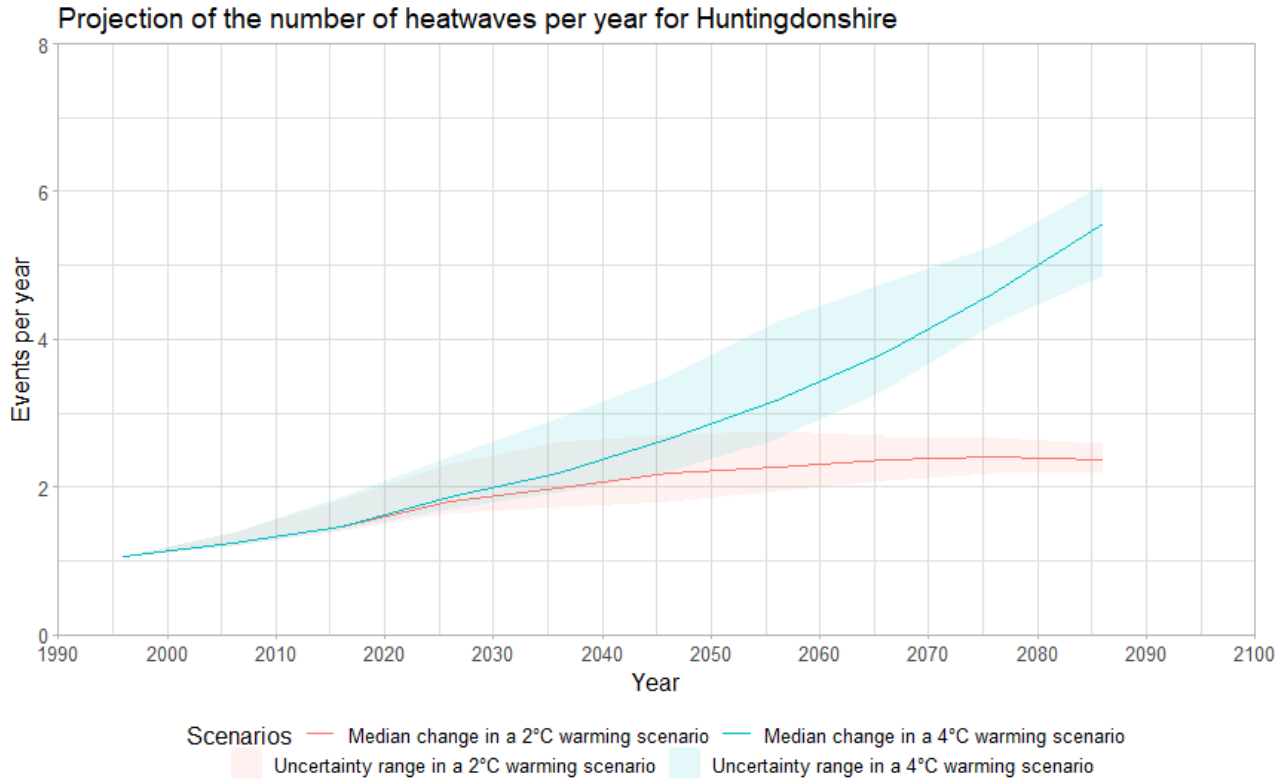
2.21 In the past few years, this has resulted in:

- Damage to properties, from floodwater and sewage, causing people to be displaced from their homes and businesses to shut [18]
- Higher mortality and demand for medical care during hot weather, with an estimated 143 heat-related deaths in the East of England in 2023 [19]
- Closure of roads, and problems with railway lines, impacting travel [20]
- Greater pressure on emergency services, both to respond to flooding [21] and fires [22]
- Farmers being unable to grow crops as usual, or having to move their livestock [23]
- River and reservoir levels falling low, and residents being asked to save water [24]

2.22 Climate projections for Huntingdonshire suggest that some extreme events are likely to become more frequent or more extreme in future decades as the climate changes. The 2017 Strategic Flood Risk Assessment for Huntingdonshire identifies areas where flood extent may increase under future climate change.[25] Figure 8 The projected number of Met Office heatwaves per year for Huntingdonshire. Source: UK Climate Risk Indicators how the number of heatwaves per year are expected to increase under climate change in

Huntingdonshire. The proportion of time that Huntingdonshire spends in drought is also expected to increase, roughly doubling by 2050 under a 2°C by 2100 climate scenario.[26]

Figure 8 The projected number of Met Office heatwaves[27] per year for Huntingdonshire. Source: UK Climate Risk Indicators



Limitations of this approach

2.23 The projections presented above are based on information from the Met Office, which uses the most up-to-date scientific literature to explore future changes in the UK's climate. Like all projections based on model simulations, they are inherently uncertain and should be interpreted with a degree of caution.

2.24 The climate system is highly complex, and in order to model future changes, some simplifying assumptions have to be made. This can result in systematic differences between projected and observed conditions. The graphs in this section are calculated from the results of 15 different climate model projections and the uncertainty ranges shown span the range of results from these different models and hence give an indication of model uncertainty. The median will not be from the same model projection in each case and so although the data shown gives a useful indication of overall trends, further detailed analysis would be required to combine the different indicators and give a more holistic view of the future climate of Huntingdonshire. In addition to the model uncertainty shown, uncertainty due to gaps in scientific understanding also exists.

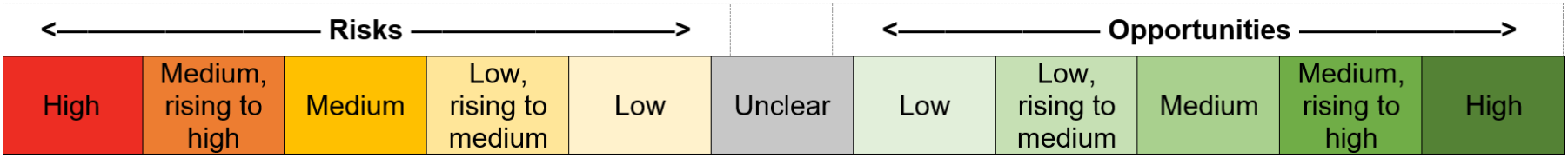
2.25 Even if it was possible to develop a perfect model of the climate system, there is also a human factor to consider. In the coming decades, there could be a variety of changes in population, economics, government policy, consumer behaviour and technological advances that could put us on a path towards lower or higher emissions – or change our ability to adapt to the changes that do occur.

Climate change risks for Huntingdonshire

Introduction

2.26 The CCRA for England sets out numerous priority risks (i.e. changes with negative consequence) and opportunities (i.e. changes with positive consequences) affecting the country as a whole. Those were screened for applicability to Huntingdonshire – for example, risks specifically associated with coastal areas were excluded – and a summary is provided in the following sections. [28,29]

2.27 Risks and opportunities have been ranked qualitatively based on the magnitude scoring for England in the CCRA and colour coded, as shown below. This scoring considers the potential impact of the risk but not the level to which there are currently mitigating measures in place. The assessment has considered the changing risk from the present day to 2050 under the 2°C and 4°C scenarios outlined in the previous section. The magnitude scoring method uses both quantitative data, such as the cost of annual damages and expected number of deaths and illnesses, as well as qualitative information from expert judgement and peer review. Uncertainty in the scoring varies across risks as the evidence base in some cases is more developed than in others. Risks that are currently medium but expected to rise to high by 2050 are marked as ‘medium to high’ and the same principle applies to opportunities. Where the overall impacts are uncertain or there is insufficient evidence to assess the scale of risk/opportunity, these have been marked as ‘unclear’.



2.28 A note on terminology: In the CCRA, 'risk' is defined as *'the potential for adverse consequences of climate-related hazards, based on their likelihood of occurrence, and taking account of exposure and vulnerability.'* [30] Therefore, the term 'risk' in this context is not interchangeable with 'likelihood' – it includes a wider range of factors.

Description of risks by theme

Natural environment and assets

2.29 Changes in climatic conditions are expected to include higher temperatures, flooding, water scarcity, increased risks of wildfires, and stronger storms with higher winds. These changes, along with the increasing frequency of extreme events, have the potential to impact terrestrial and freshwater species and habitats, soils, natural carbon stores, agricultural and forestry productivity, and the character of the landscape. This could have some beneficial opportunities (e.g. the ability to grow different crops) as well as some negative impacts (e.g. new pests, pathogens and invasive species becoming more widespread in England).

CCRA3 risk number	Risk receptor	Nature of risk/opportunity	Risk or opportunity level
N1	Terrestrial species and habitats	Changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity and flooding)	High
N2	Terrestrial species and habitats	Pests, pathogens and invasive species	Medium, rising to high
N3	Terrestrial species and habitats	New species colonisations	Medium
N4	Soils	Changing climatic conditions, including seasonal aridity and wetness	Medium, rising to high
N5	Natural carbon stores, carbon sequestration and GHG emissions	Changing climatic conditions, including temperature change and water scarcity	Medium, rising to high
N6	Agricultural and forestry productivity	Extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind)	Medium, rising to high
N7	Agriculture	Pests, pathogens and invasive species	Medium, rising to high
N8	Forestry	Pests, pathogens and invasive species	Medium, rising to high
N9	Agricultural and forestry productivity	New/alternative species becoming suitable	Medium, rising to high

N11	Freshwater species and habitats	Changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts	Medium
N12	Freshwater species and habitats	Pests, pathogens and invasive species	High
N13	Freshwater species and habitats	New species colonisations	Low
N18	Landscape character	Climate change	Medium, rising to high

2.30 The highest rated natural environment risks are the impacts on terrestrial and freshwater species and habitats. This was identified as one of eight areas for urgent action by the CCC in their advice report for the UK CCRA3. Other areas for urgent action identified within the natural environment risks include risks to soil health from flooding and drought, risks to natural carbon stores that could lead to increased emissions (for example the risk of wildfire destroying trees used for carbon sequestration) and risks to crops livestock and commercial trees which are currently rated as medium but expected to increase to high.

2.31 Within Huntingdonshire, specific hazards that are predicted to significantly affect the natural environment and land use include drought, increasing temperatures, wildfire and flooding in some locations. Agriculture is a significant industry within Huntingdonshire with over half of its agricultural land growing cereal crops in 2021.[31] Indicators shows a projection of the potential soil moisture deficit for Huntingdonshire which is the annual maximum cumulative difference between rainfall and potential evaporation. A higher deficit indicates drier soil and a greater need for additional irrigation and hence the need for additional irrigation is seen to increase over time under both climate scenarios. This may require measures such as greater

on-farm water storage or more drought resistant species. Figure 10 The projected number of days per year where the Met Office Fire Severity Index is expected to be rated 'very high' or above for Huntingdonshire. Source: UK Climate Risk Indicators shows that wildfire risk in Huntingdonshire is expected to increase under climate change and this could impact on agricultural land as well as habitats and species, human settlements and human health.

Figure 9 The projected potential soil moisture deficit for Huntingdonshire. Source: UK Climate Risk Indicators

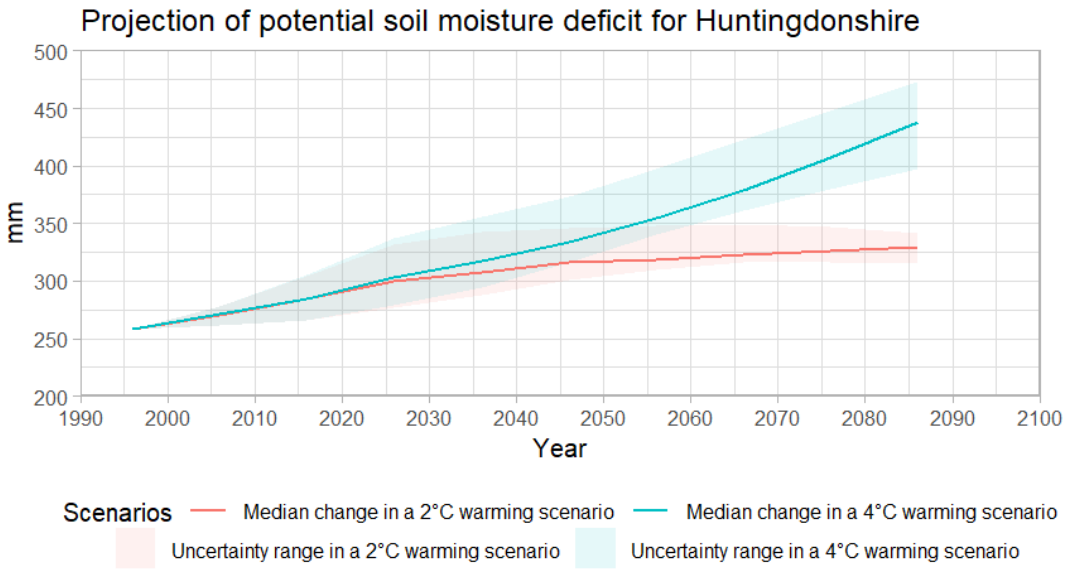
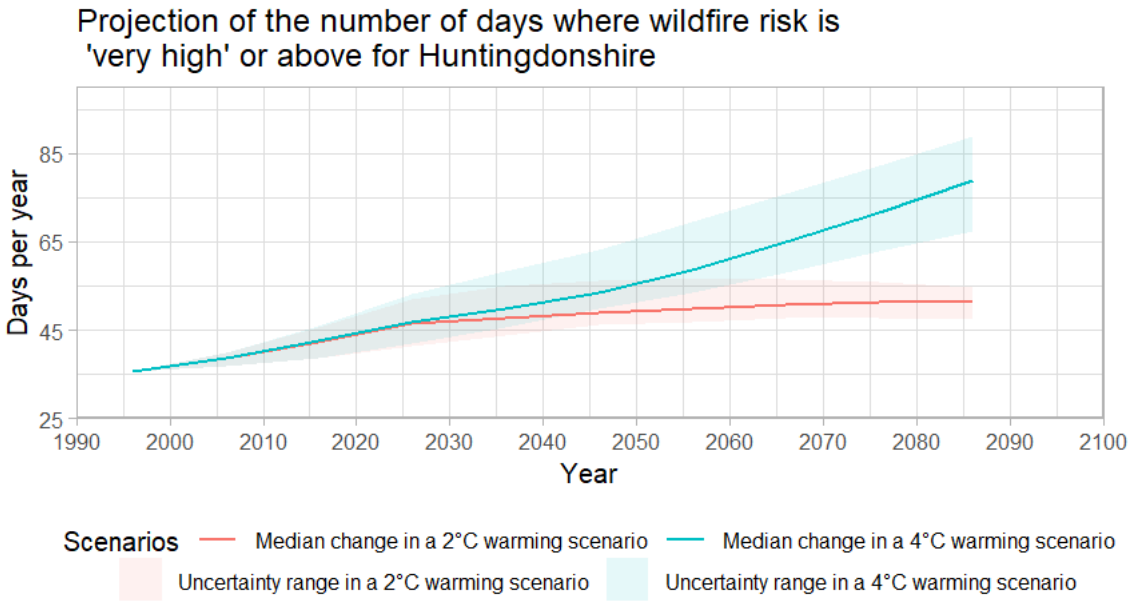


Figure 10 The projected number of days per year where the Met Office Fire Severity Index[32] is expected to be rated 'very high' or above for Huntingdonshire. Source: UK Climate Risk Indicators



How does this relate to the Huntingdonshire Local Plan?

2.32 Any landscaping will need to be resilient to the impacts of extreme weather, including (where relevant) drought resistant planting and (potentially) designing to provide protection against wildfires through natural firebreaks, incorporated with SuDS. This requires careful species selection.

2.33 Changes in the natural environment might impact existing and future carbon stores, for example by making it less likely that new trees can establish and thrive. If the Council plans to introduce any form of offsetting scheme, this risk should be taken into account and suitable contingency plans should be made.

2.34 Climate change will alter the character of the landscape. This is important to understand when considering the landscape impacts of development, including renewable energy developments.

2.35 Developments may affect water levels and nutrient pollution in waterways; given that these are assessed to be at serious risk already, it is arguably even more important to reduce these impacts and try to achieve nutrient neutrality.

Infrastructure

2.36 More frequent extreme temperatures (both hot and cold), storms, high winds and lightning pose a risk to energy, transport and digital infrastructure. Flooding and erosion could impact bridges and pipelines, while subsidence, slope and embankment

failure may affect transport networks as well as surface and subterranean infrastructure. Reduced water availability would negatively impact public water supplies as well as energy generation (because a high proportion of the water that is abstracted is used to cool thermal power plants and energy from waste facilities).

CCRA3 risk number	Risk receptor	Nature of risk/opportunity	Risk or opportunity level
I1	Infrastructure networks (water, energy, transport, ICT)	Cascading failures	High
I2	Infrastructure services	River, surface water and groundwater flooding	High
I4	Bridges and pipelines	Flooding and erosion	Medium
I5	Transport networks	Slope and embankment failure	Medium
I7	Subterranean and surface infrastructure	Subsidence *[Note that the overall risk level indicated in the CCRA is low to medium, but the British Geological Survey identifies Huntingdonshire as having areas with high risk due to shrinkage of clay soils.*[33]]	Low, rising to medium
I8	Public water supplies	Reduced water availability	Medium, rising to high
I9	Energy generation	Reduced water availability	Low, rising to medium
I10	Energy	High and low temperatures, high winds, lightning	High
I12	Transport	High and low temperatures, high winds, lightning	Medium, rising to high
I13	Digital	High and low temperatures, high winds, lightning	Low, rising to medium

2.37 Specific examples of possible climate impacts on infrastructure in Huntingdonshire are shown in Figure 11 The projected number of days per year where the maximum temperature is expected to exceed 25°C (an indicator for melting of asphalt road surfaces) for Huntingdonshire. Source: UK Climate Risk Indicatorsand Figure 12 The projected number of days per year where

temperature, rainfall and/or windspeed exceed the thresholds for relaxing standards of rail service for Huntingdonshire. Source: UK Climate Risk Indicators. Weather events such as high temperatures, extreme rainfall and high winds may impact the operation of road and rail and this could lead to wider impacts such as limiting people's ability to travel to work and school. Adverse weather events affecting road and rail are expected to increase in frequency under the climate scenarios considered here.

Figure 11 The projected number of days per year where the maximum temperature is expected to exceed 25°C (an indicator for melting of asphalt road surfaces) for Huntingdonshire. Source: UK Climate Risk Indicators

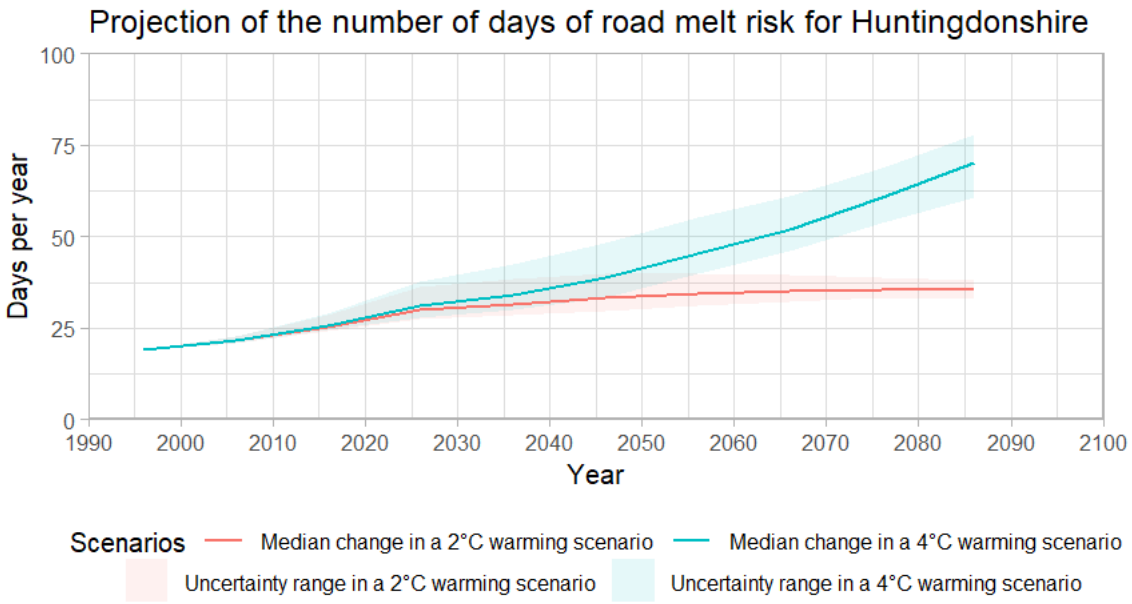
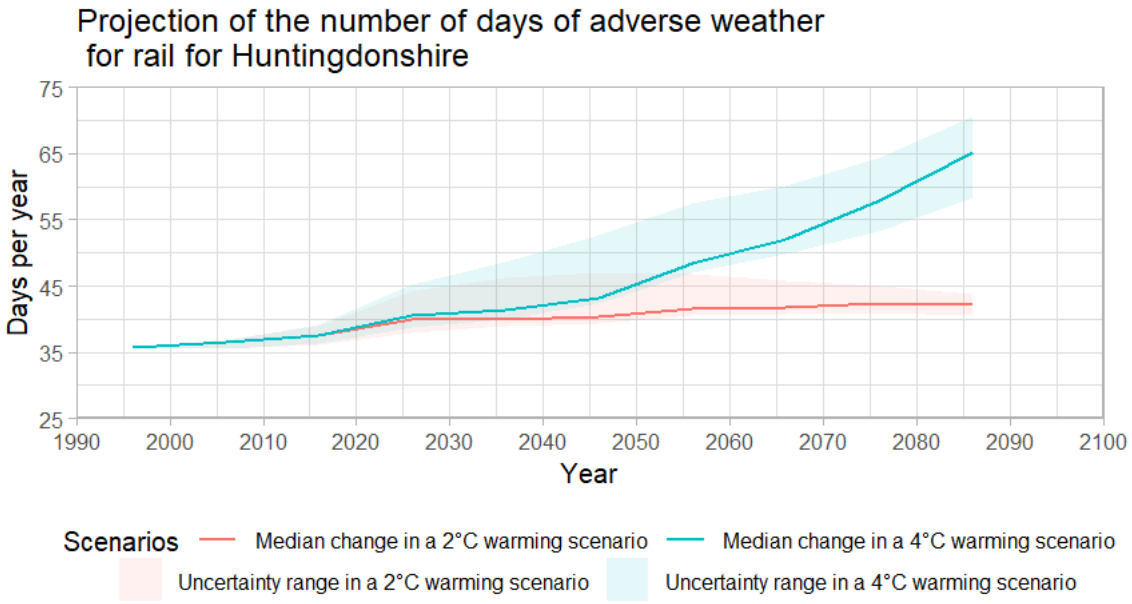


Figure 12 The projected number of days per year where temperature, rainfall and/or windspeed exceed the thresholds for relaxing standards of rail service for Huntingdonshire. Source: UK Climate Risk Indicators



How does this relate to the Huntingdonshire Local Plan?

2.38 It is important to think broadly about climate adaptive design to ensure that the supporting infrastructure, not just individual buildings, are resilient to withstand storms and extreme weather. HDC is not responsible for all infrastructure but can play a role by working in partnership with others to address this.

2.39 Local, decentralised renewable energy systems and battery storage can potentially help to improve the resilience of the energy supply, so should be included in developments where appropriate.

2.40 Water efficiency measures are particularly important to alleviate demands on existing water infrastructure given the particular risk of water scarcity in Huntingdonshire discussed above.

Health, communities and the built environment

2.41 Climatic change can have a wide variety of impacts on human health, communities and the built environment. Extreme weather (hot and cold) can impact health and social care delivery, along with education and prison services. Flooding can damage buildings and possessions, with associated impacts on health and wellbeing at both an individual and community level, while heatwaves can lead to increased risk of heat stress or even death. Climate change can potentially change the risk of airborne pollutants and reduce air quality, e.g. due to smoke from wildfires. If there are more periods of water scarcity and drought, then this – combined with population and economic growth – could lead to more instances of household water supply interruption. There is also a greater risk of contamination to drinking water supplies if flooding events and increased surface

runoff cannot be treated appropriately. Food safety may be compromised as there is a higher risk of contamination at higher temperatures, while food security could be affected by changes that impact crop yields and supply chains. Changes in the distribution and prevalence of illnesses spread by ticks, mosquitoes and other insects, are also likely to have an impact on human health.

2.42 Looking at the built environment in more detail, climate change can have a range of effects. Energy demand for cooling in summer may increase due to hotter temperatures, and the risk of overheating will increase. Conversely, in winter, the energy demand for heating might decrease, and buildings may be more comfortable.

2.43 In terms of the building fabric (i.e. the walls, floors, roof, windows, doors, etc.), the CCRA lists the following considerations:

- Increases in precipitation – Increasing the likelihood of water ingress, and requiring more ventilation to remove moisture
- Increases in temperature – Assuming there is adequate ventilation, this could have the beneficial impact of reducing mould growth and damp
- Increases in windstorms — Higher chance of physical damage during storm events
- Increases in heatwaves – Leading to a risk of subsidence, with associated damage and insurance implications. This may be particularly relevant to Huntingdonshire due to shrinkage of clay soils.

2.44 For heritage assets, flooding, wildfires, erosion, and subsidence not only affects the physical structure, but may have wider implications for the local history, community, landscape character, folklore, and so on.

CCRA3 risk number	Risk receptor	Nature of risk/opportunity	Risk or opportunity level
H1	Health and wellbeing	Risks from higher temperatures	High
H2	Health and wellbeing	Opportunities from higher temperatures	Low
H3	People, communities and buildings	Flooding	High
H5	Building fabric	Moisture, wind and driving rain	Medium
H6	Household energy demand	Risks from summer and winter temperature changes	Medium, rising to high
H6	Household energy demand	Opportunities from summer and winter temperature changes	Medium, rising to high
H7	Health and wellbeing	Changes in indoor and outdoor air quality	Medium
H8	Health	Vector-borne disease	Medium
H9	Food safety and food security	Higher temperatures (food safety) and extreme weather (food security)	High
H10	Health	Poor water quality and household water supply interruptions	Medium, rising to high
H11	Cultural heritage	Changes in temperature, precipitation, groundwater, land, ocean and coastal change	Medium, rising to high
H12	Health and social care delivery	Extreme weather	Medium

How does this relate to the Huntingdonshire Local Plan?

2.45 Flood adaptation and resilience are already important issues in Huntingdonshire and likely to become worse in future. Flood risk assessments already consider the impacts of climate change but it is worth noting that the risks or issues that affect to a particular site might occur due to events elsewhere. For instance, a flood in one part of a development might not have major impacts on its own, but the same flood event could potentially affect a nearby wastewater treatment or industrial site,

causing contamination in the floodwater. Similarly, a development site might not be at risk of flooding, but if access roads are cut off, this would impact the function of emergency services.

2.46 Overheating is another significant issue. Part O of the Building Regulations addresses overheating risk at an individual building scale, but measures are also required at a site-wide and strategic scale. This will impact the appearance of the built environment and public realm due to e.g. use of external shutters, overhangs of buildings, street layouts that provide natural shade, etc.

2.47 Adequate natural ventilation is critical so the layout also needs to facilitate cross-ventilation. However, in the event of severe or prolonged heatwaves passive cooling measures are unlikely to be adequate so consideration needs to be given to whether certain types of buildings that traditionally rely on natural ventilation, such as schools, should include air conditioning.

2.48 Designs must include robust materials that can withstand more rain and extreme temperatures. Similarly, the foundations must be designed to account for the increased risk of subsidence (in certain areas). Given that Huntingdonshire is already in an area of extreme water stress, there is justification to require much stricter water efficiency standards in new buildings. All developments should include rainwater collection and, where feasible, greywater recycling.

Business and Industry

2.49 Extreme weather, increases in flood risk, water scarcity and the associated disruption to infrastructure, communities and human health all have potential impacts on business and industry. These could include disruptions to supply chains and

production processes, damage to property (e.g. due to flooding), and lower employee productivity (e.g. due to higher temperatures in working environments). There are also potential knock-on effects in terms of businesses being able to access finance, investment and insurance.

CCRA3 risk number	Risk receptor	Nature of risk/opportunity	Risk or opportunity level
B1.	Flooding of business sites	Increase in flood risk	High
B3.	Business production processes	Water scarcity	Low, rising to medium
B4.	Business access to finance, investment and insurance	Extreme weather	Medium
B5.	Reduced employee productivity in businesses	Infrastructure disruption and higher temperatures in working environments	Low, rising to medium
B6.	Disruption to business supply chains and distribution networks	Extreme weather	Unclear
B7.	Changes in demand for goods and services	Long-term climate change	Low, rising to medium

How does this relate to the Huntingdonshire Local Plan?

2.50 Issues such as flooding, heating, water scarcity etc. are similar to those described previously for other buildings and infrastructure.

2.51 In principle, major changes or disruptions in business and industry would potentially affect the type of development that comes forward in Huntingdonshire, but this is difficult to predict.

International dimensions

2.52 The UK CCRA identifies a number of climate risks that could occur overseas but result in impacts or opportunities for the UK. Many of these risks are highly complex and for many of these risk scores the underlying evidence base is limited and hence confidence in the scores is low. In general, the adaptation responses required to mitigate these risks and harness these opportunities will involve national level foreign and development policies rather than local authority action. However, they are included here for completeness and for awareness.

2.53 At an international scale there are a wide variety of potential risks, as well as some potential positive opportunities. Some of the key risks include: decreasing agricultural yields and food insecurity arising from water scarcity, rising temperatures, sea level rise; potential increases in vector-borne diseases; disruption to supply chains due to climate change and cascading risks; climate-related international human mobility, and international conflicts/reduced collective governance.

2.54 There are some potential positive opportunities associated with being able to grow different crops in different places, and new trade routes could be opened up due to Arctic sea ice melting. Overall, however, there are numerous interacting risks that could have a cascading effect, both internationally and within the UK.

CCRA3 risk number	Risk receptor	Nature of risk/opportunity	Risk or opportunity level
ID1	Food availability, safety, and quality	Decreasing yields from rising temperatures, water scarcity and ocean changes globally	High
ID2	UK food availability and exports	Increases in productivity and areas suitable for agriculture overseas	Low

ID3	Migration to the UK and effects on the UK's interests overseas	Climate-related international human mobility	Low
ID6	ID6. Increased trade for the UK	Arctic ice melt opening up new trading routes	Medium
ID7	ID7. International trade routes	Climate hazards affecting supply chains	Medium, rising to high
ID8	ID8. Economic loss to the UK	Climate driven resource governance pressures and financial exposure	Low, rising to medium
ID9	ID9. UK public health	Increase in vector borne diseases due to climate change	High
ID10	ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	High

How does this relate to the Huntingdonshire Local Plan?

2.55 International dimensions could have a knock-on effect on Huntingdonshire's economy; however, assessing these impacts is out of scope of the current study.

2.56 If there are major global changes in crop yields, people may place a higher value on having local food growing space, so this could be provided as part of new developments; however, clearly this would not be sufficient to address large-scale food supply issues.

Further considerations

2.57 There are some important points that cut across multiple themes and sectors presented within the climate risk section above:

- A change in one climatic condition, and the associated hazards, can make it more likely that another change or hazard will occur. For example, chronic dry weather will dry surface soils, making them less permeable, and therefore raise the chances of flash flooding when it rains.
- Events might happen to multiple sectors/risk receptors at the same time, which would exacerbate the crisis by impeding our ability to respond in an emergency. For example, power outages during a heatwave might cause heat-related illness to individuals in their homes, but also make it harder for hospitals to receive and treat patients.
- Acute climate events can have long-term knock-on effects, not just on the natural and built environment, but society and the economy. For example, a school shutting down due to overheating would impact families on the day it occurs, but if shutdowns occur regularly, this would impact children's learning overall.[34]
- Climate change impacts will affect different social groups in different ways, with people in lower income brackets, older people, very young children and people in poor health often being the most vulnerable.[35] People may also be more or less exposed to climate risks, for example those working outdoors or living in certain types of housing may be more exposed to overheating risks, and may have different levels of adaptive capacity, for example a homeowner may face less barriers to adapting their home than a tenant. By developing a suitable climate adaptation strategy and policy responses, the Council can help to make this transition as just and equitable as possible as well as targeting interventions where they are most needed.

Implications for the Local Plan

2.58 Not all of the risks listed above are relevant to the Local Plan, but some are, where they merit a design response at the development or individual building level, or in terms of land use planning.[36] To summarise, the nature of key risks and opportunities identified in the tables above are:

- **Heat and cold:** There is a risk of buildings overheating in hot weather, along with other risks to transport, utilities and infrastructure associated with extreme high or low temperatures. Cold weather presents a particular issue for the existing building stock as it is less energy efficient, although cold extremes are expected to reduce under climate change.
- **Wet and dry:** More frequent and severe flooding and intense rainfall can lead to property damage. It also has the potential to overwhelm drainage systems, resulting in sewage discharges and other contamination. At the other end of the spectrum, periods of reduced rainfall and drought could result in water scarcity, supply disruptions, and ground subsidence, along with a higher chance of wildfires.
- **Wind and storms:** Stronger winds could cause physical damage to buildings, the public realm, infrastructure, and the wider landscape. Most climate projections suggest winter windstorms will increase slightly in number and intensity over the UK.
- There are a variety of policies, regulations and guidance documents that promote climate change resilience and adaptation measures in Local Plan policies and the design of new developments. (Please refer to Appendix C for more details.) However, although planners and developers are required to consider climate change impacts, there are not many specific, measurable requirements for how this should translate into policy or design proposals. The main exceptions are strategic and site-specific flood risk assessments, and the overheating and water efficiency requirements set in Building Regulations. Given the serious risks posed by climate change, this represents a ‘gap’ that the Local Plan Update can and should seek to address.

Interacting risks: A case study

A large number of warehouses and distribution centres have been put forward in Huntingdonshire. These will supply a wide variety of goods to the rest of the country. As highlighted in Section 2, the East of England is already one of the warmest parts of the UK; temperatures have already increased in the past few decades and this trend is expected to continue.

As an example of interacting risks, examine the question: **What happens if there is a severe heatwave?**

If buildings are not properly insulated, ventilated, and cooled, they are likely to overheat. In warehouses, staff welfare would be affected, with more people at risk of falling ill. For some employees, particularly those who are older or vulnerable, the health impacts could be severe or even fatal.

In extremely hot weather, more electricity would be needed to power air conditioning and cold appliances. However, this would also be the time when power networks are at higher risk of faults or outages.[i] This would not only impact the buildings and cold storage, but other utilities and infrastructure that underpin logistics supply chains.

Meanwhile, transport networks could be affected, with railway lines buckling, overhead cables sagging, and vehicles overheating or unable to charge. This could prevent goods being distributed from warehouses – if the employees manage to commute to work in the first place.

In a reasonable worst-case scenario, therefore, a severe heatwave in Huntingdonshire could disrupt supply chains not just locally but in other parts of the UK. These might include food, medicines and other vital supplies.

The responses below are considered and, where suitable and realistic to deploy in the Huntingdonshire context, included as appropriately framed policy options in **Document C** (sustainable design). In some cases, they form policy recommendations but in others they are referred to as areas HDC should consider through other means.

Issue	Response	Rationale
Higher temperatures, more frequent and severe heatwaves	Incorporate **green and blue infrastructure** to provide shade and evaporative cooling Incorporate **drought-resistant landscaping** that requires low supplementary irrigation and is designed to act as a natural firebreak **Design and orientation of developments** to provide shade for buildings and the public realm through use of overhangs or balconies, external shutters, street layout, landscaping, shaded external seating areas Building form and layout to promote **natural cross-ventilation** through use of dual-aspects and shallow plans Use **robust materials and construction techniques** in buildings, infrastructure and the public realm that are resilient to higher temperatures and heatwaves	Huntingdonshire is located in one of the warmest regions of the country, and climate projections suggest that average and maximum temperatures will increase significantly in future These measures will help ensure developments are resilient to extreme weather, protect occupant health and wellbeing, minimise exposure to extreme heat, and reduce knock-on impacts on society and the economy
More frequent and severe storms	Use **robust materials and construction techniques** in buildings, infrastructure and the public realm that are resilient to storm events and driving rain	These measures will help ensure developments are resilient to extreme weather

Issue	Response	Rationale
More frequent acute rainfall events and severe flooding, particularly in winter	**Locate developments away from areas at risk of flooding** and incorporate suitable adaptation measures to improve resilience in the event of floods *(Note: this is covered by the Huntingdonshire Local Plan and requirements in the NPPF)* **Design of SuDS** to account for climate change **Flood risk assessments** to consider wider risks and impacts of flooding, including whether the site will be accessible to emergency services and the likelihood of floodwater being contaminated e.g. if there is an industrial or waste facility nearby. *Note:* Safety/ *emergency services access is part of the national flood policy, and so adherence to the NPPF should enable this.*	Evidence suggests that the risk of acute rainfall events and flooding will increase, which is important given that Huntingdonshire already experiences severe flooding
Changes in rainfall patterns, risk of drought	Require developments to achieve very **high levels of water efficiency**, through measures that could include e.g. water efficient fittings and/or greywater recycling Require **on-site rainwater collection** for use in irrigation and toilet flushing **Foundation design** to account for potential increased risk of subsidence. *Note: This falls within the remit of building regulations*	Huntingdonshire is in an area already classed as experiencing 'serious' water stress, and this problem is expected to increase in future due to higher demand and changes in rainfall patterns It is also an area at high risk of subsidence due to clay soil shrinkage
All of the above	Where appropriate, integrate **smart, renewable decentralised energy technologies** and battery storage	To provide greater energy security and resilience

2.59 This assessment also highlights the need for **a broader climate adaptation strategy for Huntingdonshire**, moving beyond land use planning, that covers both acute and chronic risks and sets out the proposed emergency response. As a planning authority and across broader policy remits, HDC will play a key role in coordinating Huntingdonshire's response to climate change.

2.60 Over the coming decades all sectors and communities in the UK will be taking action to reduce their greenhouse gas emissions in line with net zero targets. Any measures taken to reduce emissions should be resilient under the expected future climate and where possible mitigation and adaptation measures should be considered together to take advantage of potential cost savings and co-benefits that may not be realised by addressing the issues separately. Adaptation measures may also present opportunities for meeting other policy goals such as improving health or biodiversity.

Chapter 3

Greenhouse gas emissions in Huntingdonshire

3.1 This chapter establishes the emissions baseline for Huntingdonshire and sets out a series of carbon emissions trajectories appropriate to Huntingdonshire for Business as Usual (BAU) and carbon reduction pathways to 2040 and 2050.

3.2 Establishing an emissions baseline is crucial for effective climate change policy development. It serves as a reference point to measure and track reductions in greenhouse gas emissions over time and is the basis by realistic and achievable carbon budgets can be set.

3.3 The emission trajectories developed consider how emissions may change within Huntingdonshire given the potential impacts of contributions of technology and societal changes with varying levels of ambition locally and/or nationally.

Baseline GHG emissions

Approach

3.4 The approach to compile Huntingdonshire's GHG baseline is in accordance with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories, otherwise known as the GHG Protocol for Cities. The full methodology and data sets used in the compilation of the emission estimates is set out in Appendix A.

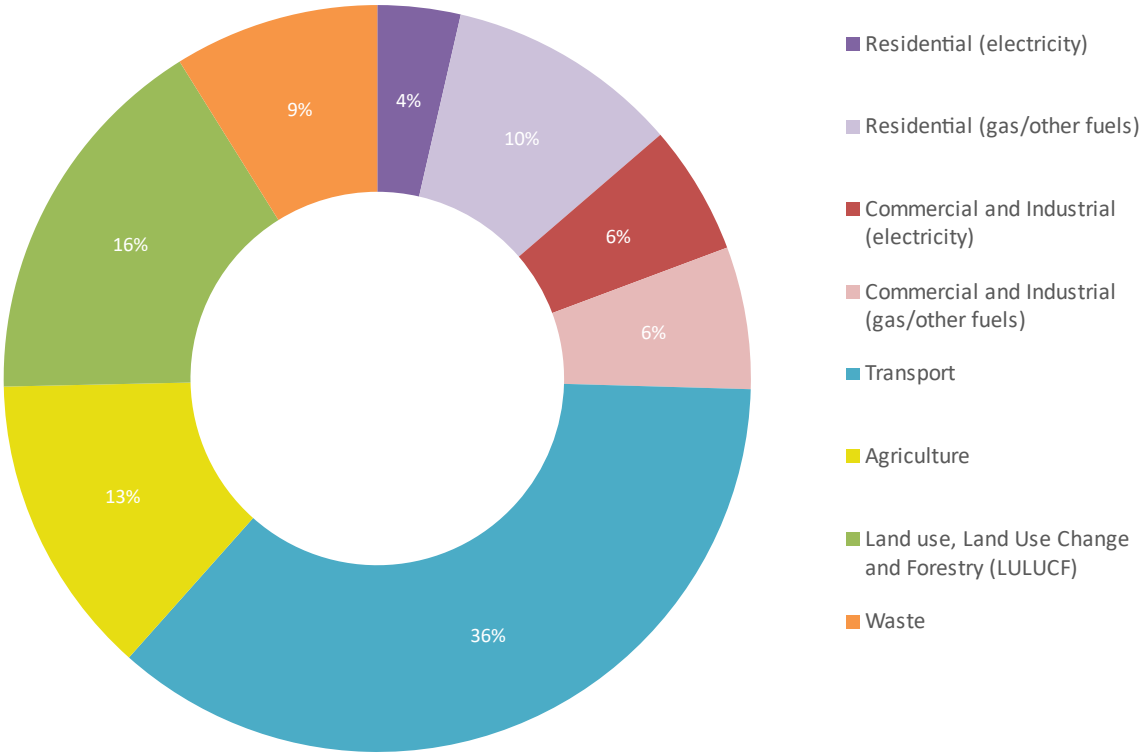
Results and discussion

3.5 Huntingdonshire's area wide GHG emissions for 2021, as estimated in the approach explained in Appendix A , are presented in Figure 13 and Table 1 below. Total emissions are estimated to be 1,805 kt CO_2e.

3.6 The most significant emissions source is the transport sector, comprising 36% of total emissions. A further breakdown of emissions arising from the transport sector included in the baseline is provided in Table 2 and Figure 14.This shows that approximately 60% of the total emissions from road transport arise from travel on A roads. This demonstrates the significance of the A1 and A14 within Huntingdonshire.

3.7 The land use and agriculture sectors are also of notable significance within Huntingdonshire, comprising 16 % and 13 % of emissions, respectively. Nationally in

Figure 13: GHG Emissions in Huntingdonshire, 2021 (CO_2e)



2021 agriculture emissions comprised 11 % of the UK total GHG emissions[37] and land use less than 4 %. This is reflective of the largely rural nature of Huntingdonshire and the substantial areas of high-quality agricultural land within the district. This poses a significant challenge for the decarbonisation of the district, which is further explored in the later part of this report.

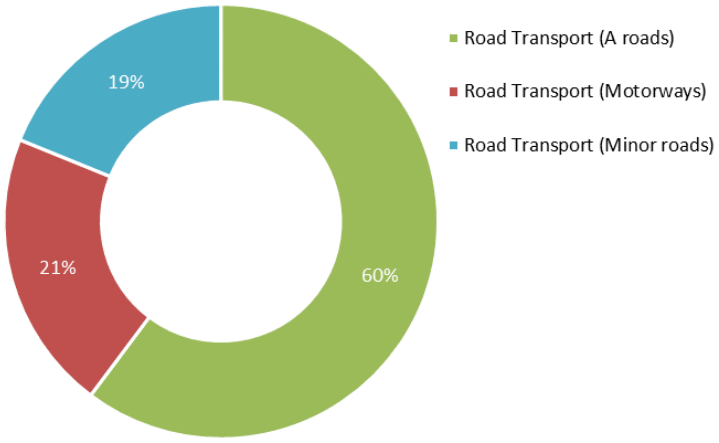
Table 1: Estimated $ktCO_2e$ emissions for Huntingdonshire District in 2021

Sector	2021 emissions (kt CO_2e)	% of total emissions
Residential (electricity)	**65**	**4**
Residential (gas/other fuels)	**182**	**10**
Commercial and Industrial (electricity)	**101**	**6**
Commercial and Industrial (gas/other fuels)	**111**	**6**
Transport	**652**	**36**
Agriculture	**236**	**13**
Land use	**297**	**16**
Waste	**160**	**9**
Total	1,805	-

Table 2: Breakdown of transport emissions by mode within Huntingdonshire, 2021

Sector – Transport breakdown	2021 emissions (kt CO_2e)	% of total emissions in 2021
Transport (buses and rail)	20	1%
Transport (cars/LGVs/motorbikes)	363	21%
Transport (HGVs)	269	15%

Figure 14: Breakdown of transport emissions by road type within Huntingdonshire, 2021



Future GHG emissions

3.8 This section describes potential future GHG emissions trajectories for Huntingdonshire, comparing a 'business as usual' scenario against alternative pathways towards net zero.

Methodology

3.9 This GHG emission trajectory study has been undertaken using the Carbon Scenario Model (CSM). Originally developed for use by local authorities (funded by Resource Efficient Scotland and Sustainable Scotland Network [38]), this Excel-based tool has been adapted by Aether to provide a bespoke modelling solution.

3.10 Within the model, baseline emissions are disaggregated by sector (e.g. buildings, vehicles, waste) and by fuel type (e.g. electricity, gas, petrol). The model is then configured to specify whether each source of emissions will increase or decrease, and by how much, in each scenario.

3.11 Changes in the 'business as usual' scenario are based on the DESNZ Energy and Emissions Projections (EEP). These account for wider trends (e.g. population and economic growth and energy prices) and adopted Government policies (provided that there is confirmed funding and enough detail to support a quantitative assessment of their impacts). Changes in the net zero scenarios are due to additional GHG reduction actions and policies that would need to be adopted either at a national or local level.

3.12 The scale of the impact from GHG reduction measures is informed by an evidence base that includes literature and policy reviews, plus engagement with Huntingdonshire planning officers to understand more about the local context. Two of the key sources of information for this study were (1) the Energy and Emissions Projections published by DESNZ, which quantify the impacts of planned and committed policies, and (2) the technical research underpinning the 6th Carbon Budget.[39,40] The model is then

configured to specify the timeframe over which the changes occur or the actions are implemented.

3.13 The table below summarises the mitigation measures that have been modelled. Appendix B provides more information about the evidence base used to quantify the emissions impact for each measure.

Category	Mitigation measures
Energy use in buildings (domestic, commercial, and public sector)	Reducing heat and electricity demand through a combination of fabric energy efficiency measures, smart heating controls, uptake of LED lighting, energy efficient appliances and heating, ventilation, and air conditioning (HVAC) systems Reducing hot water demand by installing water efficient fittings Connecting some buildings to heat networks, and then converting these to use renewable heat (e.g. electric heat pumps) Buildings that do not connect to heat networks are assumed to switch to electric heating or heat pumps to provide space heating and hot water
Industrial energy use	After energy efficiency measures (see above), switching any remaining industrial fossil fuel use to electricity, green hydrogen, or another low-carbon option
Transport	Avoiding car journeys via behavioural and technological changes, e.g. working from home, carpooling, etc. Replacing a proportion of remaining car journeys with walking, cycling, and public transport Reducing demand for LGV and HGV movements through trip consolidation and changes in logistics Improving HGV efficiency through technology improvements and driver training initiatives Uptake of electric vehicles (cars, vans, buses, and motorcycles) Uptake of biodiesel or green hydrogen (buses and HGVs)
Transport	Electrification of the rail network
Energy system	Electricity grid decarbonisation taking place in line with national projections Massive increase in deployment of roof-mounted solar technologies on suitable buildings

Category	Mitigation measures
Agriculture	Employing low carbon farming practices in soil, livestock, and manure management Reducing the consumption of meat and dairy, thereby reducing both the number of livestock and the area of land needed to feed them (land can then be used to grow food for direct human consumption and/or carbon sequestration projects) Replacing fossil fuels in agricultural machinery with electricity or biofuels
Waste	Preventing waste (including food waste), increasing recycling rates, and implementing landfill bans Employing landfill methane capture technologies and utilising CCS at energy-from-waste (EfW) plants
Land	Increase in carbon sequestration via peatland restoration and tree planting *Please note that Document F of this study provides recommendations on potential offsetting strategy in the local plan along with assessments of current carbon sequestration in the district and peatland condition.*

3.14 Based on all of this information, the model recalculates emissions for each sector and fuel type for each year up until 2050. This process highlights what strategic changes are necessary for Huntingdonshire to reach net zero, quantifies the relative scale of impact from GHG mitigation measures, and indicates any sectors where there is likely to be a shortfall. The results can then be used as an evidence base to prioritise GHG mitigation actions and identify key risks to achieving the target.

3.15 However, it is important to understand that **these are illustrative scenarios, not predictions**. Any estimates of future emissions – particularly ones that extend decades into the future – are associated with significant uncertainty and subject to adjustments as the evidence base improves and unforeseen technology and behaviour changes arise.

Results and discussion

The 'business as usual' (BAU) scenario

Figure 15. Emissions by sector in a BAU scenario

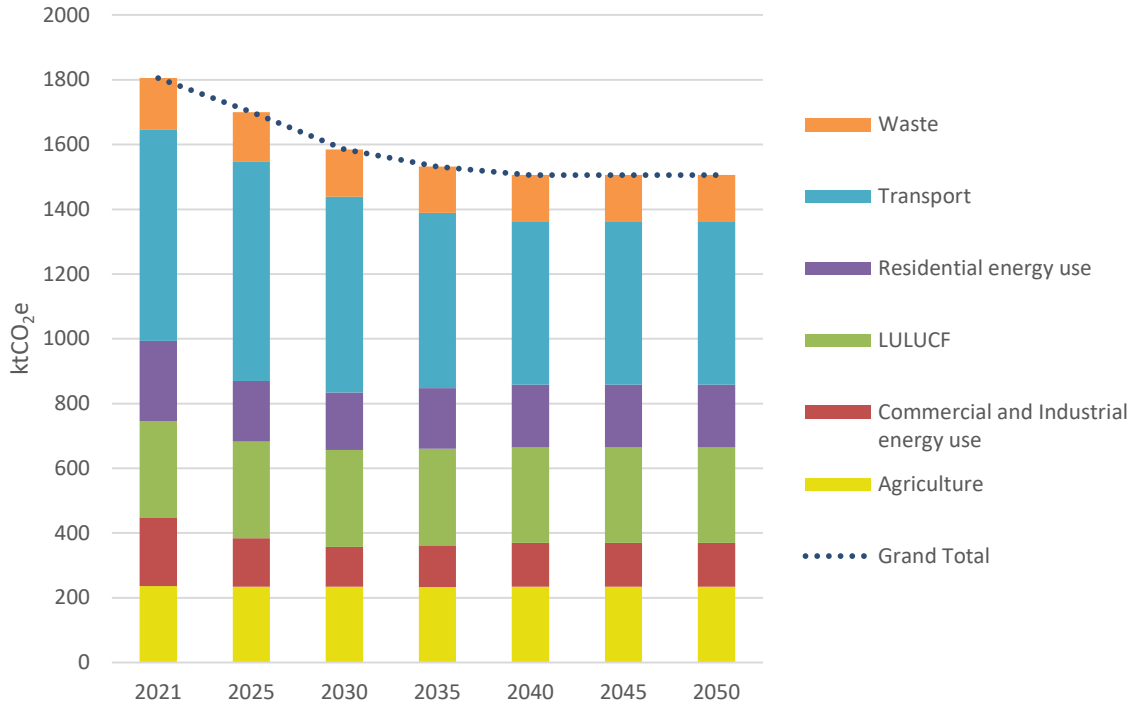


Table 3: Emissions by sector in a BAU scenario (kt CO_2e)

Sector	2021	2025	2030	2035	2040	2045	2050	% Change
Agriculture	236	234	234	233	234	234	234	-1%
Commercial and Industrial energy use	213	150	123	128	136	136	136	-36%
LULUCF	297	299	300	299	294	294	294	-1%
Residential energy use	247	187	178	187	194	194	194	-21%

Transport	652	677	605	542	505	505	505	-23%
Waste	160	154	146	142	142	142	142	-11%
Carbon removals/offsetting	-	-	-	-	-	-	-	-
Total	1,805	1,700	**1,585**	**1,532**	**1,506**	**1,506**	**1,506**	-17 %

3.16 In this scenario, by 2050 emissions would decrease by approximately 17%. Some of this is due to policies that are aimed at improving energy efficiency, particularly in buildings and transport, but the most significant driver of change is associated with the reduction in emissions from grid electricity. This occurs because, over time, it is expected that power generation will shift away from using fossil fuels, and include a higher proportion of renewable electricity. The other significant change that occurs is that there is a shift towards uptake of electric cars and vans, although the rate of EV adoption in the EEP is slower than recent market trends would suggest. As a result, emissions from buildings and transport decrease.

3.17 Clearly, in the BAU scenario, there is a major shortfall against the net zero target. This is not surprising given the current policy landscape; the national Net Zero Strategy has been challenged in court for failing to meet the UK's legally binding GHG reduction commitments. Even so, a 17% reduction by 2050 is low compared with the projections for the UK as a whole. This is a reflection of the current sources of emissions in Huntingdonshire, which has a relatively high contribution from the agriculture and LULUCF sectors in particular. Whereas in buildings and transport, there are behavioural and technological solutions to reduce energy demand and use renewables, agriculture and LULUCF emissions are more challenging to mitigate. Doing so would require large-scale changes in land use, and dietary choices – notably, restoring and re-wetting peatland and reducing meat consumption. They would also rely on changes in agricultural practices, which heavily depend on whether there are appropriate financial incentives or subsidies available.

3.18 The BAU analysis confirms that additional mitigation measures will be needed in order to reach net zero by 2050, including national and local policies and shifts in consumer behaviour. This is explored in the next section.

Decarbonisation scenarios

3.19 Three additional scenarios have been modelled:

- **Scenario 1**, which is a low ambition scenario, largely mirrors the EEP, but assumes that all cars and vans are replaced with EVs by 2050. This reflects the Government's intention to prohibit the sale of petrol and diesel cars and vans after 2035.

- **Scenario 2** aims to achieve maximum GHG reductions by 2040 using currently available technologies and practices. Those would need be adopted quickly to meet a target date 10 years in advance of the national 2050 target, and from that standpoint it is a more ambitious scenario. (It has been assumed that progress in reducing LULUCF emissions is slower because this relies on re-wetting a significant amount of peatland that is currently used to grow crops.) However, Scenario 2 *excludes* technologies that are not yet commercially available, such as green hydrogen-powered HGVs or carbon capture and storage (CCS). This is because they cannot be guaranteed to be available for widespread use prior to 2040. This puts a cap on the scale of reduction that can be achieved.

- **Scenario 3** is intended to broadly align with the CCC's 'Balanced Pathway' for decarbonisation, both in terms of the measures that are adopted and the timeframes when these take place. It includes all of the same measures as in Scenario 2, but spreads them out over a longer timeframe. It also allows for decarbonising HGVs and use of CCS to mitigate residual emissions.

3.20 All scenarios assume that grid electricity will be largely decarbonised by the mid-2030s.

3.21 Even though the scenarios represent different levels of ambition, readers should note that all of them are ambitious and challenging, given the lack of confirmed and funded government policies or other drivers/incentives to go beyond 'business as usual'.

Scenario 1 results

Figure 16. Emissions by sector in Scenario 1

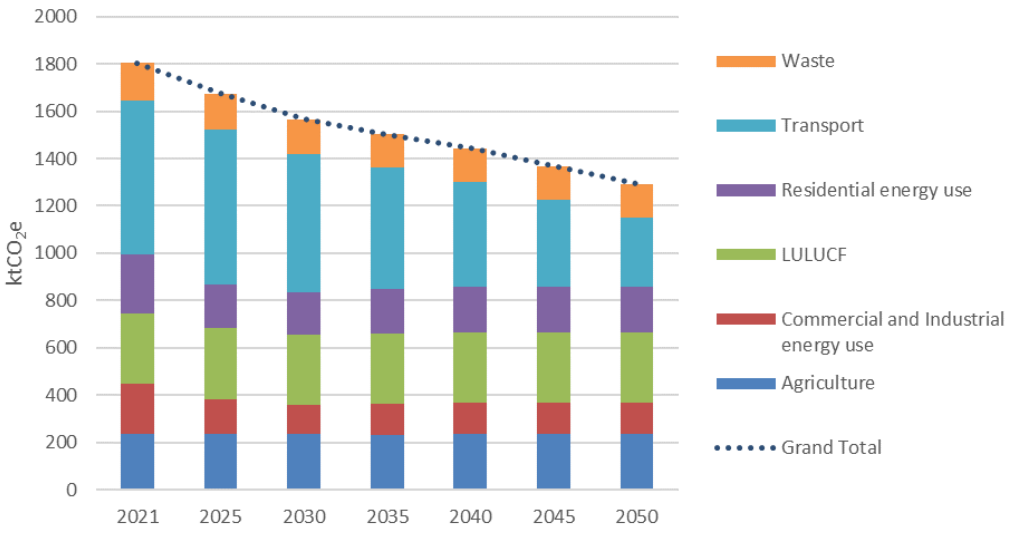


Table 4: Emissions by sector in Scenario 1 (kt CO_2e)

Sector	2021	2025	2030	2035	2040	2045	2050	% Change
Agriculture	236	234	234	233	234	234	234	-1%
Commercial and Industrial energy use	213	150	123	128	136	136	136	-36%
LULUCF	297	299	300	299	294	294	294	-1%
Residential energy use	247	187	178	187	194	194	194	-21%
Transport	652	652	592	514	438	364	292	-55%
Waste	160	154	146	142	142	142	142	-11%
Carbon removals/offsetting	-	-	-	-	-	-	-	-
Total	1,805	**1,675**	**1,572**	**1,504**	**1,439**	**1,364**	**1,292**	-28%

3.22 In Scenario 1, GHG emissions would reduce by approximately 28% by 2050. The additional reduction compared with the BAU scenario is entirely attributable to the uptake of electric cars and vans.

3.23 This highlights the impact of facilitating a shift towards EVs through the provision of adequate charging infrastructure and renewable energy supply. On the other hand, it is important to recognise that some of the emissions from the EV transition – the embodied carbon of producing the vehicles, due to material extraction, manufacturing and shipping – are not included within this model, as they occur outside of the district. The increase in electricity use also puts additional pressure on grid infrastructure, and more renewables are needed to meet demand. Even though the lifecycle emissions of EVs are lower than petrol or diesel vehicles, it is still critically important to adopt measures that promote walking, cycling and public transport.

Scenario 2 results

Figure 17. Emissions by sector in Scenario 2

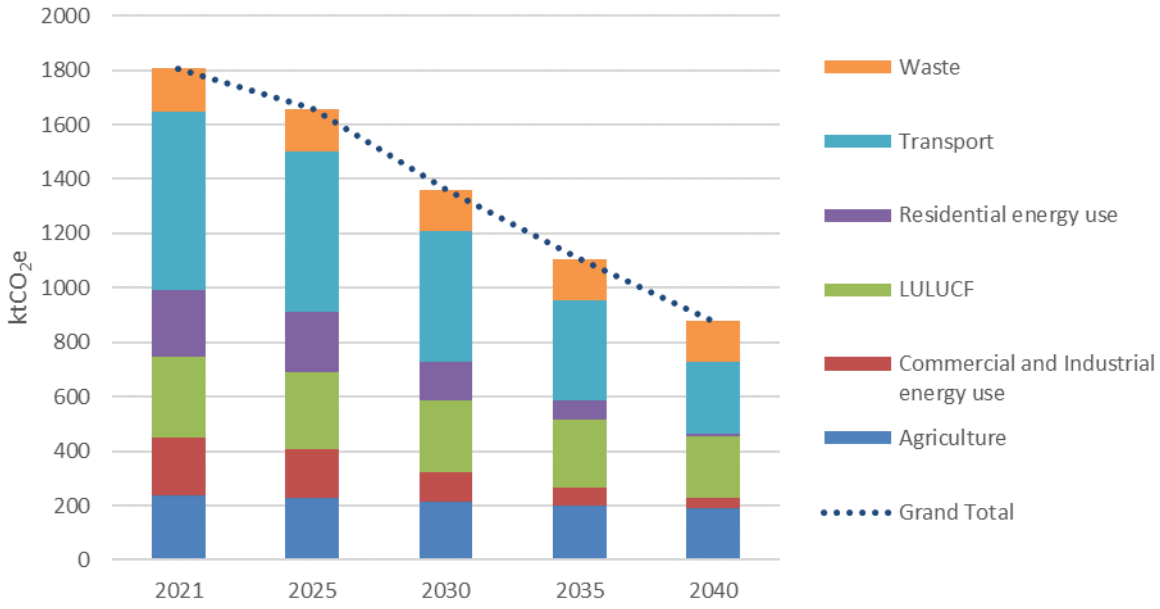


Table 5: Emissions by sector in Scenario 2 (kt CO_2e)

Sector	2021	2025	2030	2035	2040	% Change
Agriculture	236	226	214	202	190	-20%
Commercial and Industrial energy use	213	192	128	68	31	-87%
LULUCF	297	283	265	247	230	-23%
Residential energy use	247	231	156	74	4	-100%
Transport	652	592	491	371	259	-61%
Waste	160	157	154	150	146	-13%
Carbon removals/offsetting	-	-	-	-	-	-
Total	1,805	**1,682**	**1,408**	**1,112**	**859**	**-53 %**

3.24 In Scenario 2, emissions decrease by roughly 53% by 2040. As shown on the graph, emissions from domestic buildings are largely mitigated through a combination of energy demand reduction measures and phasing out fossil fuels for space heating and hot water. The same applies to non-domestic buildings, but there are some residual emissions from industrial energy use, assuming that some (but not all) manufacturing and industrial processes can switch to electricity or another zero-emission technology within that timeframe.

3.25 In the transport sector, emissions from cars and vans are mitigated through demand reduction measures and a shift to EVs, as in the BAU scenario. (Recognising that there is limited public transport provision in Huntingdonshire, it has been assumed that there are relatively fewer opportunities to use buses or rail in the District compared with some other areas.) However, nearly half of emissions in this sector are associated with HGVs, which are assumed to achieve some improvements in efficiency, but remain predominantly diesel-powered by 2040. This limits how much the transport sector decarbonises within this timeframe.

3.26 Emissions in the agricultural sector decrease by roughly 20%. This is lower than what the CCC anticipates may be possible by 2050 (the CCC's Balanced Pathway assumes an overall 36% reduction) which is intended to reflect the shorter timeframes involved. However, this is still considered ambitious, as there have been minimal changes in emissions from this sector since 2008.[41] There would also need to be changes in agricultural practices (for example, farming crops that can grow in wetlands, which is known as 'paludiculture') to enable very large-scale peatland restoration. It is worth noting, that whilst the specific impacts of the project have not been quantified, Huntingdonshire District Council is an implementing partner in the Great Fen project **[See reference** 42**]**, which is an ambitious conservation initiative aimed at restoring a vast area of fenland between Peterborough and Huntingdon.

3.27 The waste sector is considered 'hard-to-abate' because for many waste streams the only management options are landfill or incineration, both of which produce significant GHG emissions. Since Scenario 2 excludes CCS, there is only a small reduction in emissions from waste, which is largely achieved through measures to avoid waste and increase rates of recycling and composting.

3.28 From a scientific perspective, it is not the annual net emissions in 2050, but the *cumulative* emissions up until that point and beyond, that will determine the scale of

global climate change that occurs. This supports the case for taking strong action as soon as possible, while also helping communities prepare for the changes that are already inevitable.

3.29 To align with the trajectory set out in Scenario 2, the district would need to adhere to the following carbon budgets, which represent the total emissions that can occur within a given 5-year period. It should be noted, that this scenario does not achieve net zero, and delivers a 53% reduction on baseline emissions.

Table 6: Carbon budgets – scenario 2

Time period	2025-2029	2030-2034	2035-2039	2040
$MtCO_2e$	7,893	6,419	5,044	859

3.30 These should not be interpreted as binding targets, but instead represent ‘stepping stones’ on the route to net zero. Readers should also note that these carbon budgets do not align with national carbon budgets, because they reflect Huntingdonshire’s current emissions profile and are tailored to local circumstances.

Scenario 3 results

Figure 18. Emissions by sector in Scenario 3

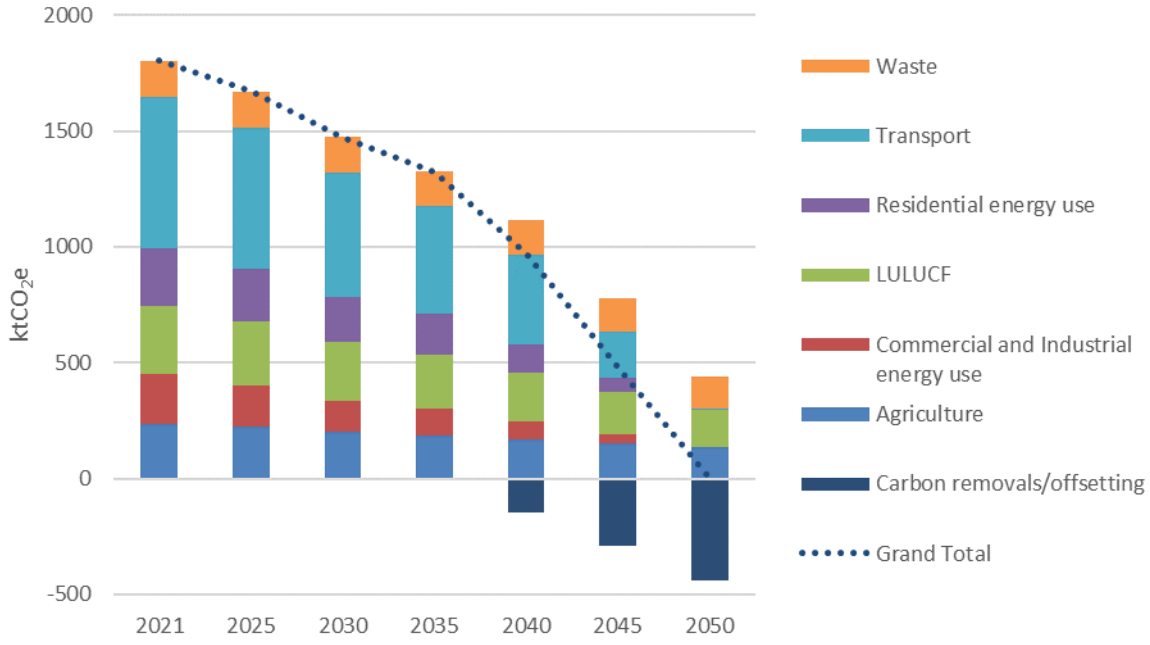


Table 7: Emissions by sector in Scenario 3 (kt CO_2e)

Sector	2021	2025	2030	2035	2040	2045	2050	% Change
Agriculture	236	222	204	186	169	151	133	-44%
Commercial and Industrial energy use	213	193	151	118	74	36	1	-100%
LULUCF	297	279	255	232	209	185	162	-46%
Residential energy use	247	233	204	181	118	59	1	-100%
Transport	652	611	544	462	386	193	1	-100%

Sector	2021	2025	2030	2035	2040	2045	2050	% Change
Waste	160	157	154	150	146	143	139	-13%
Carbon removals/off setting	-	-	-	-	(145)	(291)	(436)	-
Total	1,805	**1,695**	**1,512**	**1,329**	**957**	**475**	**1,805**	**-100%**

3.31 In Scenario 3, GHG emissions reduce by 76% by 2050. For the reasons explained above, the remaining emissions are associated with the waste, agriculture and LULUCF sectors. These would have to be mitigated through the use of CCS technologies or some other form of carbon removals/offsetting to achieve net zero emissions, as shown on the graph. Enhanced paludiculture, which is the sustainable cultivation of wetland crops on peatlands, is currently being trialled within Huntingdonshire. This has the potential to reduce the greenhouse gas emissions associated with peatland degradation, however no quantitative impact studies have been performed on the overall potential of this approach.

3.32 The measures that are modelled in Scenario 3, including the reliance on carbon removal technologies, align with the assumptions that are used to develop the Government's legally binding carbon budgets.[43] However, the availability of carbon removal options by 2050 is uncertain and this clearly poses a risk to achieving net zero. Moreover, the development of CCS technologies is outside of local authorities' ability to control or influence. Therefore, as a general principle local authorities should focus more on accelerating the GHG reductions that *can* be achieved within their local area, rather than solely focusing on net zero as an end goal.

3.33 In the same way as described above for scenario 2, carbon budgets have been derived to align with the trajectory set out in Scenario 3. These are 'stepping stones' on the route to net zero the district would need to adhere to keep pace with reductions as illustrated in scenario 3. The budgets represent the total emissions that can occur within a given 5-year period.

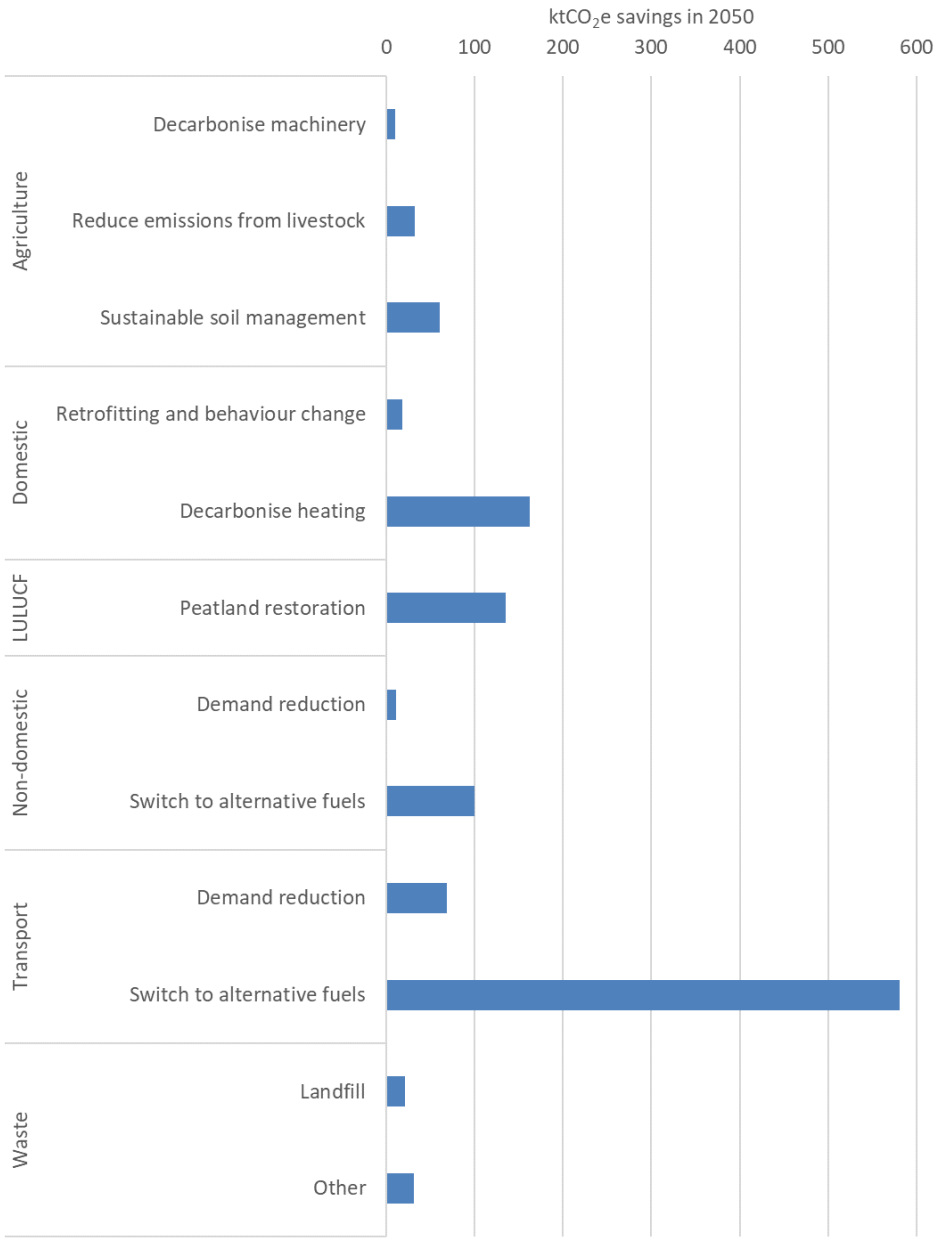
Table 8: Carbon budgets – scenario 3

Time period	2025-2029	2030-2034	2035-2039	2040-2044	2045-2050
$MtCO_2e$	7,933	7,074	5,911	3,880	1,455

3.34 These should not be interpreted as binding targets, but instead represent 'stepping stones' on the route to net zero. Readers should also note that these carbon budgets do not align with the national ones, because they reflect Huntingdonshire's current emissions profile and are tailored to local circumstances, as explained previously.

3.35 The chart below shows the relative impacts of different mitigation measures in Scenario 3.

Figure 19. Relative impacts of GHG mitigation measures in Scenario 3 (excluding CCS)



Implications for the Local Plan

3.36 It is commendable that HDC has recognised the urgent need to respond to the climate emergency and push for local action. There is a limit to what can be achieved through local measures, recognising that HDC is not in control of all emissions within

the district. Nonetheless, there are some clear steps the Council can take within the Local Plan process to ensure that the policy environment supports climate change mitigation and removes obstacles as much as possible.

3.37 The responses below are considered and, where suitable and realistic to deploy in the Huntingdonshire context, included as appropriately framed policy options in **Document C** (sustainable design) and **Document E** (renewables). In some cases they form policy recommendations but in others they are referred to as areas HDC should consider through other means.

Issue	Response	Rationale
Reduce emissions from existing buildings (new development is addressed separately, below)	**Loosen or remove planning restrictions to make it easier to install energy efficiency measures and building-mounted renewables**, including in conservation areas and listed buildings (provided that this would not harm features that are integral to their listed status). **Require energy efficiency upgrades to be undertaken alongside other works**. Also require extensions and conversions to demonstrate that the works will not result in any net increase in energy use – so, for example, a new extension would have to be highly energy efficient and/or meet all of its residual energy demands with on-site renewables. *Note that is only applicable for extensions where planning permission is required.* **Give more weight to climate change** and energy efficiency measures when determining applications.	Existing buildings comprise a significant portion of current emissions, and the Local Plan needs to use all available levers to promote decarbonisation in this sector

Issue	Response	Rationale
Promote a step-change in uptake of large-scale renewables	**Adopt a presumption in favour of large-scale renewable energy developments** provided that they meet minimum criteria **Decide how to balance the benefits of large-scale renewables against the potential negative visual or landscape impacts** – bearing in mind that visual impacts are subjective and that Huntingdonshire District Council has voted to declare a climate emergency which requires an immediate response **Consider issuing Local Development Orders or expanding Permitted Development Rights** to allow schemes to progress more easily (including standalone wind/solar farms and other solutions like installing PV canopies over parking lots or on the roofs of industrial buildings)	These actions are critical to support decarbonisation of the electricity grid, and enable the phase-out of fossil fuels. Without this, the shift to electrification of buildings and transport will not deliver the necessary GHG reductions for Huntingdonshire (and the country as a whole) to meet its targets
Reduce demand for private transport	**Develop a long-term strategy for reshaping the built environment over time**, so that the public realm prioritises active travel and public transport, and so that the mix and density of uses enables people to access facilities within an easy walking/cycling radius if they choose to do so. This is sometimes referred to as the 20-minute neighbourhood concept.	Even though individual development proposals may not have an impact on demand for private transport, they can have a beneficial *cumulative* impact

Issue	Response	Rationale
Facilitate the shift to EVs and low emission vehicles	**EV-Ready Homes**: Require new residential developments to include provisions for EV charging, such as pre-wiring or the installation of home charging points in garages or driveways. **Commercial and Industrial Sites: Require new commercial and industrial developments to include EV charging points** in their parking facilities, considering future expansion. Continue to engage with stakeholders to ensure that there is adequate charging infrastructure within the District	This would make it easier for people to choose low-emission vehicles
New development	**Strongly discourage 'demolish and rebuild' schemes** and adopt a presumption against demolition except where the applicant can show that it is justified, having given regard to the whole life-cycle carbon impacts. **New developments must have low embodied carbon** and **operate with net zero emissions** from the outset, rather than simply being 'net zero ready' To the greatest extent possible, **choose site locations that have access to good public transport** links **Require large-scale developments to deliver a density and mix of uses** to make it easier for people to access shops, schools etc. by walking or public transport *Note that Document D from this study provides an analysis of emissions from new development based on a number of spatial scenarios and policy options.*	New developments tend to increase local emissions, which is contrary to the aim of decreasing emissions These measures will help to mitigate that increase

Document B: Position statement and analysis of GHG emissions

Chapter 4
Conclusion

4.1 This report has established the evidence base upon which further documents within the Carbon and Climate Study will form policy recommendations to support Huntingdonshire District Council to contribute to the transition to net zero and adapt to climate change through the Local Plan Update.

4.2 The analysis of climate risks in Huntingdonshire presented in full in this report concludes that rising temperatures and more frequent intense rainfall days put Huntingdonshire at risk of both water scarcity and drought, as well as severe rainfall events and flooding. This combination therefore increases the likelihood of extreme weather events at both ends of the spectrum and may result in cascading impacts in the local area.

4.3 Recommended responses for HDC, based on the prioritised risks in the UK Climate Change Risk Assessment (CCRA)[1], are given in this report. They map the highlighted issues, such as 'higher temperatures, more frequent and severe heatwaves' to suggested responses, with an associated rationale.

4.4 There are climate change resilience and adaptation measures that should be considered within the Local Plan Update with respect to the design of new development. However, the assessment has also highlighted the need for a broader climate adaptation strategy for Huntingdonshire, moving beyond land use planning, that covers both acute and chronic risks and sets out the proposed emergency response.

4.5 An analysis of baseline emissions in Huntingdonshire identified key challenges in achieving net zero within the district. A significant portion of emissions comes from agriculture and land use—sectors that are difficult to reduce due to the need for large-scale changes in land management, agricultural practices, and dietary habits, or reliance on technologies like green hydrogen and carbon capture, which are not yet commercially available.

4.6 Emission pathways to 2040 and 2050 were generated which consider how emissions may change within Huntingdonshire given the potential impacts of contributions of technology and societal changes with varying levels of ambition locally and/or nationally.

4.7 The 'business as usual scenario' demonstrates a major shortfall against the net zero target, with an observed 17% reduction in emissions from the baseline driven by the decarbonisation of the electricity grid. The BAU analysis confirms that additional mitigation measures will be needed in order to reach net zero by 2050, including national and local policies and shifts in consumer behaviour.

4.8 Three decarbonisation scenarios were modelled to demonstrate the impacts of a range of ambition in climate mitigation action, both locally and nationally. Scenario 1, a low ambition scenario which mirrors the national energy projections and assumes that cars and van are replaced with EVs, achieves a 28% reduction by 2050. Scenario 2, which demonstrates maximal GHG reductions by 2040 with only known and commercially available technologies, achieves a 53% reduction by 2040. Scenario 3, which broadly aligns with the CCC's 'Balanced Pathway' for decarbonisation, achieves a 76% reduction by 2050, with the remaining emissions mitigated through the use of CCS technologies or some other form of carbon removals/offsetting to achieve net zero emissions.

4.9 The emission pathways developed all require significant and deep emission reductions driven by cross-sectoral mitigation actions. Carbon budgets have been developed which represent the total emissions that can occur within a given 5-year period whilst aligning with emission scenarios.

4.10 The Local Plan is limited in its ability to drive emission mitigation action for the sectors within the emissions baseline, however this report establishes suggested responses that HDC can take within the Local Plan process to ensure that the policy environment supports climate change mitigation and removes obstacles as much as possible. These responses are considered in further documents of this evidence base, forming policy recommendations that also take in to account their applicability and deliverability in the Huntingdonshire context.

In conclusion, there are numerous actions HDC can take to ensure that the Local Plan contributes to climate change mitigation and adaptation. **Documents C** (on sustainable design), **D** (on spatial strategies), **E** (on renewable energy) and **F** (on offsetting and sequestration) discuss the best ways forward for HDC to address mitigation and adaptation through new policy agendas.

Appendix A

GHG emissions baseline methodology

A.1 The following sections set out the methodology for the establishment of the emissions baseline for Huntingdonshire. It introduces the key concepts of emissions accounting and presents the input data used in the calculations. It is broken down into the following sections:

- Establishing the scope of the emissions baseline
- Input data
- Emissions calculation

A.2 The most widely used set of standards for local carbon accounting are those produced under the Greenhouse Gas Protocol; of relevance to this project is the Global Protocol for Companies and Organizations and Cities [44].

A.3 A **GHG inventory** is a dataset which presents estimates of emissions of various greenhouse gases from a wide range of activities in an organisation, country or other geographical area. A **GHG baseline**, is the GHG inventory for a specific year chosen by the reporting organisation from which progress in decarbonisation is monitored.

1. Establishing the scope of the emissions baseline

A.4 An important first step in the establishment of any emissions baseline is defining the scope of emission sources to cover. In the case of the area wide baseline, this is well defined.

A.5 The baseline compiled for Huntingdonshire District Council is a 'territorial-based emission inventory'. This type of emissions accounting is conventionally used for

national carbon accounting, such as the UK's national inventory. It is geographically bounded, so limited to emission sources within specific boundaries. This inventory follows a sector-based approach, splitting emissions by the activity that caused them e.g. emissions from agriculture, transport, electricity generation etc.

Geographical Boundaries and time range

A.6 The geographical, operational and time-related scopes of the targets are outlined below:

- The geographical boundary is the areas covered by the administrative areas of Huntingdonshire District Council
- The baseline for data is the 2019 calendar year. Calendar year is used as this matches the timeframe of the activity data used as input to the emission calculation.
- The unit of measurement is CO_2e. CO_2e, or carbon dioxide equivalent, is a standardized measure used to compare the emissions of various greenhouse gases based on their global warming potential (GWP). Different greenhouse gases, such as methane (CH_4) and nitrous oxide (N_2O), have varying abilities to trap heat in the atmosphere. CO_2e expresses the impact of each of these gases in terms of the amount of CO_2 that would have the same warming effect over a specific time period, usually 100 years.

Operational Boundary

A.7 An operational boundary defines the emission sources that are included in the reporting. Emission sources are divided into three scopes (see Table 9 on the next page). Setting a clear operational boundary defines which emission sources are included in the reporting and which ones are excluded.

A.8 The most widely used set of standards for carbon accounting are those produced under the Greenhouse Gas Protocol. Of particular relevance to this project is the Global Protocol for Community-Scale Greenhouse Gas Emission

Inventories, otherwise known as the GHG Protocol for Cities. This standard describes the emission sources by “scopes” which should be considered as part of a city-wide carbon accounting process; the definitions of the three scopes are shown in Table 9 below. The diagram (Figure 1) shows the activities that are included in the Huntingdonshire District Council area baseline.

Table 9 City carbon accounting scope definitions from the GHG Protocol for Cities

Scope	Definition	Sources to consider
1	GHG emissions from sources located within the district	• Fuel combustion (for energy and transportation) within the district boundary • Fugitive emissions from fossil fuels extraction and processing • Solid waste disposal (in boundary) • Biological treatment of waste (in boundary) • Incineration and open burning of waste (in boundary) • Wastewater treatment (in boundary) • Industrial processes occurring within the boundary • Product use occurring within the district boundary • Livestock emission sources • Land use emission sources • Aggregate sources and non-CO_2 emission sources on land (e.g., fertilizer application and rice cultivation)
2	GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the district boundary	• Consumption of grid-supplied energy consumed within the district boundary (energy and transportation)

Scope	Definition	Sources to consider
3	Other GHG emissions that occur outside the district boundary as a result of activities taking place within the district boundary	• Transmission and distribution losses from grid-supplied electricity • Well-to-tank emissions for stationary fuels, transportation fuels and electricity generation • Emissions from transboundary transportation • Solid waste disposal of waste transported out of boundary • Biological treatment of waste transported out of boundary • Incineration and open burning of waste transported out of boundary • Wastewater transported out of boundary to be treated

A.9 There are various reasons why some emissions are excluded from the scope of the area-wide baseline:

- **Limited data availability at district scale:**
  - **Off-road machinery**: Data on fuel consumption are not available. Given the transient nature of e.g. construction equipment, the impact of actions taken at a district level are unlikely to be representable in forecasts (i.e. to 2030). (*Note that agricultural machinery is included within the Agriculture sector*)
  - **Waterways:** While there are emissions from river traffic within the district boundaries, data is not readily available.
  - **Aviation:** There are some aviation sites such as Peterborough Business Airport as well as several private airfields/ grass strip aerodromes such as Little Staughton and Sibson. However, emissions from aviation from these sites have not been included in the scope due to the challenges associated with gaining data from these private airfields.
- **Limited relevance to district emissions:**
  - **Industrial processes**: Energy consumption at industrial sites is contained within the BEIS energy data although other process emissions are not. Process emissions include arise from the chemical and physical transformations of raw materials into final products. Unlike energy-related emissions, which come from

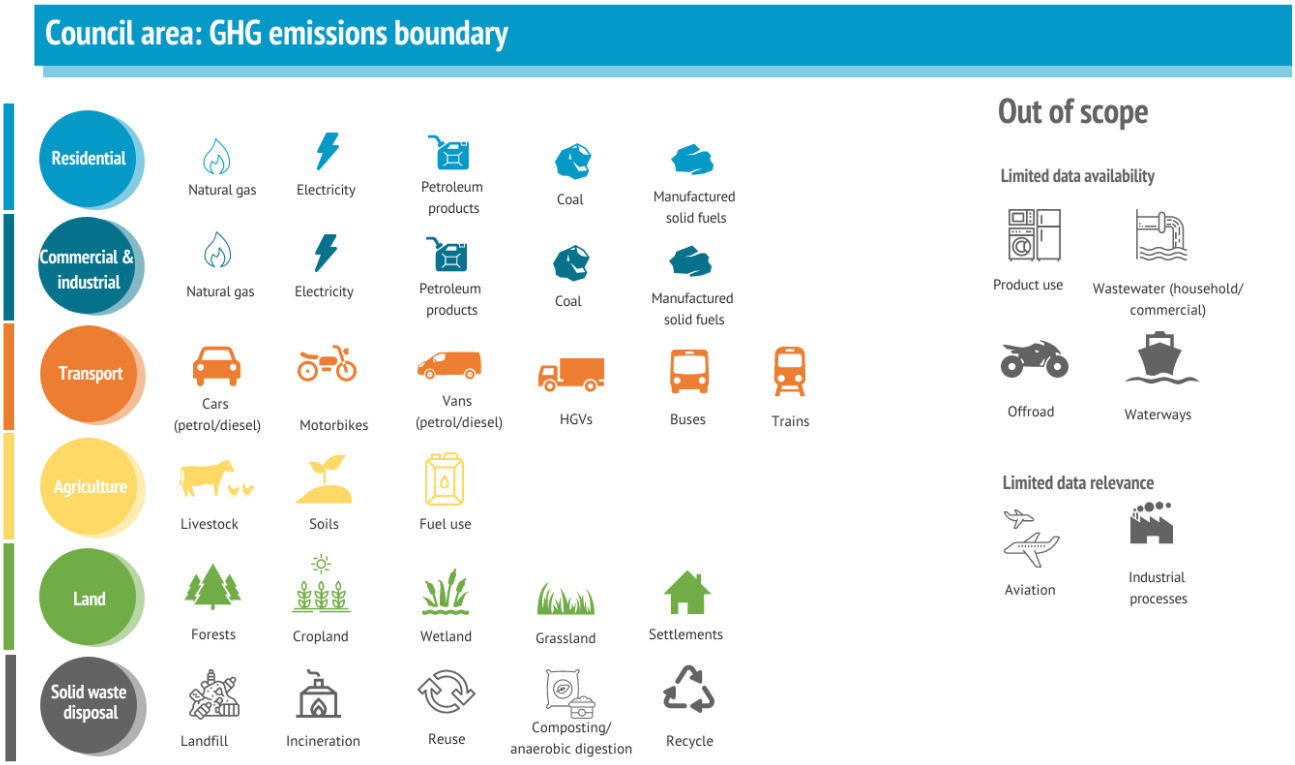
burning fuels for energy, process emissions are a byproduct of the industrial process itself. For example, significant emissions from this sector arise from cement production facilities, primary metal production, glass production etc.

- **Product Use**: data are scarce and uncertain. Emissions of concern in this sector are fluorocarbons used in electronics production and lubricants/paraffin waxes for non-energy products, neither of which are considered a significant source in Huntingdonshire.

- **Other Scope 3 emissions excluded:**

A.10 The emissions related to the procurement of goods and services has been excluded from the District scope for the baseline described in this report. A full accounting of all goods and services purchased within the districts would likely to result in carbon emissions far exceeding all other sources[45.] However, estimation of such sources is highly complex and uncertain and tends to be possible only on an average purchase or product type basis. Thus, future changes in consumption patterns, e.g. towards “greener” products, will tend not to be reflected in that type of emissions calculations.

Figure 20 Scope diagram for the district wide emissions baseline



2. Input Data

A.11 Activity data was collected from both regularly published datasets of sub-national statistics and directly from Huntingdonshire District Council for the area wide baseline.

Table 10: Activity data and emission factor sources

Source number	Data Source	Sector	Description
1	Department for Business, Energy and Industrial Strategy (BEIS): 'Sub-national electricity sales and numbers of customers'	Grid electricity; domestic economy, domestic standard and non-domestic	This dataset provides energy consumption data for domestic and commercial electricity use
2	Department for Business, Energy and Industrial Strategy (BEIS): 'Road transport energy consumption at regional and local authority level'	Bus travel, diesel car travel, petrol car travel, motorbike travel, HGV, LGV diesel and LGV petrol	This dataset provides fuel consumption data (diesel and petrol) for road vehicles within the District.
3	Department for Business, Energy and Industrial Strategy (BEIS): 'Sub-national weather uncorrected gas sales and numbers of customers'	Natural gas; domestic and non-domestic	This dataset provides energy consumption data for domestic and commercial gas use

Source number	Data Source	Sector	Description
4	Department for Business, Energy and Industrial Strategy (BEIS): 'Sub-national estimates of non-gas, non-electricity and non-road transport fuels'	Petroleum, coal and manufactured solid fuels consumption	This data set provides consumption data for other fuels, non-gas and non-electricity for domestic, commercial, industrial and non-road transport use.
5	Department for Business, Energy and Industrial Strategy (BEIS): 'UK local authority and regional carbon dioxide emissions national statistics'	District emissions from land use, agriculture and waste	This dataset provides net CO_2e emissions from land use, land use change and forestry (LULUCF), agriculture and waste
6	Department for Business, Energy and Industrial Strategy (BEIS): 'Greenhouse gas reporting: conversion factors' 2019 - 2021	All sectors	This dataset provides emission factors for all sources covered in this inventory.

3. Emissions calculation

A.12 The standard approach to estimate GHG emissions is by multiplying activity data by an emission factor associated with the activity being measured (Equation 1).

GHG emissions = Activity Data * Emission Factor

A.13 Emission Factor - This is the emissions per unit of activity, which usually comes from scientific literature. Emission factors may be quantified in a number of ways; for processes that strictly follow clear chemical or mass balance reactions they can be developed using an understanding of stoichiometry, or

they can be developed empirically through statistical sample measurements. For example, EFs for stationary energy emissions are generally estimated based on sample measurements of the average carbon content of the fuel.

A.14 Activity Data - This is a measure or estimate of the activity which is taking place, such as tonnes of fuel or miles driven. This data typically comes from national statistical datasets or from the organisation in question, in this case Huntingdonshire District Council.

Example Calculation

- Activity Data

Natural gas consumption in an organisation's operated building: 98,500 kWh

- Emission Factor

Gross natural gas EF (direct): EF: 0.18385kg CO_2e/kWh

- Calculation

Multiply kWh activity by the fuel specific EF to get total emissions from natural gas consumption

Total emissions: 98,500 x 0.18385= 18,109 kg CO_2e

A.15 The impact of different gases on the atmosphere is complex and depends on their duration and behaviour in the atmosphere. For example, methane produces 28 times more warming effect than an equivalent amount of carbon dioxide over an equivalent time period, known as the Global Warming Potential (GWP). In order to simplify this complicated situation, data for all GHGs are translated into a single comparable unit, carbon dioxide equivalence, or CO_2e, usually measured in kilogrammes or tonnes. Therefore, one tonne of CO_2e has the global warming impact of one tonne of CO_2 but it can be a mix of any of the seven Kyoto gases:

- Carbon dioxide (CO_2)

- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

A.16 Emissions are reported as a mass of CO_2 equivalent, CO_2e. Whilst less abundant than CO_2, other GHGs such as methane (CH4) and nitrous oxides (N_2O) have a greater warming effect than CO_2. A Global Warming Potential (GWP) factor is applied to these GHGs to convert to CO_2e.

Quality Principles

A.17 The GHG Protocol Accounting and Reporting standard also sets out a series of principles which are intended to guide GHG accounting towards a fair and accurate account of GHG emissions. These are:

- Relevance: Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users, both internal and external to the company
- Completeness: Account for and report on all GHG emission sources and activities within the chosen inventory boundary. Disclose and justify any specific exclusions.
- Consistency: Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series
- Transparency: Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.

- Accuracy: Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

A.18 Complying with these principles will provide a very high standard of GHG accounting.

Appendix B

Modelling future GHG emissions

B.1 A list of assumptions and references is provided in the table below.

Category	Mitigation measures	Notes	Tailoring assumptions to Huntingdonshire
Energy use in buildings (domestic, commercial, and public sector)	Reducing heat and electricity demand through a combination of fabric energy efficiency measures, smart heating controls, uptake of LED lighting, energy efficient appliances and heating, ventilation, and air conditioning (HVAC) systems Reducing hot water demand by installing water efficient fittings Connecting some buildings to heat networks, and then converting these to use renewable heat (e.g. electric heat pumps) Buildings that do not connect to heat networks are assumed to switch to electric heating or heat pumps to provide space heating and hot water	Energy consumption by end use is taken from the Energy Consumption in the UK (ECUK) End Use Tables, Table U2. The impacts of behavioural change and energy efficiency measures aimed at reducing space heating demands, and heating system replacements, are as per the CCC's Building Sector Summary report: - Energy efficiency: 12% reduction in energy demand (see Table M3.3) - Typical boiler efficiency: 85% (see table B3.3) - Typical heat pump efficiency: 283% (see table B3.3) - Hot water: 5% reduction through water efficiency measures (see p. 10) The impacts of efficiency measures in the commercial and industrial sectors are based on trends over the past 10 years as set out in the DESNZ sub-national electricity consumption statistics which indicate a c. 4% reduction in electricity use.	Due to the rural nature of the District it has been assumed that most of the heating system replacements would comprise individual heat pumps or direct electric heating, rather than district heat networks.

Category	Mitigation measures	Notes	Tailoring assumptions to Huntingdonshire
Industrial energy use	After energy efficiency measures (see above), switching remaining industrial fossil fuel use to electricity, green hydrogen, or another low-carbon option	Scenario 1: not modelled Scenario 2: 50% of residual fuel use is assumed to switch – this is an indicative estimate as a detailed analysis of industrial sub-sectors in Huntingdonshire is outside the scope of this study Scenario 3: 100% of residual fuel use is assumed to switch	It is understood that RAF Wyton is looking to intensify their activities. However, this was not modelled due to lack of data to quantify the impacts.

Category	Mitigation measures	Notes	Tailoring assumptions to Huntingdonshire
Transport	Avoiding car journeys via behavioural and technological changes, e.g. working from home, carpooling, etc. Replacing a proportion of remaining car journeys with walking, cycling, and public transport Reducing demand for LGV and HGV movements through trip consolidation and changes in logistics Improving HGV efficiency through technology improvements and driver training initiatives Uptake of electric vehicles (cars, vans, buses, and motorcycles) Uptake of biodiesel or green hydrogen (buses and HGVs)	Impacts of measures are as per the CCC Surface Transport Summary report: - Reducing demand for car and motorcycle journeys: 15% reduction (p. 10 suggests a 12-34% reduction in car kilometres is achievable by 2050; 15% has been used as a conservative assumption recognising the dispersed nature of settlements in Huntingdonshire) - Reducing demand for LGV journeys: 3% (see p. 48) - HGV efficiency improvements: 10% (p. 15 says up to 21% is feasible but have used a conservative assumption given the planned new logistics centres) The relative efficiencies of different vehicle types have been taken from the DESNZ GHG Conversion Factors for Company Reporting and used to calculate the reduction in fuel use due to switching to EVs.	We have assumed slower uptake of zero emission HGVs than indicated by the CCC, since this will be a challenge to influence at the local level. Due to the nature of Huntingdonshire's highly dispersed villages, more conservative assumptions have been made for the opportunities to reduce demand on private vehicle use.
Transport	Electrification of the rail network	Assumed to be complete by 2050	N/a

Category	Mitigation measures	Notes	Tailoring assumptions to Huntingdonshire
Energy system	Electricity grid decarbonisation taking place in line with national projections Massive increase in deployment of roof-mounted solar technologies on suitable buildings	Treasury Green Book, Data Table 1	It is noted that Huntingdonshire has a high number of conservation areas and c. 2,200 listed buildings which might result in a lower uptake of PV in these areas. However, this does not have a significant impact on the results and has therefore not been modelled. The impact of local renewable uptake is already reflected in assumptions about national grid decarbonisation.

Category	Mitigation measures	Notes	Tailoring assumptions to Huntingdonshire
Agriculture	Employing low carbon farming practices in soil, livestock, and manure management Reducing the consumption of meat and dairy, thereby reducing both the number of livestock and the area of land needed to feed them (land can then be used to grow food for direct human consumption and/or carbon sequestration projects) Replacing fossil fuels in agricultural machinery with electricity or biofuels	As per the CCC Balanced Pathway. Refer to the Agriculture and Land Use Summary Report for more information.	This has been tailored to reflect the different split of emissions from livestock versus agricultural soils in Huntingdonshire compared with the country as a whole.

Waste	Preventing waste (including food waste), increasing recycling rates, and implementing landfill bans Employing landfill methane capture technologies and utilising CCS at energy-from-waste (EfW) plants	As per the CCC Balanced Pathway. Refer to the Waste Summary Report for more information.	An application for a new Energy from Waste (EfW) plant is expected within Huntingdonshire. Anglian Water's decarbonisation plan for its Wastewater Treatment Works (WWTW) in Huntingdonshire aims to achieve net zero operational carbon emissions by 2030. These measures are in line with the types of measures recommended in the CCC report so no adjustments have been made, although note that the new EfW plant would need to be fitted with CCS by

Category	Mitigation measures	Notes	Tailoring assumptions to Huntingdonshire
			2050 in order to decarbonise the District.
Land	Increase in carbon sequestration via peatland restoration and tree planting	As per the CCC Balanced Pathway. Refer to the Agriculture and Land Use Summary Report for more information.	HDC is supporting the Great Fen Project - a large-scale conservation initiative aimed at restoring peatlands in the Cambridgeshire Fens.

Appendix C:

Policy review – climate adaptation in the UK

Introduction

C.1 This Appendix describes the key drivers for considering climate change risks and adaptation measures. It considers national and local policies, plans, and strategies, along with industry guidance.

National policies and regulations

C.2 At a national level, the **Climate Change Act 2008** sets a legal requirement for the UK Government to assess climate change risks, define objectives for adapting to climate change, and set out policies and proposals that would help meet those objectives.[46]

> *"Successful adaptation policy involves much more than simply addressing flood risk and has to take account of a range of severe and complex climate impacts."*
>
> – RTPI and TCPA, 'The Climate Crisis: A Guide for Local Authorities on Planning for Climate Change' (2023)

C.3 The Government's assessment of current and future risks is presented within the **Climate Change Risk Assessment** (CCRA), which must be updated every five years; the most recent version was published in early 2022.[47]

C.4 In the **National Adaptation Programme** (NAP3), the Government describes how it plans to adapt to climate change[48] over the next five years in relation to topics such as:

- "protecting the natural environment"

- "supporting business in adapting to climate change"
- "adapting infrastructure (for example, our electricity networks and railways)"
- "protecting buildings and their surroundings (for example, from hotter temperatures)"
- "protecting public health and communities"
- "mitigating international impacts on the UK (for example, on food supplies imported from abroad)"

C.5 Although the NAP3 primarily focuses on actions that the UK Government will take, it also highlights the role that local authorities (LAs) can play as public infrastructure managers, placemakers, suppliers of community support and social care, and risk management authorities. One of their key responsibilities is in relation to flooding, with county councils and unitary authorities taking a lead role in managing flood risks, with district and borough councils acting as partners.[49]

C.6 In the context of development planning, the **National Planning Policy Framework** (NPPF) requires that, '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.' The **National Planning Practice Guidance** (NPPG) lists examples of measures that would meet this requirement.

C.7 The **Building Regulations** set out minimum standards for new buildings and those undergoing major refurbishment, some of which link to climate change resilience or adaptive capacity. For example, Part O sets out requirements to avoid overheating, and Part G requires the use of water efficient fittings to limit potable water use.

Local and regional plans and strategies

C.8 The **Huntingdonshire Climate Strategy** addresses both climate change mitigation and adaptation.[50] One of the core objectives is to 'work to adapt our service delivery to a changing climate and build resilience in our community.' The Council intends to lead by example by introducing adaptation measures into its own building stock and implement an energy strategy that addresses resilience. It also highlights the opportunity to build more environmentally friendly developments, shaped by updated Local Plan policies. Overall, the main focus of the Climate Strategy is on mitigating GHG emissions; it does not provide any details on climate adaptation measures.

C.9 The **Strategic Flood Risk Assessment** for Huntingdonshire[51] provides information on local risks, including allowances for future climate change, and is used to Local Plan site allocations as well as decisions on planning applications.[52] In areas at risk of flooding, developers must undertake site-specific flood risk assessments.

C.10 There is also a **Regional Water Resources Plan**, produced by Water Resources East, which is 'the independent, not-for-profit membership organisation tasked by government to create a regional water resources plan for Eastern England'.[53] Although it is a non-statutory plan, it provides evidence that can inform local development plans, nature recovery strategies, flood risk management strategies, and climate adaptation and mitigation strategies.

Industry guidance

C.11 Various pieces of industry guidance have been issued in the past decade that provide recommendations on how to incorporate climate change adaptation into the design of developments and Local Plan policies. Notable examples include:

- **The Climate Crisis: A Guide for Local Authorities on Planning for the Climate Emergency**, produced by the Royal Town Planning Institute (RTPI) and Town and Country Planning Association (TCPA)[54]
- A variety of **resources and publications by the UK Green Building Council** on best practice policy measures[55] and how to assess physical climate risk[56]

Key take-home points

C.12 In summary, there are a variety of policies, regulations and guidance documents that promote climate change resilience and adaptation measures in Local Plan policies and the design of new developments.

C.13 However, although planners and developers are required to consider climate change impacts, there are not many specific, measurable requirements for how this should translate into policy or design proposals. The main exceptions are strategic and site-specific flood risk assessments, and the overheating and water efficiency requirements set in Building Regulations.

C.14 Given the serious risks posed by climate change, this represents a 'gap' that the Local Plan Update can and should seek to address.

References

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2 Guidance from the RTPI and TCPA states that: *'In thinking about the risks that will affect development in the future, always apply a reasonable worst-case scenario in relation to climate impacts.'* That is the approach taken in this report, which focuses on potential changes in a high-emission scenario. For more information, see https://www.tcpa.org.uk/wp-content/uploads/2021/11/TCPA-RTPI-Climate-Guide-4th-edition-1.pdf

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9 An 'air frost' is an event where the temperature at 1.25m above ground falls below 0°C.

10 Note that the data presented here is based on 30 year climatic averages of the UKCP18 projections. These projections run to 2100 so the final data point presented is the average from 2071-2100, centred on 2086.

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25 https://www.huntingdonshire.gov.uk/environmental-issues/flooding/strategic-flood-risk-assessment/
26 Here drought is defined as the number of months where 6-month accumulated rainfall minus potential evaporation is less than -1.5 using the UK Climate Risk Indicators.
27 The Met Office heatwave threshold for Huntingdonshire is a period of at least 3 consecutive days where daily maximum temperatures meet or exceed 28°C.
28 https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022
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41 https://www.gov.uk/government/statistics/agri-climate-report-2023/agri-climate-report-2023

42 https://www.greatfen.org.uk/about-great-fen/restoration-project-progress

43 Readers may note that the graph shows CCS being available in 2040, which was not included in Scenario 2. This is because Scenario 2 relies on currently available technologies, whereas it is anticipated that CCS will not become commercially available until the mid- to late-2030s.

44 https://ghgprotocol.org/companies-and-organizations

45 The C40 Cities report on urban consumption shows the extend of indirect emissions resulting from cities, which it describes as “consumption-based” but which are analogous to scope 3: https://www.c40.org/wp-content/uploads/2023/04/2270_C40_CBE_MainReport_250719.original-compressed-1-2.pdf

46 https://www.legislation.gov.uk/ukpga/2008/27/part/4

47 https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022

48 https://www.gov.uk/government/publications/third-national-adaptation-programme-nap3
49 https://www.local.gov.uk/topics/severe-weather/flooding/local-flood-risk-management
50 https://www.huntingdonshire.gov.uk/media/oq2hxq2y/climate-strategy-appendix-1-climate-strategy.pdf
51 https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
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