

SDS Scoping Engagement
Climate Discussion Paper

The climate question this engagement is asking you to help us with:

How should Gloucestershire plan future growth so that it supports the transition to net-zero, reduces greenhouse gas emissions and creates places, communities, infrastructure and natural systems that are resilient to a changing climate?

Gloucestershire
COUNTY COUNCIL

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We welcome your views on the strategic issues, evidence and outcomes for climate matters that should inform the future Spatial Development Strategy (SDS).

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Executive Summary

Climate change is a cross-boundary issue, both in terms of mitigation and adaptation, and poses both challenges and opportunities in Gloucestershire now and in the future. Addressing climate change not only mitigates climate impacts, but measures also provide economic, social and environmental benefits. With the UK Climate Change Committee (CCC) predicting between 2°C and 4°C warming as plausible outcomes of the current global emissions path, climate change must be a key consideration when addressing future growth. This is to ensure its risks can be mitigated and minimised and its potential benefits explored and maximised for the county.

The climate change discussion paper provides a strategic-level overview of the following climate matters of strategic importance (MSI) that should influence decisions about the location, scale, form and phasing of future growth across Gloucestershire.

Climate matters of strategic importance

MSI C1 Decarbonising energy and energy security.

MSI C2 Decarbonising transport.

MSI C3 Sustainable agriculture and food security.

MSI C4 Water management and efficiency.

MSI C5 Extreme heat.

MSI C6 Extreme weather events – Storms and wildfires.

Introduction

Climate change is a defining long-term issue for Gloucestershire. The county needs to fulfil its legal duty to mitigate climate change through meeting global, national and local net zero goals and remain within the Government's carbon budgets. Due to the unavoidable risks posed by climate change, the focus must be to ensure future communities, businesses and services within Gloucestershire are resilient to future climate risk.

The county faces increasing risks from flooding, extreme heat, drought, water scarcity, wildfires, and extreme weather events leading to multiple socioeconomic impacts. These range from damage and disruption to infrastructure, services, businesses, and homes, as well as increased impacts on health and wellbeing. The potential impacts of climate risks have already been felt in Gloucestershire, from events such as the floods of 2007 and the severe heatwaves of 2022 and 2026. Impacts are most likely to adversely affect communities already most vulnerable such as those with pre-existing health conditions or in areas of higher deprivation.

Implementing climate mitigation and adaptation interventions reduces climate-related losses and associated socioeconomic impacts, while also delivering economic, social and environmental benefits regardless of future climate impacts. This is through the creation of

jobs and productivity gains from healthier communities and environments[1]. Climate change does not respect administrative boundaries, with energy and transport networks, ecological systems, and food production operating across districts and beyond county boundaries. This means high impact and successful mitigation and adaptation measures need to be delivered through a co-ordinated and strategic approach on a large spatial scale.

Some of the highest emitting sectors in the county are within the influence of the Spatial Development Strategy (SDS). This includes transport, buildings and heating[2]. Therefore, the SDS is key in the county meeting net zero targets.

Policy and Legislation

Paris Agreement[3]

The Paris Agreement is a legally binding international treaty on climate change to limit "the increase in the global average temperature to well below 2°C above pre-industrial levels" and to seek "to limit the temperature increase to 1.5°C above pre-industrial levels". Signatories, including the UK, are required to submit climate targets and plans every five years. The UK's current target is to "reduce all greenhouse gas emissions by at least 81% by 2035, compared to 1990 levels".[4]

Climate Change Act 2008[5]

The Climate Change Act 2008 sets out the legally binding target for the UK to be net zero by 2050. This will be achieved by the Government setting legally binding carbon emissions limit every five years in the form of 'carbon budgets'. The CCC ensures these targets are evidence-based and independently assessed. The UK is currently on track to meet the requirements of the Fourth Carbon Budget (2023 to 2027) to reduce emissions to 52% below 1990 levels. In June 2026, the Seventh Carbon Budget was passed into law which outlines the requirement to achieve an 87% reduction in 1990 emission levels.

Planning and Infrastructure Act 2025

The Planning and Infrastructure Act 2025 supports the Government's target of building 1.5 million homes by 2029 and the Government's Clean Power Action Plan target of having at least 95% of Great Britain's electricity generated from clean sources by 2030.

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[1] Strengthening the Investment Case for Climate Adaptation: A Triple Dividend Approach | World Resources Institute

[2] A Carbon Baseline and Decarbonisation Transition Assessment for Gloucestershire County and Districts. January 2025.

[3] https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en https://unfccc.int/process-and-meetings/the-paris-agreement

[4] https://www.gov.uk/government/publications/uks-2035-nationally-determined-contribution-ndc-emissions-reduction-target-under-the-paris-agreement

[5] https://www.legislation.gov.uk/ukpga/2008/27/contents https://www.theccc.org.uk/climate-action/

National Planning Policy Framework (NPPF) August 2026[6]

The National Planning Policy Framework (NPPF) outlines national planning policy for both plan and decision making and emphasises the need for the planning system to contribute to the achievement of sustainable development.

Matters of Strategic Importance - Context

C1 - Decarbonising Energy and Energy Security

Gloucestershire benefits from various community energy projects, has a strong foundation of ground and rooftop mounted solar panels (PVs)[7] and is currently piloting a district heat network in Cheltenham supported by the Department for Energy Security and Net Zero (DESNZ)[8]. However, further energy decarbonisation is needed to ensure we meet our local and national carbon commitments.

Gloucestershire's household electricity consumption is 21% higher than the national average[9] and the Climate Change Committee estimates a 50% increase in UK demand by 2035. Additionally, recent geopolitical events have caused market volatility, leaving residents subject to increased energy bills.

Alongside the Clean Power Action Plan 2024, a Local Area Energy Plan (LAEP) is underway, with technology-specific pathways and spatial opportunities for renewable energy for Gloucestershire. Pathways identified will take into consideration current restraints such as the county's high proportion of rural land which is subject to competing land use between agriculture, recreation, development and ecology. Projects could include utilising the high prevalence of off-gas areas in Gloucestershire due to its rural nature, giving the opportunity to transition to clean energy through on-site renewables, building upon established community energy networks, and deploying large-scale renewables.

Urban areas can support the transition to cleaner energy by making better use of buildings and developed land for renewable energy generation, heat networks, energy storage and low-carbon heating. New development can also be planned alongside the electricity infrastructure needed to support increased demand from homes, businesses and electric transport. A combination of small and larger scale renewable energy generation can bring a more balanced energy mix for the county.

C2 - Decarbonising Transport

Transport is one of the county's largest sources of greenhouse gas emissions, accounting for around 33 – 40% of county emissions. Cars are responsible for over 60% of these

[6] https://assets.publishing.service.gov.uk/media/6a8334c03bd75b81e2329ac4/National_Planning_Policy_Framework.pdf

[7] Gloucestershire Baseline Energy Representation. October 2025.

[8] Heat Network Zoning Opportunity Report: Cheltenham

[9] A Carbon Baseline and Decarbonisation Transition Assessment for Gloucestershire County and Districts, January 2025

emissions and road transport contributes more than 90% of transport related emissions[10]. The rural nature of the county also influences vehicle fuel use (2.4 tCO2e per resident) which is 20% higher than the UK average[11]. Reducing transport emissions is therefore a critical component in meeting the county's target of 80% reduction in surface transport emissions by 2030 and net zero by 2045[12]. Meaningful reduction is only achievable via a combination of reduction in traffic growth; mode shift to public transport and active travel; and fuller adoption of electric vehicles (EVs). With the successful delivery of these targets dependent on sub-regional infrastructure, it is key these issues are strategically addressed.

C3 - Sustainable Agriculture and Food Security

Gloucestershire's agri-food supply chain employs over 50,000 people, 14.9% of the workforce and generated a Gross Value Added (GVA) of £1.39 billion in 2017, or 8.8% of the local economy[13]. However, food and drink represent the county's second-highest sector emissions, at 27%[14] of Gloucestershire's total carbon footprint. The change in climate is also affecting UK food systems, with implications for food security, environmental sustainability, livelihoods and equity.

Rising temperatures, soil moisture deficits and water scarcity can reduce crop yields, with summer deficits projected to increase by 38% - 55% by the 2050s under medium and high-emissions scenarios. Agricultural land is also at risk from wildfires. Given that farm holdings cover around 73.5% of the county's total area[15], agricultural landowners have a key role in adapting landscapes to climate impacts. Gloucestershire's Climate Risk and Vulnerability Assessment (CRVA)[16] outlines the key risks to agriculture across Gloucestershire with both pluvial and fluvial outlined. This means sustainable agricultural land management, incorporating and creating natural features such as flood plain wetland within farming land, will be critical for future resilience. Wetlands are also a natural mechanism of sequestering carbon from the atmosphere.

Protecting and promoting local food systems will therefore not only sustain Gloucestershire's agricultural industry and improve food security but will also help work towards a low carbon future.

C4 - Water Management and Efficiency

Water management in the county is heavily influenced by seasonal variations, with the CRVA reporting an 8% to 12% increase in winter rainfall and 14% to 19% decrease in

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[10] Journey to Net Zero: A routemap for transforming travel in Gloucestershire 2024: j2nz_decarbroutemapsummary_for-issuev22_final_with-hyperlink.pdf

[11] A Carbon Baseline and Decarbonisation Transition Assessment for Gloucestershire County and Districts. January 2025.

[12] Journey to net zero | Gloucestershire County Council

[13] The-Gloucestershire-AgriFood-and-Rural-Economy-final-report.pdf

[14] A Carbon Baseline and Decarbonisation Transition Assessment for Gloucestershire County and Districts. January 2025.

[15] Numbers of holdings and agricultural activity by English County/Unitary Authority, 2025, DEFRA

[16] glos-crva-report_final.pdf pg. 43

summer rainfall expected in the county by 2056. This will result in alternating periods of water excess and scarcity in the county.

Gloucestershire is prone to surface water, tidal and river flooding evidenced by previous severe flooding such as the 2007 flood event[17]. Surface water flooding is most pronounced in urban areas such as Cheltenham, Tewkesbury and Gloucester due to their dense, non-porous urban development and limited natural drainage. Gloucestershire's CRVA[18] identifies a 32% increase in areas at high risk from surface water flooding under a high emissions scenario. The risk of flooding from rivers and seas is also expected to increase and will be focused on the tidal boundary leading into the River Severn and its associated tributaries, with Gloucester and Tewkesbury most sensitive to these changes. Other settlements at risk are those located along the River Severn, including Lydney and Lechlade, with transport and business infrastructure also impacted.

Droughts are expected to increase as summer rainfall decreases, with a 15% summer average rainfall reduction in a 2°C warming scenario and between 40% and 43% within a 4°C warming scenario across the county.[19] By 2050, this is projected to increase the county's soil moisture deficit by 55%,[20] with The Fourth Independent Assessment of UK Climate Risk (CCRA4-IA) predicting that drier summers could lead to national water supply shortfalls of over 5 billion litres per day, further exacerbating the effects of droughts[21] and resulting in a deficit that adaptation measures may not be able to ameliorate.[22]

C5 - Extreme Heat

Gloucestershire is modelled to experience more frequent and intense heat as global temperatures continue to rise, with average surface air temperatures now approximately 1.4°C above pre-industrial levels. Recent heatwaves have already affected health and healthcare delivery in Gloucestershire, and in England, the 2,877 deaths attributable to the 2026 May and June heatwave are nearly double the 1,504 heat-associated deaths recorded across the entire summer of 2025. [23] High night-time temperatures are particularly concerning due to impacts on sleep, productivity and health and do so cumulatively over prolonged hot periods[24]. The Defra Overheating Dataset[25] indicates by 2030, Gloucestershire summer night-time temperatures could exceed 26°C for 10–11% of the time under a lower emissions scenario, rising to 18–20% under a high emissions scenario by 2080. Extreme heat also has economic impacts. The Office for National

[17] glos-crva-report_final.pdf pg 21
[18] glos-crva-report_final.pdf pg.17
[19] https://climatedataportal.metoffice.gov.uk/datasets/TheMetOffice::summer-precipitation-change-projections-local-authority-v2/explore?location=52.069357%2C-1.542647%2C8&style=pr_summer_4_median
[20] glos-crva-report_final.pdf pg. 20
[21] A Well-Adapted UK - Climate Change Committee
[22] A Well-Adapted UK - Climate Change Committee
[23] https://www.gov.uk/government/publications/interim-heat-mortality-monitoring-report-england-may-and-june-2026/interim-heat-mortality-monitoring-report-england-may-and-june-2026
[24] glos-crva-report_final.pdf pg.29 - 31
[25] https://environment.data.gov.uk/over-heating/choropleth/overheating/rcp26-2030/median-tm59/shading-external?lad=E07000079 last accessed: 15/07/2026

Statistics estimates annual heatwave productivity losses at £1.2 billion.[26] Additionally, the British Geological Survey details subsidence as one of the most damaging geohazards affecting Great Britain, costing the economy an estimated £3 billion over the last decade.[27]

Effective adaptation to overheating in new development and future communities should be planned strategically and at a sub-regional scale, so that design and infrastructure measures can be delivered consistently at the required standard. Opportunities for heat capture e.g. from data centres can also reduce heat in the locality, and lower bills for residents.

C6 - Extreme Weather Events – Storms and Wildfires

Storms are complex systems that involve a variety of factors determining their strength and frequency. Research suggests climate change is driving increases in storm wind and rainfall extremes[28], with the 20% increase in rainfall intensity during the UK 2023-2024 winter attributable to climate change. Such increases in wind speeds and rainfall intensity present risk to property and infrastructure, and when coupled with sea level rises, these storm events will exacerbate the severity and frequency of coastal flooding and coastal erosion.[29] Whilst Gloucestershire is projected to see minor increases in the frequency and severity of storms and high winds, the interplay between rising sea-levels and increased rainfall means storm related impacts are expected to increase in the county.

With drier, hotter summers forecast, wildfires are anticipated to become an increasingly pertinent issue in Gloucestershire. By the 2080s, the number of days rated as “Very High” Fire danger on the Met Office Fire Severity Index is projected to rise to 56 days in a medium emissions scenario and 78 days in a high emissions scenario in Gloucestershire. Climate change has increased wildfire likelihood, risk and severity, leading to an unprecedented number of wildfire events. Wildfires are an immediate risk to health, (including via poor local air quality), and place an extreme strain on emergency service provision. They also pose a risk to agricultural land and natural landscapes.

Additionally, wildfires emit carbon emissions, exacerbating the effects of climate change. The greatest disaster risk presented by wildfires is to be found at the urban-fringe interfaces of wildfire-prone areas.[30] As a county comprising of approximately 78% rural land, Gloucestershire has an abundance of urban/rural fringe areas at risk of wildfire disaster.[31] Highest impacts are seen to the north of the county in Tewkesbury, to the south of the Cotswold District, and Forest of Dean. These areas are primarily rural with farmland, woodland and shrubland.

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[26] Impact of hot days on productivity in Great Britain methodology, The Office for National Statistics
[27] Mapping climate change to build resilience, Ordnance Survey
[28] https://www.metoffice.gov.uk/about-us/news-and-media/media-centre/weather-and-climate-news/2024/climate-change-drives-increase-in-storm-rainfall
[29] https://www.theccc.org.uk/publication/a-well-adapted-uk/ pg.17
[30] https://www.tandfonline.com/doi/pdf/10.1080/01944363.2025.2527117?needAccess=true

Matters of Strategic Importance for Climate

MSI C1 Decarbonising energy and energy security

Key strategic priorities

1. Identify the strategic opportunities and constraints in delivering renewable and low carbon energy to support future growth through the LAEP and meeting the national goal of clean power by 2030.

2. Establish countywide minimum energy standards.

Spatial considerations

1. Map potential renewable energy and low carbon opportunities alongside wider constraints e.g., best and most versatile agricultural land and natural landscapes.

2. Identify areas of the county which are likely to have highest energy demands.

MSI C2 Decarbonising transport

Key strategic priorities

1. Identify how the levels of car dependency can be reduced through the delivery of cross boundary measures which follow the sustainable travel hierarchy e.g., active travel infrastructure, car clubs and congestion charging.

2. Align growth with sustainable transport methods and local amenities to further reduce car dependency and mitigate wider issues including congestion and air pollution.

3. Identify opportunities and constraints in supporting the move to cleaner vehicles such as through the electrification and use of hydrogen, particularly for vehucles used in logistics and last mile deliveries.

Spatial considerations

1. Identify broad locations of growth which are conducive to using sustainable transport options and promote wellbeing through access to local amenities and green space.

2. Identify options for mass transit and large-scale sustainable transport options to promote cross boundary sustainable travel.

3. Identify broad locations for EV and hydrogen infrastructure which would support the transition to a cleaner fleet across the county especially for logistics and last mile deliveries.

MSI C3 Sustainable Agriculture and Food Security

Key strategic priorities

1. Improve the climate resilience of Gloucestershire's agricultural sector mainly through flood mitigation and natural sequestration via natural flood measures, and flood plain wetland management to enhance food security and sustain rural livelihoods.

2. Improve food security and reduce emissions from food and drink through the strategic introduction of measures including community food growing and horticulture zones (dedicated areas for scaled-up, resilient fruit and vegetable production via large glasshouses and polytunnels).

3. Safeguard best and most versatile agricultural land (BMVL) for local food production when considering areas of growth.

Spatial considerations

1. Spatially map BMVL when identifying broad areas of growth to ensure BMVL is safeguarded and can support sub-regional growth.

2. Identify where mitigation measures could be located to protect agricultural land and the wider rural community.

3. Identify and create a framework for appropriate areas for sustainable resilient food production (i.e. horticulture polytunnels and glasshouses) aligned with the required energy infrastructure; and community food growing spaces, accessible to current and future communities.

MSI C4 Water Management and Efficiency

Key strategic priorities

1. Identify where and what type of water management and efficiency measures are required to enhance the resilience of current communities and support future growth.

2. Identify where future growth can be delivered to minimise flood risk in areas of new growth and the wider catchment area.

3. Identify how future growth especially that including water intensive industry will utilise water supplies efficiently in an increasingly water stressed county[32].

[32] Water stressed areas – 2021 classification - GOV.UK

4. Improve water efficiency of existing and new development and infrastructure through the adoption of countywide minimum water efficiency standards.

Spatial considerations

1. Map areas of flood risk identifying where large-scale flood management interventions should be located. This will also help allocate future growth away from areas of highest risk.

2. Map locations potentially suitable for water efficiency options and capacity increases such as new reservoirs.

3. Spatially identify areas where water supply infrastructure needs updating to improve water efficiency and support sustainable growth.

MSI C5 Extreme Heat

Key strategic priorities

1. Steer growth away from areas vulnerable to extreme heat risk e.g. subsidence or ensure appropriate mitigation can be adopted where risk cannot be avoided.

2. Maximise the use of multifunctional green and blue infrastructure, physical shading and heat resilient building design at a strategic scale to provide natural cooling, reduce mechanical cooling use and subsequently reduce energy demands.

3. Identify opportunities for heat capture from relevant infrastructure e.g. data centres to reduce heat in the locality and reduce emissions.

4. Prioritise district cooling networks in high density urban areas/areas at greatest risk of extreme heat.

Spatial considerations

1. Map areas of extreme heat risk e.g. subsidence, areas of deprivation/where populations are vulnerable to the impacts of climate change.

2. Map opportunities for district cooling networks and heat capture (e.g. from data centres) so they can be utilised to provide cooling and energy in high-density urban areas.

MSI C6 Extreme Weather Events – Storms and Wildfires

Key strategic priorities

1. Identify the type and location of mitigation needed to reduce the risk of extreme weather events on infrastructure, services, industry, agriculture and residents.

2. Ensure future growth is resilient to extreme weather events and won't exacerbate impacts across the county.

Spatial considerations

1. Map areas most at risk from extreme weather events aiding in the identification of sustainable locations for growth in areas of lower risk and where impacts to the wider locale are minimal.

2. Identify and map suitable locations for adaptation measures to enhance the resilience of current and future communities.



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