Using an existing organisational resilience framework to develop a **Climate Change Adaptation Plan**

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HEBCoN
Higher Education Business Continuity Network

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Introduction

Climate change is an existing and escalating threat with the potential to cause significant disruption and damage to Further and Higher Education Institutions (FHEIs). Increasing numbers of organisations are publically declaring climate change to be an 'emergency' that requires urgent action. Regardless of action taken to reduce greenhouse gas emissions, some climate change is now locked in.

The changing climate acts as a unique multiplier to the existing risks faced by FHEIs. Climate change will result in direct impacts, in which hazards influence core element of operations. For example, heatwaves, which are expected to increase in frequency and severity due to climate change, can cause impacts like staff illness or decreased productivity. Indirect impacts are also important to consider, such as heatwaves causing outages in critical infrastructure serving your institution's region (e.g. electricity and rail network), or an extreme weather event in another part of the world disrupting your supply chain.

It is possible, however, to address most climate change risks to your organisation through existing institutional risk management structures. Your institution's existing organisational resilience framework is likely to include business continuity, risk management, emergency management, and crisis management. These established services are experienced in providing a structured process to assess and respond to organisational risks. This document introduces an approach that FHEIs can adopt to develop a Climate Change Action Plan (CCAP), using the organisational resilience expertise, processes and governance that may already exist within the organisation.

The process outlined in this document draws on the Business Continuity Institute Good Practice Guidelines (2018 Edition) and the principles of enterprise risk management, both of which may form part of your organisation's existing approach to organisational resilience.

This document outlines an approach to:

1. Answer the question: 'how could climate change affect my institution?'
2. Determine where climate change represents a significant risk
3. Develop an adaptation plan appropriately matched to the organisation's climate change risk profile and priorities.

Definition of Risk

The effect of uncertainty on objectives. The effect may be positive, negative or a deviation from the expected (ISO31000). Risk is measured in terms of the probability of potential events and their impact.

Definition of Business Continuity Management

A holistic management process that identifies potential threats to an organisation and the impacts to business operations those threats might cause, and which provides a framework for building organisational resilience with the capability of an effective response that safeguards the interests of key stakeholders, reputation, brand and value-adding activities.

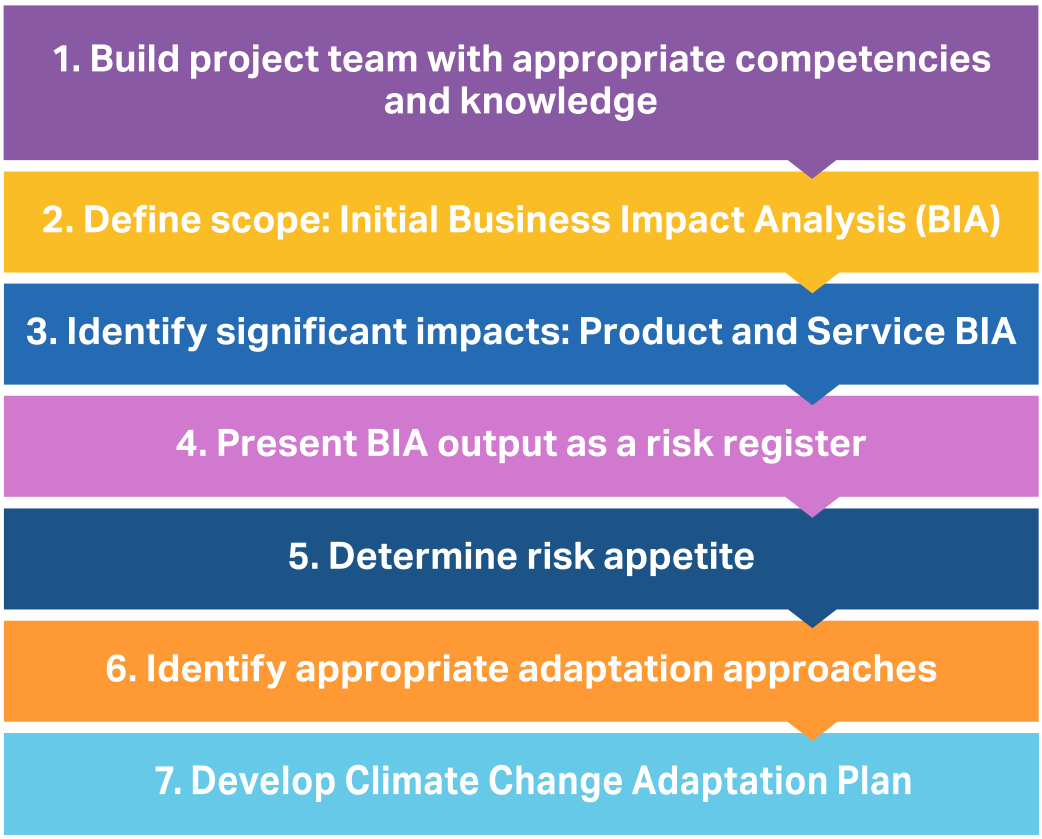
Business Continuity Institute, 2018

How to use this document

This is one of two Guides published in 2019 to highlight why, and how, to effectively embed considerations of climate change risk within your existing risk and business continuity procedures. It has been developed by a Working Group of FHE sustainability and risk professionals, led by EAUC and HEBCoN (the Higher Education Business Continuity Network), with the support of adaptation specialists from AECOM.

This Guide was produced as an Supplement to the main Guide *'Adapting universities and colleges to a changing climate: Making the case and taking action'*. The main document provides a range of support, from an initial self-assessment on climate readiness and an example Elevator Pitch to use to communicate the need for investment in adaptation, to climate projections, examples of risks, opportunities and potential adaptation actions, and a compilation of resources to support action in your institution. This Guide adds to that understanding, providing step-by-step advice on running your own Business Impact Analysis workshops to evaluate the risks presented by climate change to key organisational functions, and deciding on the actions required to reduce any significant risks."

This document presents a seven step process to develop a CCAP. Each step outlines key related processes that may already exist within your FHEI. These processes may not exactly match your FHEI's approach, but may be adapted to align with your institution's current strategy.



Step 1:
Build project team with appropriate competencies and knowledge

Objective:

Assemble the necessary competencies and knowledge needed to undertake a CCAP process.

Output:

A memo describing an interdisciplinary project team with clearly defined roles and assigned responsibilities for the CCAP process.

Building resilience to climate change is a multi-disciplinary and collaborative process – no individual holds all the necessary knowledge. As such, assembling a 'working team' from across different functional areas of an organisation can be a great approach. Before embarking on development of a CCAP, at a minimum you should engage with those responsible for organisational resilience within your organisation to understand how this function operates locally. This may include a Risk Lead, Business Continuity Lead, and/or Compliance Lead.

The table below summarises some of the roles you should consider for the team, noting that these may vary depending on your institution's organisational structure. As such, another approach is to consider the competencies and knowledge that are needed, ensuring that the working team includes these, regardless of the specific role titles.

Member	Role
Senior Management Sponsor	To provide organisational leadership and endorsement for the CCAP work.
Project Manager	To develop the project management plan and lead the project.
Environmental Sustainability Lead	To provide knowledge of climate change and likely impacts.
Risk Lead	To provide knowledge regarding the institution's approach to risk management and facilitate embedding climate change risks onto the institution's risk register.
Business Continuity Lead	To provide knowledge and expertise of business impact analysis and the development of appropriate resilience plans.
Climate Change Expert Input (Optional)	Climate data is complex, and the process of applying projections to identify future risks can be challenging. It can also be challenging to summarise and present climate data in a way that is understandable to a broad group of stakeholders. You will need to decide the level of data complexity that is necessary for your group to undertake business impact analysis, and the capability of your Environmental Sustainability lead to present this data, as well as the likelihood of other workshop members accepting their expertise on the topic. The Met Office provides a range of observed and projected climate data here: https://www.metoffice.gov.uk/ research/approach/collaboration/ukcp/index . However, you may deem it necessary to involve an expert with specific climate change risk assessment expertise in the process – this could be someone from the institution's academic staff or an external consultant.
Subject matter leads	To provide subject matter expertise, for example from Estates, ITS, HR, Learning and Teaching.

Skills	Institutional Knowledge
Enterprise risk management Enterprise risk relates specifically to risks to your university's stated objectives. Familiarity with undertaking risk assessments is a critical skill to have in your working group. It is often a good idea to integrate your approach for a climate-focused study with your organisation's existing enterprise risk management guidance (e.g. using similar criteria to assess likelihood and severity).	**Critical functions and key existing risks** What are your institution's key products, services, systems and activities that could be affected by changes in climate? What risks are already important to senior leadership?
Ability to interpret weather and climate data An increasing amount of data is available to help us understand future climate; however, this can be daunting. Some familiarity working with trend and projection data would be ideal, but resources are available to bring you up to speed at: https://www.metoffice.gov.uk/ research/approach/collaboration/ukcp/index .	**Effects of past extreme weather events** How have past events affected your institution's operations? What have been the financial costs or other impacts? Incident registers, media reports and memories of long-standing staff can all be key sources of insight.
Strategic planning Ideally your working team will include someone who is involved with your institution's strategic planning process and has strong links with senior leadership. This increases the likelihood that recommendations can be integrated into key plans and policies going forward.	**Key institutional stakeholders** Who relies on your organisation and vice-versa? How could a changing climate affect what your stakeholders need from your institution, or what you can provide?
Communication and awareness raising Your institution's efforts around climate resilience will interest different stakeholders for different reasons. An important skill is clear and targeted communication across all levels, from officer level staff to senior leadership. Keep the message simple and consistent	**Existing policies, plans and regulations** What relevant internal policies and plans could benefit from consideration of climate change? Are there any specific policy or regulatory considerations within your local government area or devolved area of the UK (e.g. Climate Change (Scotland) Act; Future Generations Act (Wales))?
Enthusiasm and positivity! Making the case for more action on climate resilience can be challenging. Understandably, some stakeholders you engage with may find the topic daunting, while others may see it as less important compared to competing priorities. Despite this, it's important to stay positive and make sure to highlight the upside of taking action now!	

Governance

As climate change compounds many existing risks, it is beneficial to incorporate climate change considerations into existing established governance and reporting mechanisms. Establish terms of reference for your project team, which includes reporting routes, for example:

- Committees
    - Sustainability
    - Academic
- Senior Management Team
- Sub-committees of the Board of Governors
    - Strategic Planning Committee
    - Audit Committee
- Board of Governors
- CCAP Steering Group

Step 2:
Undertake an Initial Business Impact Analysis (BIA)

Objective:

Understand what is fundamentally important to the organisation (critical functions).

Output:

A list of critical functions where climate change impacts need to be considered in further detail.

An Initial BIA is a high-level analysis of the key functions your organisation conducts to achieve its strategic objectives. The Initial BIA is undertaken with senior management and has the following aims:

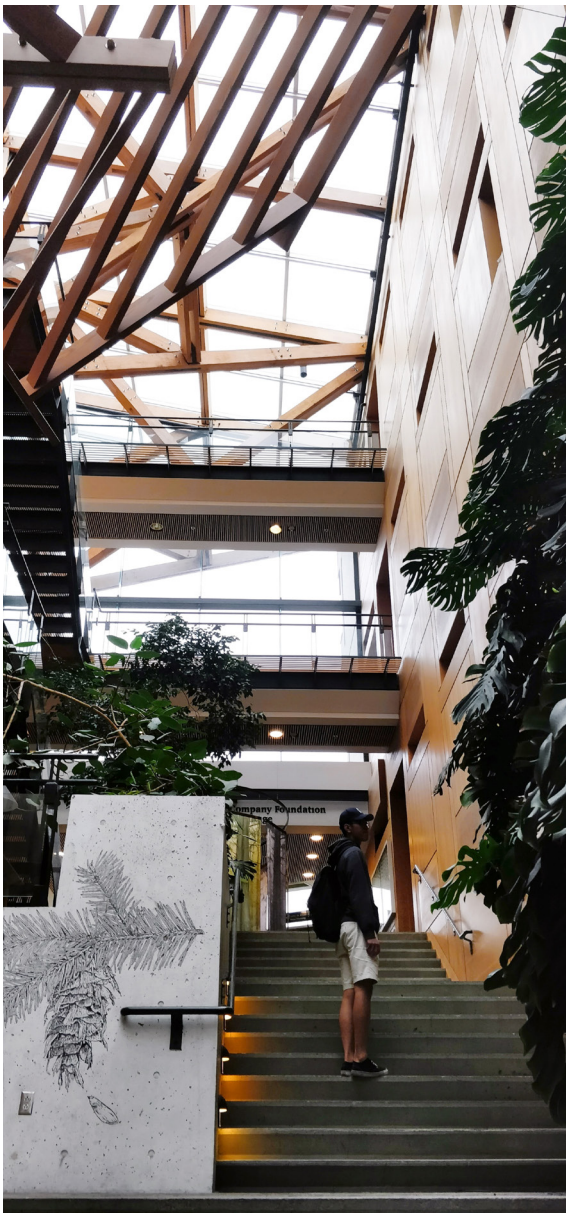
- To secure senior management understanding and engagement at an early stage, avoiding surprises further down the line.
- To identify the priority functions of the institution that the senior team has little tolerance to see significantly disrupted. At this stage the focus is not on the likelihood of disruption, but rather on those functions where the consequences would be significant if they were disrupted.

An Initial Business Impact Analysis may have already been completed for your organisation and may already be informing the development and maintenance of the organisational resilience framework. If this is not the case, then a short workshop with the organisation's Senior Management Team (SMT) will determine, at a high level, the key functions that must be considered in further detail through the remainder of the CCAP process.

As a guide, critical functions of relevance to many FHEIs may include:

- Learning and teaching (pedagogy, quality, currency and relevance)
- Research
- Estate and infrastructure
- Student recruitment
- IT Infrastructure and Systems
- People and wellbeing
- Commercial services (e.g. catering)
- Commercial ventures / partnerships
- Critical events, such as examinations and graduation.

Appendix A offers a suggested meeting structure for the Initial BIA workshop.



Step 3: Complete Product and Service Business Impact Analyses (BIAs)

Objective:

Determine specific risks to critical functions over different time horizons, incorporating the effects of climate change.

Output:

A BIA document that identifies the possible impacts to the critical functions identified in Step 2 and the likelihood of these impacts under different climate scenarios.

The Initial BIA will have identified the key functions of the institution for which disruption due to climate change would be seen as important. Each of these functions should be analysed in more detail using Product and Service BIAs. Product and Service BIAs analyse the impact over time that various climate change hazards may have on the component elements of each key function.

Product and Service BIAs are typically best delivered with a workshop component. Suggested elements for such workshops are summarised in the on the next page:

A	**Understanding historical and current impact**	It is important to first spend time discussing how extreme weather events have affected each function to date. For example, discuss the impacts already experienced from weather extremes such as heatwaves, storms, flooding, cold snaps and droughts. It should be possible to gather some information on past impacts (e.g. duration/ cost of disruption) in advance through sources such as your institution's incident register, newspaper articles, and direct conversations with long-standing employees (anecdotal accounts). It is also helpful to get an understanding if any policies, procedures or physical infrastructure has already been adapted in response to past events.
B	**Identifying Products & Services**	The workshop team should now identify the products and services '(e.g. field trips, examinations, building maintenance)' necessary to deliver the critical function(s) that are the focus for the workshop. This will enable the impact of climate change to be analysed systematically. See Appendix B for examples. **Important:** This exercise can be time-consuming. It may be most effective for the project lead to undertake a first-pass mapping of products and services against each critical function, with workshop participants then asked to validate the findings.
C	**Risk identification**	The workshop moves to analysing the potential impact of climate change on each product / service. Appendix C lists the various climate change hazards that should be used as a prompt to structure conversations. Some of these hazards will not be relevant or clearly not represent a significant threat, and should be discarded. **Important:** In addition to direct impacts, such as increased staff illness or decreased productivity during heatwaves, indirect impacts are also important to consider. For example, a heatwave causing outages in critical infrastructure serving your institution's region (e.g. electricity and rail network), or extreme weather events occurring in another part of the world that impact on an FHEI's supply chain. Remember, your FHEI may operate, or have interests, globally.
D	**Risk scoring**	A prioritised list of risks is required to inform selection of adaptation options at Step 6. Appendix D presents a risk scoring methodology that can be used or adapted to help determine the level of risk for each product and service. You may find it more appropriate to use your institution's existing risk scoring methodology. The benefit of using the existing methodology is that the calculated level of risk will be aligned to how the institution currently measures risk, meaning it may be more easily integrated into existing risk registers. **Important:** Always start by considering the risk level in the current day. Then move on to considering how that risk may vary due to climate change in the future.
E	**Further analysis**	The workshop will help to identify the products and/or services that appear to be most at risk from climate change. However, further analysis may also be required, drawing on additional subject matter experts from within the FHEI or externally due to their complexity. For example, the organisation may wish to analyse the impact more precisely for a specific building, requiring input from an engineer.

Step 4:
Present BIA output as a risk register

Objective:

Summarise BIA findings in a format that can be used to inform future decision-making.

Output:

A clear standalone risk register or modified version of the FHEI's existing corporate risk register.

Senior Management understand risk registers. Therefore, it may be advantageous to adopt a risk register template as the reporting tool when presenting the key findings of the BIA process. A risk register can be used to record and describe the significant risks climate change presents to the organisation. Engage with the institution's risk lead to ensure there is integration with the existing risk framework.

Once completed, climate change risk will be part of the corporate risk register, which will be beneficial for in maintaining awareness of climate change risk within Senior Management.

In many cases, the risks presented by climate change can be included within the risk descriptions of existing corporate risks. For example, your FHEI may already have a strategic 'People and Performance' risk. To continue with the example of increasing extreme heat, the increased frequency of overheating buildings becomes an additional cause or contributor to the 'People and Performance' strategic risk.

The following page provides more information on the advantages of integrating climate change into existing corporate risks, or how you could alternatively create a standalone climate change risk register.

Integrating climate change into existing corporate risks

Taking this approach will increase the likelihood of climate change considerations being built into an FHEI's forward-planning. Institutions will have a corporate risk register, which is likely to have identified risks similar to those listed below:

- Student Recruitment
- Student Experience
- Financial Sustainability
- Reputation
- Estate and Infrastructure
- Research impact.

The output of your BIA may fit comfortably within these risk descriptions. For example:

- The BIA may have identified threats to the suitability of the institution's Estate and Infrastructure. Should the climate risk assessment find that learning and teaching spaces may increasingly overheat, this could be an important consideration when assessing risks to student experience and reputation.
- The BIA may have identified threats to future student recruitment from markets whose economies will be increasingly challenged by climate change.

Standalone climate change risk register

Should your FHEI's leadership not be receptive to integrating climate change into existing corporate risks, the alternative is to produce a standalone risk register for climate change risks.

In this case, use of the organisation's existing risk register template is recommended rather than creating something new. The risk register should be written with input from the institution's risk lead to ensure a consistent approach to describing and quantifying the level of risk. It is important that each risk is adequately described so that it is clear what the causes and impacts of them actually are.

Risk description

A risk description describes the nature of a risk in terms of the potential causes (or threats) to the realisation of the risk, and the impact the realisation of the risk will have on the organisation. For example:

Risk

The south aspect of the second and third levels of the main administration building (containing HR, Finance, Marketing, and Student Services) may become unfit for purpose by 2030.

Causes/threats

More prolonged heatwaves will exacerbate existing airflow system and solar gain problems.

Impact

Internal temperatures will exceed 30 degrees Celsius for weeks at a time, resulting in staff sickness and absence, staff departure, reduced productivity.

Step 5: Determine risk appetite

Objective:

Assess the impacts in the risk register to determine the institution's willingness or reluctance to tolerate risk.

Output:

A validated list of the climate change risks. The SMT will have identified which risks to critical functions are crucial to prioritise and proactively address and which they are willing to tolerate for now. This will guide adaptation decision-making in Step 6.

Identifying the SMT's risk appetite (i.e. the tolerable level of risk) will help to ensure that there is agreement on the significant risks identified. The risk appetite will help inform which adaptation option best matches the FHEI's priorities. Senior management are more likely to welcome the development of a CCAP that is congruent with the FHEI's appetite for risk.

How to identify risk appetite

The significant risks from the risk register should be presented to the SMT. Avoid presenting risks that do not require a steer from SMT to enable decision-making. The focus of the discussion should be on the risks that require strategic thinking and consideration within planning and budget rounds to enable the implementation of adaptation options.

For each significant risk there should be a discussion to determine their appetite for that risk.

Risk appetite

Risk appetite can be described as the willingness and ability of an organisation to take risks. An organisation with a high risk appetite will accept or tolerate a higher level of risk. An organisation with a low risk appetite will wish to implement greater controls to reduce risk exposure. An organisation may have a higher risk appetite for some types of risk (e.g. financial risk), but a lower appetite for other types of risk (e.g. reputational risk). Risk appetite changes over time and should be tested regularly – **this is particularly important for climate change risks, which are escalating over time and becoming more clearly understood as more scientific evidence comes to hand.**

The following are examples of risk appetite statements that could be used:

Lower Risk Appetite

- There is a very low appetite to tolerate the risk, and the response should focus on minimising the risk to the greatest extent possible.
- There is a low appetite for the risk being realised, but some disruption will be tolerated.
- There is some appetite to tolerate the risk, and there is no need to invest in treatment beyond monitoring at this time.
- The risk is not seen as significant.

Higher Risk Appetite


MARLEY
LETTUCE
Frackles
LETTUCE
Webb's Wonderful
LETTUCE
Raptor

Step 6:
Identify and prioritise adaptation approaches

Objective:

Using the established risk appetite, determine the appropriate adaptation actions.

Output:

A prioritised list of the best actions to address climate change risks to critical functions.

Identifying options

If your discussion of risk appetite has identified potential impacts requiring a proactive response, to lower the likelihood of occurrence or severity of impact there is a range of ways for thinking about how action can be taken. None of the approaches described below are inherently superior, and it may help to deploy several in parallel.

Measures to address exposure, sensitivity and adaptive capacity

A common approach is to look at measures that can address each aspect of climate change risk as defined by the Intergovernmental Panel on Climate Change (IPCC):

- **Reducing exposure:** This means ensuring that key activities, resources, products, services and assets (economic, social, cultural and environmental) are located out of harm's way. This can mean redirecting a hazard (e.g. by constructing a sea wall) or moving things of value to another location (e.g. relocating computer servers or document archives from a flood-exposed basement). This is the most effective way to reduce risk, but may not always be a cost-effective or viable option.
- **Reducing sensitivity:** If it is not practical to eliminate exposure to a risk, we can often take measures to reduce susceptibility to harm. This can be as simple as encouraging staff and students to drink more water during a heatwave.
- **Increasing adaptive capacity:** This simply means increasing the ability to cope with and adjust to change. We can do this by ensuring we have a Plan B, such as backup power should a storm or heatwave result in an electricity outage.

No- and low-regret options (EU Climate-ADAPT programme)'

No-regret options	These options are considered worthwhile even in the absence of climate change. For example, shifting to a more local catering supply chain (less prone to disruption) at a similar cost.
Win-Win options	These options work to minimise climate risk and also contribute to other social, environmental, or economic goals. Investing in more renewable energy is a good example, as while it comes with upfront costs, it may generate cost-savings in the longer term and result in reduced greenhouse gas emissions.
Low-regret options	These options have low costs and high benefits, and the benefits will likely be realised under future climate scenarios.

Considering options by type of intervention

Type	How does this type of action work?	Examples
INVESTIGATION	Sometimes we need more information to make the right adaptation decision. Investigations provide further analysis of targeted issue areas, helping to identify which adaptation options are the most cost-effective.	– Flood modelling – Feasibility studies
POLICY, PROCEDURES AND SYSTEMS	Even if further investigations are needed before a major investment can be justified, there are often 'soft' actions that can be taken quickly and cheaply.This may include updating existing policies or standard operating procedures, such as inspection schedules for building facades or rules around working in extreme heat.	– Hazard-specific emergency response plans – Increase online teaching capacities and working from home options so students and staff can stay home in inclement weather – Early warning systems for natural hazards
BEHAVIOURAL.	Human behaviour is major factor in the consequences of extreme events (e.g. the decision to drive a car during a major storm). Institutions can implement awareness and/or advocacy campaigns to better educate staff, students, and communities on how to prepare for, and respond to, different types of climate hazards to ensure a robust and integrated local response strategy to extreme weather events.	– Communication and advocacy campaigns – Establishing or strengthening partnerships with other stakeholder organisations such as local authorities
NATURE-BASED SOLUTIONS	Integrating more natural features into campuses may often be more effective than hard engineering at addressing climate change risks. For example, increasing tree canopy cover and permeable surfaces can reduce extreme heat and the risk of flash flooding. Nature-based solutions may also offer supplemental benefits, such as providing areas for recreation and supporting improved mental wellbeing for students and staff.	– Raingardens and permeable pavements – Constructed wetlands and reed beds – Expansion of greenspace, including green walls and roofs – Drought-resistant planting/ landscaping – Vegetated verges along roadways
TECHNICAL (ENGINEERED)	Engineered infrastructure and technological approaches may sometimes be required, particularly when assets are highly exposed to climate change risks.	– Flood barriers and seawalls – Passive building design – Backflow preventers – Solar shading – Reinforced roofs and constructions
MAINTENANCE AND ASSESSMENT MANAGEMENT REGIMES	Ensuring that infrastructure and assets are well-maintained regularly and especially in advance of extreme weather will decrease the risks of adverse impacts.	– Checks on the drainage network ahead of storms
RISK TRANSFER AND OFFSETTING	Where risks cannot be reduced directly, an FHEI may use financial mechanisms to reduce their operational exposure to the risk.	– Purchasing resilience – Outsourcing – Resilience bonds

Methods to prioritise options

Three common methods to prioritise potential adaptation actions are presented below.

Cost-benefit analysis

Cost-benefit analysis (CBA) weighs adaptation costs against benefits. Adaptation costs are defined as 'costs of planning, preparing for, facilitating, and implementing adaptation measures, including transition costs' and adaptation benefits are 'the avoided damage costs or the accrued benefits following the adoption and implementation of adaptation measures' (IPCC, 2007). CBAs provide the SMT with a standard value for each adaptation option.

A drawback of a CBA is that it can be challenging to quantify benefits. Additionally, CBAs use 'discount rates' to discount the benefits of future benefits and costs in calculations – this is based on a standard economic assumption that benefits conferred in the future should not be weighted the same as those that can be experienced immediately. The choice of discount rate can significantly impact the outcome of the CBA – choosing a high discount rate means that future impacts are not valued as highly as present impacts, which may not adequately represent climate change risk to future generations. Choosing a low discount rate means that the future impacts are considered to be of similar importance to present impacts. SMT members should take these considerations into account when deciding whether, or how, to use a CBA.

Cost-effectiveness assessment

A cost-effectiveness assessment (CEA) provides a means to identify the least cost approaches to reducing climate change risks. For example, if the overall objective is to reduce heat-related productivity loss of staff and students, a CEA can be done to determine the cost of different adaptation actions that would achieve that goal.

Multi-criteria analysis

Multi-criteria analysis (MCA) is generally a superior approach to a CEA as it appraises options taking into account a variety of qualitative and quantitative criteria, rather than just cost and effectiveness. The table below details an example of a MCA performance matrix, where different options are scored against different criteria, which would be chosen by the SMT.

An high level example of a completed MCA is also provided on the next page.

Example of criteria for an MCA

	High (1)	Medium (2)	Low (3)
Effectiveness to Reduce Risk	High potential to reduce risk to multiple critical functions and / or asset types and / or to reduce multiple risks.	Moderate potential to reduce risk to critical function and / or asset	Potential to reduce risk is low or uncertain
Cost	Cost is Minor (£1-20K)	Cost is Moderate (£20K-£200K)	Cost is Major (£200K+)
Stakeholder Acceptance	No conflict expected with staff, students, tenants or other stakeholders around implementation and / or will provide broader social and environmental benefits	Possible conflict staff, students, tenants or other stakeholders around implementation and around implementation and / or may provide broader social and environmental benefits	Likely conflict with staff, students, tenants or other stakeholders around implementation and / or may generate negative social and environmental impacts
Urgency	Should be completed within the next 10 years to reduce a current risk	Should be completed before 2040 to reduce risk	Should be completed before 2070 to reduce risk

(lower 'Total' score indicates higher priority action)

Adaptation option description	Indicative cost	Effectiveness	Acceptance	Urgency	Total*
Review the University's Emergency Response Plan in light of the findings of this study, ensuring that suitable contingency plans are in place for different types of severe weather event.	1	2	1	1	**5**
For all buildings found to be exposed to surface water and/or riverine flood risk, review equipment and/or archive material stored in basements. Consider relocation if it is of value or important for business continuity.	2	1	1	1	**5**
Revising landscaping protocols to incorporate species that are less susceptible to temperature extremes and require less water.	2	2	2	2	**8**

17

Step 7:
Develop and implement the climate change adaptation plan

Objective:

Document, and obtain SMT endorsement of, the FHEI's approach to climate change adaptation.

Output:

A concise climate change adaptation plan with indicative timelines, implementation strategies, and key performance indicators to monitor progress.

Undertaking the previous steps should have generated the necessary elements of the CCAP, meaning this step is primarily about consolidating information into a clear, concise document. However, more work may be required to develop adaptation actions in greater detail to the point where they can be implemented. The plan should not be seen as a wish list of activities that will hopefully secure buy-in, instead it should be an implementation-ready set of agreed and funded actions.

As with any plan, stakeholder involvement will help increase the chances of successful implementation. Stakeholders involved should include:

- Leads from the relevant key function, product or service.
- Representatives of those affected by adaptation plans to secure buy-in and identify the obstacles to implementation.
- Those with a role to play in implementing adaptation actions.
- People responsible for the FHEI planning process, to identify where actions need to be embedded within the planning round because of the level of change required.
- Finance representatives, particularly where actions may need to be included within the budget round because of the level of expenditure required.

An implementation-ready guide will include:

- **Objectives:** The SMT group should agree on stated objectives in response to the prioritised risks identified in the risk register.
- **Timelines:** Each objective should have an associated implementation timeline – are they short term actions the SMT would like to accomplish within a year? 5 years? 10 years or longer? Timelines will ensure that implementation is taken seriously.
- **Key performance indicators:** KPIs should be chosen to allow for a standardised means to evaluate progress towards the stated objectives. A periodic review should be undertaken, based on the KPIs, as well as any new evidence that becomes available regarding climate change. This allows for an 'adaptive management' approach in which actions are revised to improve effectiveness as new information comes to hand.
- **Action owners:** Assign each objective to a responsible party. This includes an individual responsible for monitoring progress to implement the plan.

Appendix A:

Potential approach for an Initial BIA workshop with the Senior Management Team

Before the workshop:

- Develop a draft list of your institution's critical functions.
- Where possible, have informal discussions with staff who have worked for the organisation for many years. The institutional memory of these staff can be important for understanding how severe weather events have affected the operations in the past.

Workshop agenda

SESSION	TIMING (minutes)
Brief introduction to climate change by Project Manager • Distinction between the terms 'mitigation' and 'adaptation' • Examples of global operations / interests of the organisation.	10
Identifying critical functions • Project Manager proposes list of high level functions necessary to achieve strategic objectives • Group discussion to validate functions	20
Group discussion of potential severe weather and climate-related disruptions to each function • Introduce different types of climate hazard (e.g. flooding, drought) and give examples of past impacts • Group discussion to elicit Senior Management Team perspective on key threats.	30

After the workshop:

- Summarise workshop outcomes back to the Senior Management Team and propose a scope for CCAP process going forward.
- Agree scope with Senior Management Team.

Appendix B:

Example product and service elements of common FHEI critical functions

Critical function	Products and services

Estate and Infrastructure	• Buildings operation and performance, e.g:
	  ○ Professional service office and specialist space
	  ○ Specialised facilities required for different types of learning and teaching
	  ○ Accommodation
	• Any other specialist use, such as agricultural space
	• Building maintenance
	• Utilities
	• Drainage
	• Waste Management
	• External / natural environment
	• Travel and access
	  ○ Master planning and campus development.
	  ○ Utilities dependencies
	• Building maintenance
	• Drainage
	• Waste Management
	• External / natural environment
	• Travel and access
	• Master planning and campus development
	• Global infrastructure

Student Recruitment	• Impact to global recruitment and college partnerships
	  ○ Population change
	  ○ Economic change

Learning & Teaching	• Global taught activities • Currency and relevance of the curriculum (attractiveness and job market) • Contentious learning counter to climate change mitigation agenda • Work based learning / placement impacts • Fieldtrips • The timetable • Examinations • Graduation
Commercial Activity	• In-house commercial activities such as catering, conferencing. • Partnership activity such as science/business incubators • Building lease
Research	• Research infrastructure • Materials and materials storage • Significant research (by value, reputation) that could be at risk
People and Performance	• Global research areas and partners • Contentious research counter to climate change mitigation agenda • Research opportunities • Staff health, safety and wellbeing • Student health, safety and wellbeing
IT Infrastructure and Systems	• Key infrastructure such as data centres • Key systems to support remote access / home working

Appendix C:

Climate hazards

ACUTE HAZARDS (Quick-onset)	CHRONIC HAZARDS (Slower onset)
• Extreme heat • Extreme cold • Rainfall flooding • Extreme winds • Storms • Lightning • Storm surges • Wildfires	• Changes in average temperature • Changes in average rainfall • Sea level rise • Coastal erosion • Drought & water shortage • Ocean acidification

There are many social, economic and environmental processes that could be influenced by climate hazards. Examples include:

- Disruption to supply chains
- Changes in market demand
- Infrastructure disruption
- Regulations
- Conflict / war
- Ecosystems
- Food security.

From a corporate risk perspective, it is important to consider these types of indirect effects from climate change. For example, an institution's electron microscope may be in an area not exposed to significant climate hazards (e.g. flooding), but if the only manufacturer of spare parts was affected by an extreme weather event there would still be adverse impacts for your organisation.

Appendix D:

Example risk scoring methodology

Risk is often considered as follows:

Severity of impact x Likelihood of impact occurring in the stated timeframe.

The boxes below offer a simple approach to scoring the likelihood and severity of risk. Your organisation is likely to have its own variation of this.

Potential Scoring Methodology For Bia

SCORE	LIKELIHOOD OF OCCURRENCE	SEVERITY OF IMPACT
1	Unlikely	**Low:** Occasional, short-term or localised, tolerable impact. Easily and quickly treated.
2	Possible	**Moderate:** Occasional, short-term or localised intolerable impact. Complex or costly treatment.
3	Likely	**High:** Significant longer-term, recurring or widespread intolerable disruption. Complex or costly treatment.

	LOW (1)	MODERATE (2)	HIGH (3)
Unlikely	1	2	3
Possible	2	4	6
Likely	3	6	9

Appendix E

Business Impact Analysis Workshop Template

Climate Change Business Impact Analysis Workshop Notes

Function: e.g. Estates and Infrastructure

Product / service at risk e.g. Office space

Date:

Team: Input from...

Note that it is your decision which future timescales to assess in the table below. The 2030s are used here as it is within a realistic planning horizon for most FHEIs and there is readily accessible climate projection data available from: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index

HAZARD	RISK	IMPACT	CURRENT CONTROLS
Extreme heat	**High internal temperatures in the main administation building (containing HR, Finance, Marketing, and Student Services).**	Staff sickness & absence, staff departure, reduced productivity. Increased risk to pregnant women, and associated legal responsibility	Locally provided fans and water. Instructions on managing air flow and opening of windows. Flexible working.

Summary of potential impact (complete after scoring risks in table below)

Which buildings / space are at most risk?

Is the impact widespread or localised? Be quite specific if possible to help target necessary treatment.

Will the impact be occasional or regularly recurring?

Will the disruption be short term or more sustained?

Are stakeholders likely to tolerate the impact?

Suitability of any existing controls.

SEVERITY OF IMPACT	LIKELIHOOD OF IMPACT (CURRENT)	CURRENT RISK SCORE	HOW WILL CLIMATE CHANGE AFFECT THE HAZARD?	LIKELIHOOD OF IMPACT (2030s)	FUTURE RISK SCORE (2030s)	POTENTIAL ADAPTATION ACTIONS
2	2	4	More frequent and severe heatwaves	3	6	-

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