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Climate Change Adaptation and Resilience Guide: Appendices

Image:
Greener Grangetown WSUD
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Appendix 1: Using climate data

Image:
Oxford University Information Engineering Building

Using climate data, considering time scales

Where to go next for climate data, after this guide?

- Explore how your university will be impacted by climate change using the Met Office Local Authority Climate Service and Explorer.
- Visualise changes in key local climate metrics for temperature, precipitation and sea level rise (where relevant) in the Explorer.
- View a **Climate Report** for the local authority your university is in.
- Use the local climate indicator data from the baseline and 4 °C Global Warming Level (GWL) to inform your climate change risk assessment.
- See the example for Birmingham shown next.
- Trends for other climate hazards such as drought, flood, winds/storms, ground movement or wildfires cannot be found in those pages.
- There are plans to enhance the LACS, including more support on moving from business continuity to long-term planning using available quantitative information. So, check and sign up for updates.

Further Reading

- Understanding Met Office Climate Data
- How to assess your climate risk
- The annual State of the UK Climate Report, provides an up-to-date assessment of the UK climate.
- Met Office Climate Data Portal

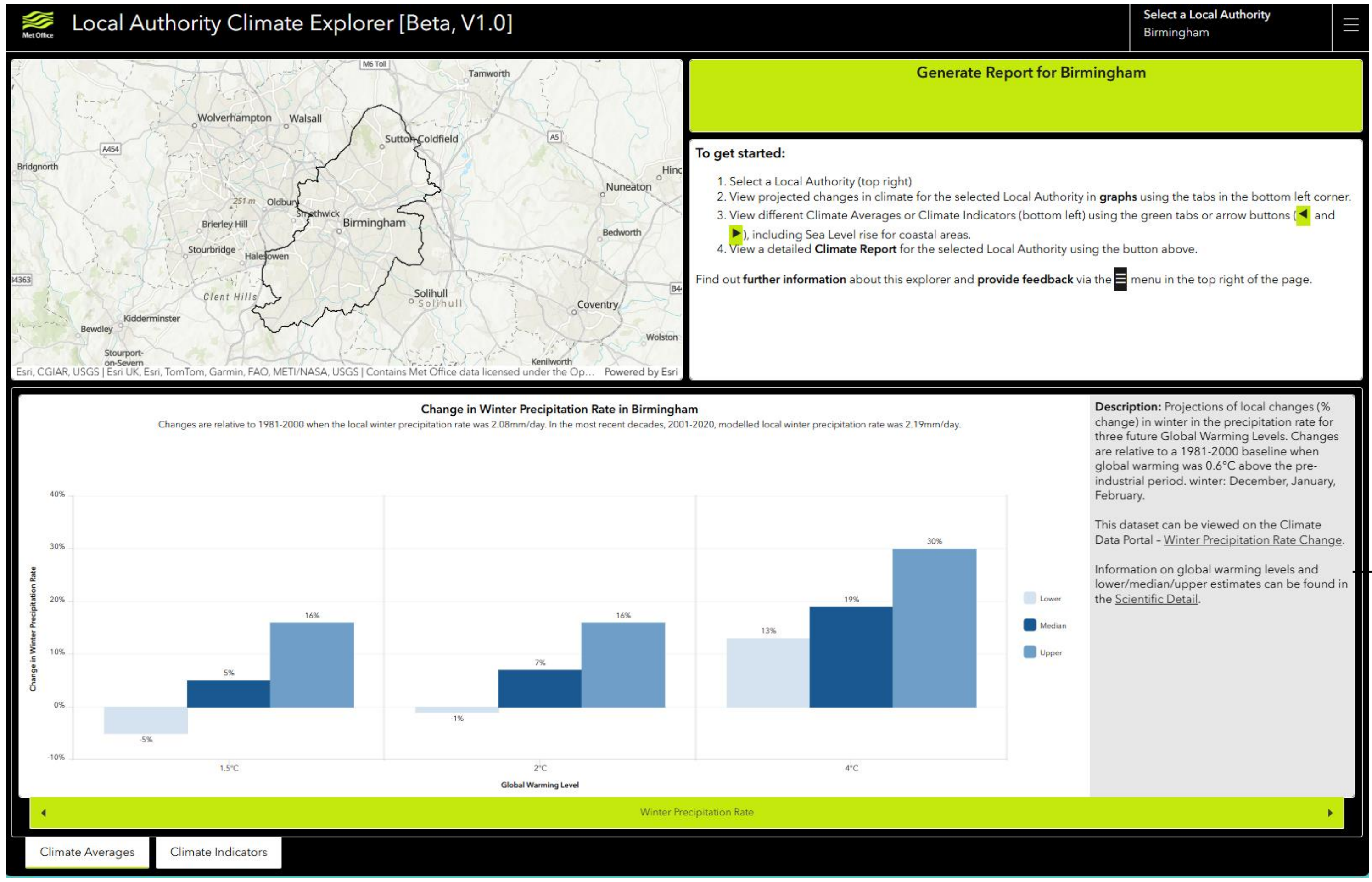


Figure 1: Example of climate projections data for Birmingham, from: Met Office Local Climate Data Service and Explorer

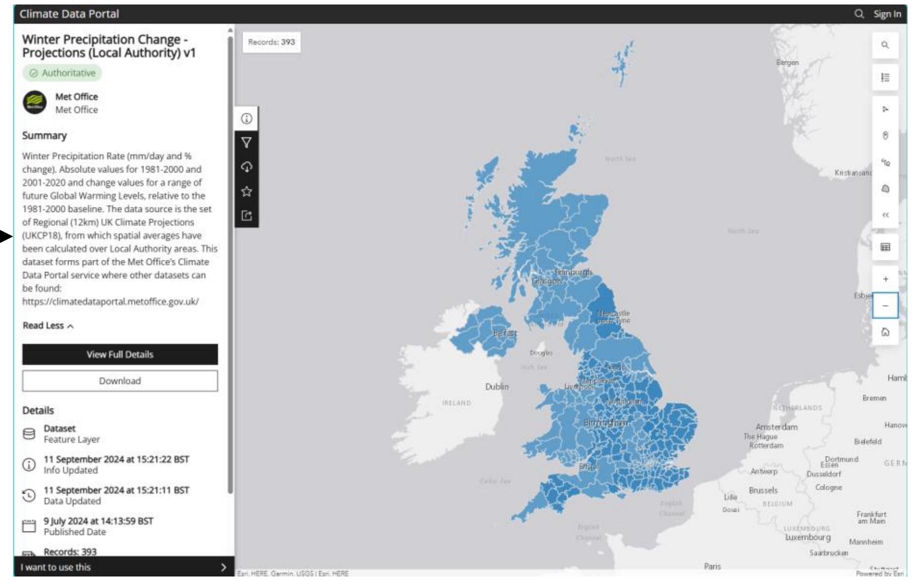


Figure 2: Example of source dataset, from: Met Office Climate Data Portal

Key message points:

- The Met Office Local Authority Climate Service provides local climate reports and a data explorer (for a selection of hazards only) for the LA your University is in.
- The projected climate changes for each Local Authority are presented for particular Global Warming Levels (GWLs).
- GWLs are a simple way to represent climate change at the global scale, which then drives local changes. They allow us to explore different strands of climate hazard information consistently. For example, the projected local change in winter precipitation for a 4 °C GWL.
- The GWLs used in the Local Authority Climate Service are the change in global mean surface temperature relative to 1850-1900.
- Information on global warming levels and lower/median/upper estimates can be found in the Scientific Detail.
- To explore spatial variation across your local authority and university further, or other climate hazard indicators, follow the route to the Met Office Climate Data Portal geospatial data.
- For bespoke climate hazard indicators for specific issues facing your university, and more detailed assessments, consider following the use of specialist consultancies.

Appendix 1: Using climate data, considering time scales

An example of the LACS Climate Report and local climate data for Birmingham

Figure 3: Example of Introduction from Climate Report for Birmingham, from: Met Office Local Climate Data Service and Explorer

Local changes and timing

- This section of the report explains what the Global Warming Levels are and their expecting timing. Shifting away from future time periods.
- Following Government and independent guidance, universities are advised to **prepare** for a 2°C temperature rise, and **assess** the risks for 4°C.

Current weather types

- The introduction sets out the that the purpose of the Local Climate Report is to provide non-technical summaries of climate projections for the local authority area.
- It sets out the current weather that Birmingham experiences as context to the expected changes.

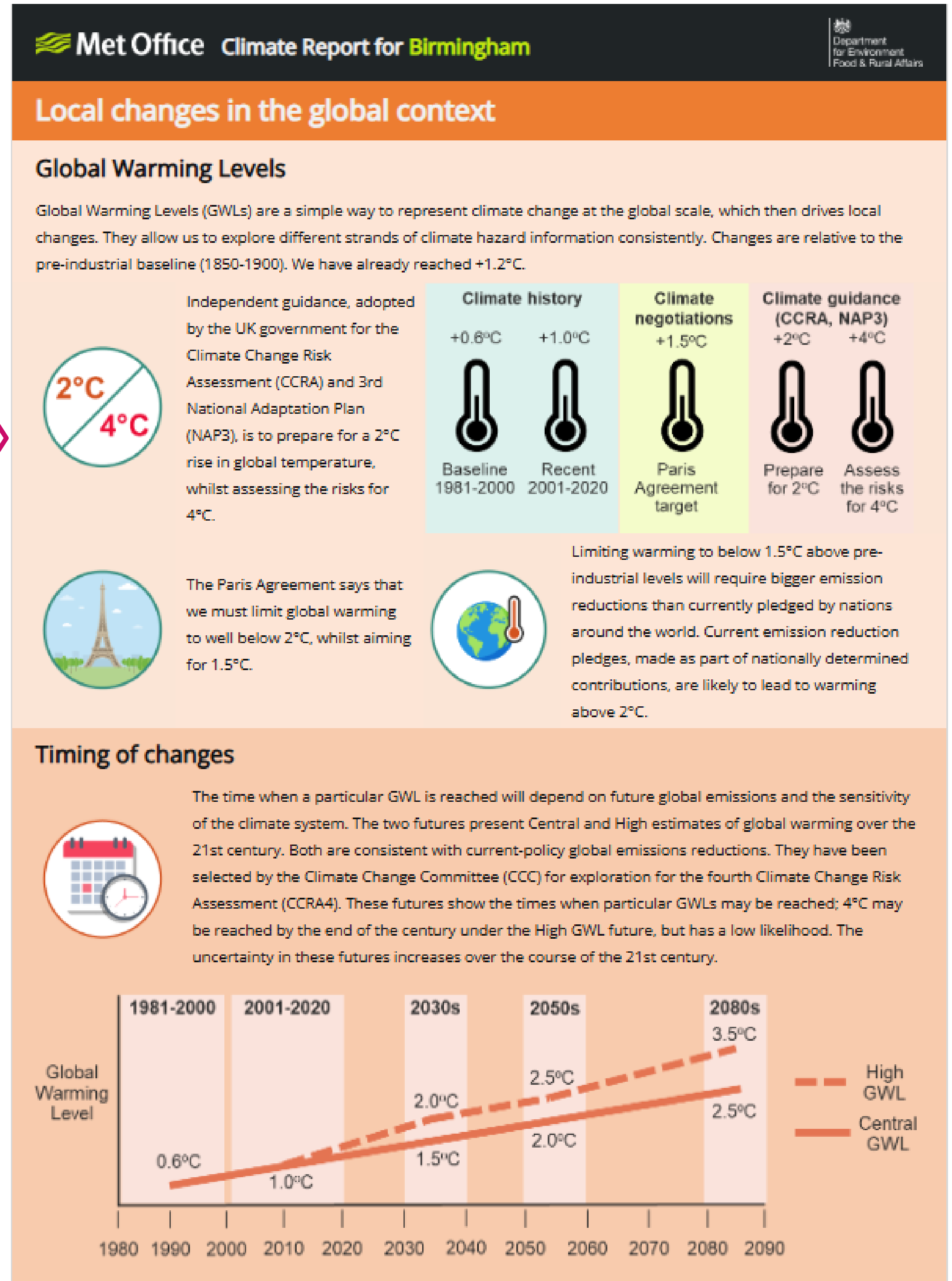


Figure 4: Example of Local changes in the global context from Climate Report for Birmingham, from: Met Office Local Climate Data Service and Explorer

An example of the LACS Climate Report and local climate data for Birmingham

Local Climate Changes – Climate Averages

Figure 5 shows the Birmingham Local Authority area with the overlaid grid showing the 12km grid boxes from the climate model used for these projections.

The table in Figure 6 shows the projected changes in average local climate, for six temperature and two precipitation variables, for the Local Authority of Birmingham area for a number of Global Warming Levels (GWLs).

There is a central projection (the Median) and an uncertainty range (the Lower and Upper values are the 10th and 90th percentiles). Changes are relative to the 1981-2000 baseline.

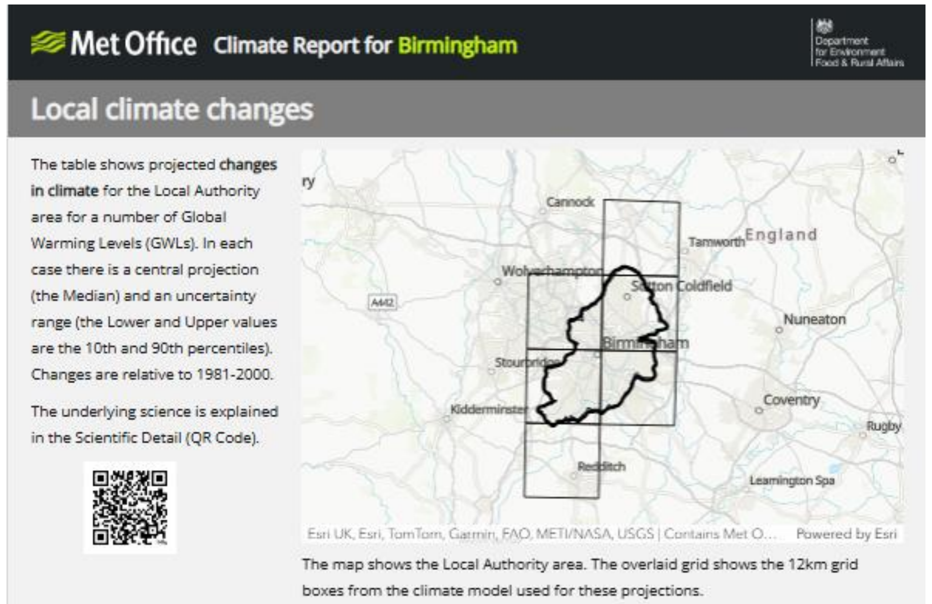


Figure 5: Example of Local climate changes Birmingham – map showing the grids used for the projections, from: Met Office Local Climate Data Service and Explorer

		0.6°C GWL Baseline 1981-2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
	TEMPERATURE	°C	°C	°C change	°C change	°C change
	Summer Maximum Temperature	29.2 28.9 to 29.7	31.3 30.4 to 32.5	+2.9 +1.1 to +3.7	+3.4 +2.4 to +5.0	+7.0 +6.1 to +8.7
	Summer Average Temperature	15.7 15.7 to 15.8	16.9 16.5 to 17.3	+1.4 +1.1 to +2.1	+2.1 +1.4 to +2.7	+4.3 +3.8 to +5.2
	Winter Average Temperature	4.1 4.1 to 4.1	4.7 4.4 to 5.2	+1.0 +0.5 to +1.3	+1.3 +0.6 to +1.6	+2.7 +1.8 to +3.3
	Winter Minimum Temperature	-8.0 -8.2 to -7.6	-6.4 -7.4 to -4.4	+2.4 +1.3 to +3.4	+2.6 +1.6 to +4.3	+5.1 +4.2 to +5.8
	Annual Average Temperature	9.7 9.7 to 9.7	10.5 10.4 to 10.7	+1.1 +0.9 to +1.3	+1.7 +1.2 to +1.8	+3.4 +3.0 to +3.9
	PRECIPITATION	mm/day	mm/day	% change	% change	% change
	Summer Precipitation Rate	1.92 1.91 to 1.93	1.89 1.68 to 2.10	-4 -15 to +4	-13 -21 to 0	-30 -44 to -22
	Winter Precipitation Rate	2.08 2.06 to 2.08	2.19 2.00 to 2.41	+5 -5 to +16	+7 -1 to +16	+19 +13 to +30

Figure 6: Example of Local climate changes – Climate Averages from the Climate Report for Birmingham, from: Met Office Local Climate Data Service and Explorer

Appendix 1: Using climate data, considering time scales

An example of the climate averages – summer maximum temperature - for Birmingham

Local Climate Changes – Climate Averages

The table in Figure 7 shows the projected changes in average **summer maximum temperature** for the Local Authority of Birmingham area for a number of Global Warming Levels (GWLs).

Birmingham University should **assess** the climate risks of **summer maximum temperature** increasing by around 7°C (above baseline) under a 4 °C GWL, averaging **36.2 °C.**

Birmingham University should **prepare** for **summer maximum temperatures** of around **32.6 °C** (wider range 31.6 °C to 34.2 °C) under a 2 °C GWL (Figure 7).

The same data in the graph (Figure 8) more clearly shows the uncertainty ranges, and provides access to the underlying data for further exploration.

		0.6°C GWL Baseline 1981-2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
	TEMPERATURE	°C	°C	°C change	°C change	°C change
	Summer Maximum Temperature	29.2 28.9 to 29.7	31.3 30.4 to 32.5	+2.9 +1.1 to +3.7	+3.4 +2.4 to +5.0	+7.0 +6.1 to +8.7

Figure 7: Example of Local climate changes – Climate Averages – Summer Maximum Temperature from the Climate Report for Birmingham, from: Met Office Local Climate Data Service and Explorer

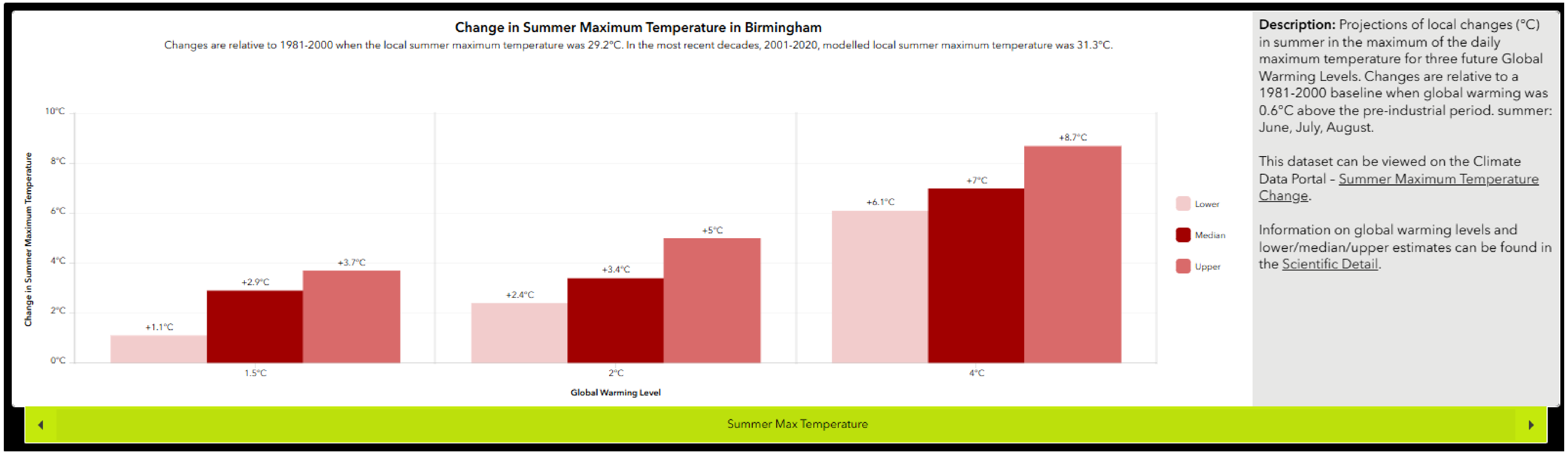


Figure 8: Example of Local climate changes – Climate Averages – Graph of Summer Maximum Temperature from the LACS Explorer for Birmingham, from: Met Office Local Climate Data Service and Explorer

An example of the climate averages – winter precipitation rate - for Birmingham

Local Climate Changes – Climate Averages

The table in Figure 9 shows projected changes in **Winter Precipitation Rate** for the Local Authority of Birmingham area for a number of Global Warming Levels (GWLs).

Birmingham University should **assess** the climate risks of **winter precipitation rate** increasing by around 19% (above baseline) under a 4 °C GWL, averaging **2.5 mm/day**.

Birmingham University should **prepare** for an average **winter precipitation** of around **2.2 mm/day** (wider range 2.06 to 2.1 mm/day) under a 2 °C GWL (Figure 9).

The same data in the graph (Figure 10) more clearly shows the uncertainty ranges, and provides access to the underlying data for further exploration.

		0.6°C GWL Baseline 1981-2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
	PRECIPITATION	mm/day	mm/day	% change	% change	% change
	Summer Precipitation Rate	1.92 1.91 to 1.93	1.89 1.68 to 2.10	-4 -15 to +4	-13 -21 to 0	-30 -44 to -22
	Winter Precipitation Rate	2.08 2.06 to 2.08	2.19 2.00 to 2.41	+5 -5 to +16	+7 -1 to +16	+19 +13 to +30

Figure 9: Example of Local climate changes – Climate Averages – Winter Precipitation Rate from the Climate Report for Birmingham, from: Met Office Local Climate Data Service and Explorer

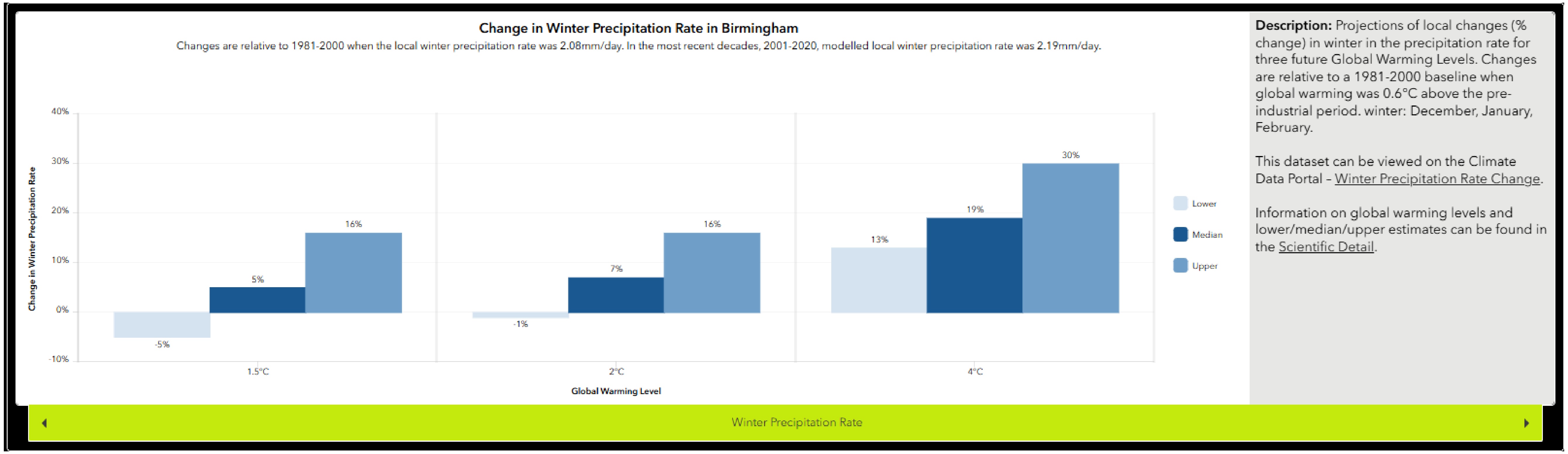


Figure 10: Example of Local climate changes – Climate Averages – Graph of Winter Precipitation Rate from the LACS Explorer for Birmingham, from: Met Office Local Climate Data Service and Explorer

Appendix 1: Using climate data, considering time scales

An example of the Local Climate Indicators for Birmingham

Local Climate Changes – Local Climate indicators

Figure 11 shows projected changes for a range of nine temperature based local climate indicators for the Local Authority of Birmingham area for a number of Global Warming Levels (GWLs).

There is a central projection (the Median) and an uncertainty range (the Lower and Upper values are the 10th and 90th percentiles). Changes are relative to the 1981-2000 baseline.

Hot summer days in Birmingham over 30 °C occur on average 1 time a year in the baseline (1981-2000). Under a 4 °C Global Warming Level (GWL), this could increase to 17 times a year (wider range 14 to 26 times a year) by the end of the century.

Tropical nights in Birmingham over 20 °C occur on average 0 times a year in the baseline (1981-2000). Under a 4 °C Global Warming Level (GWL), this could increase to 3 times a year (wider range 2 to 4 times a year) by the end of the century.

Growing degree days for plant growth in Birmingham where daily mean temperature exceeds 5.5 °C occur on average 1,819 times a year in the baseline (1981-2000). Under a 4 °C Global Warming Level (GWL), this could increase by 1000 days to 2,819 days (wider range 2,734 to 2,999 times) by the end of the century.

Local climate indicators

The table shows projected **climate indicators** for the Local Authority area for a number of Global Warming Levels. For each these are annual totals: a central projection (the Median) and an uncertainty range (the Lower and Upper values are the 10th and 90th percentiles). See also the Scientific Detail (QR Code).

Indicator	0.6°C GWL Baseline 1981-2000	1.0°C GWL Recent Past 2001-2020	1.5°C GWL Paris Agreement	2°C GWL Guidance: Prepare	4°C GWL Guidance: Assess risks
Summer Days* Daily maximum temperature > 25°C	12 (12 to 13)	23 (19 to 28)	26 (22 to 31)	31 (27 to 37)	59 (53 to 74)
High daytime temperatures with health impacts for vulnerable people at risk of hospital admission or death. Transport disruption – e.g. track buckling on railways. Can also indicate periods of increased water demand.					
Hot Summer Days* Daily maximum temperature > 30°C	1 (1 to 1)	3 (2 to 4)	4 (3 to 6)	5 (4 to 7)	17 (14 to 26)
Increased heat related illnesses, hospital admissions or death. Further transport disruption – e.g. track buckling on railways, road melt. Overhead power lines become less efficient.					
Extreme Summer Days* Daily maximum temperature > 35°C	0 (0 to 0)	0 (0 to 1)	0 (0 to 1)	0 (0 to 1)	3 (2 to 5)
Increased heat related illnesses, hospital admissions or death affecting not just the vulnerable. Further transport disruption – e.g. track buckling on railways, road melt.					
Tropical Nights Daily minimum temperature > 20°C	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)	3 (2 to 4)
Health impact due to high night-time temperatures with potential for heat stress. Vulnerable people at increased risk of hospital admission or death.					
Frost Days Daily minimum temperature < 0°C	46 (46 to 47)	36 (28 to 42)	31 (27 to 38)	26 (23 to 38)	11 (8 to 21)
Cold weather disruption due to higher than normal chance of ice and snow.					
Icing Days Daily maximum temperature < 0°C	3 (3 to 4)	1 (1 to 3)	1 (1 to 2)	1 (1 to 2)	0 (0 to 0)
More extreme than frost days, so more severe cold weather impacts.					
Growing Degree Days+ Daily mean temperature: °C > 5.5°C	1,819 (1,816 to 1,821)	2,057 (2,000 to 2,144)	2,140 (2,074 to 2,209)	2,294 (2,180 to 2,376)	2,819 (2,734 to 2,999)
Energy available for plant growth over a year. This is not a measure of season length.					
Heating Degree Days+ Daily mean temperature: °C < 15.5°C	2,324 (2,322 to 2,325)	2,123 (2,090 to 2,154)	2,037 (2,006 to 2,079)	1,897 (1,878 to 2,034)	1,541 (1,451 to 1,655)
Indicator of energy demand for heating.					
Cooling Degree Days+ Daily mean temperature: °C > 22°C	24 (23 to 25)	46 (40 to 55)	50 (44 to 67)	63 (50 to 82)	149 (132 to 201)
Indicator of energy demand for cooling.					

Figure 11: Example of Local climate indicators from the Climate Report for Birmingham, from: Met Office Local Climate Data Service and Explorer

Other climate hazard data

Flooding

In England, the Second national flood risk assessment (NaFRA2):

- Provides a single picture of current and future flood risk from rivers and the sea, and from surface water
- Uses both existing detailed local information and improved national data
- Includes the potential impact of climate change on flood risk, based on UK Climate Projections (UKCP18)
- Provides much higher resolution maps that make it easier to see where there is risk.

The models use projected rainfall, sea levels and river flows. They estimate flood risk in different ways, with different time periods. The flood risk data covers the current yearly chance of flooding plus the following future time periods:

- 2040 to 2060 for surface water
- 2036 to 2069 for rivers and the sea

The models cannot predict exactly when the chance of flooding will go up. It could happen at any time during these time periods.

Since NaFRA1 the new modelling shows that the chances and extent of surface water flooding are much greater. The UK regulators SEPA and NRW also have their own national assessments and maps.

Figure 12 shows the long-term surface water flood risk for Birmingham University for the 2050s.

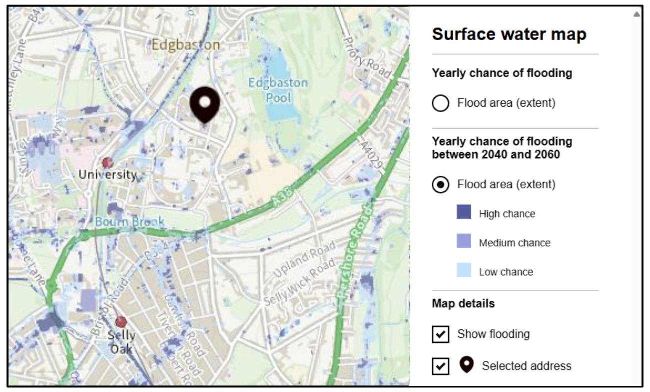


Figure 12: Example of long-term surface water flood risk for Birmingham University for the 2050s, from the Second national flood risk assessment

Heat

The UK Green Buildings Council (UKGBC), as part of their Climate Resilience Roadmap (2025) have an Urban Heat Island Web Map for six UK cities (London, Manchester, Cardiff, Birmingham, Nottingham and Glasgow).

It illustrates how different urban areas feel in terms of thermal sensation by measuring the Urban Thermal Field Variance Index (UTFVI). See Figure 13 for an example for Birmingham.

Other heat related data sources include:

- Urban Heat Service - City "Heat Packs" factsheets have been produced by the Met Office and LAs for a small selection of UK cities
- Urban Heat Snapshot
- London Heat Spots dataset on the London datastore

Detailed urban heat modelling can be carried out utilising satellite data e.g. Arup's Uheat Tool.

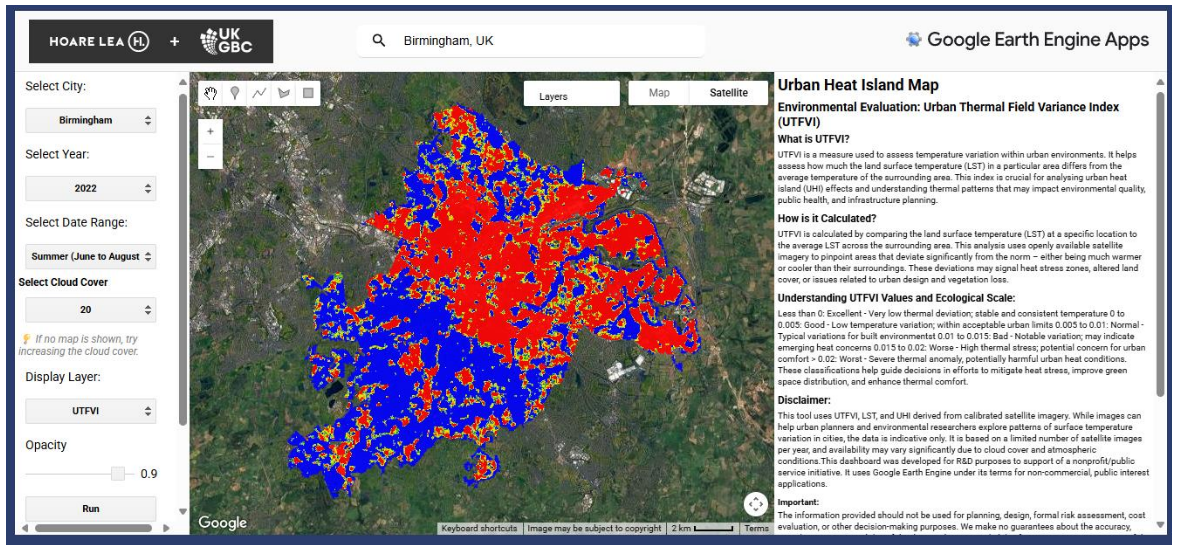


Figure 13: Example of Birmingham Urban Thermal Field Variance Index (UTFVI) , from UKGBC Urban Heat Island Web Map

Wildfire

Wildfire risk is increasing with climate change and is an emerging risk in the UK (see the UK Climate Resilience Indicators for wildfire, Figure 14).

For universities with large expanses of greenspace, wildland or near local or national designated natural areas, check the wildfire risk.

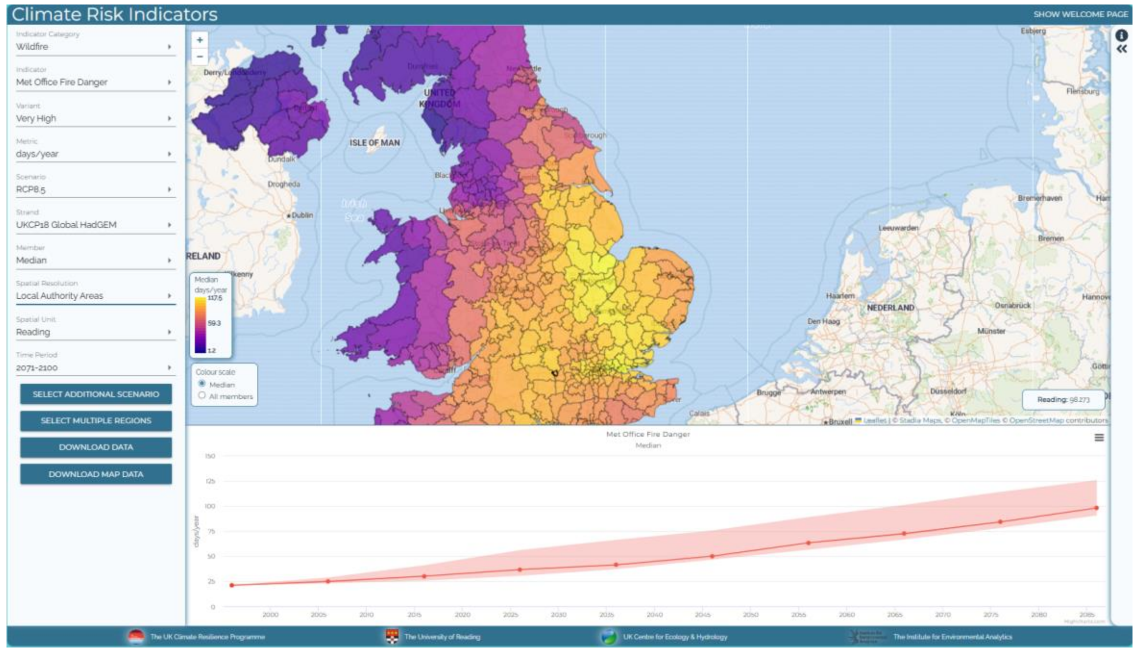


Figure 14: Example of UK Climate Risk Indicators for Wildfire – Met Office Fire Danger – Days per year at very high fire danger, from UK CRI

Accessing data and other climate information

The Climate change Adaptation and Resilience Guide is designed for UK Universities, and signposts the relevant climate data, impacts, adaptation policy and the business continuity standard for the UK.

The information and data required for climate adaptation planning in Ireland, including observed climate information and climate change projections can be found on Ireland's Climate Information Platform, Climate Ireland.

The Climate Data Explorer was developed to help understand current and projected future climate conditions for Ireland.

To access climate projection data, the TRANSLATE project was established by Met Éireann in 2021 to produce standardised climate projections and services for Ireland addressing this climate information gap. TRANSLATE represents a step-change in future climate information for Ireland. It examines both national and international climate projections of relevance to Ireland, enhances them and tailors them to the local Irish context. The result is a standardised, accessible, easy to use high resolution national resource with associated risk-based decision support tools to help Irish society speak a common climate language.

Other information relating to climate change is available from Met Éireann, the Irish Meteorological Service.

The National Adaptation Framework (NAF) outlines the approach to climate adaptation in Ireland. Included in the NAF is information on adaptation policy development and adaptation planning since the first NAF was published in 2018, and how the current NAF will be implemented.

Image:
Irish Lights Headquarters
© Arup

Appendix 2: Additional context

Image:
Central St Giles, Bloomsbury
© Daniel Imade

Climate Change In Legislation and Policy

Key messages:

- Currently, there is no legislative requirement for universities to adapt to climate change,
- DfE's sustainability initiatives provides a driver for climate action planning,
- Regional and local government plans can provide useful data to support climate risk assessment, in addition to setting out local planning requirements.

International Response to Climate Change

A key milestone for international progress on climate change action was the signing of the Paris Agreement (2016), which was the first legally binding global climate agreement, committing its signatories to prepare Nationally Determined Contributions (NDCs), which must set out efforts from each country to adapt to the impacts of climate change.

International decision making on climate change is supported by the Intergovernmental Panel on Climate Change (IPCC) who monitor and assess global science related to climate change. IPCC's most recent report (Sixth Assessment Report AR6) made it clear that whilst decarbonisation is still at the forefront of efforts, adaptation and resilience is now essential to cope with the inevitable impacts of climate change globally.

National Response to Climate Change

At a national level, the Climate Change Act 2008 provides a legally binding commitment for the UK Government to assess current and predicted impact of climate change at 5 yearly interval (CCR3 published in 2022), complemented by a National Adaptation Programme (NAP3 published in 2023), which sets out government-wide responses to climate risks.

The third UK Climate Change Risk Assessment (2022) mirrors the message from the global response, emphasising that 'Climate change is happening now' and that as a nation we must 'continue to raise ambitions on adaptation', outlining sixty-one cross-sector climate risks that universities can consider.

To translate the need to act into the university sector, the Department for Education (DfE) has launched sustainability leadership and climate action plans initiative and guidance (2023). This puts into action the commitment included in the Sustainability and climate change strategy for education ambition that by 2025, all education settings will have nominated a sustainability lead and put in place a climate action plan, which should include actions to increase resilience and start adapting to the impacts of climate change.

What is Happening in your Region?

Given the geographic variability of climate change risks and impacts across the UK, it is useful to check for availability of regional resources, to support identification of regional risk, vulnerability and proposed action. Key sources of information include:

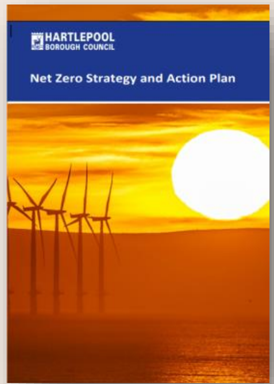
- **Regional and Combined Authorities:** may have produced vulnerability assessments or climate action plans which outline priorities at a regional scale.
- **Regional flood and drought planning:** including Environment Agency work on catchment level management plans (CFMPs), and water companies Water Resources Management Plans (WRMP).
- **Regional climate change hubs:** such as the Climate Ambassadors Programme funded by DfE, being delivered under nine regional hubs across England.
- **Other peers' Plans:** identifying other universities within the region who might have already published risk assessments or action plans.

What is Happening in your Local Area?

Connecting with plan and policy makers at the local authority level can help provide useful local context to underpin estate level planning:

- **Local Plans:** are increasingly setting out policies that must be considered when delivering new developments to ensure climate change is considered and adaptation is delivered.
- **Speaking to Local Council Climate Change Officers:** to understand any local level programmes and funding opportunities to connect into.
- **Local Resilience Forum:** risk assessments and emergency plans.

Example Regional and Local Sources of Information



Climate Action Plan

Hartlepool Net Zero Strategy and Action Plan

Local Plans and supporting guidance

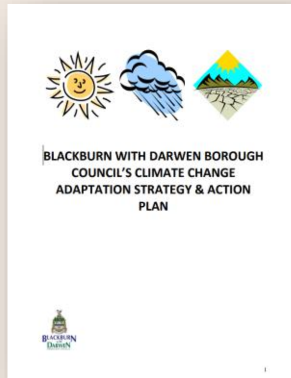
Wirral Local Plan 2022 to 2040

Flood Risk Assessment

Leicestershire Local Flood Risk Management Strategy

Vulnerability Studies

Current and Future Climate Vulnerability of Oxfordshire



Adaptation Plan

Adaptation Strategy

Appendix 2: Setting the context

Climate Change In Standards and Certifications

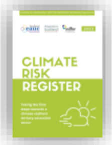
As climate-related risks become increasingly material to long-term investments, universities are under growing pressure to align with evolving investor and finance standards. While not all frameworks are mandatory for the higher education sector, voluntary alignment is rapidly becoming a marker of institutional resilience, transparency, and credibility.

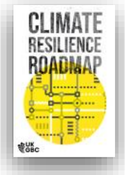
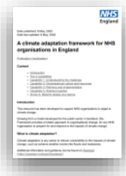
Standards and Certifications	Description
BREEAM buildings	BREEAM is a widely used sustainability certification for new buildings. It is not mandatory to adopt BREEAM, unless Local Planning policy requires this. It embeds climate resilience through credits such as: • Wst05– Adaptation to climate change (risk assessments and mitigation) • Mat01/Mat06 – Material resilience and efficiency • Hea02 – Thermal comfort Universities are increasingly using BREEAM to align estates with climate resilience goals. Both BREEAM Buildings and BREEAM Infrastructure schemes are being applied to new builds, refurbishments, and public realm projects.
BREEAM Infrastructure	BREEAM infrastructure is a leading sustainability certification for civil engineering and public realm projects. Like BREEAM for buildings, it is not mandatory unless required by planning policy or funding conditions. It embeds climate resilience through credits such as: • 2.1 Risk Assessment and mitigation • 2.2 Flooding and surface water run-off • 2.3 Future needs Local authorities, infrastructure providers, and universities are increasingly applying BREEAM Infrastructure to new transport, utilities, and public realm schemes to align with climate adaptation and resilience goals. It complements BREEAM Buildings in delivering holistic, climate-conscious development.
Task Force on Climate-Related Financial Disclosures	The Task Force on Climate-Related Financial Disclosures (TCFD) provides a global framework for disclosing climate-related risks and opportunities. Since 2025, disclosure has been mandatory for large UK organisations and financial institutions. While not legally required for universities, there is growing pressure to voluntarily align with TCFD to meet investor and stakeholder expectations.
The EU Taxonomy for Sustainable Finance	The EU Taxonomy for Sustainable Finance classification system defines which economic activities are considered environmentally sustainable. It includes climate adaptation as a key pillar. UK university projects may need to demonstrate alignment when engaging with EU-based investors or funding streams.
	This international standard provides a framework for integrating climate adaptation into organisational decision-making. It supports: • Risk identification and prioritisation • Adaptation planning and implementation • Monitoring and review Universities are embedding ISO 14090 into their climate strategies to address both acute and chronic risks. It is also becoming a requirement for funding eligibility in some cases .
GRESB	GRESB is an ESG benchmark for real estate and infrastructure portfolios. Its RA1 indicator asks what proportion of a portfolio has undergone climate risk assessment and adaptation planning 3. Universities participating in GRESB reporting or working with investors who do will need to demonstrate alignment with these expectations.

Appendix 2: Setting the context

Climate Change in Guidance documents

Key guidance has been developed to support UK educational institutions and national and international businesses to address climate risks and enhance resilience. The guidance documents below serve as essential references for universities, offering both practical direction and a broader understanding of climate adaptation strategies. Other guidance exists, therefore the below should be used as an indication and not a comprehensive list of guidance available.

Key Guidance - Education	Description
 Compendium of adaptation and resilience measures for schools	This compendium was developed by Arup in partnership with the Greater London Authority as part of the Climate Adaptation Plans (CAPs) for Schools project. It is designed to support London schools in identifying and implementing physical climate adaptation and resilience measures.
 Assessing climate risk and strengthening resilience for UK and Higher Education Institutions	This report was developed by the Environmental Association for Universities and Colleges (EAUC) in collaboration with the Higher Education Business Continuity Network (HEBCoN). It is designed to support higher and further education institutions in the UK in preparing for and adapting to the impacts of climate change.
 Climate Risk register	This tool was developed by EAUC Scotland to support universities and colleges in identifying, assessing, and managing climate-related risks. It provides a structured framework for institutions to evaluate their exposure to climate hazards. The Climate Risk Register is designed to integrate with existing risk management processes and supports compliance with public sector climate reporting duties in Scotland.
 Adapting Universities and colleges to a changing climate	This report was developed by the UK Universities Climate Network (UUCN) to support higher education institutions in understanding and responding to climate-related risks. It provides a strategic overview of how universities can assess their exposure to climate hazards and integrate resilience into institutional planning and operations.
 Using an existing organisational resilience framework to develop a Climate Change Adaptation Plan	An accompanying guide to Adapting Universities and Colleges to a Changing Climate (above). The guide provides step-by-step advice on running your own Business Impact Analysis workshops to evaluate the risks presented by climate change to key organisational functions, and deciding on the actions required to reduce any significant risks. The document presents a seven-step process to develop a Climate Change Adaptation Plan.

Key Guidance - Other	Description
 Adaptation Planning for Business	Adaptation Planning for Business provides practical, action-oriented guidance developed by World Business Council for Sustainable Development (WBCSD) in collaboration with over 70 global business and adaptation experts. It addresses the critical need for businesses to move beyond identifying climate risks to effectively planning for and addressing them. Insights in the guide often apply to and can be adopted by universities.
 UK Climate Resilience Roadmap	Developed by UKGBC this guidance outlines a strategic approach for enhancing the resilience of the built environment to climate-related hazards. It identifies the critical policies and actions needed to future-proof buildings and infrastructure. The guidance highlights four key recommendations for embedding climate resilience into organisational operations—particularly relevant for those managing extensive estates and property portfolios. These recommendations are highly applicable to universities.
 A climate adaptation framework for NHS organisations in England	The framework is designed to strengthen organisational resilience across NHS trusts and systems by building adaptation capability—the capacity to anticipate, prepare for, and respond to climate-related risks. Its core components include organisational transformation, integrated risk assessment, service continuity planning, and alignment with Net Zero objectives. These principles can be effectively translated to a university context, particularly within university healthcare systems, to enhance climate resilience and operational sustainability.

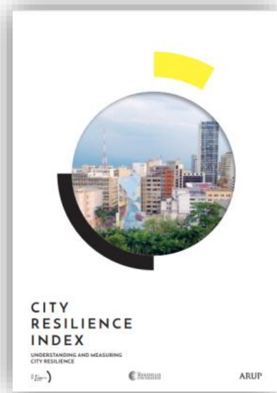
Appendix 2: Setting the context

Further Guides

City Resilience Framework

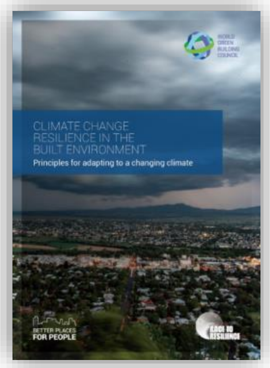
Developed by Arup with support from the Rockefeller Foundation and provides an approach to understand and enhancing the resilience of cities in the face of diverse challenges- from climate change and natural disasters to social and economic stresses.

City Resilience Index



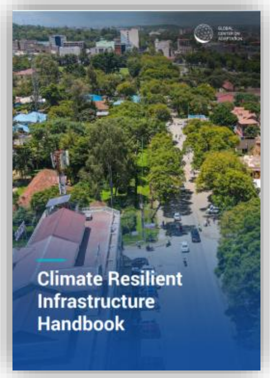
Developed by Arup with support from the Rockefeller Foundation designed to help cities understand, assess, and improve their resilience to a wide range of shocks and stresses. It provides a structured, evidence-based approach to measuring resilience across urban systems.

WGBC Climate Change resilience in the built environment



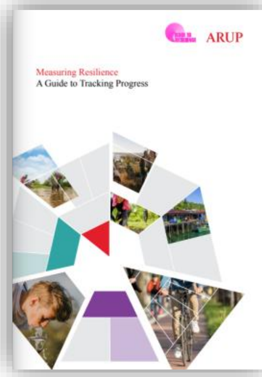
The guide was developed by the World Green Building Council in collaboration with the UN High-Level Climate Champions and C40 Cities. It is designed to support the global transition toward people-focused infrastructure by helping stakeholders in the built environment understand, assess, and enhance resilience to climate-related hazards.

Climate Resilient Infrastructure Handbook



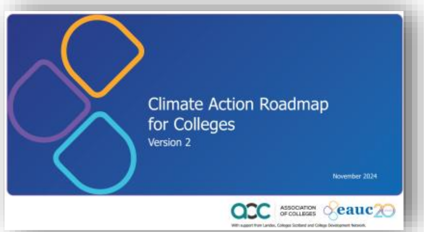
This handbook was developed by the Global Centre on Adaptation in collaboration with the Ministry of Infrastructure and Water Management of the Netherlands, the World Bank Group, and other international partners. It is designed to support infrastructure practitioners in integrating climate resilience into public-private partnership (PPP) projects.

Measuring Resilience



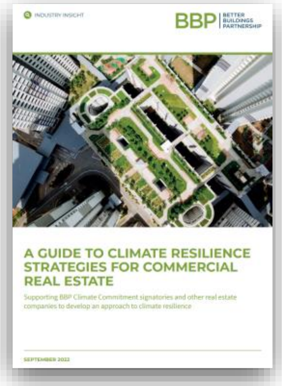
Arup authored report developed for the Race to Resilience (RtR) campaign, provides a practical framework for non-state actors—such as businesses, NGOs, and sub-national governments—to measure and report how their actions enhance climate resilience, particularly for vulnerable communities.

Climate Action Roadmap for Colleges



A universal framework developed by the AoC and EAUC for colleges addressing climate change impacts. The roadmap includes tolls resources and a roadmap dashboard to help colleges monitor their sustainability journey.

A Guide to Climate Resilience Strategies for Commercial Real Estate



The guide draws together existing industry guidance and BBP member best practice case studies to set out how to define, measure and report on climate resilient real estate portfolios. Although focused on the real estate sector this can be applied to the university context.

Global Alliance for Buildings and Construction (GlobalABC)

UN environment programme | Global Alliance for Buildings and Construction

Higher Education Institutions Action Group

The GlobalABC Higher Education Institutions (HEI) Action Group connects academic institutions worldwide to advance research, innovation, and education in sustainable buildings and construction. Focused the group fosters collaboration on initiatives for sustainable, resilient, energy-efficient, and zero-carbon buildings among higher education institutions and leverages on their knowledge and research, education and training and local partnerships and networks.

Sustainability Leadership Scorecard

Since 2018 AUDE and EAUC members have been measuring their sustainability performance using the Sustainability Leadership Scorecard. The Scorecard provides a framework for continued sustainability effort, developed to promote innovation and encourage knowledge transfer.

The SLS comprises 18 standard frameworks developed to address current and emerging sustainability themes. Frameworks are grouped within four priority areas. Each framework is made up of 8 activities and scoring is given at an activity level. All scoring is based on a 0 to 4 scale.

The four priority areas

Scorecard insights

The Scorecard has enabled AUDE and the EAUC to use insights to consider where their support would be most valuable to the sector. The 2025 results show that the climate change adaptation scores as one of the lowest frameworks overall as well as having low levels of ambition in terms of target score. These outcomes, along with the context globally and nationally present a clear case for this Guide and future alignment to the issue of embedding climate adaptation actions and increasing the climate resilience of estates.

128 institutions participated in the 2025 rankings; these institutions shared at least 10 scores on the platform.

Completing the Scorecard

If you would like to complete the Scorecard for your institution, you can access the platform here.

For any questions on the SLS tool or access please email info@sustainabilityleadershipscorecard.org.uk

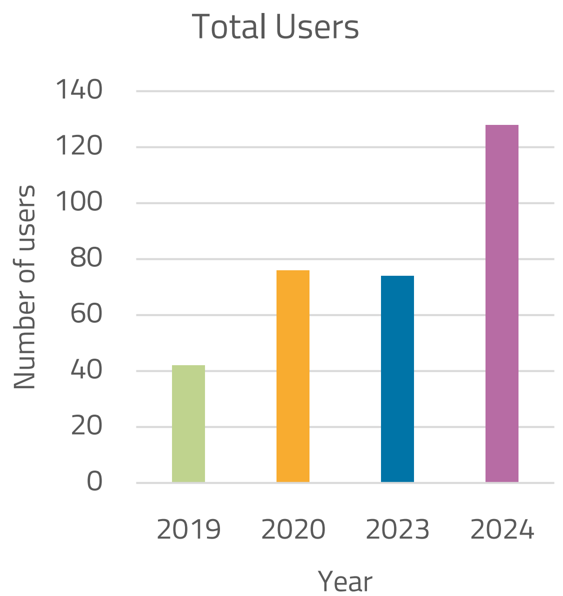


Figure 15: Graph showing growth in institution participation over time

Climate change adaptation scores over time

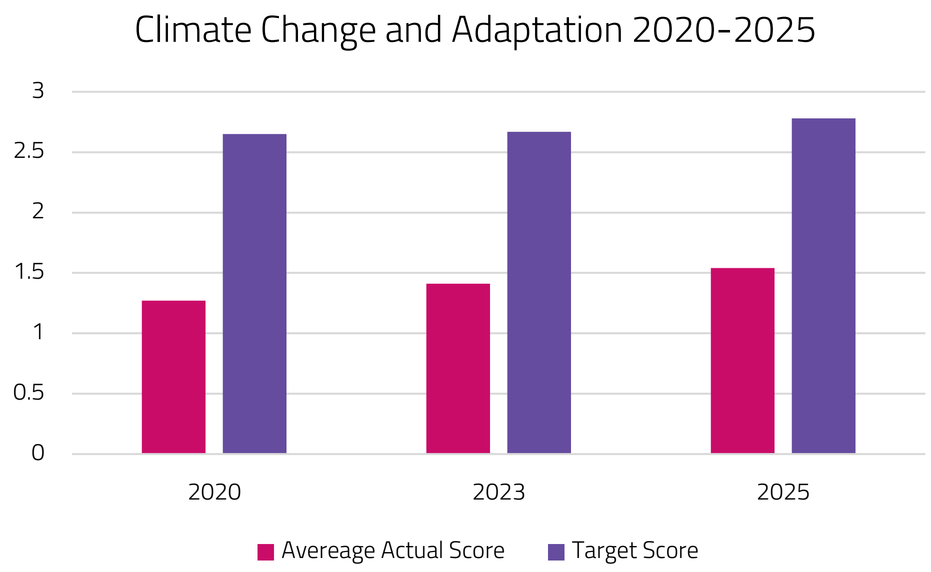


Figure 16: Graph showing actual score Vs target scores for institutions who participated in the 2020, 2023 and 2025 rankings.

Appendix 3: Engagement Insights

Image:
Serpentine Magazine Building, Kensington Gardens, London
© Thomas Graham

Appendix 2: Engagement Insights

Summary of insights from AUDE member workshops, Workshop 1

What we set out to understand: What are the assets and systems of university estates?

People, Place, Economy

Student and Staff Experience

- **Operational Disruption**: Extreme weather events like heatwaves and storms disrupt teaching, research, and support services.
- **Recruitment and Retention**: Inadequate climate adaptation may affect student satisfaction and influence enrolment decisions.
- **Global Climate Impacts**: International students and staff may face travel or participation challenges due to climate events in their home countries.

Climate and Sustainability Solutions

- **Building Performance**: Many university buildings struggle to maintain thermal comfort during extreme weather, highlighting the need for adaptive design.
- **Decarbonisation Complexity**: Transitioning to low-carbon heat networks is technically and environmentally challenging.
- **System Conflicts**: Shared heating/cooling systems may pose health or legal risks under new zoning regulations.

Governance and Leadership

- **Regulatory and Financial Pressure**: Universities face growing expectations for climate disclosures, insurance compliance, and statutory duties.
- **Public Sector Role**: As anchor institutions, universities are expected to support regional adaptation and resilience strategies.

Supply Chain and Economic Resilience

- **Disrupted Supply Chains**: Climate events and geopolitical instability threaten construction, maintenance, and operations.
- **Changing Employment Landscape**: Climate change is reshaping graduate skill needs, and the roles universities prepare students for.

Global Engagement and Mobility

- **International Operations**: Overseas campuses and global partnerships are exposed to climate risks that may affect collaboration and continuity.
- **Academic Events**: Travel disruptions from climate events can impact conferences, visiting lecturers, and institutional visibility.

Water and energy networks

Energy Supply and Infrastructure Stress

- **Rising Cooling Demand**: Higher temperatures are increasing energy use for cooling, raising operational costs and straining systems.
- **Substation Vulnerability**: Equipment is at risk of overheating, prompting the need for additional cooling systems.
- **Winter Energy Pressure**: Colder winters may also increase heating demand, adding further stress to energy networks.
- **Power Disruption Risks**: Outages can lead to food spoilage and damage to sensitive research equipment like ULT freezers.
- **Aging Infrastructure**: Existing assets such as pipework and cabling are increasingly vulnerable to extreme weather and supply chain delays.

Water Supply and Quality

- **Water Stress and Cost**: Heatwaves reduce water availability and increase costs.
- **Groundwater Concerns**: Falling levels may compromise water quality and pose health risks.
- **System Strain**: Boreholes and irrigation systems are under pressure from both drought and flooding, requiring more robust management.

Supply Chain and Systemic Risk

- **Disrupted Supply Chains**: Extreme weather and geopolitical instability are affecting the availability of energy and water infrastructure components.
- **Network Interdependence**: Disruptions in one part of the system can cascade across interconnected residential, industrial, and campus networks.

Drainage, Sewerage, and Flood Risk

- **Flooding from Rainfall**: Intense rainfall is overwhelming drainage systems, causing flooding and infrastructure damage.
- **Sea-Level and Riverside Risks**: Water and sewer lines near rivers or sea level face long-term flood threats.
- **Water Quality Hazards**: Rainwater harvesting systems face increased Legionella risk due to rainfall variability.
- **Adaptation in Practice**: Cities like Glasgow are already implementing levees and flood mitigation measures in response.

Appendix 2: Engagement Insights

Summary of insights from AUDE member workshops, Workshop 1

What we set out to understand: What are the assets and systems of university estates?

Transport Assets

Vulnerability of Transport Infrastructure

- **Flood-Prone Rail Links**: Key commuter routes, such as the Glasgow–Edinburgh line at Winchburgh Tunnel, are increasingly disrupted by flooding.
- **Localised Flood Zones**: Known hotspots like Dalmiwest (west of Glasgow) further reduce commuting reliability.

Car Park and Road Resilience

- **Flooded Car Parks**: University visitor car parks are vulnerable, with some sites having multiple flood-prone entrances.
- **Adaptation Opportunities**: Measures like Sustainable Urban Drainage Systems (SUDS), as seen in Nottingham, offer resilience and potential for integrated EV charging.

Disruption to Campus Access

- **Public Transport Interruptions**: Extreme weather disrupts bus and train services, reducing attendance at teaching and campus events.
- **Active Travel Limitations**: Heatwaves and storms make walking and cycling less viable, increasing reliance on cars.

Road Maintenance and Climate Impact

- **Increased Repair Needs**: Roads are deteriorating faster due to heat-related surface damage and flood erosion, requiring more frequent maintenance.

Broader Mobility Challenges

- **Heat-Related Transit Issues**: Extreme heat affects the reliability and safety of public transport, making it harder for staff and students to reach campus.

Buildings

HVAC and Cooling System Resilience

- **Increased Cooling Demand**: Rising temperatures are pushing HVAC systems beyond their design thresholds, especially in student accommodation, labs, and teaching spaces.
- **Efficiency Concerns**: Cooling systems may become less efficient and more energy-intensive in extreme heat, increasing operational costs and carbon emissions.
- **Mechanical Cooling in Education**: Summer temperatures are already exceeding design limits in schools and colleges, suggesting a long-term trend that universities must prepare for.

Critical Infrastructure and Equipment

- **Laboratories and Research Facilities**: Labs require uninterrupted cooling to protect sensitive equipment and research samples. Overheating risks damage to scientific apparatus and climate-controlled storage.
- **IT Servers and Data Systems**: Server rooms and IT infrastructure are vulnerable to overheating, especially in poorly ventilated spaces, risking data loss and service outages.
- **Hospitals and Healthcare Spaces**: University-affiliated hospitals face increased strain on estates and maintenance teams due to overheating of building services and infrastructure.

Passive Cooling and Adaptation Measures

- **Shading and Design Solutions**: Outdoor shading (e.g. blinds, trees, structures) is essential to reduce indoor heat gain and support cooling systems, especially in labs and healthcare buildings.

Water and Drainage Systems

- **Overheating in Water Storage**: Elevated temperatures can cause water tanks to overheat, affecting water quality and increasing the risk of bacterial growth.
- **Drainage Overload**: Guttering and drainage systems are often insufficient to handle intense rainfall, leading to blockages and localized flooding.

Student Accommodation and Health Risks

- **Thermal Comfort and Safety**: Student residences must be capable of maintaining safe indoor temperatures. Heatwaves pose health risks, especially during power outages or in poorly ventilated buildings.

Public Realm

Biodiversity and Habitat Conservation

- **Protection of Sensitive Sites**: Ancient woodlands and Sites of Special Scientific Interest (SSSIs) are critical for biodiversity and require careful conservation.
- **Habitat Management**: Active management of hedgerows, field margins, ponds, rivers, and streams supports ecological health and resilience.
- **Species Conservation**: Efforts are being made to conserve rare and biodiverse species across campus landscapes.

Climate Adaptation Through Landscape Design

- **Tree Planting for Shade and Shelter**: Trees are used to provide natural cooling for students, livestock, and outdoor activities, supporting thermal comfort and biodiversity.
- **Floodplain Restoration**: Replanting native species in floodplains (e.g. the Trent floodplain) enhances flood resilience and ecological value.
- **Demonstration Sites**: Riverbanks are used as regional demonstration areas for tree planting and climate adaptation projects.

Outdoor Learning and Public Realm

- **Outdoor Learning Spaces**: Outdoor areas, including botanical gardens and courtyards, are increasingly important for education, wellbeing, and climate adaptation.
- **Underutilised Infrastructure**: Pavilions and shaded structures (e.g. at Nottingham) have not been fully leveraged for student shelter, events, or learning.
- **Urban Policy Integration**: Local policies, such as those from Nottingham City Council, support the use of outdoor learning areas in educational settings.

Appendix 2: Engagement Insights

Summary of insights from AUDE member workshops, Workshop 1

What we set out to understand: What is the key criteria for assessing climate change impacts on university estates?

Reputation and Strategic Positioning

- **Student Perception**: Impacts on student surveys, awards (e.g. Green Gown), and enrolment.
- **Graduate Outcomes**: Climate resilience may influence employability and institutional rankings.
- **Public Image**: Risk of activism, protests, and community complaints if adaptation is inadequate.
- **Legal and Compliance Risks**: Exposure to fines, environmental taxes, and failure to meet statutory or planning requirements.
- **Strategic Alignment**: Climate adaptation affects the university's ability to meet broader institutional goals.

People and Wellbeing

- **Health and Comfort**: Poor indoor conditions (heat, humidity) affect student performance and staff productivity.
- **Retention and Welfare**: Climate-related discomfort may impact student and staff retention.
- **Accessibility**: Vulnerable groups may be disproportionately affected.
- **Mental Health**: Climate anxiety and stress from disrupted routines or unsafe conditions.
- **Workplace Dynamics**: Increased remote working may reduce campus cohesion and collaboration.

Facilities and Infrastructure

- **Building Performance**: Need for high resilience or rapid recovery in buildings.
- **Accreditation and Standards**: Compliance with frameworks like BREEAM.
- **Water and Energy Storage**: Capacity for rainwater and renewable energy storage to manage supply variability.
- **Maintenance and Planning**: Increased costs and planning requirements due to climate impacts.

Operability and Continuity

- **Transport Disruption**: Staff often travel further than students; public transport must be resilient.
- **Academic Disruption**: Lost teaching hours or cancelled classes due to extreme weather.

Existing Adaptation Measures

- **Sustainable Drainage Systems (SuDS)** and water management plans are in place.
- **Energy Transition**: Opportunities to shift from gas CHP to cleaner electricity, though dependent on wind availability.

Financial Risk and Resourcing

- **Insurance and Funding**: Rising insurance costs and potential impacts on funding awards.
- **Budget Pressures**: Costs of resilience measures, retrofitting, and maintenance.
- **Capital Availability**: Competing priorities within university financial planning.
- **Risk Management**: Need to integrate climate risks into business continuity and financial planning.

Appendix 2: Engagement Insights

Summary of insights from AUDE member workshops, Workshop 2

What we set out to understand: What are the climate change impacts universities are facing?

Flooding

Operational and Infrastructure Disruption

- Flooded car parks, blocked access routes, and impassable transport infrastructure hinder campus operations—especially during key events like open days.
- Surface water and overwhelmed drainage systems cause damage to buildings and infrastructure.
- Underground facilities such as car parks and rail tunnels are particularly vulnerable.

Reactive and Resource-Intensive Management

- Flood events often require urgent, unplanned responses, diverting staff time and resources.
- Rising maintenance demands and costs are placing additional strain on estates teams.

Building and System Vulnerabilities

- Water ingress can damage HVAC systems, rendering them inoperable.
- Heritage buildings are especially at risk, with narrow downpipes and outdated drainage systems unable to cope with modern rainfall intensity.
- Not all buildings can be retrofitted to meet new drainage demands.

Access and Mobility Challenges

- Flooding disrupts footpaths, cycle lanes, and public transport routes, reducing accessibility and increasing reliance on cars.
- These disruptions contribute to higher emissions and lower campus attendance.

Environmental and Strategic Gaps

- Irrigation system failures affect green roofs and walls.
- Underinvestment in green infrastructure is often due to a lack of understanding of its benefits.
- Budget priorities tend to favour teaching spaces over landscape resilience.
- Fragmented land ownership complicates coordinated flood management.

Health and Safety Risks

- Flooding can lead to pipework contamination, posing risks to water quality and public health.

High Temperatures

Academic Disruption and Student Wellbeing

- High temperatures reduce concentration, lower productivity, and lead to decreased attendance—particularly during exam periods.
- Heatwaves can disrupt field-based learning and outdoor academic activities.
- Temporary cooling measures and limited decant space add pressure to timetabling and space management.

Infrastructure and Operational Strain

- Extreme heat can cause HVAC systems, IT labs, and other critical equipment to underperform or fail.
- Opening windows for ventilation can introduce noise, disrupting teaching and research.
- Retrofitting heritage buildings for cooling is often unfeasible due to structural constraints.

Accommodation and Equity Challenges

- University residences often lack cooling systems, and retrofitting can be costly—expenses that may be passed on to students.

Transport and Access Issues

- High temperatures soften road surfaces, buckle rail tracks, and increase vehicle overheating, leading to travel delays and safety risks.
- These conditions discourage active travel and reduce campus attendance.

Green Infrastructure and Landscape Pressures

- Overuse of green spaces during hot weather leads to degradation.
- Plants and green infrastructure are vulnerable to heat stress, with limited onsite capacity to manage them.
- A lack of shaded corridors reduces outdoor comfort, while financial and coordination challenges hinder long-term investment in landscape resilience.

Behavioural and Safety Concerns

- Warm weather is linked to increased antisocial behaviour, placing additional pressure on universities to manage student conduct.
- System failures during heatwaves can compromise safety and disrupt operations.

Storms

Infrastructure Damage and Recovery Challenges

- Storms cause widespread damage to campus infrastructure, including fallen trees, damaged roofs, and dislodged equipment like air handling units.
- Roof damage is common across both old and new buildings, with repairs often delayed due to varied specifications and long procurement times.
- Leaks are difficult to detect and repair, especially in older or complex roof structures.

Operational and Maintenance Pressures

- Storm events increase the burden on estates teams, requiring urgent tree safety assessments and landscape repairs.
- Rising maintenance costs and limited capacity often lead to reactive rather than strategic decision-making.

Safety and Emergency Planning

- Storms can leave visitors stranded, raising concerns around duty of care and the need for robust emergency response plans.

Transport and Access Disruption

- High winds and debris block roads and rail lines, while power outages disrupt electric vehicle charging and electrified rail services.
- Unsafe travel conditions—caused by snow, flash flooding, or wind—reduce campus attendance and discourage active travel.

Impact on Outdoor and Green Spaces

- Outdoor learning areas and biodiverse gardens are vulnerable to physical damage.
- Storms disrupt the use of green spaces and slow recovery efforts, especially where coordination and resources are limited.

Appendix 2: Engagement Insights

Summary of insights from AUDE member workshops, Workshop 2

What we set out to understand: How are you currently addressing and preparing for climate change and extreme weather?

Planning and Strategy

- **Climate Risk Assessments:** Conducted at the university level (e.g., ISO14001 EMS), but not yet fully integrated across departments.
- **Regional Collaboration:** Working with local councils and public sector bodies to develop a regional climate risk assessment—progress is slow due to complexity.
- **Corporate Risk Register:** Climate adaptation is now included at the top level, raising its institutional profile.

Infrastructure & Adaptation

- **Flood & Heat Mapping**: GIS-based spatial analysis of flood and heat risks shared with leadership and continuity teams.
- **Building Standards:** New build and refurbishment projects now include climate adaptation standards.
- **Decarbonisation & Energy:** Reviewing energy strategies and emission scenarios (e.g., RCPs); installing air source heat pumps.
- **Water Management**: Rainwater harvesting, SuDS (Sustainable Drainage Systems), and drought-resistant planting.
- **Public Realm Projects:** Enhancing outdoor spaces to reduce urban heat island (UHI) effects and increase shade.

Nature-Based Solutions (NbS)

- **Tree Planting:** Focus on resilient, native species; non-native species have shown poor survival.
- **Biodiversity Action Plans:** Integrated into sustainability strategies.
- **Water-Efficient Landscaping:** Selecting plants that require less water.

Academic & Student Engagement

- **Academic Input:** Climate experts involved in local partnerships and flood prevention research.
- **Student Guidance**: Online resources provided for coping with extreme heat.

Emergency Preparedness

- **Incident Response Plans:** Being updated to reflect climate risks.
- **Evacuation & Emergency Plans**: Under review, with input from sustainability and resilience teams.
- **Weather Alerts:** Hot weather alerts issued, especially for IT systems.
- **Business Continuity:** Role-playing emergency scenarios; reviewing major incident planning.

Data & Monitoring

- **Event Logging:** Limited historical data on past weather events; engineering logs may be used as a proxy.
- **Impact Tracking**: Exploring how to record costs and disruptions from extreme weather (e.g., lost time, damage).
- **GIS Data Sharing**: Used to inform strategy and planning teams.

What we set out to understand: What are the barriers and challenges for adapting to climate change and extreme weather?

Strategic & Organisational Challenges

- **Short-Term Focus:** Sustainability efforts often prioritize immediate goals (e.g., energy savings), while climate adaptation requires long-term investment.
- **Lack of Direction:** No clear leadership or strategy for climate adaptation; many institutions are starting from scratch.
- **Siloed Working**: Departments and teams often work in isolation, making coordinated action difficult.
- **Competing Priorities:** Energy efficiency, legal compliance, and cost-saving projects often take precedence over adaptation.

Governance & Collaboration

- **Complex Partnerships:** Working with local councils and other institutions can be slow and complicated.
- **Lack of Leadership:** No clear ownership of climate adaptation within estates or senior leadership teams.
- **Need for Collaboration**: Effective action requires coordinated planning—"dig once" approach to avoid repeated disruptions.

Cultural & Perception Issues

- **Adaptation Seen as Distant:** Climate change is often viewed as a long-term issue, making it harder to prioritize over immediate concerns.
- **Academic Vs. Operational Divide**: Climate research exists, but isn't always applied to estate planning or operations.

Strategic & Organisational Challenges

- **Short-Term Focus**: Sustainability efforts often prioritise immediate goals (e.g., energy savings), while climate adaptation requires long-term investment.
- **Lack of Direction:** No clear leadership or strategy for climate adaptation; many institutions are starting from scratch.
- **Siloed Working:** Departments and teams often work in isolation, making coordinated action difficult.
- **Competing Priorities:** Energy efficiency, legal compliance, and cost-saving projects often take precedence over adaptation.

Data & Evidence Gaps

- **No Climate Risk Assessments**: Many institutions lack formal assessments to identify and prioritize climate risks.
- **Lack of Local Data**: Difficulty accessing or generating site-specific data to support action.
- **No Tracking of Impacts:** Limited recording of climate-related incidents or costs (e.g., flooding, overheating, IT failures).

Funding & Resources

- **Limited Funding:** Budget constraints make it hard to invest in long-term adaptation projects.
- **Unclear Business Case:** Lack of data and documentation makes it difficult to justify investment in adaptation.
- **Selling Assets:** Some universities are selling older buildings to fund estate strategies, which may limit future flexibility.

Appendix 2: Engagement Insights

Summary of insights from AUDE member workshops, Workshop 3

What we set out to understand: What are the partnerships universities are currently undergoing in practice?

Types of Partnership

- **Local Authority Collaboration:** Many universities (e.g. York, St Andrews, Exeter, Stirling) are engaging with local councils to align on adaptation plans and city-wide strategies.
- **Cross-Sector Networks:** Institutions like Devon's climate emergency group and Adaptation Scotland's climate ready South East Scotland network bring together universities, councils, NHS, police, and others to share knowledge and coordinate action.
- **Cultural and Academic Institutions:** Oxford's GLAM is working with museums and libraries to assess shared risks and integrate climate into training.

Benefits of Partnership

- **Knowledge Sharing**: Forums like CRC meetings and regional partnerships help universities learn from others and benchmark progress.
- **Resource Pooling:** Collaborations (e.g. Queen Margaret Uni with colleges) allow institutions to share limited sustainability resources and build capacity.
- **Strategic Alignment:** Some partnerships are helping align university goals with regional or national adaptation strategies.

Challenges faced

- **Complexity and Coordination:** Many efforts stall due to unclear leadership, overlapping objectives, or lack of decision-making authority.
- **Funding Gaps:** A recurring theme is the lack of investment to move from discussion to delivery.
- **Momentum Loss**: Without clear terms of reference or dedicated roles, partnerships often lose steam as people return to their core jobs.

What we set out to understand: What are the Internal drivers for university's climate adaptation?

- **Strategic Vision & Governance:** Climate adaptation is increasingly embedded in institutional strategies, risk registers, and continuity planning (e.g. Kingston University).
- **Risk Framing & Communication**: Framing adaptation as a risk issue helps engage senior leadership without requiring deep climate expertise.
- **Operational Pressures**: Staff and student demands for quick fixes (e.g. cooling) often lead to reactive responses rather than long-term planning.
- **Planning, Space Use & Masterplanning:** Adaptation is being integrated into estate masterplans, often linked to space reviews and capital projects.
- **Student Experience:** Ensuring comfort and continuity is a key motivator, especially for recruitment and retention (e.g. overheating at Imperial College).
- **Leadership Support:** While leadership may be supportive, action is often delayed due to unclear ownership or concerns over cost (e.g. Queen Margaret University).
- **Perception & Cultural Barriers:** Adaptation is still seen as a long-term issue and often deprioritised in favour of immediate concerns.
- **Academic-Professional Collaboration:** Effective adaptation requires joint working between estates teams and academic researchers.
- **Internal Benchmarking & Peer Awareness:** Institutions are learning from each other, creating momentum through shared experiences (e.g. Bournemouth University).
- **Data, Reporting & Business Case Development**: Universities are beginning to include climate risk in financial reporting to justify adaptation investment.

What we set out to understand: What are the external drivers for university's climate adaptation?

- **Government Policy & Regulation:** National and devolved governments are embedding adaptation into reporting requirements and sector guidance (e.g. Scotland's Public Bodies Climate Change Duties).
- **Financial Oversight & Accountability:** External auditors and funders increasingly require climate risk disclosures and adaptation planning as part of financial due diligence.
- **Insurance & Market Pressures**: Insurers are becoming more risk-averse, prompting universities to demonstrate resilience to avoid uninsurable risks.
- **Sector Benchmarking & Peer Influence:** ISO standards (e.g. ISO14001), league tables, and peer comparisons create reputational pressure and drive shared learning across institutions.
- **Local & Regional Partnerships:** Councils and communities expect universities to contribute to regional adaptation efforts and collaborate on climate resilience.
- **Student & Public Expectations:** Students and the wider public expect visible climate action, especially where it affects wellbeing, access, and institutional reputation.
- **Data, Evidence & Business Case:** External expectations are pushing institutions to collect data and build robust business cases for adaptation, often linking it to financial reporting.
- **Environmental Risk**: Increasing exposure to real-world hazards—such as flooding, heatwaves, and storms—is making climate adaptation a tangible and urgent priority (e.g. flood risk at Kingston University).

What we set out to understand: What should the guide include?

Must include:

- **Building Adaptation:** Retrofit strategies for existing buildings, including planning for closures and improving student comfort.
- **Finance & Funding:** Clear examples of financing options and guidance on funding planning—not just capital costs.
- **Practical Tools**: Step-by-step guidance, simple and cost-effective actions, and integration with other projects.
- **Risk & Assessment:** Use of tools like LCAT, risk categories, and templates for risk registers; plan for 2°C/4°C scenarios.
- **Business Continuity:** Emphasis on minimising disruption and maintaining student experience.
- **Regional Relevance:** Acknowledge and address regional climate differences (e.g. Scotland vs. South East England).
- **Partnerships:** Guidance on working collaboratively with partners to deliver outcomes.
- **Student Focus:** Link adaptation to student recruitment, retention, and learning experience.
- **Case Studies:** Real-world examples of implemented measures (e.g. heat adaptation).
- **Budgeting:** Information on costs for different adaptation types to support conversations with senior leaders.

Nice to have:

- **A shared platform** to record climate-related events and track where mitigation efforts have reduced impacts.
- **Clear language, roles, and responsibilities** to support consistent communication and accountability.
- **Guidance on partnership working**, including how to collaborate effectively across institutions.

AUDE