MANCHESTER CLIMATE CHANGE FRAMEWORK

(2020-25) | 2022 UPDATE

MANCHESTER CLIMATE CHANGE PARTNERSHIP

Produced by
MANCHESTER CLIMATE CHANGE AGENCY

4. ADAPTATION AND RESILIENCE

4. Adaptation & Resilience

To adapt the city's buildings, infrastructure, and natural environment to the changing climate and to increase the climate resilience of our residents and organisations.

Introduction

Bold action on climate change mitigation is vital, as described in the previous section of this update. However, the global and local climate is already changing, with many climate impacts already 'locked in'[181] and deemed irreversible, even under the most ambitious emissions reduction scenarios.

Climate change creates risks for our communities, buildings, critical infrastructure, wider economy, and natural environment; yet we do not fully understand the impacts we face at local level and so cannot plan and prioritise effective action.

The costs relating to climate disasters, such as flooding and wildfires, are unplanned and largely unaccounted for on most balance sheets in the public and private sector. We need to monetise the impact of climate change[182] to help incentivise action that builds resilience and avoids stranded assets.

To adapt well, a holistic approach must be taken, where measures that build resilience are integrated with actions that reduce emissions across all sectors, with particular focus on protecting the most vulnerable.

The climate is changing now

The latest evidence report[183] that feeds into the UK's Climate Change Risk Assessment[184] sets out the following observed changes to England's climate:

Average annual temperature:

- Increase of 0.9ºC from mid-1970s to mid-2010s

Annual mean rainfall:

- Increase of 4.5% from mid-1970s to mid-2010s

Sunshine:

- Increase of 9.2% from mid-1970s to mid-2010s

Weather extremes:

- UK-wide increase in extreme heat events
- Little evidence yet on changes in extreme rainfall

Sea level rise:

- UK-wide increase of ~1.4mm per year since 1901 (16cm to date)

In addition, the Climate Change Committee's (CCC) Independent Assessment of UK Climate Risk[185] identifies that:

- Global and UK average land temperatures have risen by around 1.2°C since the 1850-1900 period.
- Episodes of extreme heat are becoming more frequent, with the chance of a hot summer like 2018 now up to 25% per year, compared to less than 10% a few decades ago.
- 5.2 million homes and businesses are now at risk from flooding.

Future projections for the UK's climate,[186] as modelled by the UK Met Office, tell us to expect:

- Hotter, drier summers with +5.6°C summer mean daily temperature
- Warmer, wetter winters with +28% winter mean precipitation
- More frequent and intense weather events, including heatwaves and floods

The picture locally is the same, with climate changes being felt in Manchester and projected to increase and intensify:

- Flooding is Manchester's biggest climate risk:
  - Approximately 10,000 homes are at flood risk in Manchester[187]
  - Storm Christoph in January 2021 led to 3,000 properties across Didsbury and Northenden being evacuated[188]
  - In February 2022, the UK's Met Office named three major storms in one week for the first time
  - These events saw Manchester experience disruption to critical infrastructure services, including increased sewer flooding incidents[189]

Rising temperatures are an increasing risk for the city:

- July 2022 saw the highest maximum recorded temperature in Manchester at 38°C,[190] and the UK Met Office issued its first 'extreme heat' weather warning[191]

- Periods of water scarcity are projected to become more prevalent:
  - During 2018, 2020 and 2021 the North West experienced extremely hot, dry weather coupled with significantly increased demand for water over the summer,[192] leading to temporary use bans in Manchester

The evidence for the third UK Climate Change Risk Assessment (CCRA3) identified eight top risks for England[193] based on the urgency of additional action, the gap in adaptation planning across the UK, imminent opportunities for integrating adaptation action into upcoming major policy commitments, and the opportunity to avoid lock in where major developments are taking place now. These are:

- Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards.
- Risks to soil health from increased flooding and drought.
- Risks to natural carbon stores and sequestration from multiple hazards, leading to increased emissions.
- Risks to crops, livestock and commercial trees from multiple climate hazards.
- Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks.
- Risks to people and the economy from climate-related failure of the power system.
- Risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings.
- Multiple risks to the UK from climate change impacts overseas.

The Climate Change Committee's progress report[194] to Parliament in 2022 also raised the increasing need for adaptation action across the UK economy and key sectors, and urges the Government to:

- Take urgent steps to ensure the UK is ready for our changing climate
- Demonstrate how the top eight priority risks are being addressed
- Set out how adaptation is being integrated into policy across all departments
- Develop a detailed monitoring and evaluation framework

Green infrastructure and nature-based solutions

Green infrastructure (GI) and nature-based solutions (NBS) are identified as one of six priority areas in Manchester's Climate Change Framework.

The city's green infrastructure includes our public green spaces, parks, gardens, trees and woodlands, rivers, canals and lakes, growing spaces, green roofs and green walls, and sustainable urban drainage systems, for example ponds, rain gardens, ditches and swales.

The term nature-based solutions refers to the sustainable management and use of natural features and processes to tackle challenges such as climate change, water pollution, biodiversity loss, and disaster risk management.

GI and NBS have an essential role to play in helping Manchester to meet its climate change objectives, both adapting the city to the changing climate (by helping to manage flood risk and heat stress) and helping to reduce our CO_2 emissions (to stay within our carbon budget we need to become a net remover of carbon).

They are addressed within this section of the Update as they are a critical part of helping the city to adapt to climate change and build resilience to extreme weather events.

In order to adapt

We need to **understand our exposure to climate change risk** and make detailed plans that support all our residents, all parts of our city, its economy and natural environment to adapt.

This includes prioritising action to ensure our **critical infrastructure is resilient** to climate change and ensuring our most **vulnerable communities are protected**.

We need to ensure all the investments we make are resilient to climate change and we need to develop innovative models to **unlock new private investment** for adaptation.

Update on research and initiatives

Since publication of the Framework, Manchester Metropolitan University, Manchester Climate Change Agency (MCCA) and members of Manchester Climate Change Partnership's (MCCP) Adaptation and Resilience Advisory Group[195] have collaborated on the following research and initiatives:

Manchester's climate risk: a framework for understanding hazards & vulnerability[196]

This work identifies the key weather-related hazards in Manchester and how these will be amplified by climate change.

It sets out the direct impacts these hazards are likely to have on the city's people, communities, health, energy consumption, water supply, buildings, economic activity, transport and other critical infrastructure, and natural environment.

In doing so, it establishes a structure to support a comprehensive assessment of the city's vulnerabilities to climate change and an evaluation of our capacity to respond to these threats.

It recognises that we must intensify our collective effort to understand the complex interactive implications of a changing climate, in order that we can prioritise where adaptation action will have the most benefit and calls for a comprehensive risk assessment to be carried out at city-scale.

Manchester Climate Ready: risk, resilience, and adaptation[197]

This work outlines the global to local policy drivers on climate adaptation, proposes a broad vision for progressive climate resilience in Manchester, identifies the key characteristics of such a resilient city, and seven principles to guide both ambition and practical action.

It sets out the following vision for a climate resilient Manchester:

Our vision for a more climate resilient Manchester will enhance the capacity of the entire city – our buildings, infrastructure, green and blue space, businesses, and people – to adapt to future climate shocks and stresses.

Our pursuit of climate resilience will be aligned with other progressive agendas that aspire to create a healthier, happier, and a more socially just city, and to produce sustainable, inclusive, and green economic growth.

The work also details a series of characteristics of a climate resilient city; where action reduces the systemic causes of vulnerability; is pursued by the whole of society; is informed by a comprehensive assessment of climate risk; takes account of future risk; targets interventions toward those most in need; ensures a legacy of climate resilience; avoids unintended adverse consequences ('maladaptation') and 'lock-in' to decisions; delivers adaptation measures beyond the city's boundaries; and capitalises on the co-benefits of climate adaptation interventions.

It identifies seven principles to catalyse coherent action and to assess progress:

1. Enhance leadership and strategic capacity to pursue progressive resilience and adaptation action across the city.
2. Develop detailed understanding of the implications of, and vulnerabilities to, exposure to climate change.
3. Embed progressive climate resilience ambition and action across the city, including governance, policy, and practice.
4. Enable individuals, communities, service providers and businesses to adopt and integrate adaptation measures.
5. Embed and enhance green and blue infrastructure to support climate resilience and adaptation.
6. Ensure our urban environment, including buildings and urban infrastructure, is climate resilient.
7. Encourage research, innovation, and reflective practice to support our progress in creating a more resilient Manchester.

The work also identifies specific actions against each of these principles for different stakeholders to follow.

Manchester Climate Ready (MCR) website[198]

To help bring action to life, a range of examples of adaptation measures will be published from members of the Manchester Climate Change Partnership.

MCCA is also working with:

The Met Office on:

- A City Pack[199] to forecast climate projections at local level and to highlight the importance of addressing climate risk.
- A heat mapping tool to give the city a better understanding of its exposure and vulnerability to heat over time.

The University of Exeter on:

- A Local Climate Adaptation Tool[200] (LCAT) that is intended to recommend adaptation action that will support improvements in health and wellbeing.

Other policy drivers and enablers

While this Update is setting ambitious targets for action, there are a range of related policies at local, regional, and national level that are driving and enabling change of a similar magnitude and pace, including:

- Manchester's Green and Blue infrastructure strategy refresh[201] embeds the role of our natural environment in supporting climate resilience and adaptation.
- Greater Manchester's Strategic Flood Risk Assessment[202] provides a framework for flood risk management across the city-region, including identification of key strategic flood risks plus existing and planned interventions.
- Greater Manchester Resilience Strategy 2020-30[203] sets out the vision for a resilient Greater Manchester; the Greater Manchester 5-Year Environment Plan[204] includes a priority to ensure 'our resilience and adaptation to climate change'; and Places for Everyone[205] refers to climate resilience and adaptation throughout.
- The Climate Change Act (2008)[206] provides a framework for mitigating and adapting to climate change. It requires the completion of a five-yearly Climate Change Risk Assessment (CCRA),[207] with a National Adaptation Programme establishing how risks will be addressed. Additionally, the Act provides an 'Adaptation Reporting Power' requiring public bodies and infrastructure operators providing key services to report actions being taken to address climate impacts.
- The Glasgow Climate Pact emphasises the urgency of scaling up climate adaptation through local, regional, and national planning.[208]
- The Environment Agency's Flood and Coastal Erosion Risk Management Strategy[209] and Strategy Action Plan[210] sets out how they will deliver a £5.2 billion capital investment programme allocated to flooding and coastal erosion by 2027.[211]
- The UK Infrastructure Bank's Strategic Plan[212] sets out how it will explore projects that make the UK's infrastructure more resilient to climate change and better adapted to future risks – including the impact of climate change on financial assets.
- The Bank of England published its first climate stress tests in 2022,[213] highlighting the need for UK banks and insurers to act on climate change to avoid climate-related losses.
- Greening Finance: A Roadmap to Sustainable Investing[214] is suggesting that mandatory requirements to the pension and investment sectors, to assess and disclose climate risk on portfolios, will help shift financial flows to align with a net-zero, nature-positive economy.
- The Government's green taxonomy[215] will help to tackle greenwashing by providing a framework for sustainable financial disclosure.

Challenges

There are significant economic, technical, institutional, societal, and regulatory challenges in transitioning to a zero carbon, climate resilient city, including:

- There are limitations in information and awareness of climate risk and a lack of clarity on ownership of risk management and response.
- DEFRA's survey What does a well-adapted England look like?[216] found that people in Greater Manchester need more information on the risks associated with climate change and the type of actions they can take. This lack of awareness applies across sectors.[217]
- Quantifying the risks and costs associated with climate change is in its infancy with gaps in standardised data and reporting. This makes it difficult to quantify the benefit of adaptation and resilience measures which would incentivise action.
- A future with a changing climate contains innate uncertainty and makes adaptation complex in terms of planning, setting targets for and catalysing action. This particularly impacts on private investment into adaptation, which are costly and resource intensive, and need confidence in climate risk modelling[218] to unlock.
- Currently, the largest share of investment into resilience goes into the post event- emergency response and recovery, much of which is held by the public sector.[219] This needs to be expanded to include de-risking investment to attract private finance.[220]
- Adaptation measures can take time to plan and implement, especially for infrastructure and nature-based solutions, which means change has to happen quickly to avoid 'lock-in' to high levels of risk in 2050 and beyond.[221]
- Adaptation metrics are essential for tracking progress[222] but current data and tools are partial and fragmented[223] which makes benefits difficult to assess.
- Future Homes Standards and building regulations[224] are not proposing to cover climate adaptation measures within new and existing buildings, focusing only on reducing greenhouse gas emissions.

Co-benefits of action

The systemic transitions required within cities are complex and interlinking. This creates challenges but also means that action to increase our resilience to climate change can deliver additional benefits to reducing our emissions, improving the health and wellbeing of our communities, and delivering an inclusive and sustainable economy.

Staying within our carbon budget

- Nature-based solutions that build resilience to climate change can also deliver zero carbon benefits in the form of carbon sequestration.
- Without consideration of the future weather and climate conditions, aspects of the UK's transition to zero carbon are at risk of failure.[225]

Health and wellbeing

- Adaptation and resilience that is targeted through a comprehensive risk assessment will deliver benefits to those communities most at risk, including from heat stress, flooding and extreme weather events.
- Nature-based solutions that build resilience can also provide access to good quality green space, which supports health and wellbeing and enhances quality of life.
- Increased tree coverage in urban areas can help to mitigate extreme heat and therefore reduce the associated health impacts.

Inclusive, zero carbon and climate resilient economy

- Action to build climate resilience helps to grow the green technology and services sector, which brings growth and job opportunities for Manchester, especially in sectors such as construction, water, infrastructure, and nature conservation.[226]
- Businesses that have adapted to climate change and built resilience will be less likely to experience disruption and the costs associated with this.
- Investing in resilience is good for business[227] with estimates indicating cost-benefit ratios up to 1:10. Recent research[228] shows that this topic is high on the agendas of CEOs with 79% adjusting supply chains to reduce risk.

Examples of good practice

Although the challenges are great in transitioning to a zero carbon, climate resilient city, there are many examples of good practice within Manchester, the wider city-region and across the UK, including:

- Northern Gateway development:[229] now called Victoria North,[230] on the River Irk, is investing over £16m into flood mitigation and river works alongside major enhancements to the existing green spaces.
- Mayfield development:[231] will include a new multifunctional city park that provides recreation space, manages flood water, and increases biodiversity.
- Manchester City Council's Climate Change Action Plan[232] has set a target of net 1,000 new trees, 1,000 new hedge trees and four community orchards a year on known schemes on public or partner land.
- Manchester City Council's Highways team are integrating Sustainable Urban Drainage (SuDS) into schemes such as 'Glade of Light' Manchester Memorial Gardens to treat and attenuate flows before discharging into the nearby River Irwell.
- The GrowGreen[233] project has delivered a new community 'sponge park' in West Gorton, which demonstrates how nature-based solutions such as swales, bio-retention tree pits, rain gardens and permeable paving can be used to address climate issues like surface water flooding.
- Manchester is a signatory to the Edinburgh Declaration on post-2020 global biodiversity framework,[234] which tackles the twin challenges of climate change and biodiversity loss by integrating nature-based solutions into city planning.
- The Greater Manchester Environment Fund[235] is bringing together public, private, and philanthropic funders to tackle urgent environmental challenges facing the city region.
- The IGNITION[236] project is exploring innovative funding and delivery mechanisms to increase Greater Manchester's green infrastructure over the next two decades.
- Greater Manchester is part of both the Resilient Cities Network[237] and the UNDRR's Making Cities Resilient 2030 (MCR2030) programme.[238] It has been recognised as a MCR2030 Resilience Hub[239] and is working to enhance city-to-city collaboration and inspire other communities to reduce risk and build resilience.
- The Business of Resilience programme[240] is an industry-led taskforce working to identify current strengths and future international opportunities for the UK's resilience industry.
- The Coalition for Climate Resilient Investment[241] develops and pilots practical tools, solutions, and financial instruments to support a more efficient integration of physical climate risks in investment decision-making.
- Financing Nature Recovery UK[242] outlines a new roadmap to unlock barriers and deliver high-integrity environmental markets that drive private investment and nature recovery across the UK.
- The Race to Resilience,[243] is a UN-backed global campaign to catalyse a step-change in ambition for climate resilience, putting people and nature first in pursuit of a resilient world where we don't just survive climate shocks and stresses, but thrive in spite of them.

Recommended actions

To achieve our climate goals, action needs to be taken urgently and by everyone – by government at local and national level, by institutions and organisations in the public, private and voluntary sector, and by residents and communities across the city.

These recommended actions have been co-designed with stakeholders across the city to provide clear guidance to all sectors on how they can play their full part in tackling the climate crisis. They should all be read in the context of the need for urgent action at scale.

Adaptation

To be delivered locally, where direct control lies in Manchester:

1. Manchester should set a **high level ambition for adaptation** to mirror the city's target to reach zero carbon by 2038.
2. Manchester City Council (MCC) to lead a **detailed climate risk and vulnerability assessment** of the city and produce an **adaptation plan**, directing priority action towards increasing the resilience of our critical infrastructure and most vulnerable communities, and ensuring that nature-based solutions are given sufficient time to develop their adaptive services.
3. MCC to ensure that its **planning, housing, and infrastructure policies and project appraisal** incorporate climate adaptation and resilience, in line with Green Book standards, including through deployment of nature-based solutions, to avoid increasing exposure to risk through capital expenditure and new developments.
4. MCC and Greater Manchester Resilience Forum to assess the current and predicted future costs of damage caused by climate change and extreme weather events to the city's critical infrastructure, residents and local economy, to support the **business case for increased investment in adaptation** and resilience measures.
5. MCC to ensure capital expenditure is made resilient to climate change and to help develop innovate ways to **unlock private capital investment** into adaptation and resilience.
6. Public sector organisations to **transparently report** on what they are doing to mitigate the risks of climate change to their services and how these risks are being governed, in line with TCFD[244] reporting standards.
7. **Manchester Climate Change Partnership** (MCCP) to work collaboratively on assessing climate risks and building resilience, both at organisational level and through value chains, sharing learning with wider partners.
8. Manchester Climate Change Agency (MCCA) to work with local partners to explore ways to **raise awareness of climate risk to communities**.

Adaptation

To work on at city-region level, with Greater Manchester partners:

9. **Greater Manchester Pension Fund** to actively work towards a greater percentage of its investment portfolio being divested from fossil fuels and defined as environmentally sustainable and climate resilient, as set out in the UK Green Taxonomy.[245]
10. Greater Manchester Combined Authority (GMCA) to engage with the National Infrastructure Commission to explore the early adoption of **national resilience standards**.

Recommended actions

Adaptation

To advocate for national government to do:

11. Set a **high level ambition for adaptation** to mirror the UK's target to reach net zero by 2050 as called for by the Climate Change Committee.[246]
12. Set out a **National Resilience Strategy** to focus on the UK's ability to anticipate, assess, prevent, mitigate, respond to, and recover from known, unknown, direct, indirect, and emerging climate risks.[247]
13. Strengthen the ownership and accountability of the cross-Whitehall **National Adaptation Strategy** to drive adaptation principles across government policy and strategy.
14. Ensure climate resilience is factored into all **public capital spending**, including the National Infrastructure and Construction pipeline of £650 billion investment by 2030.[248]
15. Develop national **adaptation and resilience infrastructure standards** as called for by the National Infrastructure Commissions report: 'Anticipate, React, Respond'.[249]
16. Use the **Green Finance Strategy** to set the frameworks for more integration of investment into measures for resilience, emission reduction and nature restoration.
17. Develop more **localised climate risk and vulnerability data** to guide investment and decision-making, as recommended by The World Bank report.[250]
18. Require infrastructure operators to develop and maintain long term **resilience strategies** that meet resilience standards.[251]
19. Put in place longer term support to continue the work of **Flood Re**,[252] a joint initiative between the Government and insurers, making flood cover part of household insurance policies more affordable.
20. **Expand mandatory TCFD**[253] reporting to the public sector.[254]
21. Make **TNFD reporting**[255] **mandatory** for both the public and private sector once published.

Adaptation

To do differently, where there are opportunities to innovate:

22. HM Treasury to commission a review on the **economics of climate resilience** to better understand the costs and benefits, and drive smarter public-private investment into adaptation.[256]
23. HM Treasury to develop an **Environmental Investment Tax Relief** to incentivise investment into environmental outcomes including adaptation and resilience.
24. Advocate for national action to support the **Commission for Climate Resilient Infrastructure's** call for physical climate risks to be systemically integrated into infrastructure project appraisal and spending by 2025.[257]

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