AUDE

Together, for excellent university estates & facilities

ASSOCIATION OF UNIVERSITY DIRECTORS OF ESTATES

Climate Change Adaptation and Resilience Guide

Developed to outline recommendations and case studies for the UK higher education sector relating to climate change adaptation and resilience.

Image:
Greener Grangetown WSUD
© Math Roberts

Using and navigating this document

How to use this guide

When AUDE embarked on this project, the requirement from members was to develop guidance on climate change adaptation and resilience for UK universities. The Association knew that to do this required insight from the sector and a deep-dive into what exists already ahead of any recommendations being made.

The co-creation with members led to there being clear requirements for the guide that stretch beyond one standalone document. To meet these needs, the Climate Change Adaptation and Resilience Guide is split into three documents.

1. **Climate Change Adaptation and Resilience Guide** – this document, split into three core sections: Context, Taking Action and Case Studies. Each having sub-section that have been developed to support estates teams to understand the need for climate adaptation, how to approach it and what action looks like elsewhere. Case studies are weaved throughout as well as there being a dedicated section.
2. **Catalogue of Adaptation Measures** – developed to highlight types of adaptation actions that could be implemented once the strategy and plan have been actioned. This document outlines a catalogue of adaptation measures to help inform and inspire your adaptation journey. Designed to be picked up whenever you would like inspiration for the types of adaptation measures that could be implemented on your estate.
3. **Appendices** – this document holds a wealth of information designed to support ongoing implementation of the recommendations made. The appendices include: a step-by-step guide of how to use climate data (using Birmingham as an example location); insight into legislation, policy, standards, certification and other guidance; and, a summary of AUDE member insights gathered during workshops and one-to-one conversations to develop this guide.

Whatever stage of your adaptation journey, the guide has been developed to inform and inspire action. AUDE have set out a clear call to action to members, outlined in the summary, with a vision for all members to consider and action.

This section has been developed to set the scene, how is climate change impacting the university estate? Go here for:

- The impact of climate change and how AUDE member estates are being impacted.
- Key climate hazards and trends of the UK.

This section has been developed to outline two areas that each represent a step in the process of taking action:

1. Strategy – integrating climate change into the business continuity process.
2. Plan – adaptation planning based on engagement insights.

Forewords

AUDE

The steer to our universities couldn't be clearer, and in offering my thanks to all participants in the creation of this report, including AUDE member universities who have shared their work, their data and their ideas; and to our Sustainability Advisory Group which initiated this guide (along with last year's two related works – the 'Guide to Decarbonisation' and the 'Legacy Buildings Guide') on behalf of the association. In all cases I am really grateful for such clear guidance.

Spend on climate resilience needs to become a type of 'business-as-usual' item. Climate change is happening, and at a faster rate than most predictions. Investing now in climate adaptation and resilience is a way to ensure we have to spend less now rather than more later. Accepting the reality of climate change and doing what we can to mitigate its worst effects is the only sensible strategic response.

But that argument needs winning in institutions that are searching for every penny. Our contributors acknowledged a sense of backsliding on investing sustainability issues – that arguments that were won perhaps five or six years ago have begun again, in the light of challenging financial outlooks.

At the same time, we must acknowledge the affordability gap facing many institutions. Universities are being asked to do more with less, and the reality of finite resources means difficult choices are unavoidable. Climate resilience must become integral to core decision-making, but doing so requires recognising the financial pressures that risk stalling progress. Rebuilding consensus and momentum in this context is not only about making the case for long-term savings, but also about aligning action with institutional capacity.

There are many ways to approach this report, and you will find one that will suit you no matter what the level of your personal or institutional knowledge on these issues. Counter-intuitively can I start by suggesting a look at the terminology and definitions? It's important we use words and terms in shared ways and explain and influence colleagues around consistent terminology. You might go straight for the catalogue of possible adaptations – a very practical response. The likely climate challenges you will face in your (Met Office) region is another potential entry point. Are you in an urban heat island? Or facing sea-level rise (Wales), storms (the north-east), or wildfires (Scotland)? Your university community is ready to be influenced on a theme that is of direct importance to all of us. Use this guide to shape your influencing work as well as your estates and facilities management decisions.

We've broken the Guide down into three manageable chunks, and we hope this works for you in steering around a theme that is fast emerging as a central one for university estates. Don't put this – either the theme or the guide – on the back burner.

Use it now to start conversations, prioritise actions, and shift the culture. Climate change = business as usual. Build an awareness of climate change into every estate's decision – it's a question not just of sustainability, but of long-term institutional risk.

Syd Cottle

AUDE Chair and Director of Estates and Infrastructure at the University of Liverpool

EAUC

Universities are navigating increasingly complex challenges. Amid this turbulence, one risk continues to escalate, yet remains under-recognised in many institutions: the impact of a changing climate.

All universities have risk registers, but too few treat climate adaptation and resilience as a core concern for business continuity. If buildings flood, operations are disrupted. If heatwaves intensify, student wellbeing, research, and the teaching environment are affected. These are not hypothetical risks: they are happening now.

A key theme of this guide is collaboration. At EAUC, we work closely with AUDE and other sector partners to support and challenge institutions to embed sustainability across their whole organisation: from teaching and learning to research to operations and leadership. Our shared work on the Sustainability Leadership Scorecard has consistently shown that climate adaptation is one of the most underdeveloped areas of institutional response, despite its clear links to risk, wellbeing, and resilience.

Yet this is not simply an estates issue but a whole-institution one, that touches planning, governance, learning, student and staff experience, community relationships and reputation.

This guide is both timely and practical. It helps move adaptation from the periphery into the centre of institutional thinking, supporting action that protects people, places and purpose. Its emphasis on integrated planning, inclusive engagement, and system-wide collaboration aligns closely with our 2030 strategy.

As the climate shifts, so must our approach: within institutions and across the sector. Extreme weather events may still be labelled 'exceptional', but they are becoming the norm. The cost of inaction, whether that be financial, reputational, educational, is growing. By acting now, together, we can build university estates that are not only resilient, but regenerative, equitable and future-fit.

We encourage all institutions to use this resource as a catalyst for strategic, joined-up action.

Charlotte Bonner

CEO, EAUC

Arup

The impact of climate change on our estates and beyond is placing unprecedented pressure on the university to respond not just appropriately but at pace. The harsh reality is that if we were to stop the burning of all fossil fuels with immediate effect, the climate would continue to change and average global temperature would continue to rise whilst the atmosphere responds to the greenhouse gases that have already been emitted. As a collective, UK universities must adapt to the changes ahead and prepare and manage the ongoing and increasing impacts of climate change. Each university has a responsibility to ensure the estate is capable of withstanding the effects of a changing climate whilst maintaining the safety of those who use it.

In developing this guide, AUDE has helped to establish practical guidance for its members to consider alongside their existing structures and processes. The guide emphasises just this – integration into current processes and procedures is essential for any institution wanting to withstand the impact of extreme weather and ongoing changes to environmental conditions.

Although targeted at the estate level, the guide demonstrates that success will come from a shift from individual thinking and action, towards collaboration and partnership. Climate hazards will not stop at the boundary line of the university that has implemented adaptive measures on elements of its estate, measures must also be taken elsewhere in the local community and beyond to enable real adaptation and establish climate resilience.

If you are not already, now is the time to take action, now is the time to embed climate change thinking into your everyday and now is the time to be part of the change to truly climate resilient university estates.

Sophie West

Senior Consultant, Sustainability

Image:
Royal Holloway College
© Harry Sowden

Executive summary

2024 was the warmest year on record, at around 1.55°C above pre-industrial levels, confirmed in January 2025 by the World Meteorological Organization (WMO). This shocking confirmation comes alongside a decade of record-breaking temperatures and other extremes. Over the next 10 years, organisations expect risks associated with climate change to be more severe than misinformation, AI, the refugee crisis, and politics (World Economic Forum Global Risks Report 2025). Climate risk management and building climate resilience is now a vital part of operations, not a nice-to-have.

Why do we need to adapt?

The increasing frequency and severity of climate-related impacts means that adaptation is a necessity for the resilient university estate. Extreme weather events, previously thought to be once-in-a-lifetime, rising temperatures, sea level rise and changing weather patterns are no longer far-off future scenarios, they are the present reality, demanding our immediate attention. Today's investment in adaptation will secure tomorrows future, with the long-term cost of inaction far outweighing the cost of action.

The ongoing climate and ecological crises have brought with them hazards and risks that are impacting university estates whilst at the same time, the estate is existing in an increasingly uncertain operating environment. Risks from climate change are exacerbating the openness to sudden shocks and long-term impacts that reduce how resilient an estate can truly be. Building resilience and implementing adaptative actions is not a risk-avoidance process, it is also an opportunity to invest in ongoing business continuity, staff, students, community and supply chains. The value creation possible and co-benefits to be realised demonstrate the power of UK estates to secure a resilient climate future.

The role of UK Estates

AUDE recognise the power of university estates that collaborate to deliver a more resilient UK and Ireland. Internally within the estate, adaptation actions can't be the responsibility of one team only, efforts must be integrated across teams and within various strategies and plans. This integrated approach is a must if there is to be meaningful change.

AUDE members in the Republic of Ireland

This guide is designed for UK universities, and signposts the relevant climate data, impacts, adaptation policy and the business continuity standard for the UK. The equivalent information is available for the Republic Ireland through Ireland's Climate Information Platform, Climate Ireland, the TRANSLATE project from Met Éireann, the Irish Meteorological Service, the National Adaptation Framework (NAF) and ISO 22301:2019 - Business continuity management systems. The remainder of the guide is equally applicable to Irish universities.

Steps for a transformed estate

This guide demonstrates that implementing effective climate adaptation and resilience measures requires business transformation that considers processes, procedures, governance and planning. Three steps have been identified to support this transformation:

1. **Identify**
2. **Embed into business continuity processes**
3. **Take action, build resilience**

After reading this guide, you will be equipped with recommendations that support the implementation of adaptation actions and insights drawn from case studies included to demonstrate how higher education estate are adapting to climate change.

The aim is that you feel empowered to be an advocate for climate resilience and feel ready to demand more from our buildings, communities and the natural world around us to be prepared for the impacts of a changing climate.

Climate Risk

In 2022, the Intergovernmental Panel on Climate Change (IPCC) defined climate risk as:

"The potential for adverse consequences for human or economical systems, recognizing the diversity of values and objectives associated with such systems…[Climate] risks result from dynamic interactions between climate-related hazards with exposure and vulnerability."

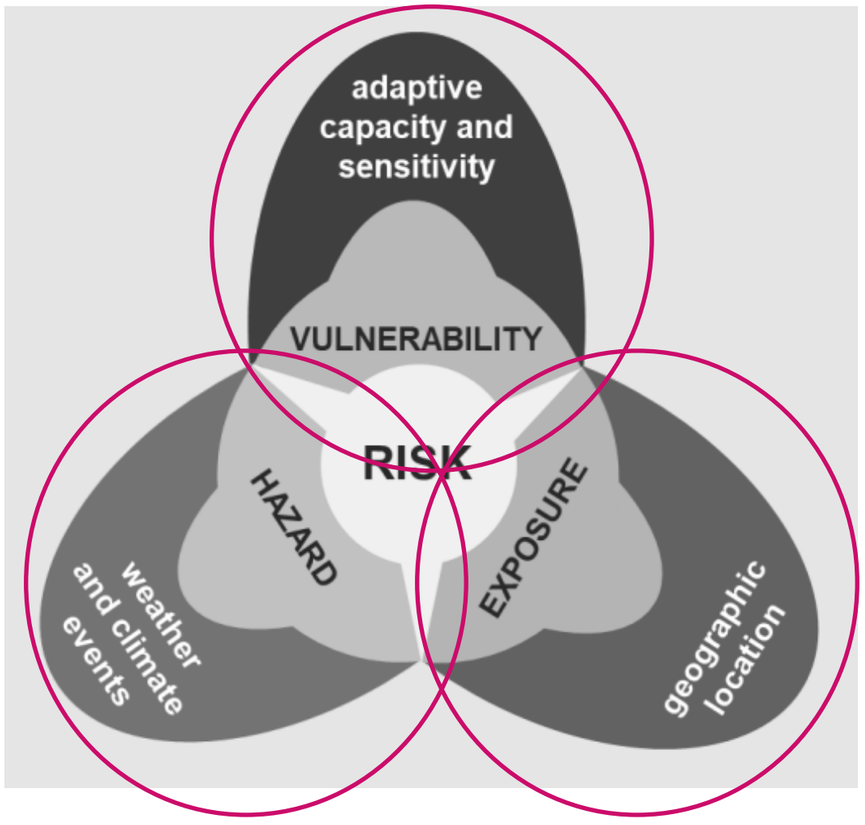
Risk is a combination of likelihood and consequence of something (often negative) happening. Climate risk is the potential for climate impacts to negatively affect lives, livelihoods, health and wellbeing, ecosystems and species, economic, social and cultural assets, services and infrastructure.

Climate risk depends on hazards, exposure and vulnerability all being present. Each of these factors can be uncertain in terms of magnitude and probability of occurrence, and they can change over time and across geographic locations. Each of these factors are dependent on socio-economic changes and human decision making.

Climate Risk
The potential for climate-related hazards to cause (direct or indirect) damage or disruption to the buildings, infrastructure, spaces, systems, people or networks that make up the university estate.

In the context of this guidance, climate risk is understood as a function of hazard (likelihood) and vulnerability and exposure of the estate's assets (impact/consequence)

What is the impact/consequence of the hazard on your estate?



What are the climate hazards and what is their likelihood?

Where is your estate located, relative to the hazard?

Figure 1: Hazard, exposure and vulnerability interactions lead to climate risk (Source: Met Office Local Authority Report)

Terminology and Definitions

Climate Risk, Resilience and Adaptation

Adaptation to Climate Change

"The changes in processes, practices and assets to mitigate potential risk or to benefit from opportunities associated with climate change." (UNFCCC)

Adaptation to the changing climate is an ongoing process that supports the outcome seeking to be realised: climate resilience. Adaptation to climate change involves actions and preparations to reduce exposure and vulnerability to the current and projected impacts of climate change.

University estates face unique challenges; these challenges are dependent upon and influenced by the location and geography of the estate. City campuses for example must consider adaptation for challenges such as the urban heat island effect and pressures on resources like energy and water. Coastal campuses must consider sea-level rise and coastal inundation. Estates with farmland must consider special and habitat degradation and wildfires.

Effective adaptation in the built environment requires "modifying and upgrading new and existing buildings and infrastructure, as well as supporting people and ecosystems to withstand changes in climate, reducing damage and harm from climate impacts, promoting longevity in the current building stock, and innovating across the supply chain" (UKGBC Resilience Roadmap).

Adaptation measures can include adjustments to environmental, social and economic systems by updates in processes, polices and practices, as well as adjustments to physical infrastructure.

Climate Change Resilience

"Capacity of social, economic and ecosystems to cope with a hazardous event or trend or disturbance." (IPCC, 2022)

Resilience to climate change is the outcome that adaptation to climate change is seeking to deliver. It is defined as the capacity to prepare for, respond to, and recover from the impacts of hazardous climatic events while incurring minimal damage to societal wellbeing, the economy and the environment.

This entails a range of actions across policy, infrastructure, services, planning, education and communication. As such, building climate resilience requires a holistic and multi-dimensional approach to enhance communities' social, human, natural, physical and financial capacities to cope with and recover from the impacts of climate change. (Source: LSE, Grantham Institute)

Climate related challenges can also be opportunities to deliver wider benefits through integrated design, furthering global and local objectives, such as the Sustainable Development Goals (SDGs).

Climate Resilience

The capacity to prepare for, respond to and recover from climate-related impacts occurring across the estate.

Resilience is the outcome we achieve through the action (adaptation) to manage climate change risks.

Climate Adaptation

Making changes to processes, procedures, and governance and implementing adaptive measures across the estate to reduce the impact of climate-related problems when they happen.

Adaptation is the action required to manage climate change risks.

Image:
Cardiff Drainage And Green Infrastructure
© Paul Carstairs

Context

Image:
University of Hong Kong, Centennial Campus,
© Damon Yuen

Image:
University College Hospital Macmillan Cancer Centre
© Thomas Graham

Setting the context

Overview

Introduction

There is an urgent need to adapt our university estates to the direct and indirect impacts of climate change. The increasing frequency and severity of climate-related impacts means that adaptation is a necessity for the resilient university estate.

In the UK, there is a broad understanding of the need to adapt the built environment to climate change, illustrated by the Third National Adaptation Programme (NAP3) released by the UK government in 2023. Despite this broad understanding, there are obstacles to implementation, including funding, planning and governance.

This section explores the context of climate change in the UK, including climate hazards and trends and how these may affect universities. Existing guidance and standards are referred to that provide insights for developing adaptation plans and taking action.

Key messages:

- The increasing frequency and severity of climate-related impacts means that adaptation is a necessity for the resilient university estate.
- Our current trajectory points to a global temperature rise of approximately 2.7°C by 2100.
- The UK has the capacity and resources to respond, but it has yet to do so.
- The cost of inaction on climate adaptation significantly exceeds the cost of taking action.
- University estates must make informed, strategic decisions that support adaptation to climate change in support of a resilient estate.

The Impact of Climate Change: Current and Anticipated Future Impact

Key messages:

- The changing climate has caused record-breaking temperatures.
- Temperatures will continue to rise leading to further climate-related impacts including overlapping events.
- Adapting to and building resilience against extreme, unpredictable weather is essential.

Overview

The global climate is changing at an unprecedented pace, with 2024 confirmed as the warmest year on record and the first likely to exceed 1.5°C above pre-industrial levels a critical threshold identified by the UK Met Office.

This underscores the accelerating impact of human-induced climate change, which is already being felt across the globe and here in the UK.

From rising sea levels threatening low-lying coastal communities, where over 600 million people live less than 10 meters above sea level, to increasingly frequent and intense storms, floods, and heatwaves, the consequences are widespread and escalating.

The Intergovernmental Panel on Climate Change (IPCC) warns that with further warming, every region will face more frequent and overlapping climate hazards, such as simultaneous heatwaves and droughts.

Our current trajectory points to a global temperature rise of approximately 2.7°C by 2100, far beyond the Paris Agreement's 1.5°C target highlighting the urgent need not only to reduce greenhouse gas emissions but also to build resilience against increasingly extreme and unpredictable weather.

Over the past two decades, natural disasters have affected 4.4 billion people, caused 1.3 million deaths, and led to $2 trillion USD in economic losses.

Without decisive action, projections suggest that by 2050, globally over 970 cities could face extreme heat, and more than 570 could be impacted by rising seas.

In the UK, this means preparing for hotter, drier summers and warmer, wetter winters—conditions that demand both mitigation and adaptation at every level of society.

Need for sector wide action

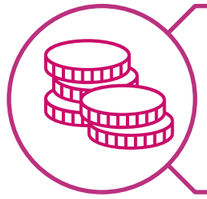
The cost of inaction on climate adaptation significantly exceeds the cost of taking action. The Climate Change Committee (CCC) warns that while the UK has the capacity and resources to respond, it has yet to do so. Acting now is more cost-effective than dealing with future consequences. Without further adaptation, the number of climate-related risks costing billions annually could triple by the 2080s, even if global efforts succeed in limiting warming to 2°C above pre-industrial levels.

One estimate from the Bank of America suggests a $1.8 trillion USD investment by 2030 in early resilience measures (warning systems, resilient infrastructure, dryland agricultural crop production, mangroves, and water resource management) would yield more than $7 trillion USD of benefits in avoided costs from climate change effects (Global Commission on adaptation, 2019)

This makes immediate, strategic action essential, especially for institutions like universities, who manage complex estates, serve diverse communities, and shape future generations.

Over 500,000 built environment assets are estimated to be at risk from climate change by 2050 under a high emissions scenario (UKGBC, 2025)

Over 55% of UK homes already experience overheating during relatively mild summer conditions (UKGBC, 2025)



A reduction of 7% in green space coverage—critical for local cooling—was recorded across the UK between 2011 and 2016 (Environmental Audit Committee, 2018).

£1.3 billion is the estimated cost of flood-related damage to the UK economy in 2016 (UKGBC, 2025)

60% of climate-related risks facing the UK are currently assessed as requiring the highest level of urgency (UKGBC, 2025)

Climate trends in the UK

Key messages:

- Expect to see warmer and wetter winters, hotter and drier summers and more frequent and intense weather extremes.
- The UK Climate Projections (UKCP) are the Met Office's climate analysis and projection toolkit.

Our climate has already warmed

Our climate has already warmed by around 1 °C since the 1850s, and we expect further warming in the future.

Some warming is already inevitable due to historical emissions. The amount of further warming we could avoid depends on our ability to cut emissions. This means there are a range of different possible pathways of warming.

The UK Climate Projections

The UK Climate Projections (UKCP) are the Met Office's climate analysis and projection toolkit. The 2018 UKCP are the latest projections and provide the most up-to-date assessment of how the climate of the UK may change over the 21st century.

How will climate change affect the UK?

We expect to see:

- **Warmer and wetter winters**
- **Hotter and drier summers**
- **More frequent and intense weather extremes**

Climate change will make these conditions more likely. The UK's weather will continue to be variable, but we will see more of this type of weather.

In the future, we will see a lot of the weather we experience today. The difference, though, is that the intensity of some weather types will change.

Spanish plumes (an air mass travelling north from Spain) bring hot conditions to the UK in the summer.

We could see these become more intense, creating even hotter summer weather. But these plumes can also bring more intense downpours during summer thunderstorms.

More rainfall could happen in winter storms, too. While the temperatures may be milder, winters will tend to be wetter, with more potential for flooding.

Greatest climate hazard trends 2100 under a high emissions scenario

High winds

The highest surface wind speeds across the UK are expected to affect universities in the north-west and west coast of Scotland, although the confidence in this is low.

Increased winter precipitation

Winter precipitation is expected to increased for most universities across the UK, with the greatest increases seen everywhere except central northern highlands of Scotland, northern Wales and the north of Northern Ireland.

Very hot days over 30°C

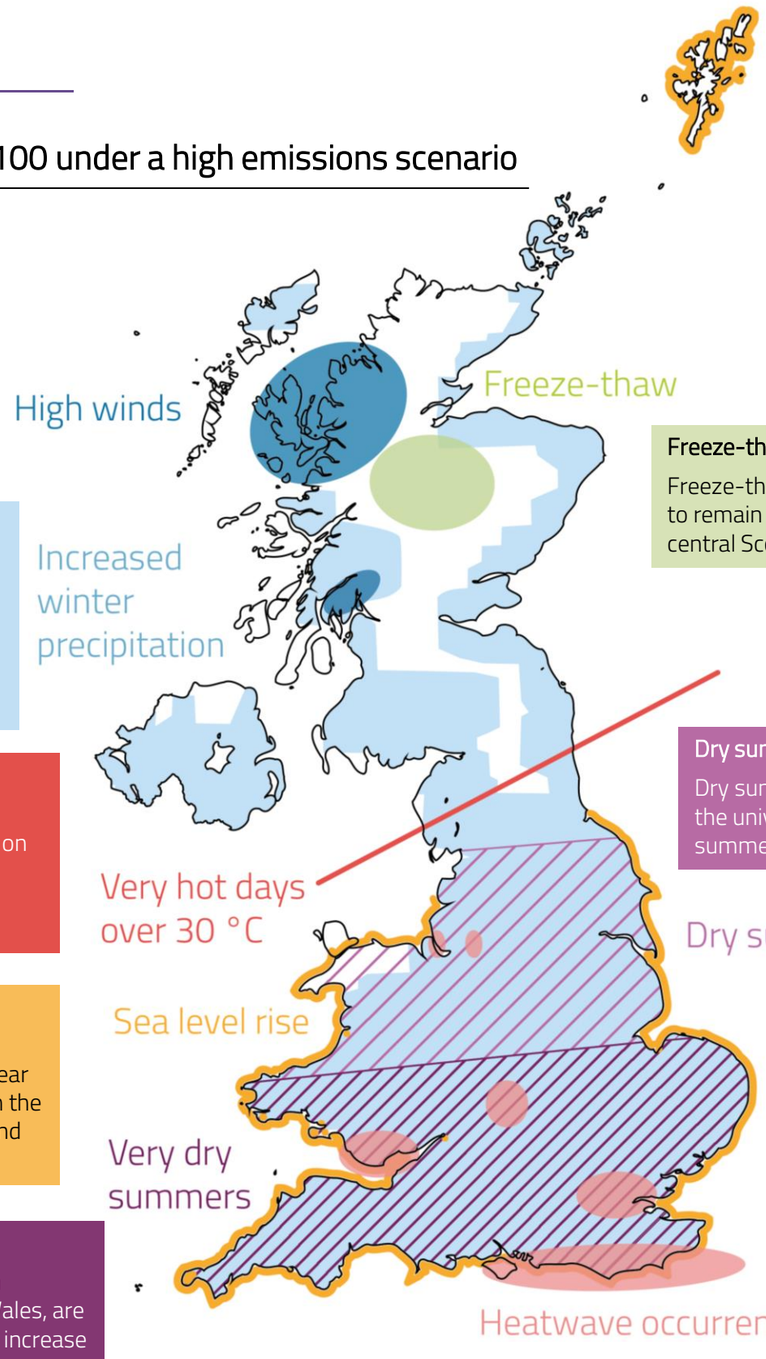
Universities below this line, between the Lake District on the west and Newcastle on the east, are expected to experience the greatest number of hot days over 35°C, across the UK.

Sea level rise

The greatest increase in sea level rise is expected to impact universities on and near the coastline around England (apart from the far north-east and north-west), Wales and the Shetland Islands.

Very dry summers

Universities in southern and eastern England, and the southern part of Wales, are expected to experience the greatest increase in very dry summers.



Freeze-thaw

Freeze-thaw weathering cycles are expected to remain an issue, and worsen, in the central Scottish Highlands.

Dry summers

Dry summers are expected to affect most of the universities in England (with very dry summers likely further south).

Heatwave occurrence

The greatest number of heatwaves across the UK are expected to be seen at universities on the south coast of England, London, Birmingham, south Wales and around Liverpool and Manchester.

Figure 2: Illustration to represent the expected greatest climate hazard trends across the UK by the end of the century, under a high emissions scenario (based on UKCP18 data)

How much could the UK climate change?

Projections deal in probability, rather than definite outcomes. However, we have summarised some of the possible changes for the UK.

Compared to our climate in 1990, by 2070 for the UK it is projected that:

Winter

- Winters are between 1 and 4.5°C warmer
- Winters are up to 30% wetter
- Intensity of rain increases by up to 25%

Summer

- Summers are between 1 and 6°C warmer
- Summers are up to 60% drier, depending on the region
- The average hottest summer day is between 4 and 7°C warmer
- The chance of exceeding 40°C is similar to the chance of exceeding 32°C in 1990
- Intensity of rain increases by up to 20%
- Days when rainfall exceeds 30mm per hour happen twice more often

These changes are based on the high emissions scenario, where the world continues to create high levels of emissions.

The greatest trends by the end of the century, for a selection of hazards, are illustrated in Figure 2 on the previous page.

Appendix 1 in the Appendices supplement explains how to access and use the Met Office Local Authority Climate Service and **Explorer** and an example of the outputs for Birmingham.

Further reading (and information source): Met Office **Climate Change in the UK**.

Republic of Ireland University Estates

This guide is designed for UK universities, and signposts the relevant climate data, impacts, adaptation policy and the business continuity standard for the UK.

The equivalent information is available for the Republic Ireland through Ireland's Climate Information Platform, Climate Ireland, the TRANSLATE project from Met Éireann, the Irish Meteorological Service, the National Adaptation Framework (NAF) and ISO 22301:2019 - Business continuity management systems.

The remainder of the guide is equally applicable to Irish universities.

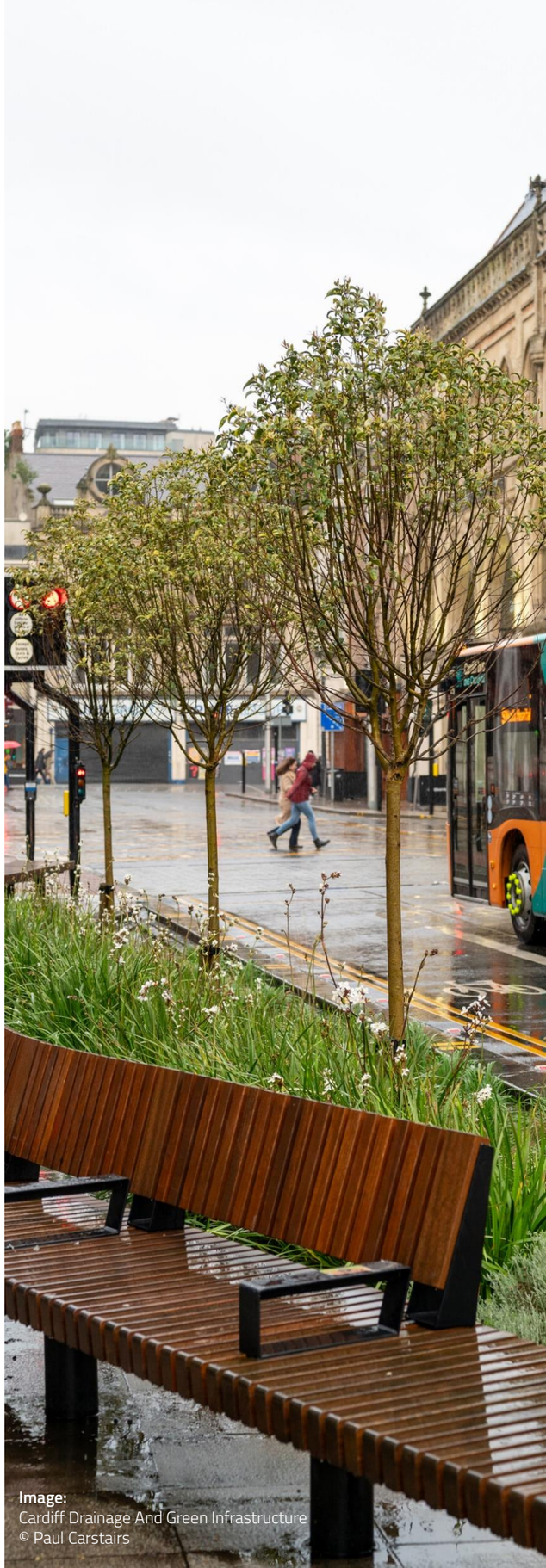


Image:
Cardiff Drainage And Green Infrastructure
© Paul Carstairs

Climate hazards in the UK

Climate risk

The World Economic Forum's Global Risk Report, published in January 2025, identified the ten most significant worldwide threats anticipated over the next two and ten years, emphasizing their implications for financial institutions and capital flows. This assessment contextualizes climate-related risks alongside technological, social, geopolitical, and economic challenges through comprehensive survey-based analysis.

Within the next decade, organizations anticipate **climate-related risks will be more severe than misinformation, AI, the refugee crisis, and politics** – so it's important that managing those risks becomes a significant part of our industry.

The following tables outline key UK hazards, their trends, and example adaptation measures. While not exhaustive, the listed measures provide a representative overview of current approaches.

Climate Hazards

As part of an internal research project, Arup identified the key climate hazards likely to occur in the UK. Those are represented in the table to the right an on the following page.

Climate hazard	What is the hazard	What are we seeing	Example Adaptation
High temperatures	Extreme heat is defined as a period of unusually high temperatures, often accompanied by high humidity. Climate variables such as maximum temperature and number of hot days can be used to understand heat related trends.	The dangers of overheating are already evident. In the summer of 2022, when UK temperatures exceeded 40°C for the first time, an estimated 3,271 excess deaths occurred in England and Wales—primarily among those aged 65 and over (ONS UKHSA, 2022).	• Natural ventilation • Insulation • Shading – cool surfaces, cool roofs, internal and external blinds • Natives planted beds and trees • Green screens, walls and roofs • Grounds shade – sail, pergola, lunch benches • Louvres or brise soleil • Updated incident or adverse weather plans for heat • Extreme heat student guidance
Drought & dry weather	In the UK, a drought is generally defined as a prolonged period of water shortage, with no single, universally applicable definition, but rather a range of indicators and impacts considered by the Environment Agency.	During summer 2022, water restrictions were in place across much of the UK, and six water companies issued a hosepipe ban, affecting around 19 million people . By the end of August in England, 17 out of 18 water companies activated drought plans, with five introducing temporary use bans (Barker et al. 2024)	• Internal water efficiency measures • Rainwater harvesting • Smart water monitoring and management • Native, drought-tolerant xeriscaping (a type of landscaping the reduces the need for irrigation) • Smart irrigation
Flooding	In the UK, flooding is legally defined as land that is not normally covered by water becoming covered by water (Flood and Water Management Act 2010).	The 2008 National Flood Risk Assessment for England reported that 20% of railways, 14% of electricity infrastructure, and 10% of main roads were at risk of flooding (Environment Agency, p.18).	• SuDS measures- rain gardens, swales, filter drains, basins, ponds, wetlands, permeable surfaces grass and woodchip • Attenuation tanks • Retention and detention basins • Flood door barrier, storage areas, embankments and walls • Sandbags • Critical equipment flood protection
Storms	In the UK, a storm is generally defined as a period of violent weather, often characterized by a combination of strong winds, heavy rain, or snow, and is named when it's forecast to cause significant disruption or damage, potentially leading to amber or red weather warnings.	In recent years, the UK has experienced several storm events. During Storm Eunice (2022), wind speeds reached 122 mph (196 km/h) at the Needles Old Battery on the Isle of Wight—among the highest ever recorded in the UK (Met Office, 2022)	• Underground cabling • Windproof and canopies • Power and monitoring systems – power supply resilience, smart infrastructure, weather stations • Nature based – planting trees • Emergency evacuation routes

Setting the context

Climate hazards in the UK

Key hazard	What is the hazard	What are we seeing	Example Adaptation
 Wildfires	In the UK, a wildfire is defined by the National Fire Chiefs Council (NFCC) as "any uncontrolled vegetation fire where a decision or action is needed about its suppression".	During the summer 2022 heatwave, fire services in England recorded four times as many wildfires from June to August as during the same period the previous year (BBC News, 2022).	• Low flammability vegetation • Irrigation of vegetation • Defensible space design • Fire resistant and non-combustible materials • Rainwater harvesting and storage • Early warning systems
 Heavy rainfall	Extreme precipitation, or 'flash flood' hazard, is defined as heavy or excessive rainfall in a short period of time that produces immediate runoff, creating flooding conditions within minutes or a few hours during or after the rainfall.	Winters are likely to be warmer and wetter, with 5% more rainfall and an increase in both the number of rainy days, and in the intensity of rainfall events (Met Office, 2022)	• Sustainable Drainage Systems (SuDS) • Wetland restoration • Rainwater harvesting and storage • Drainage infrastructure (channels, swales, buffer/filtration strips) • Permeable surfaces • Retention ponds and detention basins • Smart infrastructure (in-built) for effective monitoring
 Low temperatures /frost & ice	Low temperatures are typically characterised by days when temperatures fall below 0°C, often resulting in frost or ice. Days where temperatures fluctuate just above and below freezing are also a concern, as freeze–thaw cycles can accelerate the degradation of certain built environment materials.	In early January 2025, frost and ice caused major disruption across the UK, with yellow weather warnings issued for snow and ice. The cold snap severely affected travel, impacting roads, railways, and airports (Met Office, 2025)	• Cold tolerant planting • Thermal mass and wind protection • Snow and ice management • Frost-resistant material
 Sea level rise	In the UK, sea level rise is defined as the increase in coastal water levels, primarily driven by melting land-based ice and global mean thermosteric sea-level change (thermal expansion of oceans due to rising global temperatures), which leads to increased coastal flood risk and erosion.	Since the period 1981–2000, global sea levels have risen by approximately 6.5 cm and are expected to continue rising by around 2.5 cm every decade (CCC). However, when we account for land movement, the rise in sea level around the UK has been even more significant—about 17 cm since the start of the 20th century (Met Office).	• Flood defence doors (in-built), embankments, gates and walls • Seawalls and bioactive seawalls • Coastal revetments • Infrastructure adaptation (elevated infrastructure, cable sealing, underground cabling, increased foundation stability) • Critical equipment flood protection • Water-resistant dry floodproofing and structure sealing • Evacuation routes
 Ground movement	In the UK, a ground movement hazard can be defined as any geological phenomenon causing or potentially causing the movement of the ground, which can lead to damage to buildings, infrastructure, and the environment, including landslides, sinkholes or subsidence.	In 2022, insurers paid out £219 million in subsidence claims, the highest since 2006. Of the 23,000 claims, 18,000 were made in the second half of the year, after record-breaking summer temperatures, equivalent to one every 15 minutes (ABI, 2023).	• Soil stabilization and terracing • Erosion control planning • Early warning systems

Setting the context

How climate change is impacting AUDE member estates

How universities are impacted by climate hazards

Via workshops with AUDE members, we set out to explore how climate-related hazards are affecting universities across the UK. To support a consistent and locally relevant assessment of risk, we have structured our findings around five key dimensions:

Physical – The direct and tangible impacts of climate change on the built environment and infrastructure, including damage from flooding, storms, and extreme heat.

Operational – The ability of a university to maintain its core functions—such as teaching, research, and campus services—under climate-related disruptions.

Health and Safety – The wellbeing of students, staff, and visitors, particularly in relation to increased exposure to heat stress, poor air quality, and other climate-induced health risks.

Economic – The financial implications of climate change, including both direct costs (e.g. repairs, insurance) and indirect effects (e.g. reduced student mobility, increased adaptation investment).

Reputational – The influence of a university's climate response on its public image, stakeholder trust, and global rankings.

While the specific experiences of institutions vary depending on geography and estate characteristics, it is clear that climate hazards are having a widespread and growing impact across the sector.

To bring these dimensions to life, we have included direct quotes from AUDE members alongside key statistics from trusted sources. These first-hand insights illustrate the real and varied challenges universities are facing—and the urgency of building resilience into estate planning and operations.

Physical

Buildings

University buildings are increasingly vulnerable to the physical impacts of climate change. Extreme weather events—particularly heavy rainfall and storms—are causing more frequent and severe damage to roofs and internal water systems. Older or architecturally complex roof structures present particular challenges, as leaks are often difficult to detect and costly to repair.

'Roof damage is common, even in the newer buildings, with replacement parts often delayed due to the varied ages and specifications of Structures' **– Imperial University, London**

Infrastructure

Climate change is placing significant strain on university infrastructure beyond buildings. Intense rainfall events are overwhelming drainage systems, leading to surface flooding and damage to underground utilities. Storms are contributing to falling trees and windborne debris which can damage critical infrastructure and cause power outages. These outages are increasingly affecting electric vehicle charging stations and other energy-dependent systems.

Public Realm

Rising temperatures are accelerating the decline of shaded areas. Simultaneously, prolonged heat and drought conditions are threatening the survival of green infrastructure such as trees, lawns, and planted areas.

'At the University of York, the campus is home to a rich array of biodiversity, including pollinators such as bees and butterflies. However, these species are increasingly vulnerable to heat stress'. **In the UK 80% of butterfly species have decreased in abundance or diversity, or both since the 1970s (Science, Innovation and Technology Committee, 2024)**

Operational

Flooding and Weather-Related Disruption

Flooded car parks, blocked access routes, and overwhelmed drainage systems are increasingly disrupting campus operations—particularly during high-profile events such as open days. Underground facilities like car parks and tunnels are especially vulnerable.

' Flooding of the River Trent Floodplain often means sports pitches are out of action for extended periods of time. Pavilions have to be built raised not to be flooded ' **– Nottingham University**

Strain on infrastructure and systems

Extreme heat is placing pressure on critical systems such as HVAC units and IT labs, leading to underperformance or failure during heatwaves.

Retrofitting heritage buildings for modern cooling solutions is often impractical, and relying on natural ventilation—such as opening windows—can introduce external noise that disrupts teaching, research, and administrative activities.

Transport and accessibility challenges

Severe weather events and prolonged heat are damaging road and rail infrastructure, leading to delays and reduced campus attendance. Flooding and storm debris frequently obstruct travel routes, while unsafe conditions discourage active travel such as walking and cycling. This increases reliance on private vehicles, exacerbating congestion and undermining sustainability goals.

One-third of England's critical infrastructure lies in flood-prone areas. In 2025, major flood events led to widespread rail disruptions and the closure of key routes like the M5 motorway. (The Guardian, 2025)

Health and Safety

Safety and Emergency Planning

Climate-related events are increasing risks to the safety and wellbeing of students, staff, and visitors. Storms can leave individuals stranded, highlighting the need for robust emergency response planning and clear duty of care protocols.

'Storms have dislodged critical infrastructure such as air handling units, posing safety and operational risks' **– Imperial University, London**

Public health risks

Flooding also introduces significant public health concerns, including the potential contamination of pipework, potable water supplies, and ventilation systems. These risks place additional pressure on estates and facilities teams, who must respond rapidly with safety assessments, emergency repairs, and landscape restoration.

'A number of buildings across our university estate are heritage buildings with narrow, decorative downpipes that were never designed to handle the intensity of modern rainfall. These pipes are often overwhelmed during heavy rain, leading to issues such as backflowing toilets' **– University of Glasgow**

Setting the context

How climate change is impacting AUDE member estates

Economy

Attracting investment

Funding bodies are beginning to prioritise climate resilience in their grant criteria and are increasingly requiring alignments with frameworks like TCFD.

'Sustainability and climate adaptation were required by financial auditors' **– Bournemouth University**

Insurability

Universities are facing growing financial risks from climate related disruptions. Climate risks are now being factored into business continuity and financial planning, with insurers and funders expecting institutions to demonstrate resilience.

2024, UK insurers paid out a record £585 million for weather-related damage to homes and possessions—highlighting the growing financial burden of climate-related building damage (ABI, 2025).

Reactive and Resource-Intensive Management

Universities are increasingly facing unplanned operational pressures due to climate-related events. Flood incidents and extreme weather demand urgent responses, diverting staff time and resources away from planned activities. At the same time, rising maintenance demands and costs are placing additional strain on estates teams, challenging their capacity to manage long-term resilience effectively.

Reputation

International reputation

Universities' approaches to climate action are increasingly influencing their global reputation and rankings.

'In 2022, 79% of students rated environmental responsibility as very important, and by 2023, over half of those considering UK universities actively researched institutional sustainability strategies' (HEPI, 2024).

International students

Climate-related disruptions are affecting international student mobility. Extreme weather events are increasingly delaying or cancelling flights, complicating travel for students.

Given the financial contributions of these students, this trend poses a significant risk to institutional stability.

This compounds existing challenges: in 2023, around one-third of UK universities reported a sharp decline in non-EU international student applications—nearly double the previous year's drop (Forbes, 2024).

Attracting and retaining talent

Universities that prioritise climate resilience, sustainability, and accessibility are more attractive to prospective staff and students, with these factors now influencing global rankings and decision-making.

Rising temperatures and extreme weather are affecting learning environments and wellbeing—particularly for students with health conditions or additional needs.

A recent report from the Office for Students (OfS) confirms that inclusive practices significantly influence university choice in the UK. This aligns with global trends — Times Higher Education recently recognised institutions leading in climate change mitigation for 2024, while QS data, based on insights from over 115,000 international students, highlights sustainability as a key differentiator in university selection. (HEPI, 2024).

Students and Staff experience

Rising indoor temperatures are directly linked to reduced student performance. Thermal discomfort diverts mental focus, impairing cognitive function and learning outcomes.

According to the US EPA, poor indoor environmental quality correlates with lower daily attendance and increased dropout rates—up to 10–13 additional dropouts per 1,000 students compared to institutions with well-maintained environments.

'High temperatures have forced the relocation of students, causing significant disruption. With limited opportunities for decanting, this has been especially challenging during the summer months when exams are underway.' **– University of Glasgow**

Image:
Cardiff Drainage And Green Infrastructure
© Paul Carstairs

Image:
Paul O'Gorman Institute for Cancer Research, University of Newcastle
© Rob Oliver

Setting the Context

Drivers & Pressures

As climate change impacts intensify, the urgency for adaptation and resilience measures becomes increasingly evident. This trend will continue accelerating, placing mounting pressure on universities to take meaningful action.

During the development of this guide, insights have been shared that demonstrate the drivers influencing decision making relating to climate change, including adaptation and resilience. These drivers include 'standard' or 'business-as-usual' activity, which is evolving to include climate change considerations. As well as more nuanced, specialist considerations that are changing with the political and economic landscape.

This section of the guide intends to outline both internal and external drivers and pressures from systems that may be outside of the Estates Director's control or influence but remain important when digesting what else needs to be considered before arriving at a strategy, action and delivery plan. These internal and external drivers and pressures act as a foundation when considering climate change adaptation and resilience in action.

There are many and varied factors that are increasing the urgency for adaptation, there are also many factors that influence how adaptation might be most effectively undertaken within your estate. Together, this makes adaptation a complex problem and the delivery approach and outcomes will be different for every estate. Despite this, setting a **strategy**, having good **planning** and sound **implementation** are key to success.

Key message points:

- Finance and funding represent the greatest perceived pressures for universities implementing adaptation actions.
- Whilst universities are individual, the drivers and pressures being felt are similar. Navigating these requires collective decision-making and sharing of knowledge and best practice.
- Having a strategy, plan and implementing actions are what will ensure climate change adaptation takes place across UK estates.

Internal Drivers and Pressures

The pressure to take meaningful action to implement climate adaptation measures and improve climate resilience manifest through both internal institutional priorities and external forces, with external drivers currently exerting the most influence. Extreme weather events, occurring with greater frequency and severity, are particularly significant in prompting rapid, sometimes reactive responses that shape universities' climate adaptation strategies. From engagement with AUDE members and additional research carried out to develop this guide, the internal drivers demonstrated to have the greatest prominence have been outlined in detail below.

Financial and risk management

Budget allocations - both internal and external - support research and implementation of climate adaptation measures. These **financial expectations, combined with insurance considerations and the need to ensure business continuity in the face of extreme weather or other disruptions drive climate adaptation**. The ability to finance the investment required is an ongoing issue for many universities, despite many having clear commitments to address climate change.

Business continuity

The focus of sustainability efforts to date have been towards climate mitigation such as decarbonisation efforts. This focus is happening alongside a failure to see weather and climate events as a trend, instead there being a perception that these are a set of isolated, one-off inconveniences. The outcome is **a lack of strategic response to climate adaptation and resilience which impacts overall business continuity in the long term.**

Leadership and governance

Whilst there is acceptance of needing to do something, for many, actions are yet to take place. **Strong leadership and governance structures within the university can drive the prioritisation of climate adaptation and resilience across institutional planning**. This may involve commitment from senior executives, governing bodies, and sustainability committees.

Internal policies and strategic plans

Policies and plans focus on mitigation, e.g. decarbonisation, rather than climate change adaptation. Climate resilience was not (often) included in climate action plans that were developed in recent years which has led to a gap in implementation. A more appropriate approach is to understand the value of climate adaptation being considered within current strategies, plans, interventions and actions. This approach will **create space for adaptation action whilst action is also being taking to manage the estate and implement mitigations.**

Student and staff engagement

Consistent pressures for universities to consider their impact on the environment and changing climate by students and staff is continuing at pace. In response, there are more commitments to change and real interventions and delivery of climate action. Students and academic staff can play an important role, especially when climate change is integrated into the curriculum.

Access to funding

Currently, the broad picture across many estates is that adaptation is an unbudgeted risk, with activity limited to screening assessments but not always taken further to consider adaptation actions. There is **fierce competition for budgets and competing priorities** (often alongside mitigation activities such as decarbonisation). Insights have demonstrated that **climate adaptation is often considered as a standalone additional area to be funded instead of a part of strategic (sustainability) planning.**

Decision-making structures

The **correct structures can facilitate cross departmental collaborations, however, without these there is little space to develop knowledge relating to climate and the ability to contribute collaborative to a response that will effectively address climate adaptation and resilience**. Currently, only a few universities have established specialist groups (of sustainability practitioners, finance, estates, academic colleagues and external partners) who can work collaboratively to address climate change impacts.

Faculty and staff expertise

Notably amongst operational staff there is **a perceived gap in understanding what it takes to adapt to changes in weather and climate and the skills required.** However, as outlined elsewhere in this guide, adaptation is already taking place across our university estates but not labelled as such. Investment in the change to decision-making structures outlined above can help navigate a portion of this, but it is also worth drawing out these examples to demonstrate to teams their ongoing contributions.

Research and innovation

Universities are centres of research and innovation, where internal drivers for climate adaptation often stem from initiatives such as circular economy research, the development of sustainable engineering solutions, and the adaptation of campus infrastructure. These efforts help **foster a culture of innovation and resilience within the institution and more collaboration between estates teams and academic teaching and research staff is becoming more commonplace.**

Compliance

Universities seeking to align with Environmental, Social, and Governance (ESG) goals are increasingly reinforcing the case for climate action. At the same time, there is growing pressure to comply with frameworks such as the Task Force on Climate-related Financial Disclosures (TCFD), where funders often require clear **evidence of climate risk preparedness as part of institutional accountability.**

External Drivers and Pressures

From engagement with AUDE members and additional research carried out to develop this guide, the external drivers demonstrated to have the greatest prominence have been outlined in detail below.

Policies and regulations

National and regional governments are placing increasing emphasis on climate adaptation through **evolving legislation and strategic planning frameworks.** In parallel, **compliance with industry standards,** such as BREEAM for sustainable construction, and internationally recognised certifications like ISO 14001 and ISO 50001, is becoming a significant external driver, encouraging universities to develop and implement robust climate adaptation strategies.

Environmental and climate pressures

The **increasing frequency and intensity of extreme weather events** are underscoring the driver for climate adaptation. At the same time, universities that fail to address the risks are facing **rising insurance premiums,** adding financial pressure to take climate adaptation measures.

Reputation

Universities are increasingly evaluated on their sustainability performance, including climate adaptation measures. Climate adaptation plans can enhance an institution's reputation, attract environmentally conscious students and staff, and contribute to positive public relations.

Partnerships and collaboration

Universities may be influenced by collaboration with councils, NGOS and other institutions that can support shared adaptation goals. **Where universities are working collaboratively with others, joint aims and objectives and desired outcomes have been recognised early on, helping enable adaptation action.**

External funding opportunities

External funding sources, including government grants and private initiatives, may be tied to sustainability goals. Universities with clear climate adaptation plans may have better access to such funding opportunities.

Risk management

Climate change poses risks to infrastructure, operations, and long-term planning. Universities may develop decarbonisation plans as a form of risk management to enhance resilience against the potential impacts of climate change.

Case Study

Manchester Metropolitan University

Manchester Metropolitan University have developed a module on climate risk, part of a MSc in Environmental Sustainability. The module empowers students to conduct research that not only deepens their academic understanding of climate risk and resilience but is also contributing to tangible sustainability initiatives across the university campus.

The module - *Climate Risk and Management* - bridges academic learning with institutional impact. Its core objective is to equip students with the knowledge and tools to assess and manage climate-related risks within institutional and organisational settings.

A critical component of the module involves the evaluation of various climate outputs and data tools. Students assess the suitability of these tools for conducting risk assessments, fostering data literacy and analytical skills essential for climate resilience planning. The module culminates in a practical assessment that asks students to develop a plan for a comprehensive climate risk assessment tailored to MMU's estate and activities.

Engagement with institutional risk and resilience expertise

Students engage directly with leaders from key university departments—including Estates, Finance, and Sustainability—using qualitative inquiry (either interviews or panel discussions) to gather insights and intelligence. This collaborative approach ensures that the data collected is grounded in the operational realities of the institution, enhancing the real-world relevance of student proposals whilst also refining their communication and research skills.

Beyond the practical insights into climate risk management provided through engagement with key university stakeholders, students are expected to place their work within both topical academic literature and align with national and global best practices in climate risk management.

Assessment structure

Students are required to address the following key considerations:

- Provide a **rationale** for conducting an institutional climate risk assessment: Students are required to articulate the necessity of a comprehensive climate risk assessment for the university, including an appraisal of potential impacts and an evaluation of institutional responsibilities.
- Develop an **approach** to assess risk: Students review and compare methodologies adopted by higher education institutions across different geographies to identify risk assessment strategies.
- Appraise **policy and standards**: Students evaluate existing policies and international standards with a view to informing effective climate risk governance.
- Finally, students are asked to produce a range of climate outputs and evaluate their suitability, and their limitations, for risk assessment.

Feeding back to university professional staff

After the conclusion of the unit, insights gained from the students' work were fed back to staff from key university departments (Estates, Finance and Sustainability) with a view to informing the development of the institution's emerging risk assessment and climate resilience and adaptation planning.

Summary

By embedding real-world challenges into the curriculum, the module not only enhances student learning but also contributes the institutions broader sustainability goals, particularly around climate risk and resilience.

The module exemplifies how higher education institutions can serve as living labs for climate innovation, preparing graduates to lead climate risk and resilience initiatives in a rapidly changing world.

Taking Action

Image:
National University of Singapore,
© Franklin Kwan

Image:
University of Liverpool Faculty of Engineering
© Hufton+Crow

Taking Action
Section overview

AUDE member insights have outlined the drivers and pressures being felt by universities demonstrating the context within which the complex challenge of climate change is being considered. These are important points to navigate in order to take action.

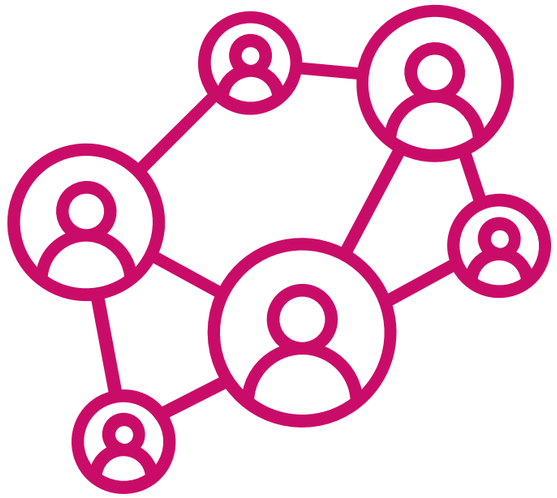
This section of the guide focuses on two areas that each represent a step in the process of taking action:

1. **Strategy**
2. **Plan**

There is a third step in the process – **Implementation** - provided as a supplement to this guide in the form of an adaptation catalogue.

What members insights have demonstrated is that for many, commitments to take action have been developed, but there is a gap related to how these commitments are being achieved in the immediate and longer term.

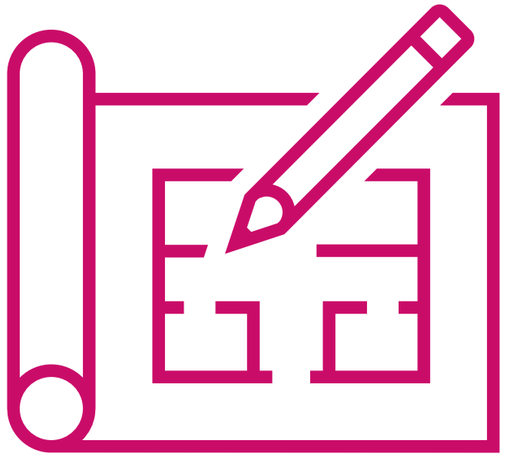
An element of this gap is that climate adaptation is often being considered as a standalone, additional area of investment and action rather than something to include alongside and within current strategies, plans and interventions. In practice this will ensure there is space for adaptation action whilst managing the day-to-day estate, masterplan delivery and implementing mitigation (decarbonisation) actions.



1. Strategy

Climate impacts are hyper-local, once these have been identified you need to determine what you are going to do about these and who you are going to work with to deliver.

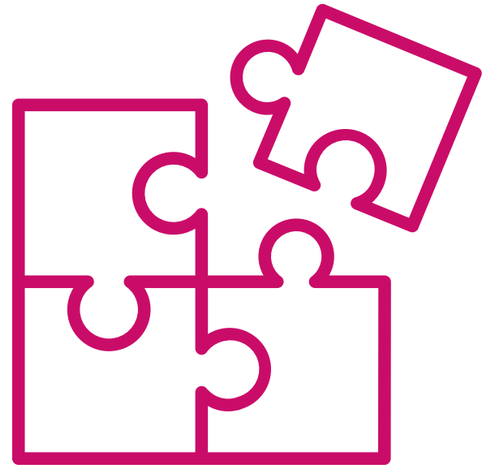
This sub-section is all about the value of taking an integrated approach to climate adaptation, identifying partners to help you, governance and finance considerations.



2. Plan

Adaptation plans should be practical and aligned to other plans; adaptation is additional to and in support of the great work taking place across the estate already.

This sub-section is all about adaptation planning based on engagement insights and outlining processes that can support the development of a robust plan.



3. Implementation

Real climate resilience will only be achieved when actions are delivered on the ground.

A catalogue of adaptation examples has been developed for you to review and evaluate. They should be considered alongside your Strategy and Plan. The catalogue is a separate supplementary document, available to access on the AUDE website.

Image:
Leeds Metropolitan University Rose Bowl, Faculty of Business & Law
© Giles Rocholl Photography

Taking Action

Strategy overview

An incredible amount of work has taken place in recent years, notably from 2019 to present, which supports the university to make the case for climate change.

AUDE member insight has demonstrated that whilst the case has been made, for many, action is still not being taken that enables adaptation actions to be embedded across UK university estates.

This section of the guide focuses on Strategy: an integrated approach to adaptation. Whilst developing the guide member insights demonstrated that climate adaptation action is continuing to been as an addition to all the other strategies, plans, intervention and procedures that must take place to ensure a functioning university estate. This guide suggests that this approach is inherently preventative, it limits climate change action to being *in addition* to everything else that takes place, rather than *an addition* – to be considered within these plans, interventions and procedures.

An integrated approach to climate change supports building resilience by embedding a climate response into everything which the Estates Director does, demonstrating that it is not a nice to have, but a must have.

Key message points:

- There is an urgent need for an integrated approach to adaptation to become commonplace across university estates.
- Integration means considering climate change as an addition to other strategic focuses, rather than in addition to.
- Business continuity can support this integration, embedding climate change considerations into this process can help to guide decision making and provide a process to follow.

Making the change: what am I working towards?

When approaching how to embed adaptation into the universities business as usual, there may be a sense of overwhelm; thoughts of where to start. It's important to consider setting your scope and determining the vision, ambition and any goals. This will help lay the foundations of any strategy or plan and help to guide and influence decision making. If it doesn't support your vision, or won't help to meet your ambition and goals, it may not be the appropriate action to be taking right now.

From insights used to inform this guide, UK universities have very ambitious climate commitments, and these commitments are useful to help develop goals relating to climate adaptation. However, despite ambitious commitments, action still isn't being taken across all UK university estates.

Where to start

There is no need to reinvent the wheel, guidance elsewhere can help you to determine your climate readiness (see Adapting universities and colleges to a changing climate developed by the EAUC and partners) and determine what climate hazards are expected to impact your estate.

You can also find a step-by-step guide of how to use climate data that will inform you of the hazards projected to impact your estate (by region) in the Appendices supplement, provided separately to this document, available on the AUDE website..

Without this information, you will be unable to identify risks, opportunities, develop priorities and set goals. These goals are what will help the estates team to secure resource and gain must needed buy-in.

Step-by-step guidance

The World Business Council for Sustainable Development (WBCSD) have developed a guide for business to use to implement a structured approach to adaptation. The process follows similarly to the Adaptation Process developed by the United Nations Framework Convention on Climate Change (UNFCCC), summarised in Figure 3. The WBCSD outline taking an integrated approach to adaptation planning, a similar approach is suggested for our UK university estates: integrate climate adaptation into operations, processes and business continuity planning to have the greatest impact. Whether you are at the beginning of your adaptation journey, or a seasoned pro, using these processes and reviewing the guidance offer clear steps to consider to help your efforts be effective.

What considerations do I need to make?

AUDE member insights have demonstrated there are key considerations that must be made throughout the adaptation process that are particularly important to the sector:

- ✓ **Keep disruption to a minimum**
- ✓ **Maintain and improve the student experience throughout**
- ✓ **Utilise knowledge available – academic and non-academic staff and students**

These considerations should be considered as priority throughout the strategy, plan and implementation process.

Integrate climate adaptation into operations, processes and business continuity planning to have the greatest impact.

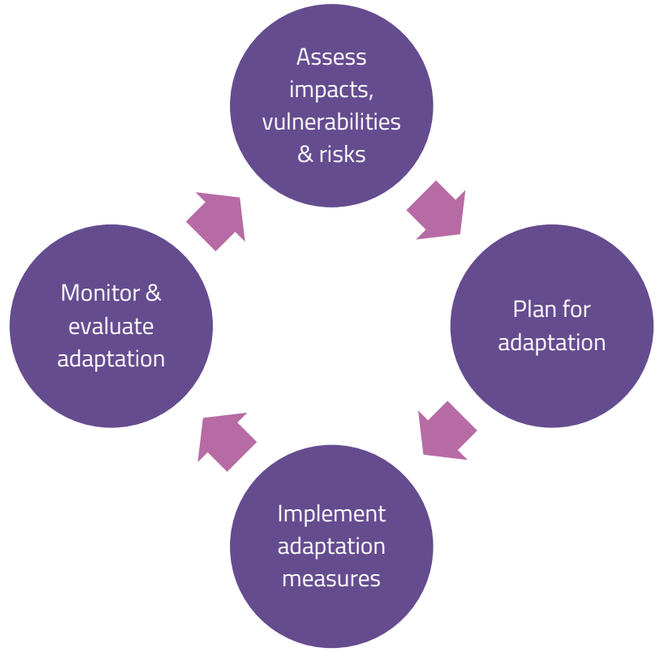


Figure 3: The Adaptation Process, United Nations Framework Convention on Climate Change

An integrated approach to climate adaptation

Numerous guides have been developed that support university estates directors and others to integrate climate into strategy and planning. At a high-level, these guides represent a first step in the approach to considering climate change adaptation. What must then be considered is how to move from strategy into action (or delivery).

The interaction with AUDE members during the development of this guide has highlighted a crucial missing piece in the development of climate resilient estates: the integration and implementation of climate adaptation alongside current plans.

In the previous section, internal and external drivers and pressures were identified. Funding climate adaptation is an area that is understood to be causing most (if not all) universities ongoing pressure. A significant reason for this is that climate adaptation is often being considered as a standalone, additional area of investment and action rather than something to include alongside and within current strategies, plans and interventions. A different approach would be to implement adaptation actions alongside current plans and activities. This integrated approach would significantly change the delivery approach for adaptation and reinforce an understanding that climate action requires both adaptation *and* mitigation simultaneously. Not, as is often the case, one or the other at varying opportunities.

How to implement adaptation alongside your current plans

First, consider the plans that are currently being executed; where is delivery already taking place, where is it planned for in the near term and where can strategic integration be a force for long term action.

A summary of standard plans have been used as examples of how adaptation can be integrated alongside existing plans, others will exist for your university, and it is worthwhile spending time finding out what these plans are, what stage of delivery they are at and where you can influence including adaptation within these.

The integrated approach to climate adaptation recommends adopting measures that support climate adaptation alongside other actions and activities for example, where the estates management plan has identified a refurbishment of a lecture theatre is required as part of ongoing maintenance works, there should be a line item included in the cost plan for climate. This line would include both adaptation and mitigation actions and the cost of these would be included in the overall refurbishment costs, not as individual, additional costs on top of the refurbishment works.

Key pillars of successful integration

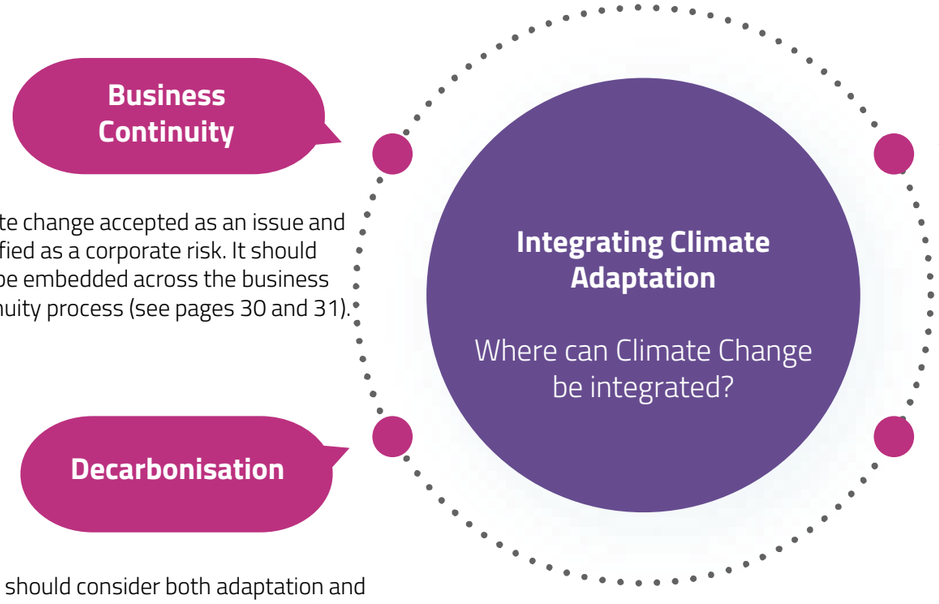
AUDE member insights have demonstrated key points the support the successful integration of climate adaptation into various strategies and plans. These points are considered in more detail throughout this section.

- **Identify partnerships and put in place appropriate internal governance structures.**
- **Recognise climate change as a corporate risk.**
- **Integrate climate change across all processes and procedures including business continuity and make it a requirement that climate change is included in all projects and proposals.**

The above should be considered in the context of the three priority considerations outlined on the previous page: keep disruption to a minimum; maintain and improve the student experience; and utilise knowledge available from academic and non-academic staff and students.

Climate change adaptation requires the Estates Director to work to establish ways to integrate climate change into current plans, procedures and processes. Instead of thinking of adaptation as an additional, stand-alone consideration, instead think of it as an integral part of resiliency within all university plans.

Think about where climate change isn't already an element of consideration within a plan, and where it could be.



Business Continuity

Climate change accepted as an issue and identified as a corporate risk. It should then be embedded across the business continuity process (see pages 30 and 31).

Estates Masterplan / Strategy

Considering climate change in the Estates Masterplan will enable action over the long-term. This action requires whole university buy-in and commitment to climate change action.

Decarbonisation

Plans should consider both adaptation and mitigation, when interventions are being proposed that support decarbonisation (mitigation) efforts, include space in the proposal for climate change. For more information and guidance on decarbonsation at the estate level, see A Guide to Decarbonisation previously published by AUDE.

Maintenance & Replacement

Planned Preventative Maintenance schedules and maintenance proposals would benefit from a 'climate consideration' line (or similar) item. Providing a space for financing climate action within ongoing repairs and upgrades. Such an action does not compensate for broader, estate-wide discussions that are needed relating to financing climate action.

Why Collaborate?

Climate change is a complex challenge that no one organisation can face alone. A systemic approach is needed to leverage data, knowledge, skills, resources and power to influence together, and deliver solutions at scale. Working closely with users of university estates and local communities is integral to designing inclusive adaptation measures that bring positive and equitable outcomes for all members of society.

Some of the positives of taking a collaborative approach include:

- Creating more detailed, robust and representative evidence base for decision making,
- Understanding how to deliver just and equitable outcomes, targeting areas most in need,
- Enable strategic working at scale, to maximise positive impacts, and minimise likelihood of maladaptation,
- Sharing risks and collaborating on risk management, coordinating business continuity across different organisation,
- Ability to pool resource, knowledge, and funding,
- Improving opportunities for leveraging external funding and finance.

Identifying Who to Engage With

Before jumping into engagement, it is important to understand the network within which the university estate sits.

Completing an estate specific climate change stakeholder map can help to simplify the complex stakeholder landscape and provide a comprehensive basis for decision-making.

There are a number of different stakeholder types that should be considered during this process:

1. **Regulation and Compliance:** Who do you need to engage with to ensure the university is doing everything it must to comply with regulation?
2. **Collaborators and Best Practice:** Who can you engage with to gather best practice knowledge, lessons learnt or data?
3. **Delivery Partners:** Who can you work with to plan for and deliver against shared climate change goals?
4. **Local Knowledge and Needs:** Who can you engage with to bring an understanding of local wants, needs and knowledge?

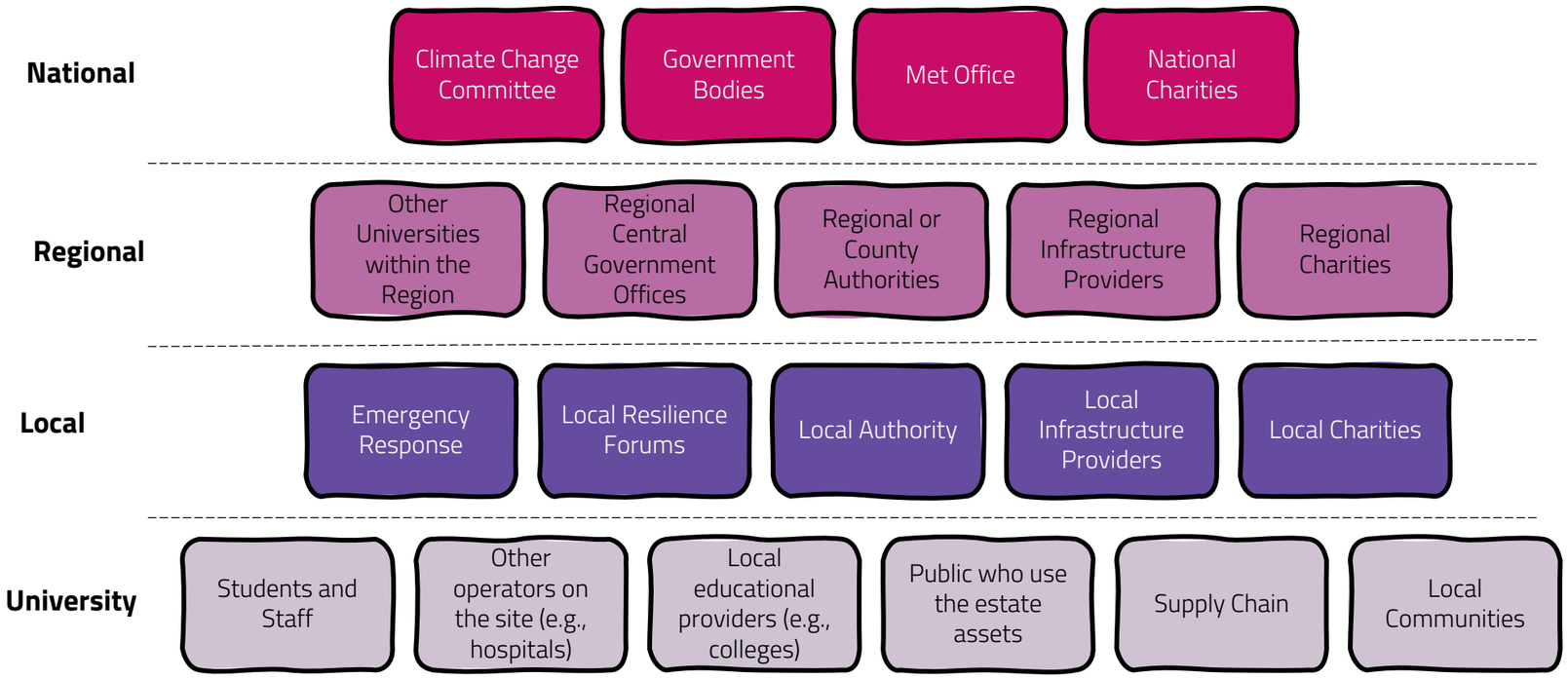


Figure 4: Illustrative example of the types of stakeholders at different geographic scales that are likely to form the basis of an estate specific climate change stakeholder map

Inclusive and Equitable Climate Change Adaptation

What is the issue? The impacts of climate change are not evenly distributed, with the poorest and most vulnerable people being unequally hit by the impacts of extreme weather and long-term climatic changes. In addition, these populations are likely to have less ability to adapt on their own and are more likely to be overlooked in strategic adaptation action due to structural, economic and political inequalities.

How does this relate to university estates? There will be university estates users who are more vulnerable to direct or indirect impacts of climate change or will require specific needs from adaptation measures, for example protected characteristic groups such as elderly people, children and people with disabilities. There are also university estate users whose ability to recover after climatic events are shaped by circumstances such as those experiencing deprivation.

What can university estates do? Look into availability of demographic data of university estate users to identify those groups who might have additional vulnerability to climate change, or specific adaptation needs. Build into the engagement plan actions to meaningfully engage with groups of site users. Consider how these groups can be brought into design decision making, such as co-design workshops.

Case Study

University of Strathclyde

Summary

The University of Strathclyde has implemented a multi-pronged approach to achieve stronger climate resilience, including partnerships with external bodies and implementation of physical adaptation measures. This has resulted in a more climate resilient campus and a long-term strategy of continuous development.

Adaptation Responses

- The university has brought forward a range of projects that support overall climate resilience, such as the deployment of green roofs in new developments and refurbishments.
- Through learning about climate resilience, the university has incorporated visible and interpretative rain gardens and sustainable drainage and green roofs in their Heart of the Campus landscaping and pedestrianisation project.

Partnerships

- The University is a member of Climate Ready Clyde, a cross-sector initiative that aims to enable climate adaptation for the Glasgow City Region. Joining the partnership has enabled the university to develop their academic involvement in climate resilience through research and teaching initiatives, resulting in an award-winning Climate Neutral Districts project.

Benefits

Climate resilience implementation: Implementing adaptation responses has helped improve safety on campus and ensures resilience is embedded throughout.

Community impact: Strathclyde's 'whole systems' approach seeks to align climate resilience with climate mitigation strategies, health and wellbeing and social inclusion.

Expert strategy: The pooling of expertise from and a shared understanding between groups enables coherent action on climate issues.

Enhanced investments: Partnerships with public and private stakeholders can leverage investment that helps fund knowledge and infrastructure for resilience-building.

Case study adapted from the UK Universities Climate Network, case study library, available via the UUCN.

Barriers to Partnership Building

Whilst there are many positive reasons to build partnerships, the added time and complexity can become a burden and may even slow down delivery of climate change adaptation on the ground. Key messages from your feedback on the barriers to partnership working include:

'There is a lack of clarify in who can make decisions, or too many decision makers involved'

'There are complications due to deviations in objectives or goals between different parties'

'There are funding constraints in setting up partnerships'

'Can get lost within pressures of the day job, losing momentum'

Step-by-Step Approach

Taking into account the potential barriers, the following step-by-step approach to considering partnerships, focusing on driving effective, efficient and targeted collaborations that result in change on the ground.

1. Reflect on Your Ambitions and Targets

- Be clear on your climate ambitions, targets and desired outcomes,
- Think about what organisations in your region or local area that might also benefit from these outcomes.

2. Planning Engagement

- Develop your stakeholder map and your Engagement Plan,
- Identify those who need to be informed, involved or opportunities for partnership,
- Consider opportunities for cross-sector working, with multiple partners.

3. Listen to your Potential Partners

- Get to know your potential partners, listen to their ambitions and needs,
- Be open and honest about your risks,
- Develop your shared vision.

4. Decide on Type of Partnership

- Agree on your partnership outcomes,
- Identify type of agreement needed to delivery outcomes (e.g. Working Group, Formal Partnership, Public Private Partnership),
- Undertake any due diligence needed (e.g. legal, financial).

5. Operationalise Partnership

- Develop a Terms of Reference,
- Set out a clear partnership aim, objectives, activities, timelines, roles and responsibilities,
- Be clear about funding arrangements,
- Set out governance and decision-making.

6. Coordinated, Action focused delivery

- Sharing necessary data, resources, tools and knowledge,
- Keep your focus on the specific outcomes, and don't get lost in the wider picture or complexities,
- Be patient and proactive.

7. Measuring and Celebrating Impact

- Include allocation of responsibilities for tracking delivery, monitoring outcomes and reporting impacts.

Climate Ready Clyde

Summary

Climate Ready Clyde (CRC) was created to develop and deliver a shared vision, strategy, and action plan for adapting Glasgow City Region to climate change.

Partnership model

CRC is funded by 12 member organisations and supported by the Scottish Government. In May 2022, it adopted a new governance structure to accelerate transformative adaptation. Each member appoints one representative to the CRC Action Group, supported by a Technical Secretariat. CRC operates as a collaborative, non-legally binding partnership with voluntary participation from local authorities, universities, infrastructure providers, and regulators.

Climate Ready Clyde enables its participants, including universities, to share learnings, expertise and experiences and by joining forces, the collective group can respond to climate change risks across the region.

Benefits

- **Scale:** Joining groups helped ability to think on a bigger scale, forming large scale action plans
- **Expert knowledge:** Access to strong research and knowledge outcomes that enable the University to focus investment on adaptation where needed.
- **Enhanced Research:** Facilitating innovative research opportunities e.g. Cultural adaptations.
- **Community awareness:** Understanding Business Continuity implications across the city region where we have operating assets and residential areas.
- **Climate monitoring:** Developed climate vulnerability map, reduce emergency action and cost.
- **Climate resilience:** Urban greening and SuDS have been implemented to adapt university to changing climate.
- **Enhanced investments:** Joint working between universities and public and private stakeholders can leverage investment that helps fund knowledge and infrastructure for resilience-building.

ClimateReadyClyde

Bristol advisory committee on climate change (BACC)

Summary

The Bristol Advisory Committee on Climate Change (BACCC) was established in 2019 as an independent technical advisory body to support Bristol's ambition of becoming carbon neutral and climate resilient by 2030.

Purpose and Role

BACCC provides expert climate advice to all Bristol One City Boards. The partnership was co-founded by the University of Bristol and the University of the West of England, and brings together professionals from academia, the public and private sectors, and civil society.

Membership Model

Members are appointed as individuals rather than as representatives of their organisations, though they may draw on their professional knowledge and networks. The Committee aims to reach decisions by consensus through open discussion. Where a formal vote is required, a majority decision will apply. In the event of a tie, the chair will hold the casting vote.

Bristol Advisory Committee on Climate Change

Royal College of Music

Summary

As part of the South Ken ZEN+ initiative—a collaboration of 24 leading cultural and scientific institutions including the Royal College of Music (RCM)—a major focus has been placed on climate adaptation and resilience in South Kensington.

Adaptation Actions:

In 2024, South Ken ZEN+ commissioned Allies & Morrison to lead a stakeholder engagement project to explore how to make the area greener, more biodiverse, and climate-resilient.

Key themes included flood mitigation, managing rising temperatures, increasing shaded public spaces, and enhancing biodiversity.

RCM's Role:

Actively involved in climate adaptation discussions and planning.
Participates in working groups focused on flood resilience, urban greening, and sustainable infrastructure

SOUTH KEN ZEN+

Outlining Roles, Responsibilities and Mechanisms

Establishing effective internal governance to deliver on climate change ambitions and embed these into day to day running of the university is vital to successful adaptation.

Effective governance for climate adaptation will encourage the following:

- Securing buy-in across the university,
- Ensuring strategic alignment with wider university strategies,
- Guarantee accountability for actions,
- Maximising value for money in decision-making.

1 Establish a Climate Adaptation Lead

Establish who is the responsibility owner of overall climate adaptation planning and implementation for the university. This would typically be existing Risk Manager or Sustainability Management.

2 Adaptation and Resilience Committee

Setting up an Adaptation and Resilience Committee within the university governance structure can be a powerful way to demonstrate commitment and deliver change within university operations and planning. The following points should be considered when setting up this committee:

- Ensure representation from staff members with decision-making powers (e.g. COO),
- Embed representation from university functions that will need to advise on aspects of adaptation and resilience, such as operations and HSW,
- Confirm that there is a member able to sign off investment decisions on adaptation measures (e.g. Financial Director),
- Set out a clear scope, mandate and budget set up for the committee.

3 Existing Risk Processes

The existing risk management team play a vital role in operationalising climate change risk. Climate change risk must be integrated into existing risk register and management frameworks. Climate change risk should be assessed, ranked, and where applicable costed, alongside wider operational risks. Integrated approaches to risk management should be identified where possible.

4 Supply Chain Risk

Integrating climate change into procurement activities relates to managing risks and impacts from climate change and extreme weather events within your supply chain. An important first is to ensure there is a strong understanding of the university supply chain, including source of and transportation of goods. Creating and updating robust supply chains maps is important for identifying climate change risks within these supply chains and then managing these risks.

5 Involving Staff and Students

Bringing students and staff into decision making can result in increased buy-in, more people orientated and tailored solutions and a higher likelihood of effective adoption and maintenance. Methods to facilitate this can include bringing representation into committee (see no. 2), social media campaigns, utilising student run networks or events and involvement in maintenance.

6 Working with Academic Departments

Many universities will have departments or research programmes that relate to understanding and adapting to the impacts of climate change across sectors. Tapping into these in-house expertise can support with universities own journey, supporting on activities such as data collection, analysis, linking with best practice and innovation.

Typical Roles	Typical Responsibilities
Strategic Decision Making	
Chief Operating Officer	Sets strategic direction, vision and ambitions, signs off on proposed implementation plans.
Finance Director	Creating financial and capital allocation plans for investment into climate change and resilience.
Risk Management	Integrated climate risk into existing risk identification and management processes, balances risk with wider risks and integrate management where possible.
Delivery	
Estates Directors	Integrating into operations management, implementing action on the ground, monitoring and reporting impacts.
Sustainability Manager	Integrates climate change resilience into wider initiative and plans, including any net zero or biodiversity planning.
Procurement Teams	Works with supply chain to embed any risk and adaptation action into supply chain management.
Student Services and Welfare	Speaking to student to understand their needs, embedding student experience into climate adaptation action planning .
HSW and Emergency Response	Feeding into risk identification and management focusing on where there is a safety concern for staff or students.
Communication Team	Delivering compelling engagement and delivery of actions around digital warning systems.
EDI Officer	Bringing in knowledge of vulnerability and inclusive design into actions.
Legal Teams	Ensuring compliance with any evolving legislation and regulation.

Adaptation & Resilience: how does this relate to business continuity?

As climate-related risks become increasingly more severe, the interconnectedness with business continuity becomes more apparent.

At the heart of business continuity is ensuring operational stability, reducing potential disruption by understanding risks, developing plans, processes, procedures and implementing actions to mitigate these and be able to respond and recover when they happen.

If the words business continuity are removed and replaced with climate adaptation, no change would be required. The approach is the same.

Business continuity generally requires the application of the four Rs, these can also be applied to adaptation:

1. **Resilience,**
2. **Reliability,**
3. **Response, and**
4. **Recovery.**

By applying the continuity approach to adaptation, there is no need to create something new. Instead, existing processes can be broadened to integrate adaptation.

Where to start – Integrating climate adaptation into the existing business continuity process

The **ISO 22301:2019 Business Continuity Standard** has been used to provide a standard that can be applied to continuity planning for many university estates and provides a useful outline of the steps required to complete a business continuity process. ISO 22301 defines business continuity as:

an organization's capability to continue delivering products and services within acceptable timeframes, at predefined capacity, during a disruption.

Summarised to the right are the elements to consider integrating when applying the existing Business Continuity Standard process, a detailed step-by-step approach is outlined on pages 30 and 31.

Integrating climate adaptation into the existing business continuity process

Context

Climate change accepted as an issue, evaluation of stakeholder requirements, climate change commitments adopted into business continuity management.

Leadership

Establish a policy that includes climate change and relevant objectives for adaptation. Communicate the importance of climate change, ensure roles and responsibilities are considered and identified to spread the load of climate change requirements.

Planning

Ensure climate change risks and opportunities are included in the wider risk identification process. Integrate climate change across all processes and projects, ensuring objectives are established that include climate change.

Support

Identify roles and responsibilities, implement training to upskill, seek out guidance and support from the industry. Document how things are going, collate lessons learn and additional requirements as they are identified.

Operation

Collect weather and climate disruption data for the estate. Include identifying climate hazards and risks in the risk assessment process. Include adaptation actions in resultant strategies. Trial solutions, report successes and share lessons learned.

Performance Evaluation

Monitor adaptation solutions and report weather and climate disruptions. Ensure climate change is included as a standard agenda item at all business continuity meetings.

Improvement

Ensure it is understood that this is not a one-off process, climate risk will need to continuously be monitored and assessed. Lessons learnt and general feedback to be used to continually improve.

"Business continuity is an essential part of modern business and ensures organizations can maintain their critical business functions during - and after - an incident has occurred. It is the foundation of a resilient organization."

BCI

Integrating climate adaptation into the existing business continuity process

Adopting the **BS EN ISO 22301:2019 Business Continuity Standard**

	BCMS Requirement	Integrating Climate Adaptation Considerations
Context	1. Determine internal and external issues relevant to the purpose of the university which affect the ability to achieve the BCMS. Determine if climate change is a relevant issue. 2. Understand stakeholder needs and expectations. 3. Identify legal and regulatory requirements. 4. Determine the scope of the BCMS including internal and external issues, requirements and goals.	1. Climate change understood and accepted as a relevant issue for the university. 2. Understanding stakeholder requirements related to climate change (consider maintaining and improving the student experience). 3. Is the university required to report on any activity, implement any specific actions etc.? 4. Climate change commitments to be included as a goal and potential mission.
Leadership	Top management to demonstrate leadership and commitment. 1. Ensure a business continuity policy is established and objectives are set that are compatible with the university. 2. Ensure the BCMS requirements are integrated into processes. 3. Ensure resources are made available. 4. Communicate the importance of effective business continuity and conforming to the BCMS requirements. 5. Support other leadership roles to demonstrate their commitment within their area of responsibility. Ensure roles and responsibilities are assigned and communicated.	1. Climate change (and adapting to this) included within the policy and objectives established. 2. Climate change a consideration within all processes and projects. 3. Ensure appropriate consideration is given for the addition of climate change in all projects e.g. space utilisation activity. 4. Communicate why climate change is a priority consideration and the objectives of the university for making it so. 5. Adaptation is not the responsibility of any one team alone. Roles and responsibilities to be considered – who has the skills, where is there a gap, what opportunities exist to upskill and from where? – and people identified who can help implement. Identify champions who can support implementation and ongoing improvement (consider utilising knowledge available via students and staff).
Planning	1. Determine risks and opportunities. 2. Plan how the university will address risks and opportunities. 3. Establish business continuity objectives .	1. Ensure climate change risks and opportunities are included in the wider risk identification process. Supported by climate change being recognised as a corporate risk and listed in the corporate risk register. 2. Planning to include integrating climate change across all processes and procedures. 3. Climate objectives to be established.
Support	1. Ensure resources are allocated, the correct competence and experience of people, awareness of the policy and contribution to it, and internal and external communication. 2. Have in place appropriate processes to ensure documented information is maintained e.g. activities, processes and resources.	1. Roles and responsibilities to be applied and allocated appropriately. Where there are gaps in knowledge and understanding, implement training programmes and seek support from industry experts and associations. Prepare and share communications regularly that include the importance of climate adaptation for a resilient university. (consider again utilising knowledge available via students and staff and how they can support upskilling). 2. Document how climate change is to be considered within all projects, include in lessons learned procedures and keep documentation that outlines resourcing needs and how these are met for climate change.

Integrating climate adaptation into the existing business continuity process - continued

Adopting the **BS EN ISO 22301:2019 Business Continuity Standard**

	BCMS Requirement	Integrating Climate Adaptation Considerations
Operation	1. Plan, implement and control the processes to meet requirements (risks and opportunities). 2. Determine, implement and maintain a processes for analysing business impact and assessing the risk of disruption. 3. Implement and maintain a risk assessment process. 4. Identify and select business continuity strategies that consider options for before, during and after disruption. 5. Implement and maintain selected business continuity solutions.	1. Develop a processes for collecting information and data on weather and climate disruptions across the estate e.g. surface water flooding, leaks, storm damage, power outages during heat events etc. Use this data to analyse the impact to the estate and level of disruption. 2. Risk assessment to include the identification of climate hazards and resultant risks to be included in the main risk assessment. 3. Include climate change adaptation actions in the resultant strategies and any action plans. 4. Trial solutions, report successes and share lessons learned. (Consider keeping disruption to a minimum and maintaining the student experience throughout).
Performance Evaluation	1. Monitor, measure, analyse and evaluate BCMS performance. 2. Conduct internal audits and management reviews.	1. Monitor and measure performance of adaptation solutions, report weather and climate disruptions that contribute to BCMS performance. Relate monitoring, measurement and analysis back to the risk assessment and internal and external drivers identified. Ensure climate change is included as a standard agenda item at all business continuity meetings. 2. Development of, and reporting against, relevant climate adaptation indicators or metrics. 3. Climate change commitments and objectives to be included within audits and reviews.
Improvement	1. Determine opportunities for improvement and implement necessary actions to achieve the intended outcomes of its BCMS. 2. Continually improve the BCMS, considering suitability, adequacy and effectiveness.	1. Use the data collection process outlined in the Operation section to identify opportunities, as well as lessons learned. Gather general feedback from those involved in climate change and those who are not formally involved in the BCMS process e.g. students and other staff members. 2. Ensure it is understood that this is not a one-off process. Repeat the Risk Assessment aligned to your university standard business continuity process. Use the tools and guidance available to learn from others and implement new ways of working that support building climate resilience.

Case Study

University of Melbourne

THE UNIVERSITY OF MELBOURNE

Summary

The University of Melbourne has emerged as a higher education leader in climate action, actively contributing to the advancement of sustainability knowledge and practice. Sustainability at the university is governed by the university's sustainability framework, comprising three elements: the sustainability Charter, Plan and Annual Report.

University Sustainability Plan

Sustainability Plan 2030 is a roadmap for delivering commitments of the sustainability charter, aligned to the goals of the 2030 institutional strategy, Advancing Melbourne.

Within the sustainability plan are 12 priorities areas the university focuses on delivering, one of which is Climate Resilience. The target is for the university to reach and maintain a 'high' climate change preparedness level. Progress to date:

- Climate change risk has been elevated to the university Risk Register by direction of the University Council Audit and Risk Committee.
- The first assessment of the university's climate change preparedness was undertaken with most functions assessed having a moderate or high level of preparedness, except financial planning and reporting.
- University staff and students are contributing to climate resilience through engagement and partnerships across the broader community.

Benefits

Identifying opportunities: Conducting gap analysis on the current sustainability strategy helps highlight that more work needs to be done on financial planning and reporting. Understanding where the strategy is lacking is a valuable tool to ensure the university is reaching its maximum potential in sustainability areas.

Access to funding: Embedding climate resilience aligned with place and government needs is a great way to potentially gain access to funding.

Delivering Climate Adaptation and Resilience

The Dookie Agricultural Campus delivered a $21 million student accommodation project, co-funded by the Victorian Government. It provided housing for at least 85 additional students and can also serve as emergency accommodation for first responders during crises. The building is designed for climate resilience, including backup power connectivity to ensure continued use during events such as fires and floods.

Financing adaptation – prioritisation approach

Overview

Member insights have demonstrated that whilst there is a huge amount of ambition across UK university estates to consider climate change and put in place adaptation measures, there are serious budgetary constraints and financial considerations affecting implementation. With many universities considering their long-term financial outlook and continuity amidst an ever more difficult economic and political position.

Essentials

Throughout this guide, AUDE have demonstrated the need to view adaptation not as *an addition to* activity already taking place, but *in addition to*, taking an integrated approach. This approach has been identified to support adaptation becoming embedded – as has been the case for decarbonisation – in estates activities.

Approach

Alongside this essential for long term adaptation is an approach for finance and funding to be **prioritised**. The overall process of business continuity planning will have paved the way for this, asking the university to consider internal and external issues, commitments made and regulatory requirements among others. After this process, and following a climate change risk assessment having been conducted, the university will have determined the current and future risks and opportunities related to climate change, and these will be considered alongside all other established risks and opportunities e.g. space utilisation.

Member insights have demonstrated that some estates teams are still having to give their attention to outlining the case for adaptation (and sustainability more broadly), in business cases and proposals. Often this process is where they come up against financial blockers. Simply, proposing adaptation spend in the context of climate change and sustainability only presents itself as a high-cost approach. By considering adaptation within business continuity planning and outlining where adaptation can be considered in addition with ongoing, planned or future activities, the university is better able to considered financing requirements for adaptation (or climate change) relative to the activity taking place i.e. making an allowance for climate change within the operational budget and capital plans, as a line item in budgets for upgrades, remedial works and so on.

This more considered approach enables estates to think about adaptation delivery over the immediate and longer term, making considerations for priority areas that will have the greatest benefit for the university, and integrating investment into and alongside activities that support the ongoing resilience of the university estate.

The recommendations from the AUDE Decarbonisation Guide continue to apply here and can be considered ahead of any prioritisation process.

Financing Decarbonisation Recommendations – expanded to consider climate adaptation

Make the business case	Develop clear, concise decarbonisation plan summaries tailored for senior leaders	Capture broader benefits and avoided BaU costs, not just short-term financial returns	Align with strategic priorities and emerging student/stakeholder expectations
Break down silos	Establish cross-functional working groups to embed decarbonisation across the institution	Engage sustainability leads at the executive level as key decarbonisation stakeholders	Improve communication and coordination between estates, finance, IT, planners and academia
Innovate on financing	Explore green bonds, sustainability-linked loans, revolving funds and partnerships	Lobby for dedicated grant funding to support decarbonisation initiatives	Develop phased investment plans that balance quick wins and long-term ambition
Build skills and capacity	Provide training for sustainability and estates teams to stay ahead of the curve	Foster a sector-wide community of practice to share challenges and best practices	Engage students, staff and stakeholders to build bottom-up support for action
Prioritisation	Review outputs from business continuity and determine where the biggest risks are	Workshop and discuss opportunities and determine what would have the biggest benefit	Invest in what works for your university

Key steps for an integrated climate adaptation approach

Adopt

Climate change accepted as a priority and a core part of business continuity planning

Prioritise & Fund

Identify prioritise, find partners with the same requirements and seek out funding opportunities

Implement

Actions that impact the climate resilience of the university estate

Funding Routes

Universities are at various stages of their climate resilience journey, and the funding tools and mechanisms that can support the maturity level and action delivery vary (consider completing the Sustainability Leadership Scorecard if you haven't already done so to understand your current level).

Consideration of financing and funding climate change should be part of ongoing and continuous business continuity planning, supporting an integrated and prioritised approach to delivery. This approach is particularly critical when considering future risks to the estate where there is no obvious financial return on the investment made to mitigate future risk. The entire journey must be considered and evaluated before a decision is made. An investment today is an investment into the future safety and continuity of the estate in the face of a changing climate. Some of the actions needed to support adaptation will require capital upfront, and the impact felt in 20 or more years into the future. The ability to think in these timelines, not CapEx only, is a necessity for managing climate risk, implementing adaptation and becoming climate resilient.

Prioritising and making allowances for climate change across multiple projects (rather than one significant costly strategy) are key here, they will enable a more considered, long-lasting approach that will improve and become normalised over time. It's important to recognise that funding now for a projected future is a new approach, work with you Finance teams and other Partners will significantly aid the development of a financing approach that works for your university.

A summary of mechanism that are available to universities is outlined on this page, however, this is not an exhaustive list and should not be treat as financial advice, rather an example of what is out there for your university to consider.

Case Study: Integrating Adaptation into Project Delivery

University of Glasgow

The University of Glasgow make an allowance in the operational budget and capital plan process based on risk. Each project where adaptation is relevant includes an allowance for adaptation in the project scope, budget envelope and the cost plan.

Individual projects where climate resilience is identified includes a cost for a remedy if that is possible e.g. rainwater goods.

Adaptation is included in the Sustainability form as a consideration, and this then leads to a discussion around budget allowances.

Planning requirements can drive this agenda in terms of FRA or sustainable urban design conditions and policy at Council level. That in turn drives the cost plan.

Example Funding Routes

Green Loans and Bonds

Loans used to finance sustainability projects following Green Loan Principles (GLP) and bonds used to raise capital under a fixed-income debt facility, following the Green Bond Principles (GBP). Consider the appropriateness for meeting the university estates priorities.

Example
University of Hull Green Finance Framework

Innovation and Research Funds

Where your priorities and potential actions to meet these are considered innovative. Consider potential collaborations with your identified partners.

Example
Newcastle University, UK Collaboratorium for Research in Infrastructure and Cities (UKCRIC)

Public Private Partnerships

Where the university has identified partners with shares ambition and priorities who are across various sectors, a PPP may private an appropriate rout to finance projects that will serve multiple groups (public good).

Example
University of Manchester, University of Cambridge, Unit M, Innovate Cambridge and Research England.

Local Funding and Funding to Enable Local Plans

Discuss with local partners and connections the availability of community, Local Authority, local climate change Partnership funding streams that have been developed to support implementing climate adaptation measures.

Example
Oxford-Cambridge Arc, Enterprise Oxfordshire

Power Purchase Agreements

Where long-term energy needs have been identified as priority within your plan, consider the potential of a PPA to support unlocking finance to support adaptation action implementation.

Independent advice should be sought before entering into any contract or agreement.

Case Study

University of Tasmania

Summary

The University of Tasmania is undergoing an AUD$750m multi-year redevelopment of all campuses. This effort has included climate positive approaches in line with the university's Emissions Reduction Strategic Plan 2022-2030 that covers 15 material emission sources with an overall 2030 target of a minimum 50% reduction in gross emissions against a 2015 baseline.

Background

The university has been ranked #1 in the Times Higher Education Impact category for Climate Action for the fourth consecutive year, this positioning alongside their emissions reduction target underpin design elements for this redevelopment program. Climate Adaptation Plans identified increased intensity of rainfall and wind as major issues at all campuses as well as potential riverine flooding as a major issues at one campus.

Green Bond Framework

Coupling information from the university's Climate Active carbon neutral certification and sustainable design guidelines with sustainable financing through a Green Bond Framework ties together financial and environmental sustainability.

The Framework specifies a minimum 20% reduction in upfront carbon emissions, with an internal target of over 30%.

At the time, it was the largest green bond deal completed by an Australian university and the first in the Australian market with an eligibility criterion focused on embodied carbon rather than just operational performance.

Our environmental credentials were especially attractive to investors, generating strong interest from financial markets globally. This delivered favourable interest rate terms for the green bonds.

Climate Adaptation

Green bond proceeds have supported adaptive reuse of existing buildings and climate-conscious construction practices in projects with all structural and fit out elements assessed for reduced embodied carbon alternatives.

Through 2024, across five projects the university avoided 15,743 tCO2e compared to a reference building, averaging reductions of 32% for new builds and over 60% for re-purposing existing buildings versus reference buildings.

The university engaged with a broad range of suppliers to identify products or changes they could make to reduce the embodied carbon content or contribute to carbon sequestration.

To combat flood risk, building designs included raising the ground floor above flood projections, having critical infrastructure on the upper floors, and materials used to be removable, and recyclable should inundation occur.

Benefits

Enhanced Investments: The success of the green bond fundraising demonstrates strong like-minded investor support for opportunities focused on climate resilience and climate action and a significant sign of confidence in the university's sustainability agenda.

Cost savings: For one building on campus, annual energy use has been reduced by 20% and water use by 31%, in turn reducing energy costs.

Increased admittance: These initiatives increase the attractiveness of the university, noting that 41% of prospective students globally have actively researched universities' environmental sustainability strategy or efforts. (Quacquarelli Symonds Student Survey 2023).

Taking Action

Plan Overview

Beyond setting the strategy for climate resilience and adaptation, there is a need to have a plan in place to ensure practical action is taken onsite for estates to be physically transformed over the coming years.

Having a plan helps to ensure the requirements of the strategy are met, ensuring disruption is kept to a minimum, the student experience is maintained or improved and academic, non-academic and student knowledge and insights are utilised.

This sub-section focuses on adaptation planning based on engagement insights and outlining processes that can support the development of a robust plan.

Each estate will need to spend time developing their bespoke plan for adaptation, based on local climate change data, university challenges and drivers, as well as on their level of awareness around key climate related concepts (climate change, climate risk, resilience and adaptation).

Key message points:

- Define your level of maturity on climate adaptation
- Understand your climate risk: what are the priority hazards to address and what would be the impacts on your estate?
- Involve the staff, students and wider community
- Think short term, medium term, long term for adaptation measures
- Integrate adaptation alongside defined actions for the Estate (e.g., decarbonisation targets)
- Use existing guidance to prepare, develop and implement your adaptation plan

Image:
Oxford University
©Darya Tryfanava

Where are you on your climate adaptation journey?

During engagement with AUDE members, we aimed to understand the level of understanding of climate change adaptation and resilience, and actions already taken to adapt UK estates. Members reported not having resilient thinking embedded throughout their university, often relating this to conflicting priorities and budget restrictions.

Figure 5 illustrates a summary of levels that help assess the climate adaptation maturity of the estate. This is a good start to understand what is missing in your approach and what to consider as a minimum to reach a more advanced level.

How to develop your background evidence?

Developing a strong adaptation plan starts with understanding how climate change is already affecting your estate. Collecting detailed evidence of extreme weather events—what happened, how long it lasted, which areas were affected, and the financial and operational consequences—will help build a reliable foundation for planning. It is important to consider not just physical damage, but wider effects on student attendance, staff access, service delivery, and income. This analysis is particularly important to the considerations mentioned earlier is this guide: keeping disruption to a minimum and maintaining and improving the student experience.

The idea is to create a database of past events, and a shared record of how extreme weather events impacted assets. The ideal scenario would be a space to share these experiences across the network of universities. Tools like a central log or template can help make this process simple and consistent. Engaging with and contributing to the EAUC would offer valuable access to sector-wide data, case studies, and practical solutions. This kind of shared learning can help ensure your plan is grounded in real-world experience and keeps evolving with the challenges ahead.

What information to collect before starting your adaptation plan?

Determine drivers and priorities for your estate and local authority

Engagement with AUDE members led to the identification of internal and external drivers (see more details in the Context section of this guide). Some examples of estate drivers are shown in Figure 6.

We recommend the estate's team meet and map out:

- Top drivers to identify what matters to them the most.
- Top priorities and objectives for short, medium and long term.
- Top objectives of the local jurisdiction.

This exercise will help set the scope and adaptation goals of the plan which can be integrated into the wider objectives of the estate. For instance, if retrofitting of assets is planned over the next 5 years, the plan will account for this and identify a range of interventions that can be retrofitted at the same time for climate resilience. If the priority is decarbonisation by a certain date e.g. 2030, the team can find ways to incorporate climate adaptation measures into the plan and integrate this into the decarbonisation strategy for the estate.

In addition, we suggest mapping out the priorities of the local authority as this could influence the estate's plan depending on the trajectories of local policies and strategies for the estate's borough. For successful implementation of climate adaptation, we recommend full integration into the estate's wider strategy and plan and alignment with the local authority's wider plan.

Beginner	Beginner+	Intermediate	Advanced
• No background evidence • Aware but no action • Not integrated into risk management approach • No strategy or plan for climate adaptation • No climate risk assessment • Short term planning	• Background evidence • Aware and some action but mostly reactionary (looking at the past) • Not integrated into risk management approach • No strategy or plan for climate adaptation • No climate risk assessment • Short term planning	• Background evidence • Aware and some adaptation action underway (future proofing the estate) • Not integrated into risk management approach • Strategy in place for climate adaptation • Climate risk assessment • Short, medium-term planning	• Background evidence • Aware and adaptation action underway (future proofing the estate) • Climate risk integrated into the estate's risk management approach • Strategy and plan in place for climate adaptation • Climate risk assessment • Short, medium, long-term planning

Figure 5: High level maturity scale to assess the climate adaptation of your estate

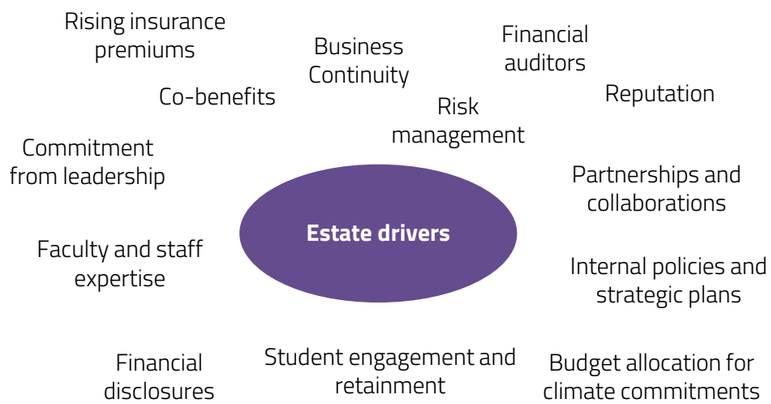


Figure 6: Examples of estate's drivers (external and internal) derived from engagement with AUDE members

What information to collect before starting your adaptation plan? (Continued)

Identify challenges, barriers and opportunities

As explored during engagement with AUDE members, each estate faces challenges and barriers on the journey to climate resilience. Some estates are already "advanced", whilst others are in the early stages of considering the requirements of an integrated climate change strategy and plan.

To develop a comprehensive adaptation plan, members of the Estates Team and relevant stakeholders (e.g., Operations Manager) need to understand key barriers to adaptation and what can be done in the future.

This is done through understanding key priorities for the estate beyond climate resilience and mapping out where climate adaptation could be integrated as part of the estate wide strategy and plan.

Build on what you are already doing and learn from others

- Consider: What adaptation measures are already in place? What worked well, not so well and why? How could it be improved in the future?
- Partner with other organisations as identified earlier in the Strategy sub-section to support delivering common goals.
- Learn from other universities and the partnerships and approaches they have developed (see the Climate Ready Clyde and University of Glasgow case studies).
- Seek out others where it may be possible to identify a **"mirror" or "twin" Estate** as part of the network of AUDE universities. Liaise with them to discuss best practice and how they implement adaptation onsite.

How to account for climate risk?

To identify the most suitable adaptation interventions for your estate, the first step is to understand the risk associated with climate change at the site location. This can take place following a 3-step approach as part of a 'Rapid Climate Risk Assessment'.

Integration into the current risk management approach

To ensure climate risk is considered at all levels of your organisation, it is important to understand where climate change is considered in your internal processes. Does the estate have a risk register, and if yes, is climate change identified as part of the risks? Roles and responsibilities need to be clearly defined and communicated to ensure responsibility across directory. This links to step 1 of the Adaptation Planning Cycle by the WBCSD *"Understand Estate governance structure to establish governance and resource needs for climate resilience"* on the following page.

The steps outlined in the Strategy sub-section relating to the business continuity process are key here. Integrating climate risk into your current (or updated) risk and continuity approach will ensure it appropriately prioritised and considered at the correct leadership level and addressed on a regular basis.

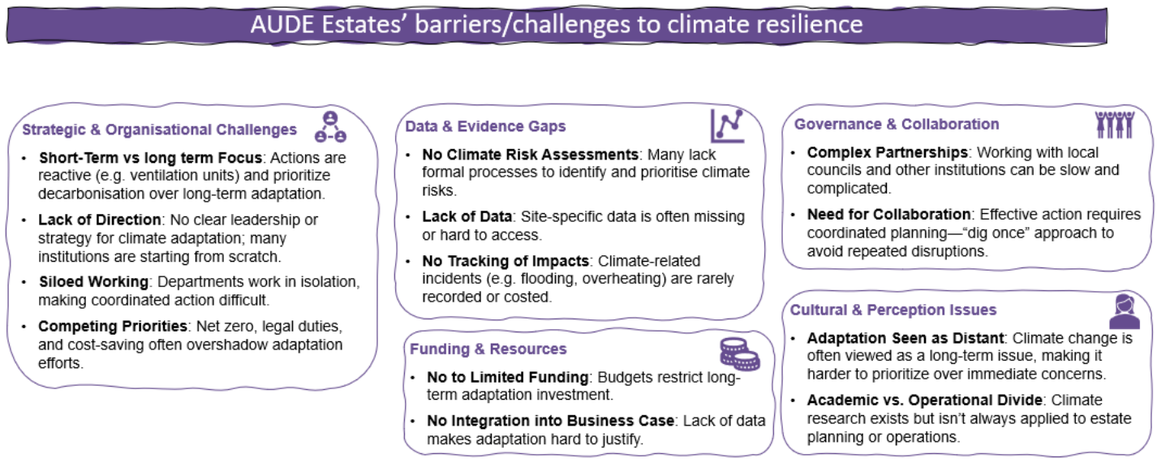


Figure 7: Summary of barriers/challenges encountered by Estates based on Arup engagement with AUDE members conducted in May 2025

What does a 'Rapid Climate Risk Assessment' entail?

Prior to talking about climate resilience and adaptation, each estate needs to understand their risks from climate change. This can be done through a rapid climate risk assessment (high level assessment) to identify relevant hazards to consider and key vulnerabilities of the estate. The 3-steps approach 'hazards-impacts-adaptation' is detailed below:

1. Identify climate hazards and local trends

- Select climate hazards based on the estate's location (shortlist will vary between UK regions).
- Understand key local trends for those climate hazards based on approach detailed in Appendix 1.

2. Identify more vulnerable assets and potential impacts from climate change

- Identify your key assets and which ones would be more vulnerable to climate change.
- Determine existing and potential impacts from climate hazards on those assets and where the most significant impacts would be. Involve staff, students and wider community. Frame impact scale around 5 dimensions: physical, operational/business continuity, financial, reputation and people.

3. Develop the adaptive capacity of your Estate to minimise climate impacts onsite

- Select adaptation measures that will address priority risks identified in the previous step. Involve staff, students and wider community.
- Develop an action plan with SMART actions for successful short-, medium- and long-term implementation. Include targets to monitor and evaluate impact of adaptation interventions and revise regularly as required in the future.

Use existing guidance to support the development of your adaptation plan

A range of guidance documents are readily available to support the development of a climate adaptation plan for your estate. These documents should be consulted when developing the estate's plan.
Three documents are presented below that will help with adaptation planning. Some of these guides have been outlined in the Appendices suppliment, provided separately to this document, available on the AUDE website.

Adaptation Planning Cycle, World Business Council for Sustainable Development

As highlighted in the previous Strategy section, the process suggested by the World Business Council for Sustainable Development (WBCSD) in their Adaptation Planning for Business guidance is a good place to start. The four-step process the WBCSD have developed has been developed to help business consider both business rationale and the impact of action, all within the process of continual improvement (Figure 8).

Whether you are at the beginning of your adaptation journey, or a seasoned pro, using these processes and reviewing the guidance offer clear steps to consider to help your efforts be effective.

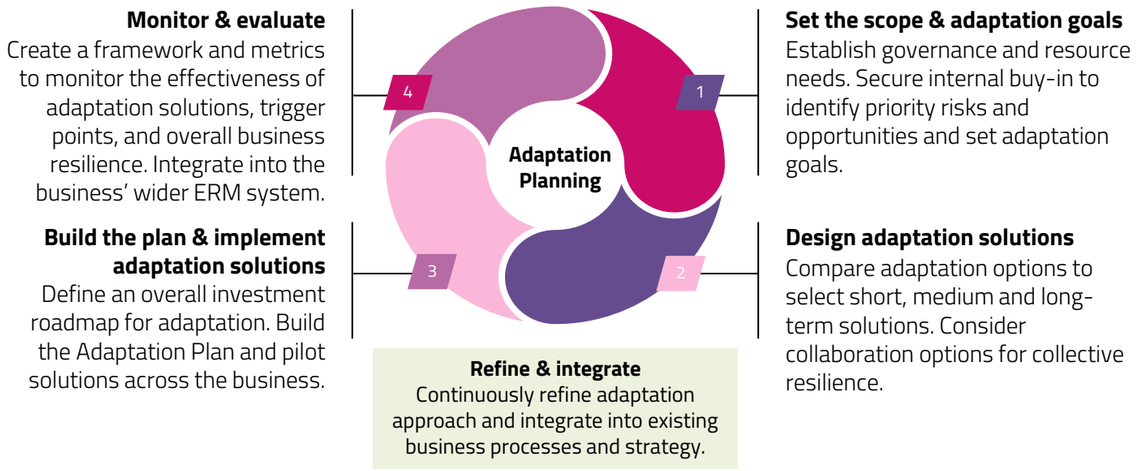


Figure 8: The Adaptation Planning Cycle, adapted from: World Business Council for Sustainable Development, Adaptation Planning for Business

Adapting universities and colleges to a changing climate

Cranfield University put together a short guidance note on developing climate risk assessment and adaptation strategies for universities, which highlights some of the challenges of implementing adaptation options.

For further details, visit the UUCN case study.


KEY MESSAGES

- **There is no one size fits all** for climate change risk assessment and adaptation strategy, every university must carry out its own individual assessment.
- **Climate change risk assessments should involve stakeholder groups** and engage from the bottom-up to create a well-rounded perspective of risks and potential adaptation measures, although these should be backed up with quantitative evidence such as costs and weather data.

Climate Resilience Roadmap, UK Green Building Council

The UK Climate Resilience Roadmap published by the UK Green Building Council (UKGBC) was developed through deep collaboration with industry leaders, policymakers, and experts. It translates cutting-edge research, modelling, and real-industry insights into practical, scalable solutions. It serves as a framework for climate adaptation, equipping stakeholders across the built environment with the tools to manage risks and seize opportunities for long-term resilience (Figure 9).

Recognising that adapting to climate hazards must go hand in hand with climate mitigation, the Roadmap emphasises integrated strategies that both reduce emissions and enhance climate resilience, building a sustainable and future-proofed built environment.

The section on Recommendations for Sustaining Resilience offers detailed recommendations for integrating climate resilience for organisations, project teams (and policy-makers). Additionally, it offers recommendations for organisations seeking to integrate climate resilience into their organisational strategy, following the four pillars of the Task Force on Climate-Related Financial Disclosures (TCFD) framework. The section also highlights critical actions for project teams to consider at each stage of the RIBA Plan of Work, to ensure climate resilience is embedded throughout project lifecycles. Finally, it explores recommendations for financing climate resilience in the built environment.

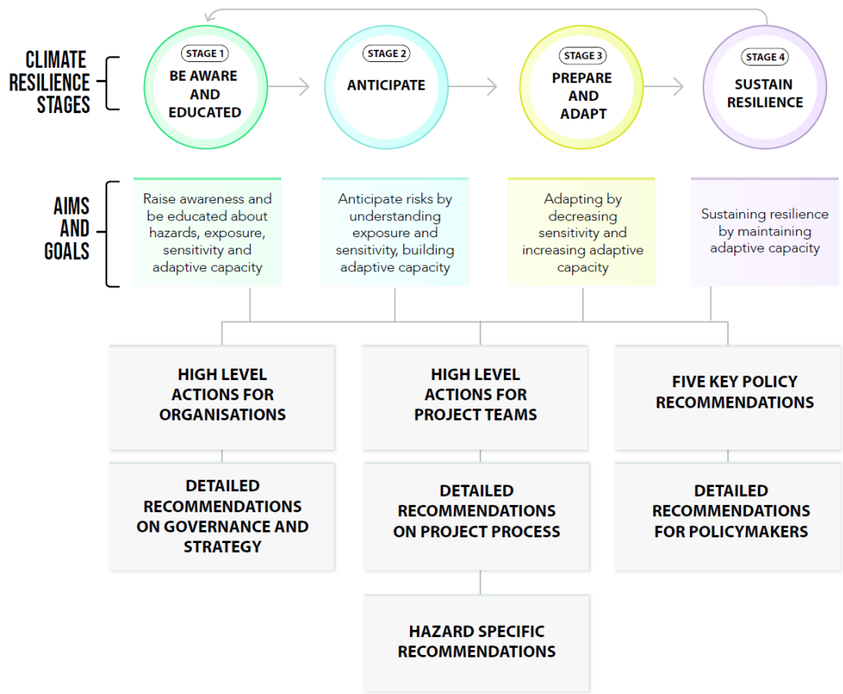


Figure 9: Diagram showing the connection between the aims, goals and actions for each one of the four stages of the climate resilience framework , adapted from: UK GBC Climate Resilience Roadmap (2025)

Summary

Image:
Witwatersrand University
© Witwatersrand University

Summary
Call to Action

Ahead of the publication of this guide, AUDE recognised that there is a growing sense within the UK education sector that more practical guidance and cost-effective action is urgently needed on implementing effective climate adaptation and resilience measures. The guide set out to demonstrate the context estates are operating in, showing clearly the need to act but the obstacles Estate's Directors are often finding themselves up against, outline case studies of climate action and make recommendations for the UK higher education sector relating to climate change adaptation and resilience.

Call to Action

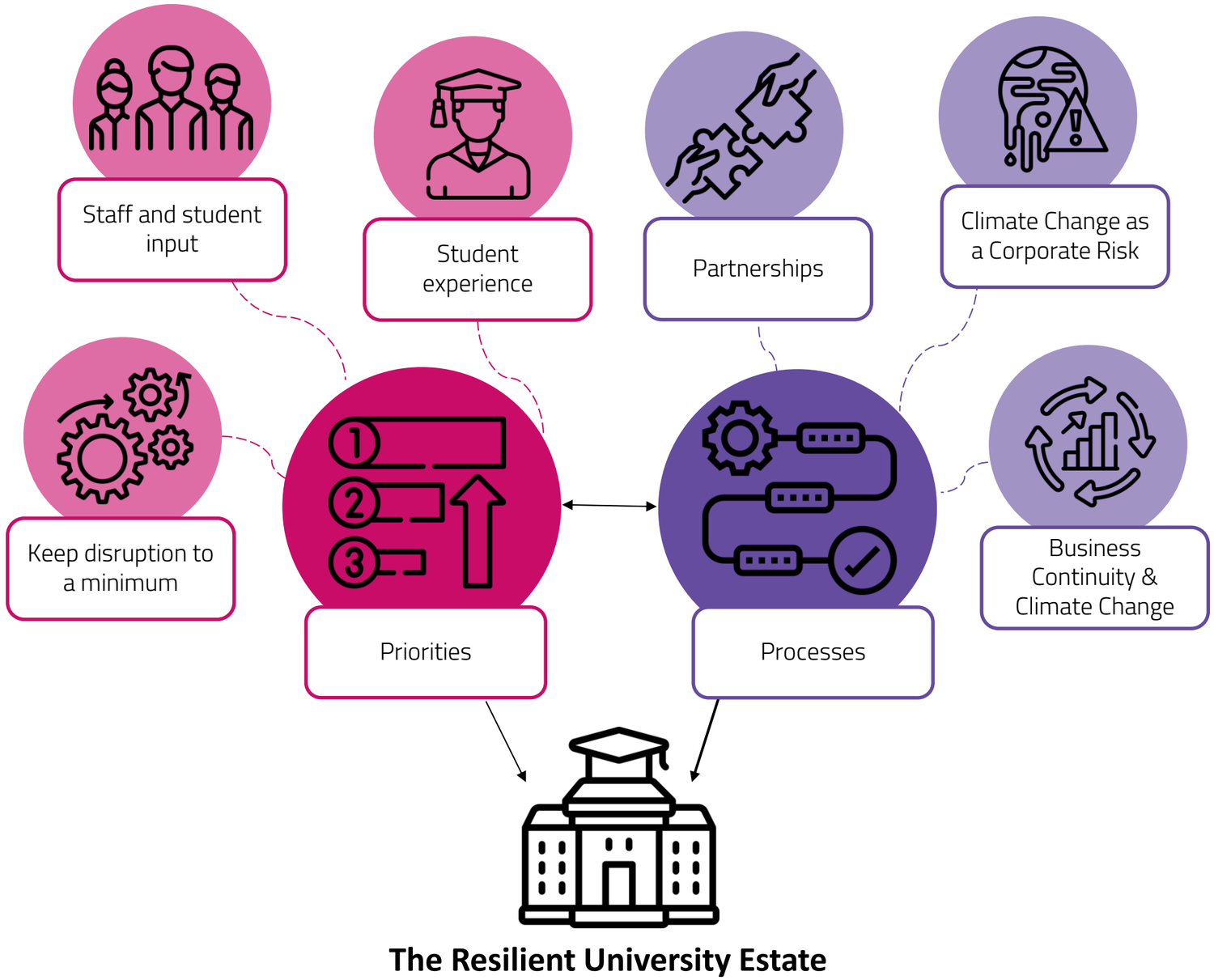
The guide has a set of core messages that if embraced can help UK higher education estates prepare for and adapt to the impact of climate change and make clear steps on the path to a resilient estate.

- Identify partnerships and put in place appropriate internal governance structures.
- Recognise climate change as a corporate risk.
- Integrate climate change across all processes and procedures including business continuity and make it a requirement that climate change is included in all projects and proposals.

When developing a strategy, implementing the plan and putting adaptation measures into action three priorities have been identified.

- Keep disruption to a minimum;
- Maintain and improve the student experience throughout, and;
- Utilise knowledge available – academic and non-academic staff and students.

It is only if we adapt our estates now can we survive the current and future climate reality. By implementing these recommendations, the sector will be better prepared for and set up to recover from future climate impacts.



Case studies

Image:
University of Nottingham Engineering and Science Learning Centre
© Stephen Fernandez

Case Study

University of Exeter

Summary

The University has a focus of clean water and sanitation and subsequently excelled in this area. Additionally, adaptation measures have been implemented throughout the university to combat climate change effects, ensuring the campus is embedded with climate risk and resilience strategies. Commitment to the Sustainable Development Goals also helped guide the University through their sustainability journey.

Clean water and sanitation

The University of Exeter maintained its global number one position in the Times Higher Education (THE) Impact Rankings for Clean Water and Sanitation in 2024. Metrics included:

- Research on clean water and sanitation
- Water consumption tracking and usage
- Water usage and care - process to treat wastewater, process to prevent polluted water entering water systems; free drinking water for students, staff and visitors; building standards to minimise water use
- Landscape planting to minimise water usage
- Water re-use
- Water in the community: providing support and education on sustainable water use in the wider community.

Adaptation Responses

Water efficiency: The University installed ultra low-flush toilets (ULFTs), the process to implement these included:

- A baseline of water-use, sewer network condition, water bills, and sewer discharges.
- 119 ultra-low flush toilets implemented in seven buildings on campus.
- Scheme monitored to ensure performance was as expected.

The project resulted in:

- Annual water savings of 2,287m^3
- Annual cost savings (at 2018 prices) of £12,580

Nature-based flood management: The University of Exeter are planning a nature-based flood management scheme in the Lower Hoopern Valley working with the Environment Agency, Exeter City Council, and academics from the Centre for Resilience in Environment, Water and Waste (CREWW). This will 'slow the flow' of water from campus, by adding leaky woody spreaders (which allow fish and freshwater invertebrates through), creating areas in the stream which hold back water during high flow, and connecting the brook to the flood plain to create wet grassland habitat. Working with regional partners, CREWW academics have helped understand the impacts of river land restoration surrounding the River Aller in Somerset on downstream water flows during weather extremes. Find out more about the University's river restoration work here.

Biodiversity: The University is developing policies to promote nature-based adaptations to changing climate such as planting green infrastructure to shade key areas and reduce heat effects. Additionally, nature-based solutions were used in the parkland area of campus.

Trialling new technologies: The University plans to trial new real-time control technology to manage surface water run-off, reduce downstream flooding and maintain watercourse baseflows in summer.

Case Study

University of Glasgow

Summary

The University of Glasgow focussed on key elements such as climate resilience, biodiversity enhancement, renewable energy and partnerships to boost sustainability and enhance student and academic staff experiences throughout the campus. Using a combination of internal strategy and collaboration with relevant groups ensured, these elements could be integrated seamlessly into the university's strategy as a whole.

Adaptation Responses

SuDs: The Western Campus was updated to integrate sustainable urban drainage systems to complement other sustainability efforts. This included implementing rain gardens to provide surface water storage and the addition of underground attenuation to store surface water run-off.

Mitigation response: Whole system adaptations were implemented to meet climate neutrality targets, including energy modelling, renewables deployment, space utilisation and bio-solar PV roof installation.

Governance and Process: A governance process was created that sets out policy and strategy, with mitigation and adaptation added to the Terms of Reference (TORs) of different groups. A financial allowance is made in the cost models that support project development.

Partnerships

The University worked with many groups to support their overall response, this approach helped to harness the collective effort required to take meaningful action. The University takes a whole system approach to engagement, which has helped with successful research projects, funding submissions, and has improved engagement overall.

Key partnerships include the Sustainable Glasgow Partnership, Climate Ready Clyde and Clyde Climate Forest.

Benefits

Climate resilience: Implementing adaptation responses has ensured the University is prepared for and can respond and recover from hazardous climate events.

Enhancing biodiversity: Rain gardens and other planting to reduce flood risk has the additional benefit of providing new habitats for local fauna, ensuring the University increases their biodiversity throughout campus and helps establish a new aesthetics for areas that need regeneration.

Clean and affordable energy: To meet carbon neutrality targets, renewable energy systems were deployed, that provide the university with lower price energy that has a reduced impact on their carbon emissions.

Increased funding: The University partnering with external bodies has enabled them to secure funding, ensuring that research into climate resilience measures can be used to its full potential.

Case Study

University of Liverpool

Summary

The University has established robust governance and risk management systems that are now driving the integration of climate considerations across its capital planning and investment decisions. Through the University's strategic framework, Liverpool 2031, climate risk and resilience are being embedded at the core of decision-making processes. In parallel, the University is laying the foundations for a climate-adaptive physical estate, designed to support the management of broader organisational risks associated with climate change and reinforce sustainability as a strategic imperative.

Governance Approach

The University's ability to respond to the impact of climate change on its activities is included on the strategic risk register and monitored through the Senior Leadership Team and University Council. The risk is defined in three sub-risks:

- The impact of climate on our physical estate and risk of the estate's condition negatively impacting student recruitment and retention.
- The reputational impact of not meeting statutory and strategic commitments or poor performance in sustainability rankings and league tables
- Longer term financial impact if climate change affects student mobility in a way which negatively impacts on international student recruitment

Climate resilience and adaptation are embedded within the Estates & Infrastructure Strategic Risk Register as part of a broader risk and assurance framework that informs organisational resilience planning. The register assigns senior accountability for managing climate-related risks to the physical estate, with control actions including the development of climate risk assessments, mitigation and adaptation plans, and the integration of climate-responsive design standards into key capital projects. Recognised risks – such as infrastructure operability, asset degradation, supply chain disruption, and urban heat impacts – are being addressed through integrated governance mechanisms, supporting alignment with business continuity and long-term operational planning.

Sustainable Infrastructure

In 2023/24, the University delivered a Sustainable Built Environment Investment Framework project, marking a critical step in formalising climate resilience within its estate operations. Through this work, roles and responsibilities required to deliver sustainable and climate-resilient capital projects were comprehensively reviewed, identifying key capability and governance requirements. The findings have also helped inform wider estates operating model and strategic culture change, reinforcing the shift toward more integrated, sustainability-led delivery. This has directly supported the development of a sustainable targets and guidance document, due for release in 2025/26, which will embed climate-conscious and risk-responsive design principles into capital projects across the estate. The guidance will establish design standards and performance targets, tailored by project type and scale, to address priority climate risks facing the estate, with a strong focus on low-carbon, energy-efficient, and adaptable spaces. While climate resilience remains an emerging area in terms of embedded controls, this work lays the groundwork for more structured implementation and clearer ownership of climate risk across the physical estate.

Climate Plan and Wider Delivery Framework

The University's Climate Plan sets out its approach to achieving net zero and strengthening resilience to the physical and transitional risks posed by climate change. It commits to assessing climate risk across the estate to inform the development of mitigation and adaptation measures—work that is scheduled to begin.

This sits within a broader environmental framework that increasingly integrates climate considerations. A new Biodiversity Plan recognises the value of nature-based solutions in climate regulation, while an updated Waste Management Plan, due in the new academic year, is expected to strengthen links to climate impact. By layering climate impact and response through multiple avenues of estates planning and operations, this approach becomes integral to strengthening the University's long-term resilience and delivery capability. Oversight of climate adaptation and resilience will be supported by the Sustainable Campus and Operations implementation group, established in 2025 and chaired by the Director of Estates & Infrastructure, which will track delivery of the Climate Plan across key operational areas and drive climate leadership through estate planning.

Manchester Metropolitan University

Summary

Manchester Metropolitan University have adopted a collaborative approach to strategy development, working together with students, professional and academic staff and external partners.

Collaborative leadership

The institution's Leadership in Sustainability Strategy 2022–2026 was co-created through collaboration with students, professional staff, academics and external partners (including Greater Manchester Combined Authority and local residents). Through the process, climate change adaptation and resilience was identified as a risk to the institution and included within the strategy as a KPI. Subsequent engagement with in-house academic specialists and post-graduate students via workshops contributed to inform the university's approach to assessing the climate change risks facing Manchester Metropolitan University.

The result is a comprehensive assessment concentrating on the direct physical impacts of climate change, specifically flooding and heat stress on the Manchester City Centre campus. The analysis adopts the high-emission Representative Concentration Pathway (RCP) 8.5 scenario, consistent with methodologies used by the Intergovernmental Panel on Climate Change (IPCC), the UK Climate Change Risk Assessment (CCRA4), and the Met Office. This scenario assumes continued emissions growth, projecting global warming levels of approximately 2°C by 2050 and 4°C by 2100. The assessment uses this "business-as-usual" scenario to evaluate current and future risks, thereby informing strategic planning, business continuity and estate resilience strategies.

Identification of key risks: Flood and Heat

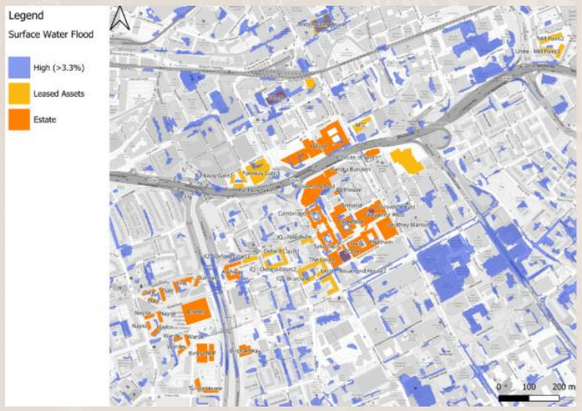
Flood risk assessments were conducted using high-resolution data from the Department for Environment, Food and Rural Affairs (DEFRA), covering surface water, rivers and seas, and reservoir failure scenarios. Currently, 3% of the campus area is at high risk of surface water flooding, increasing to 9% by the 2050s. Key university assets, including academic buildings, student accommodation, and transport infrastructure, are projected to face heightened exposure. River and sea flooding currently pose a lower risk, but this too is expected to increase modestly.

Heat risk analysis, based on the UKCP18 ensemble model, reveals a significant increase in the frequency and intensity of hot weather events. By 2100, the number of summer days exceeding 25°C is projected to increase three-fold, while days exceeding 30°C will quadruple compared to the baseline period 2001-2020. This escalation poses direct risks to health, infrastructure, and building usability.

The report also evaluates the urban cooling potential of green infrastructure. Findings from a 2023 Terra Sulis study indicate that existing greenspaces such as All Saints Park and the Birley campus provide measurable cooling benefits (up to 1°C), despite the urban heat island effect experienced on the City Centre campus. These insights underscore the importance of expanding nature-based solutions to mitigate heat stress.

While the assessment provides a robust foundation for understanding direct climate risks, it acknowledges limitations. Indirect impacts, such as those on supply chains and social vulnerability, are not assessed in this work. Additionally, the use of district-level data may not fully capture microclimatic variations across the campus.

In conclusion, the assessment equips Manchester Metropolitan University with critical insights into the physical risks posed by climate change and offers a data-driven basis for enhancing institutional resilience.



Example GIS image mapping future flooding risk from surface water (2050).
Source: Manchester Metropolitan University

University of Nottingham

Summary

The University of Nottingham set out to to address sustainability throughout campus, setting clear objectives of what they want to achieve. Firstly, determine the likelihood and impact of physical climate risks as a result of climate change, then undertake a risk assessment of Jubilee, Sutton Bonington, and University Park campus assets to prioritise those which are most vulnerable and finally provide recommended site-specific adaptation measures.

Background

The University of Nottingham are seeking to raise awareness of climate risks, impacts and appropriate responses to understand and forward issues and strategic implications for adaptation planning across their estate

Issues the university came across, specifically in the summer 2022 heatwave, included significant increases in the number of requests for the installation of air conditioning, labs closing due to increased internal temperatures, the loss of a third-party data centre significantly impacting on a key business system, Jubilee Lake reduced water levels and higher water temperatures risks to wildlife and a wildfire on university land.

Adaptation responses

Nature-based solutions: Measures that utilise nature-based solutions are prioritised, including:

- Green roofs
- Green walls
- Sustainable urban drainage systems (SuDS)

Solar shading: The university plans to implement solar shading on all residential halls to reduce heat gain, this can be added to designs of new buildings or added through the considered planting of trees.

Managing flood risk:

- Addition of flood prevention measures in low-elevation areas will be incorporated throughout the campus.
- Soakways will be implemented to manage surface water runoff from hard surfaces.
- Increasing the area of soft landscaping to help manage surface water through natural drainage.
- Increased frequency of drainage channel maintenance and improve timing – clearing leaf litter regularly and promptly.

Benefits

Flood Risk Management: These improvements have had a significant positive effect on the drainage system. To date, despite the number of storm events experienced since completion, the library (high-risk building) has not flooded, and no insurance claims have been made.

Increased quality of living: Strategies that combat overheating in student accommodation will improve students' comfortability day to day and ensure the buildings are safe to live in all year.

Reduced costs: Implementing measures that reduce impact of climate change can reduce costs for the university. Solar shading for example will reduce the need for more frequent air conditioning, reducing damage to university buildings and subsequently minimising costs.

Case Study

Cranfield University

Summary

As teaching and research institutions, universities are major contributors to climate change adaptation and mitigation, as they have the power to inform and influence students and others to take action.

To harness this potential for building climate resilience, Cranfield University developed a Climate Change Risk Assessment followed by a draft plan for adaptation measures, by involving staff and students in a series of workshop-based exercises.

Background

Cranfield University campus suffered from flash flooding in June 2016 due to poor drainage which caused widespread damage, resulting in over £1 million worth of costs, and severe interruptions to day-to-day business.

On a more frequent basis, the campus suffers from power outages due to extreme weather, overheating of laboratory equipment which destroys experiments, extreme cold causing damage to pipes and roads, and infrastructure damage caused by high winds.

Adaptation Responses

Managing flood risk: Adaptation measures have been carried out for new builds on campus, such as at Baroness Young Halls where sustainable drainage systems (SuDS) have been installed.

Managing overheating: Air conditioning implemented to reduce over-heating and damage to laboratory equipment, assessment of risks must be completed due to increased emissions this will cause.

Monitoring climate: Sensors are being used to monitor weather and temperature changes, ensuring climate risks are being tracked.

Constraints

Cost limitations: Some barriers to implementation of the newly developed strategy for adaptation and resilience building included the strategy being high in capital costs and being challenging to retrofit into existing buildings. Such measures would require buy-in from senior management.

Ineffective practices: Some of the lower cost blue/green options would not have been effective enough or would be difficult to implement.

Benefits

Climate awareness: The Climate Change Risk Assessment is monitoring and keeping ongoing records of extreme weather events and associated damage on campus. This is reducing the need for emergency action subsequently reducing damage and cost.

Comprehensive strategy: Implementing a balance between a top-down and bottom-up approach, from stakeholders to students will ensure a well-rounded perspective of risks and potential adaptation measures.

Understanding limitations: The university highlighted where the strategy had issues, for example cost limitations – this can inform the university where to aim their efforts, in this case to engage senior management and acquire more funding.

Enhanced research: Adopting a sustainability strategy stemming from a post-graduate study encourages the university to support more on campus research into different adaptation methods.

Case study adapted from the UK Universities Climate Network, case study library, available via the UUCN.

Case Study

Newcastle University

Summary

Driven by significant disruption from flooding, Newcastle University implemented sustainable drainage systems and green infrastructure across its campus. Working with other city stakeholders to manage surface water, this produced benefits for the university and wider city community.

Background

Newcastle University has been impacted several times by extreme weather over the last decade. Most significantly, the 'Toon Monsoon' in June 2012 resulted in over £1 million worth of damage to the campus when 50mm of rain fell in just two hours.

The event prompted a risk assessment of the university's buildings and business critical assets, and actions to mitigate against future flooding, including the installation of flood barriers to doors and flood alarms.

Immediate and strategic responses

Short-term measures: Installation of flood barriers and alarms to protect vulnerable infrastructure.

Long-term strategy: The Estates Support Service (ESS) funded an academic post to collaborate with researchers on flood modelling and the design of Sustainable Drainage Systems (SuDS) across campus.

Partnerships

Over £4.5 million in funding was secured from:

- Newcastle University
- UK Collaboratorium for Research in Infrastructure and Cities (UKCRIC)
- University/City Council Partnership

This funding supported the creation of the National Green Infrastructure Facility (NGIF) – facilitating research into Sustainable Drainage Systems and green infrastructure (GI).

- Collaborations between researchers led to modelling that identified vulnerable areas and buildings.
- The management of urban water for city stakeholders was a key motivation of a project to model flow paths within the university campus.

Benefits

Community engagement and local food resilience: Community workshops showcased how simple interventions—like using water butts to capture stormwater—can reduce pressure on urban drainage systems. These also allow water to be reused locally to support local food growing initiatives, strengthening community ties and promoting sustainable water reuse.

Enhanced urban environment and wellbeing: The expansion of green space across the campus not only supports flood resilience but also delivers improved urban ecology, enhanced water quality, and positive impacts on the wellbeing of students, staff, and the wider community.

Educational and research value: The National Green Infrastructure Facility, whilst actively reducing flood risk, is also used for research and teaching, shaping the university's climate curriculum, and providing visual demonstration and advocacy of green infrastructure.

Reduced insurance premium: Measures to mitigate flood risk also led directly to the University being able to renegotiate a reduced insurance premium.

Collaborative governance: Partnerships with students, Newcastle City Council, Northumbrian Water Limited, and other organisations as part of a Local Action Alliance promoted a sense of shared responsibility for surface water. One outcome was a city-wide pledge for joint working to achieve the highest standards of water management and to promote investment in SUDs.

Case study adapted from the UK Universities Climate Network, case study library, available via the UUCN.

Case Study

Oxford Brookes University

Summary

Oxford Brookes university received planning permission to redevelop the Clive Booth Student Village. This redevelopment will increase resilience to higher temperatures and heatwaves, flooding and potential risks of energy shocks, while also providing benefits to student quality of living, reducing pressure on local housing supply and reducing carbon emissions.

Background

Oxford University has a strategy to increase the resilience of its estate and adapt to the current and future impacts of climate change. The project aims to benefit student health and well-being and increase the sustainability of university operations.

In stages, eleven 1970s blocks will be replaced with twelve sensitively designed, high-performing buildings, which have estimated carbon savings in excess of 70% when compared to a 2013 Building Regulation compliant base case.

Adaptation responses

Reducing energy demand: The building uses a fabric-first approach, maximising the performance of walls, roofs, and windows to reduce the need for heating and cooling. Air source heat pumps will replace gas boilers, well ahead of the UK's 2035 phase-out target.

Managing overheating: Naturally ventilated spaces are being designed to reduce the risk of overheating, helping the building adapt to rising temperatures and more frequent UK heatwaves.

Flood mitigation: The landscape design enhances the existing woodland setting while managing surface water. It encourages student interaction with nature and targets an 11.87% net gain in biodiversity.

Resilience to energy shocks: A decentralised energy system boosts resilience to supply disruptions. Facilities teams can isolate faults without shutting down the entire system, minimising disruption for residents.

Benefits

Increased rent price control: The University has a greater control of rent prices, which can help them lower costs in the context of the UK's cost of living crisis, providing higher quality accommodation as part of the student offer, and helping to reduce pressure on local housing supply and local transport systems, contributing to the resilience of Oxford as a city system.

Improved student wellbeing: The design prioritises thermal comfort and natural ventilation, reducing the risk of overheating during heatwaves. This creates healthier, more comfortable living environments that support student wellbeing and academic performance.

Increased green space: The landscape design enhances and protects the existing woodland, supporting local ecology while creating restorative green spaces for students and staff.

Case study adapted from the UK Universities Climate Network, case study library, available via the UUCN.

Endnotes

Numbered list of sources used to support the guide.

1. ABI- More action needed to protect properties
2. ABI- Sinking UK
3. Adaptation Planning for Business – WBCSD
4. Barker et al. 2024- An appraisal of the severity of the 2022 drought
5. BBC – Invest $1.8 trillion to adapt
6. Climate Change Committee - Independent Assessment of UK Climate Risk
7. Climate Change Committee - Progress in adapting to climate change: 2025 report to Parliament
8. Environment Agency- Flooding in England
9. Environmental Audit Committee - House of Commons- Heatwaves: adapting to climate change
10. Global Commission On Adaption
11. Gov UK – Third National Adaptation Programme (NAP3)
12. Met Office – Local Authority Climate Service
13. Met Office – Local Authority Climate Explorer
14. Met office – Climate Change in the UK
15. Met Office- Past and future sea level rise
16. Met Office- Snow and Ice Warnings
17. Met Office- UK wildfires
18. Met Office- UKCP headlines
19. Met Office- UK storm season 2021/22
20. Office for National Statistics- Excess Mortality Periods
21. Science, Innovation and Technology Committee- House of Commons- Insect decline and UK food security
22. The Guardian- Flooding
23. UK Universities Climate Network – case study library
24. UKGBC- Climate Change Adaptation
25. World Economic Forum Global Risks Report, 2025
26. World Meteorological Organization (WMO), 2025

For links to other guidance, please see Appendix 2 of the Appendices supplement.

AUDE