

Manchester

Climate Change Strategy 2017-50

CONTENTS

EXECUTIVE SUMMARY

FOREWORD BY GAVIN ELLIOTT, CHAIR, MANCHESTER CLIMATE CHANGE AGENCY

1. INTRODUCTION AND CONTEXT

2. OUR PLATFORM FOR SUCCESS

3. OUR VISION AND OBJECTIVES

3.1 VISION

3.2 OBJECTIVES

- SUSTAINABLE ECONOMY AND JOBS
- HEALTHY COMMUNITIES
- RESILIENCE TO CLIMATE CHANGE
- ZERO CARBON
- CULTURE CHANGE

4. OUR COLLECTIVE ACTION

4.1 INTRODUCTION

4.2 ENABLING ACTIONS

4.3 THEMATIC ACTIONS

4.4 5-YEAR IMPLEMENTATION PLANS AND CARBON BUDGETS

4.5 ACTION BY ALL STAKEHOLDERS

5. GOVERNANCE

6. FUNDING

7. MEASURING AND REPORTING PROGRESS

8. UPDATING OUR STRATEGY

9. FURTHER INFORMATION



EXECUTIVE SUMMARY

INTRODUCTION AND CONTEXT

The Paris Agreement marks a critical turning point in the relationship between the global economy, society and the natural environment that we depend upon for our prosperity and wellbeing. As we move towards 70% of the world's population living in urban areas by 2050, cities will increasingly be the places where this shift happens.

Like many times before, Manchester aims to help shape this latest global shift. This climate change strategy sits as a key part of the overarching policy framework of *Our Manchester*, the city's strategy for 2016-25. As with *Our Manchester*, this strategy's development and implementation is similarly devolved, so that all city stakeholders have a say and role in its ongoing development and delivery.

Over 700 people and organisations responded to the strategy's public consultation during July to October 2016. 97% of respondents believe it is important for Manchester to take action on climate change. 85% of respondents felt that the commitment to become zero carbon by 2050 is the right target, versus 6% who felt that this target is not ambitious enough. However, further analysis of the responses reveals that of those submitting more detailed responses, including those submitting information on the latest developments in international science and policy, 35% felt that zero carbon by 2050 was the right target; versus 24% who stated that a more ambitious target was needed. There is a developing body of scientific evidence that supports this latter view, setting out that decarbonisation by as early as 2030-40 may be the required target for developed countries that want to play their full part in meeting the Paris Agreement targets. And that 1.5°C, rather than the less-well defined 'well below 2°C' is the correct upper limit for global average increases.

However, this current debate does not prevent us from continuing on our climate change journey. Whether 2030, 2040 or 2050, 1.5°C or well below 2°C, all potential scenarios will require Manchester to make rapid progress towards becoming a zero carbon, climate resilient city.

As we embark on this journey we need to recognise that it will be challenging, that there aren't any 'silver bullets', and that it will require the whole city – all residents and organisations – to transition through a process of major change. This transition will also need to be supported and enabled by the right Greater Manchester and UK Government policies. It will challenge existing ways of working and thinking and, to be successful, will need to have collaboration and positivity as its core principles. Organisations and individuals will require support to adopt new lifestyles and operations, not criticism for practices that were appropriate and accepted in a pre-Paris era.

OUR PLATFORM FOR SUCCESS

Since the launch of Manchester's climate change strategy for 2010-20, a broad range of activities have been delivered. However, despite the many good areas of progress, they have not been scaled up at the rate needed in order to meet our original 2020 targets and to provide a strong platform to meet the longer-term and even more ambitious objectives in this strategy.

Based on the city's climate change progress to date, the views stakeholders expressed during the public consultation on *Our Manchester*, the Paris Agreement and the need for cities to play their part in global decarbonisation by 2050, in 2015 it became clear that Manchester should look to develop a new climate change strategy, to replace the strategy for 2010-20.

OUR VISION AND OBJECTIVES

Vision 2050

Manchester is playing its full part in limiting the impacts of climate change, locally and globally. It is a thriving, zero carbon, zero waste, climate resilient city where all our residents, public, private and third sector organisations are actively contributing to and benefiting from the city's success.

We compete and collaborate with cities around the world, ensuring that our collective efforts have limited global average temperature increases to well below 2°C, hopefully to 1.5°C, relative to pre-industrial levels.

Objectives:

- **Sustainable economy and jobs** – action on climate change will become an increasingly important part of the city's sustainable, dynamic and competitive economy. Manchester-based businesses and universities will be playing a strong and growing role in delivering solutions locally and to cities around the world. The city's businesses will have access to a rich pool of Carbon Literate local talent, fed by our world-class universities, and our excellent schools and colleges. All Manchester businesses will save money and improve their performance by increasing their energy and resource efficiency. Businesses, workers and visitors will come from around the world to experience our liveable, resilient, green city.
- **Healthy communities** – Manchester's residents will lead increasingly healthy lifestyles that are underpinned by access to high quality parks and green spaces, clean air, healthy local food, safe walking and cycling routes, energy efficient homes, affordable supplies of energy and an understanding of how they can help to reduce local flood risk and exposure to heat stress.
- **Resilience to a changing climate** – the city's communities, public sector, businesses and third sector will become increasingly resilient to the changing climate.
- **Zero carbon** – Manchester will adopt and stay within a scientifically robust carbon budget that is consistent with the Paris Agreement to limit global average temperature increases to well below 2°C, ultimately resulting in Manchester becoming a zero carbon city by 2050. Manchester's carbon budget, pathway and timescales for becoming zero carbon will be kept under ongoing review and be subject to revision, to ensure that the city plays its full role as part of the Paris Agreement.
- **Culture change** – climate-positive and climate resilient decision-making and behaviours will become progressively incentivised and embedded within the lifestyles and business operations of the city, helping lead to practical actions that reduce the city's CO₂ emissions and increase our climate resilience.

OUR COLLECTIVE ACTION

'Enabling actions' and 'thematic actions' set out the key areas where action is needed in order to achieve our vision and objectives. For each area, details of the specific strategic actions that need to be delivered within a given five-year period will be set out in the strategy's latest implementation plan. In combination with the strategic actions set out in implementation plans, all stakeholders in the city will also have a role to play. In addition to concerted action within Manchester, supportive GMCA and UK Government policies will be required to enable us to fully achieve our objectives.

Enabling actions:

- Education and engagement
- Investing in our young people
- Innovation, investment and business growth
- Enabling and incentivising institutional investment
- Supporting our businesses
- Spatial planning, development and infrastructure investment
- Joined-up public services
- Resident-led solutions and the voluntary and community sector
- Digital technologies and data
- Working with the Greater Manchester Combined Authority, UK Government and Devolution

Thematic actions:

- **Buildings:** very low and zero carbon existing and new buildings
- **Energy:** supplied by 100% clean energy by 2050
- **Transport:** decarbonising our local transport system by 2050 and managing Manchester Airport's CO₂ emissions as part of an international scheme
- **Resources and waste:** zero waste by 2050
- **Food:** sustainable food production and consumption
- **Green spaces and waterways:** for climate resilience and carbon sequestration

GOVERNANCE

Our Manchester Forum: working on behalf of the city, the Our Manchester Forum has responsibility for high-level oversight of the city's climate change commitments, as part of its role in overseeing the full suite of commitments in the *Our Manchester* strategy.

Manchester Climate Change Agency: Manchester Climate Change Agency is responsible for focusing specifically on *Our Manchester's* climate change commitments. The Agency's role is to oversee, champion, coordinate and facilitate the delivery of this strategy.

Partnerships, groups and networks: existing partnerships, groups and networks already play a key role in scaling-up action on climate change in Manchester.

Leadership: across all sectors and all communities, leaders will need to inspire and help drive action. Political leadership will be an important but not the only type of leadership we will need to see.

FUNDING

Funding will need to come from a range of different sources: private sector; individuals and communities, and; public sector.

MEASURING AND REPORTING PROGRESS

Manchester Climate Change Agency will publish an annual report that sets out the city's progress against the strategy's objectives, progress in the delivery of the latest implementation plan, and areas where new activities are needed to ensure we remain on track to meet our objectives. Ongoing reports and news stories will be published at:

www.manchesterclimate.com

UPDATING OUR STRATEGY

This first version of Manchester's Climate Change Strategy 2017-50 is being published at a time when ongoing developments in international policy and science makes it difficult to set clear commitments and plans for Manchester. This strategy has therefore taken the latest information we have available and used it to develop our first step towards Manchester becoming a zero carbon, climate resilient city.

Actions set out in the Implementation Plan 2017-22 will help us to define our next steps, for the period 2023-27, at the same time as taking practical action. This version of the strategy has been written with a view to being refreshed prior to the development of the Implementation Plan for 2023-27. The intention is that this refresh will include a carbon budget for Manchester, which is consistent with the Paris Agreement, and which includes a pathway and timescale for expending this budget.

FURTHER INFORMATION

Further information is available from:
www.manchesterclimate.com.

Contact Manchester Climate Change Agency at:
info@manchesterclimate.com.



**FOR A GREEN
AND HEALTHY
MANCHESTER**

FOREWORD

by Gavin Elliott, Chair, Manchester Climate Change Agency

In the Paris Agreement, we now have, for the first time in our history, universal recognition from national Governments that climate change is happening, and that it poses the most severe threat to the prosperity and wellbeing of current and future generations, in all countries of the world.

The Agreement also recognises two further things. Firstly, that in responding to the severe risks of climate change, there are also great opportunities. Investing in clean, renewable energy technologies, shifting to a circular economy, protecting the natural environment, and many other agreed facets of global climate change action will also yield significant social, economic and environmental benefits.

And secondly, as the world becomes increasingly urbanised, cities will be key drivers of this shift to a decarbonised, climate resilient world.

In Manchester, we also share these views. Action on climate change needs to be at the heart of our plans and actions over the coming decades if we are to be home to residents leading happy and healthy lives, and businesses enjoying success as part of a global low carbon economy.

The city's overarching strategy and policy framework for 2016-25, *Our Manchester*, provides us with a good place to start. It was developed in 2015 to set out the city's vision and priorities for the coming decade, using as its key inputs the views of those who know Manchester best, the city's residents, public, private and third sector organisations. "A carbon neutral city", "green industry powerhouse", "the cleanest air", "economically and environmentally sustainable", "a world leader in urban sustainability and environmental regeneration", were among the 2,500 responses to the question, "what's your dream Manchester?". This adds well to the views that were expressed in 2009, when stakeholders from across the city came together to produce Manchester's first climate change strategy, *Manchester: A Certain Future – our collective action on climate change*.

As a result, over a quarter of the commitments in *Our Manchester*, 17 out of the 65, relate directly to acting on climate change and improving the environment. Of the other 48, almost all can support and be supported by reducing our CO₂ emissions and becoming more

resilient to the changing climate. Educating our young people to help them act on climate change, combined with growing the city's low carbon and environmental sector will help to 'create new jobs [that are] accessible to Manchester residents, reducing the number of people who are out of work'. Making walking and cycling the travel modes of choice, improving air quality, providing access to high quality green spaces will all help to 'collectively improve our health and wellbeing and be more active as adults and children'. There are many more examples, all of which demonstrate that an integrated approach to the next phase of the city's development is key to our social, economic and environmental success.

Building on these commitments, Manchester Climate Change Agency has facilitated the development of this strategy. As with Manchester's previous climate change strategy, our intention has been to bring together the views of the city at large and use them as the basis of this document. We have been helped enormously in this task by the many partners who have helped to promote the development of the strategy and encouraged their networks, partners and customers to participate. And most importantly the development of this strategy has only been possible thanks to the hundreds of people that shared their views as part of the consultation. A big thank you to all of those that contributed.

The last twelve-months have demonstrated what a turbulent and uncertain place the world can be. However, it has also demonstrated what can be achieved if different parties work together towards a common goal. In the Paris Agreement we all now have a common goal to act on climate change. Over the short, medium and long-term, every community and business on the planet stands to benefit from the transition to a decarbonised and climate resilient world. This strategy is Manchester's commitment to playing our full part in this transition. Ensuring that by working together, all residents and businesses in Manchester will prosper on our challenging but exciting journey to become a zero carbon, climate resilient city.

On behalf of the City of Manchester.

Gavin Elliott

Chair, Manchester Climate Change Agency

December 2016

1. INTRODUCTION AND CONTEXT

GLOBAL COMMITMENT

Global average CO₂ concentrations are now at over 400 parts per million, rainfall and floods that were originally expected only once every 100 hundred years have hit towns and cities two, three and more times over the last decade, and we have seen historical temperature records broken for 15 of the last 16 years. We now have clear and unequivocal evidence from all corners of the globe that the climate is changing. The weight of this evidence, the overwhelming scientific consensus, the popular mandate from citizens around the world, business support, and the political commitment to act has now finally led us to start building the level of global response that is necessary.

In December 2015, at the 21st meeting of the United Nations Conference of the Parties (COP21), national governments reached a landmark agreement to address the causes and effects of global climate change. Underpinned by this agreement, the 21st century will see a critical turning point in the relationship between the global economy, society and the natural environment that we depend upon for our prosperity and wellbeing. Success will mean global average temperature increases limited to well below 2°C, hopefully to 1.5°C, relative to pre-industrial levels.

As we move towards 70% of the world's population living in urban areas by 2050, cities will increasingly be the places where this shift happens. Whilst broadly shaped by global macro policies and trends, fundamentally cities will need to chart their own course in the world. Those cities that prosper over the coming decades will be those that develop and champion new models of low carbon, climate resilient growth. The choice is not between a low carbon future and growth, the choice is about how to develop an integrated city strategy that creates jobs and economic success, attracts investment, improves social wellbeing and health, at the same time as reversing global environmental impact.

LOCAL COMMITMENT

Like many times before, Manchester aims to help shape this latest global shift. Competing with other global cities, collaborating, and ensuring that developments and approaches adopted in Manchester can be exported around the world for the benefit of our local economy, other cities, and the global environment.

We were the birthplace of the industrial revolution, we are a world-leading test-bed for science and innovation, a magnet for ambitious investors and workers, and a city known for our world-class sporting, cultural, and heritage attractions. What we do here in Manchester helps shape the world. Like those cities we compete and collaborate with, Manchester continues to draw people and businesses from around the world to share in our history and play their part in our future.

To be successful in the 21st century we will need to continue to build on this platform. Partnerships between the public and private sector will need to continue to drive investment and innovation, our universities will need to ensure their research continues to identify solutions to the challenges and opportunities the world faces, and our residents will need to continue to shape their own lives for the better, seeking fulfilled, happy, health lives as part of the city's diverse communities. This is the vision set out in *Our Manchester*, the city's strategy for 2016-25.

Our Manchester also contains the city's high-level commitment on climate change:

'Manchester will play its full part in limiting the impacts of climate change... and by 2025 will be on a path to being a zero carbon city by 2050'.

Throughout this document you will see regular references to the climate change and environmental commitments in *Our Manchester*, to make it clear why and how this strategy will ensure they are delivered.

Our Manchester is also significant in that it marks a key milestone on the city's devolution journey. It was developed through a devolved approach to citywide policy development, one which invited all residents and organisations to actively participate in defining Manchester's plans for the future.

This climate change strategy sits as a key part of the overarching *Our Manchester* policy framework. As with *Our Manchester*, this strategy's development and implementation is similarly devolved. Over 700 people and organisations responded to the public consultation during July to October 2016 to help shape the city's plans for action on climate change.

The views expressed during this period are telling of both the city's commitment to climate change and how quickly global climate science and policy is developing. 97% of respondents expressed that they believe it is important for Manchester to take action on climate change. 85% of respondents felt that the commitment to become zero carbon by 2050 is the right target, versus 6% who felt that this target is not ambitious enough. However, further analysis of the responses reveals that of those submitting more detailed responses, online and by email, including those submitting information on the latest developments in international science and policy, 35% felt that zero carbon by 2050 was the right target; versus 24% who stated that a more ambitious target was needed to be consistent with our ambitions to 'play our full part in limiting the impacts of climate change'. There is a developing body of scientific evidence that supports this latter view, setting out that decarbonisation by as early as 2030-40 may be the required target for developed countries that want to play their full part in meeting the Paris Agreement targets. And that 1.5°C, rather than the less-well defined 'well below 2°C' is the correct upper limit for global average increases.

The international consensus on 2030, 2040 or 2050 for developed countries, and 1.5°C versus 'well below 2°C' will help define what it means for Manchester to 'play our full part'. However, these discussions and translation into formal international policy will take time. This strategy therefore sets out high-level options that take account of potential future international climate change policy scenarios. Selecting the correct option will only be possible once we have clarity on the international policy framework.

However, this does not prevent us from continuing on our climate change journey. Whether 2030, 2040 or 2050, 1.5°C or well below 2°C, all potential scenarios will require Manchester to build on the progress made in the delivery of our first climate change strategy, *Manchester: A Certain Future*, and to make rapid progress towards decarbonising our energy supplies, decarbonising our local transport system, and establishing a zero waste, circular economy. And as the climate in Manchester continues to change, decisive action to increase our climate resilience needn't be defined by the outcome of international agreements. By continuing with action across all these areas, the city's communities, businesses, public sector, and natural environment all stand to receive major benefits, in addition to those already secured from work to date. This strategy therefore

marks the next step on our journey, accompanied by a more detailed route for our first six years, the Implementation Plan for 2017-22, including work during 2017 to define our carbon budget, pathway and timescales for its expenditure.

LOCAL ACTION

This strategy is, of course, driven by climate change objectives, ensuring we play our part in meeting national and international targets. But it is not a traditional city climate change strategy. It is also equally driven by our ambitions for economic success, job creation and prosperity, by the need to ensure that our residents can share in that success, and that they can enjoy the kind of health and wellbeing that should be expected in a sustainable, liveable city of the future.

As well as benefiting in the short-term, this strategy also provides us with the time required to bring about the level of physical and cultural change that is only possible over the medium and long-term. These changes will be significant and will require major partnership-based programmes of work, combined with climate informed decisions becoming embedded in residents' everyday lives and our organisations' ongoing activities.

WORKING TOGETHER

We believe that Manchester is one of the first cities in the world to make the commitment to become zero carbon by 2050. It is an ambitious, challenging commitment but one which, based on what we know today, we believe is the right one to ensure that we make our full contribution to the successful implementation of the Paris Agreement.

As we embark on this journey we need to recognise that it will be challenging, that there aren't any 'silver bullets', and that it will require the whole city – all residents and organisations – to transition through a process of major change. This transition will also need to be supported and enabled by the right Greater Manchester and UK Government policies. It will challenge existing ways of working and thinking and, to be successful, will need to have collaboration and positivity as its core principles. Organisations and individuals will require support to adopt new lifestyles and operations, not criticism for practices that were appropriate and accepted in a pre-Paris era. This strategy marks the city's collective commitment on climate change. It also provides a platform for our collective action, to underpin a shared mission for good jobs, a successful economy, happy, healthy lives, a flourishing natural environment, and the knowledge that we are making our full contribution as part of a global effort on climate change.

2. OUR PLATFORM FOR SUCCESS

PROGRESS 2010-16

In 2009 stakeholders from across the city came together to produce Manchester's first ever climate change strategy. Produced with the involvement of over 100 organisations and 200 individuals, the strategy, *Manchester: A Certain Future*, represented the city's collective commitment to take action on climate change during 2010-20. Since the strategy's launch, a broad range of activities have been delivered to move the city towards achieving its climate change goals.

Working to simultaneously play their parts in the city's growth and decarbonisation, many organisations have pioneered innovative new approaches to business-led low carbon development. Manchester Metropolitan University's 'zero carbon, zero waste' Birley Fields campus, Manchester City Football Academy and its low carbon energy system, Whitworth Art Gallery's energy efficient extension and refurbishment, and the Co-operative Group's BREEAM 'Outstanding' development at One Angel Square are among the many initiatives already contributing to the city's low carbon growth.

Community-led activities focussing on household energy efficiency, community greening and food growing have continued to expand across the city. Often delivered with support from the city's leading environmental organisations, these activities have also led to new skills and jobs for residents, improved social cohesion and better health outcomes, alongside the achievement of local environmental benefits.

As one of the first sectors to respond to *Manchester: A Certain Future*, the arts and culture sector and its 'Manchester Arts Sustainability Team' (MAST) has provided a clear example of what can be achieved through strong commitment, collaborative working and best practice sharing. Established in 2010 the MAST membership has grown over the last six years to enable organisations large and small to work together on their journey to save carbon and money through reducing energy, water and waste.

In the Corridor the City Council, the two Manchester universities, Central Manchester Hospital and Bruntwood have integrated low carbon and environmental priorities as part of the Corridor Partnership's strategic vision to 2025. This has already led to the partners being awarded a share of the €25m Triangulum project to transform the Corridor into a smart district and £10m as the UK 'Internet of Things' demonstrator, using smart technologies to deliver social, environmental and economic benefits. Underpinned by world class research and teaching, the Corridor also provides the platform for further cutting edge developments over the life of this strategy.

The award-winning Carbon Literacy Project – a world-first approach, created in Manchester – was recognised at COP21 as one of 100 globally significant 'Transformative Action Projects'. The award puts Carbon Literacy forward as an innovative means of engaging and inspiring people to act and recognises that, if rolled out at scale, it can make a material difference to how climate change is tackled around the world.

However, despite the many good areas of progress, they have not been scaled up at the rate needed. *The Manchester: A Certain Future Annual Report 2016* sets out that the city's CO₂ emissions are reducing, but currently only projected to reduce by 32% by 2020, against a 41% target (from the 2005 baseline). Of the key organisations working across Manchester that were reviewed in 2015, only 68% included actions on adapting and preparing their businesses for the changing climate as part of their business plans and strategies. The carbon intensity of the city's economic activity has reduced by one-third since 2005. This puts us on track for the 57% reduction target by 2020 but with work still needed, particularly where some of the easier opportunities have already been taken.

In response, six key strategic activities were delivered during 2015-16:

1. Our Manchester

– a combination of stakeholder views from the *Our Manchester* public consultation, the findings of the *MACF Annual Report 2015*, and the Paris Agreement led to the development of the commitment that 'Manchester will play its full part in limiting the impacts of climate change... and by 2025 be on a path to become a zero carbon city by 2050'. Following the strategy's launch in March 2016, the Our Manchester Forum – the group of 40 senior leaders that oversee the strategy – have been working during 2016 to establish arrangements to ensure its successful delivery. www.manchester.gov.uk/mcrstrategy

2. This strategy

– to set out how the climate change commitments in *Our Manchester* will be achieved.

3. Manchester Climate Change Agency

– the Agency was established in September 2015 to provide strategic capacity and expertise to champion and facilitate the implementation of the city's climate change commitments. The Agency is responsible for facilitating the development of the city's devolved climate change policies and strategies, seeking to maximise the numbers of stakeholders involved in their development and implementation; working with partners to deliver targeted engagement activities for all stakeholder groups; developing new partnerships, projects and bids for funding; honestly and transparently reporting Manchester's progress on climate change, and; for further developing the city's reputation on climate change nationally and internationally. www.manchesterclimate.com

4. Manchester Climate Change Partnership

– recognising the need to mobilise private sector partners to play their part and the opportunity to unlock significant potential economic benefits, the Manchester Climate Change Partnership is in development, scheduled for launch in 2017. The Partnership will combine the city's academic expertise and private sector capacity to innovate and invest, to enable business-led solutions to climate change to come forward. Using Manchester as a testbed for new products and services, the Partnership will provide the space needed for innovative, commercially viable and socially accepted products to be developed, before rolling them out citywide and to other cities around the world. www.manchesterclimate.com

5. Green and Healthy Manchester Partnership

– the Partnership was established in March 2016, with the aim to build capacity and skills in our communities and to provide the support needed to enable residents to improve their own health and wellbeing, at the same time as taking action on climate change. Across the five work streams – community greening, food growing and cooking, active travel, domestic and community energy, and skills development – the Partnership believes that joined-up action on health and climate change is key to cost-effectively meeting our goals in these two closely related priorities. The Partnership is sponsored by the Manchester Health and Wellbeing Board and includes the NHS, Manchester City Council, Manchester Climate Change Agency, Groundwork, City of Trees, Cooler Projects, Emerge, Carbon Co-op, Manchester Environmental Education Network, MERCi, Hulme Community Garden Centre, Sow the City, and Greater Manchester Community Renewables. www.manchesterclimate.com

6. Manchester Climate Lab

– Climate Lab was an experimental programme to test different ways to increase Manchester stakeholders' levels of engagement on climate change. It was delivered as part of Manchester's European City of Science activities in 2016, by over 30 partners, and coordinated by Manchester Climate Change Agency. Combining a range of non-traditional means of engagement, alongside some of the more tried-and-tested techniques, the programme reached approximately 100,000 people from March to October 2016. Arts and culture-based activities as well as those delivered by and for 16-24 year olds were particularly popular. Analysis of the programme will be complete in early-2017 and used to underpin the development of Manchester's climate change engagement programmes for 2017+.

PLANNING FOR 2017+

Manchester's first ever climate change strategy, *Manchester: A Certain Future*, (MACF) was originally developed for the period 2010-20. Based on the views stakeholders expressed during the public consultation on *Our Manchester*, combined with the Paris Agreement and the need for cities to play their part in global decarbonisation by 2050, in 2015 it became clear that Manchester should look to develop a new climate change strategy, to replace MACF.

As set out in the Introduction and Context section, the first step was to embed climate change commitments as part of *Our Manchester*, the city's overarching strategy for 2016-25, based on the responses to the strategy's public consultation. Underpinned by these commitments, the draft Manchester Climate Change Strategy 2017-50 was developed by Manchester Climate Change Agency. It set out a draft headline aim that Manchester would become a zero carbon, climate resilient city by 2050.

The public consultation ran from 19th July 2016 to 16th October 2016 and received over 700 responses. There was strong support for the aim in the draft strategy, for Manchester to be a zero carbon, climate resilient city by 2050 (85% of respondents). However, it was also clear that a number of the city's stakeholders (6% of respondents) believed that Manchester needs a more ambitious target to be consistent with the commitment in *Our Manchester* that the city will 'play our full part in limiting the impacts of climate change'. Of those that submitted more detailed views and evidence, including those providing references to fast-developing global climate science and policy, only 35% were supportive of the draft aim, versus 24% who believed that a more ambitious target was required¹.

This final version of the strategy has taken account of these comments and the latest science and policy, in particular those aspects that have developed since the publication of the draft strategy in July 2016. Debates between scientific experts and policy-makers are currently underway, discussing whether meeting the Paris Agreement targets will require the formal adoption of 1.5°C as the limit in the global average temperature increase, rather than 'well below 2°C', and whether developed countries will need to demonstrate their ability to lead the way, and to decarbonise by 2030-40, rather than by 2050.

As such, at this stage, it is not possible to set a definitive Manchester carbon budget, timescale and plan for staying within it. However, it is possible to provide high-level options, based on the potential scenarios for international climate change policy, and to help prepare us for developing and finalising the

right budget. These options are set out in Section 3 of this strategy. It is also possible at this stage to establish outline plans that will start moving us towards the decarbonisation of our energy and transport systems, the establishment of a zero waste, circular economy, increasing our climate resilience, all of which will need to be achieved, whatever the outcome of international negotiations. The areas where action is needed are set out in Section 4.

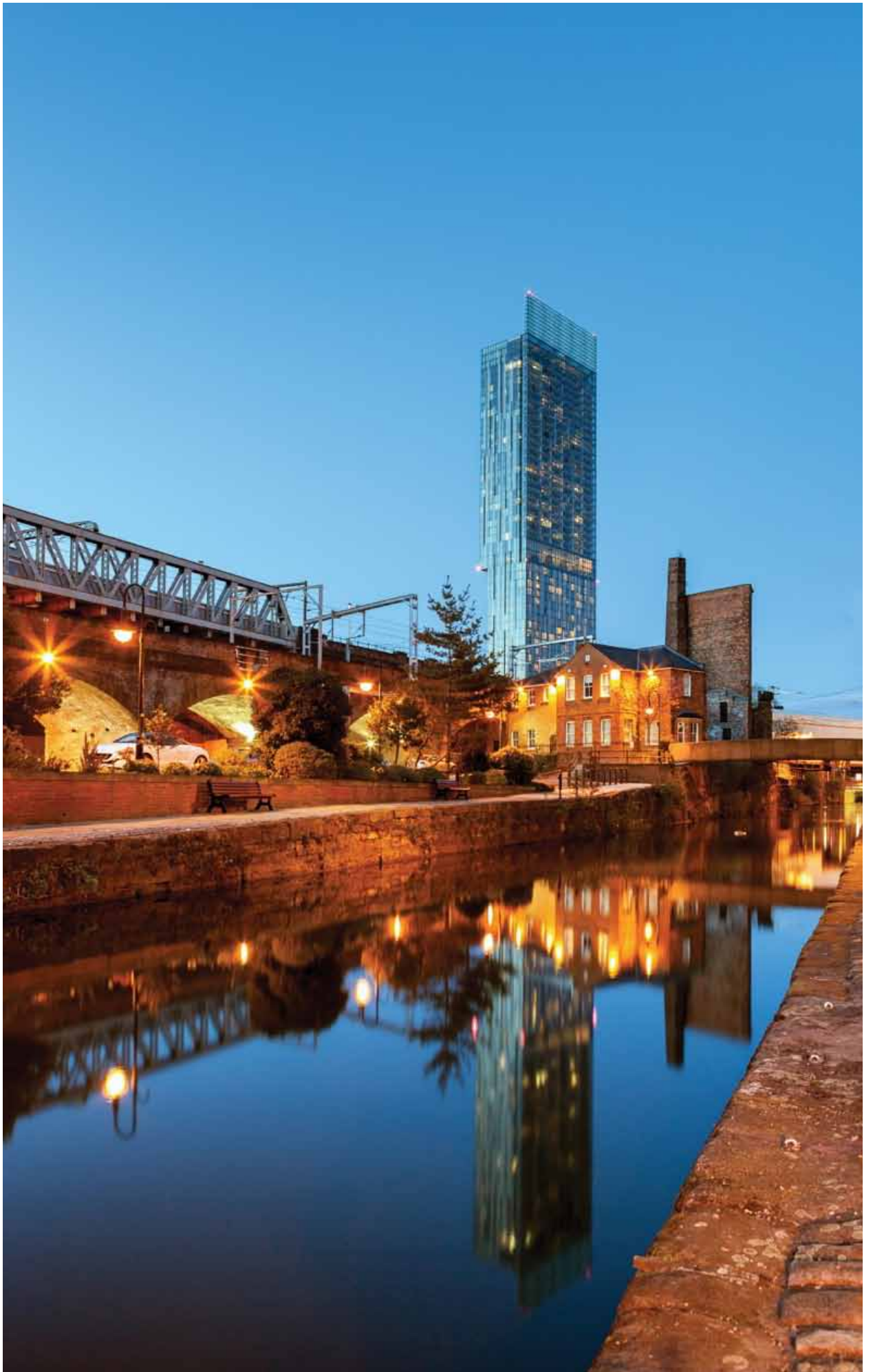
WORKING WITH GREATER MANCHESTER COMBINED AUTHORITY AND UK GOVERNMENT

This strategy represents the scale of ambition and serious intent that the city and its partners apply to this subject. However, the city does not exist in a vacuum. It exists and operates as part of a wider geographical and policy landscape. A number of the initiatives we will need to take forward will be best delivered in collaboration with the Greater Manchester Combined Authority (GMCA) and the other nine GM districts. This approach recognises that the city-region can offer economies of scale, access to funding, and the momentum needed to translate some of our bigger ideas into action. On that basis, this strategy can be seen as Manchester's contribution to delivering the Greater Manchester Climate Change Strategy Implementation Plan for 2016-20, and part of the evidence for the development of a Greater Manchester Climate Change Strategy for 2020+.

Working with GMCA also provides us with the opportunity to work with and influence UK Government, as part of the devolution programme. We know that Government shares our vision for unlocking Manchester's potential more broadly. The devolution of powers to date on health, transport, housing and economic growth set the precedent – built on the evidence that we are best able to deliver positive outcomes in these areas through managing the relevant funding and services locally. We now need to build on this platform and broaden it to include the powers and funding required to ensure that we can achieve decarbonised growth and prepare for the changes in climate that are already happening. As the population of the UK becomes increasingly urbanised, empowering and enabling UK cities to take action on climate change will need to become a central part of the Government's strategy for meeting national targets. It is hoped that, working with GMCA and Core Cities², such an agreement can be reached, well before 2020. Committing to establishing 5-year carbon budgets through this strategy, aligned with the timescales for UK budgets, is part of this work at a Manchester level.

¹ The full consultation report is available from www.manchesterclimate.com.

² www.corecities.com



3. OUR VISION AND OBJECTIVES

3.1 VISION 2050

Manchester is playing its full part in limiting the impacts of climate change, locally and globally³. It is a thriving, zero carbon, zero waste, climate resilient city where all our residents, public, private and third sector organisations are actively contributing to and benefiting from the city's success.

Happy, healthy, carbon literate, citizens live in warm homes with affordable energy bills. They have good jobs and services nearby, and most choose to move around on foot, bicycle and on the city's affordable, integrated public transport system. The city is powered by 100% clean energy, a significant proportion of which is generated by local communities and organisations. Everyone has access to healthy air, food and water, and nature is flourishing, supporting our wellbeing and protecting the city from flooding and heat stress.

Our excellent schools, colleges and universities are providing Manchester's young people with the skills, knowledge and enthusiasm they need to succeed in a decarbonised world. Partnerships between our educational organisations and businesses are providing routes for students and graduates to secure good jobs. The city's businesses are providing the products and expertise Manchester and other cities need to prosper in a decarbonised, climate resilient global economy.

Manchester is known as a green, liveable, forward-thinking, welcoming city that draws people from around the world, deepening the diversity that has been one of the city's key strengths for many years.

We compete and collaborate with cities around the world, ensuring that our collective efforts have limited global average temperature increases to well below 2°C, hopefully to 1.5°C, relative to pre-industrial levels.

³ Relevant Our Manchester commitment: Manchester will play its full part in limiting the impacts of climate change

3.2 OBJECTIVES

Realising our vision will mean building on the progress already made during 2010-16 and continuing to make progress over the short, medium and long-term. Our progress will be measured in relation to five headline objectives: sustainable economy and jobs; healthy communities; resilience to climate change; zero carbon, and; culture change. These objectives are intrinsically linked, reflecting the fact the successful delivery of this strategy will require us to take a joined-up, integrated approach, working across traditional areas of policy:

	Sustainable economy and jobs	Healthy communities	Resilience to climate change	Zero carbon
Sustainable economy and jobs		Good, secure jobs are a key part of good health and wellbeing in Manchester.	Manchester businesses will sell the products and expertise needed to help ensure resilience to climate change in Manchester and other cities.	Manchester businesses will sell the products and expertise needed to help Manchester and other cities to decarbonise.
Healthy communities	Healthy workers have higher rates of productivity and lower absence rates.		Healthy citizens are more resilient to flood risk and heat stress.	Healthy citizens are able to participate fully in activities that will reduce CO ₂ , individually, and as part of community activities.
Resilience to climate change	Resilience of the city, its infrastructure, its workers, and supply chains, to flooding and heat stress, will help ensure businesses can continue to prosper in a changing climate. Manchester businesses will profit from selling the products and expertise needed to help make Manchester and other cities resilient.	Building the capacity of communities and individuals to be resilient to flooding and heat stress will help to prevent the physical and mental health impacts that can otherwise occur.		Walking, cycling and public transport routes will need to stay open and usable even rainfall and temperature levels rise. Well-insulated and naturally ventilated buildings will avoid the need for air conditioning during warm weather.
Zero carbon	Reducing CO ₂ by reducing demand for energy and generating local renewable energy will also help to save consumers money.	Manchester businesses will profit from selling the products and expertise needed to decarbonise Manchester and other cities.	Extensive, integrated active and public transport systems will help residents to save money and make it easy to access employment.	By generating and distributing renewable energy locally, this will make it possible to climate-proof our energy infrastructure, helping to safeguard Manchester from disruption in supplies that from outside the city.
Culture change	This is an enabling objective. A shift in culture, where an understanding of climate change and how to take action is embedded throughout the city, will underpin action to meet all four of the strategy's other objectives			

3.2.1 Supporting a Sustainable Economy and Jobs

There are four key components to supporting a sustainable local economy and jobs: growth of the low carbon and environmental goods and services sector; improving the environmental performance and climate resilience of all businesses; ensuring Manchester residents have the skills and experience to secure local jobs, and; innovation to create the technological solutions and behaviour change we need. These components are relevant to businesses of all sizes, recognising that all have a part to play and that by focussing on businesses of only a certain size or sector this will result in us missing the economic opportunities that climate change action offers to the city. With SMEs (small and medium enterprises) contributing 50% of GDP in the UK, it is clear that these businesses will have a significant role to play working alongside and in partnership with the city's large organisations.

Growth of the low carbon and environmental goods and services sector

Greater Manchester's low carbon and environmental goods and services (LCEGS) sector forms a stable and growing part of the local economy. As part of the UK and international sector, valued at £3.4 trillion and £122 billion, the city-region currently has the third highest sales in the UK, worth £5.4 billion in 2013. With local and global demand for products and services continuing to grow, particularly in the context of the Paris Agreement, the LCEGS sector will become an increasingly important part of our local economy. The Manchester Growth Company will play a key role in helping to make this happen.

Improving the environmental performance and climate resilience of all businesses⁴

Opportunities abound for non-LCEGS businesses seeking to improve their productivity and profitability. To date Greater Manchester's business support programme has helped businesses to save £272m through energy and resource efficiency improvements, created or safeguarded 8,264 jobs, and increased or safeguarded £371m of sales. When combined with growing expectations from clients that businesses can demonstrate a commitment to environmental improvement, and increasing energy and resource costs, businesses that succeed will increasingly be those that place low carbon commitments at the heart of their operations.

All businesses will also need to develop an understanding of the risks that climate change presents to their operations. From on-site impacts, workers' inability to travel due to flooding, through to the exposure of supply chains, businesses are exposed to a broad range of potential risks due to climate impacts in Manchester and beyond. Embedding management of these risks as part of day-to-day operations and long-term business planning will be an important part of our organisations' successes.

Ensuring Manchester residents have the skills and experience to secure local jobs

To be truly successful, the city's economy needs to be powered by a skilled and diverse workforce that includes a significant proportion of local residents. By playing their part in driving a successful economy, they and their families will also be best-placed to benefit from this success over the long-term. The city's schools, colleges and universities have a key role to play here. The University of Manchester and Manchester Metropolitan University are home to 70,000 students and 20,000 staff. This provides a tremendous platform to create Carbon Literate graduates and employees with the knowledge, skills and global outlook to achieve their own personal success at the same time as making a significant positive contribution to action on climate change.

Innovation to create the technological solutions and behaviour change we need

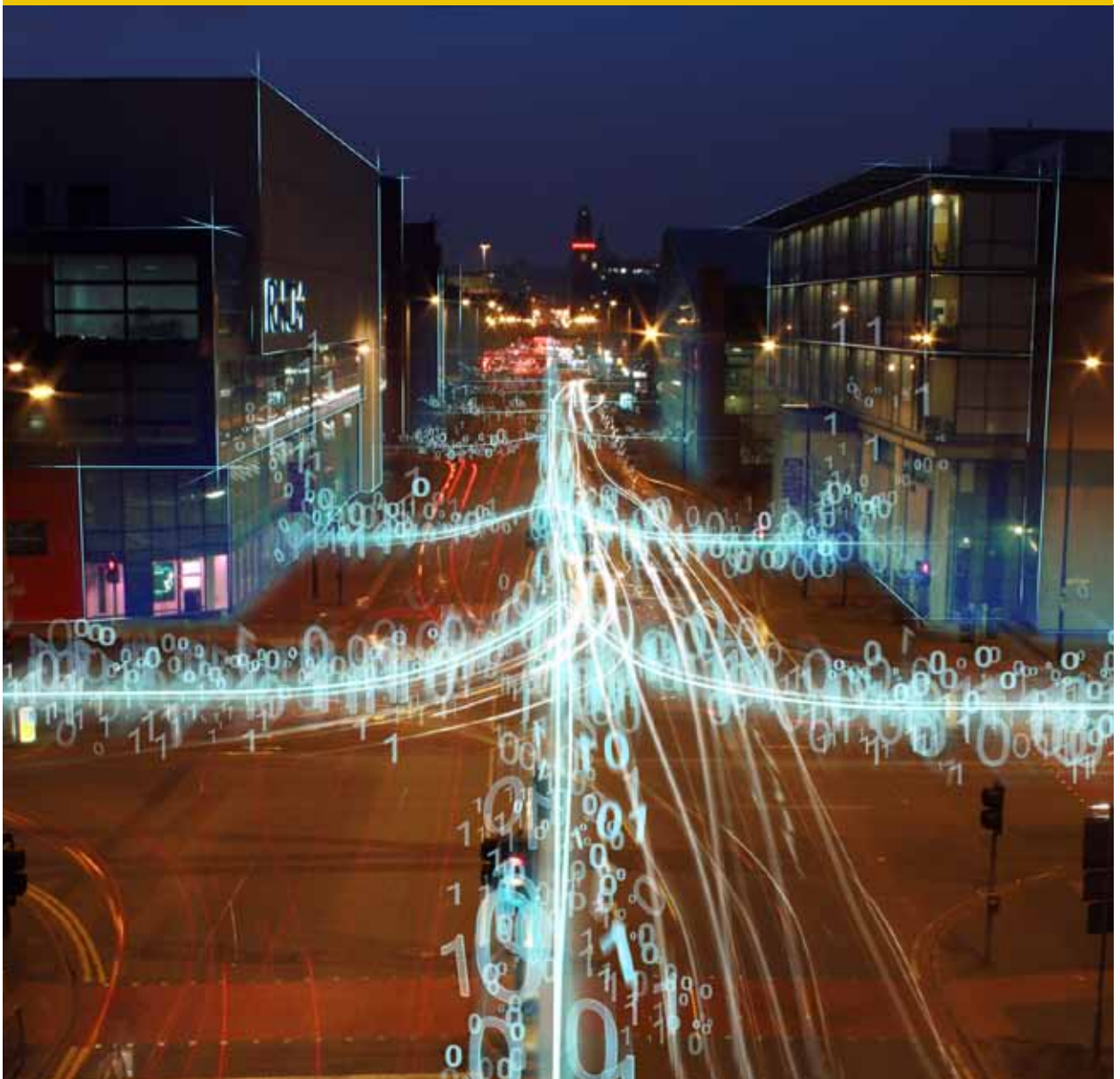
Many of the solutions we will need to enable low carbon, climate resilient city development already exist. However, the current rate of deployment of these solutions is not yet keeping pace with the scale of the climate challenge and opportunity. Reducing costs and finding more efficient, quicker and easier ways to roll-out these existing solutions is key, with innovation at the heart of this work. For the many measures we already have at our disposal, there are also many more that are yet to be invented, a number of which it will be difficult to conceive of today. Glow-in-the-dark pavements that reduce the need for street lighting, driverless vehicles that remove fuel-inefficient manual driving techniques, solar panels that can be rolled up and used as a portable power source and many others are among the cutting-edge technologies that have emerged in recent years. As the city where the atom was first split, Graphene was invented, plus many other ground-breaking scientific discoveries, Manchester is well-placed to capitalise on the strengths and agility of our universities and businesses to bring forward the level of innovation and development of technological and behavioural solutions that we need to see.

⁴ Relevant Our Manchester commitment: improve the resource efficiency, carbon and environmental performance of all business sectors

These four key components will combine to help create a city that existing and new businesses will want to be part of, and thereby support the ambitions in *Our Manchester* that we establish a 'competitive, dynamic and sustainable economy'.

Our objective for 'supporting a sustainable economy and jobs' is that from 2017:

'Action on climate change will become an increasingly important part of the city's sustainable, dynamic and competitive economy. Manchester-based businesses and universities will be playing a strong and growing role in delivering solutions locally and to cities around the world. The city's businesses will have access to a rich pool of Carbon Literate local talent, fed by our world-class universities, and our excellent schools and colleges. All Manchester businesses will save money and improve their performance by increasing their energy and resource efficiency. Businesses, workers and visitors will come from around the world to experience our liveable, resilient, green city.'



3.2.2 Healthy Communities

Manchester has a mixed story to tell in terms of health. The city is home to nationally and internationally significant healthcare and sporting facilities such as the Christie and the Etihad sports campus. However, it is also home to some of the worst health outcomes in the country with levels of disease and early death that, despite the concerted efforts of the organisations involved, have shifted too little over the last decade and beyond. Breaking this status quo is the aim of the Greater Manchester Health and Social Care Plan. Underpinned by strong local governance and the devolution of powers and funding from central Government, the plan aims to bring about a more joined-up health and social care system for the city-region, moving to a model of more preventative interventions rather than reactive, building capacity within communities to empower them to take charge of their own health and wellbeing, and addressing the wider determinants of health.

Many of these wider determinants are also key factors in the delivery of this strategy. Poor quality, damp and energy inefficient homes give rise to respiratory problems, fuel poverty, high energy bills, and CO₂ emissions. Regular exercise reduces cardiovascular disease and obesity, an activity that is enabled by high quality green spaces and routes for walking, running and cycling. These spaces also help to increase the city's resilience to a changing climate – wetter winters, hotter summers, downpours and heatwaves – and help encourage residents to replace carbon-emitting vehicle journeys with active travel by foot and bike. Reducing vehicle journeys also helps to improve air quality, in turn helping to further improve health. Popular community-based activities such as food growing and gardening deliver a range of environmental outcomes at the same time as increasing physical activity, reducing social isolation, building community cohesion and developing skills and confidence that can help residents move into training and employment.

By addressing these wider determinants of health – housing quality, environmental quality, physical activity, social interaction, and employment – through activities that also deliver positive climate change outcomes, the city and its service providers will be able to deliver better value, more impactful and sustainable health and climate change outcomes, particularly where we build the capacity of local communities to deliver these outcomes for themselves.



Our objective for 'healthy communities' is that from 2017:

'Manchester's residents will lead increasingly healthy lifestyles that are underpinned by access to high quality parks and green spaces, clean air, healthy local food, safe walking and cycling routes, energy efficient homes, affordable supplies of energy and an understanding of how they can help to reduce local flood risk and exposure to heat stress.'

3.2.3 Resilience to a Changing Climate ⁵

In common with cities all over the world, Manchester's climate has already started to change, driven by the continued accumulation of greenhouse gases in the atmosphere. Further shifts are expected over the coming years and decades. In headline terms, projections indicate the prospect of;

- Warmer and wetter winters – expected to lead to increased flood risk,
- Hotter and drier summers – expected to lead to increased heat stress and potential hospital admissions for vulnerable residents,
- More extreme weather in the form of heat waves, droughts and heavy downpours.

To an extent, we can 'adapt' the city to avoid some of the impacts associated with these changes in the climate. However, given the limitations in accurately predicting future climate, some unexpected impacts will also occur. We therefore need to ensure that our communities, public sector and businesses are 'resilient' to a wide range of potential impacts; that is they must be able to prepare for, respond to and recover from events should they occur. Enhancing resilience also means designing and managing Manchester's built and natural environments in different ways in order to reduce the frequency and magnitude of extreme weather and climate events and associated negative impacts should they occur.

Adapting and building resilience to the changing climate will require a wide range of activities across sectors and spatial scales. In particular, we need to invest in our physical infrastructure – transport, energy, water, telecommunications, digital, greenspaces and waterways. Doing so will require Manchester City Council and the GMCA to work in partnership with key infrastructure and service providers, and will most likely require the devolution of powers and funding from Government to fully enable this to happen.

We also need to invest in building the capacity of our public sector, businesses and communities, ensuring that they are better adapted and more resilient to climate change. This will require us to look at how services are currently delivered, including through national bodies such as the Environment Agency, to understand where changes could be made and how funding can be better used to enable our economy and residents to prepare for and 'bounce forward' following events such as floods and heatwaves. Building capacity will also involve strengthening knowledge and awareness of climate change and its potential impacts, in addition to developing collaborative networks between individuals and organisations.

Driven by the multi-partner Greater Manchester Resilience Forum, a significant programme of work is already underway to understand and manage the risks to the city and city-region from the current and future climate. Over time, this programme will need to be broadened and extend beyond the work of specialist agencies so that residents, businesses and other public sector bodies are also playing an active role in adapting and building resilience to the changing climate.

Our objective for 'resilience to a changing climate' is that from 2017:

'The city's communities, public sector, businesses and third sector will become increasingly resilient to the changing climate'.

⁵ Relevant Our Manchester commitment: ensure that our communities are protected from a changing climate

3.2.4 Zero carbon ⁶

The Paris Agreement commits governments to limit global temperature rises to ‘well below 2°C’, with an aim for 1.5°C, relative to pre-industrial levels, and for global decarbonisation to be achieved by 2050. Achieving these commitments will require an internationally agreed carbon budget to be established, and for national budgets to be apportioned and agreed. The size of the international budget, individual national budgets, and the period over which they should be spent is currently subject to the work being undertaken as part of the Paris Agreement work programme.

Reaching scientific and political consensus on budgets and timescales will take time. In the UK further work will then be required by Government to set out the strategy for the UK to stay within its carbon budget, including the roles for cities to play.

On that basis it is not possible at this stage for Manchester to set a definitive carbon budget and detailed plan for staying within it. However, it is possible for us to develop potential scenarios, budgets and targets, based on the international agreements and information we have to date,

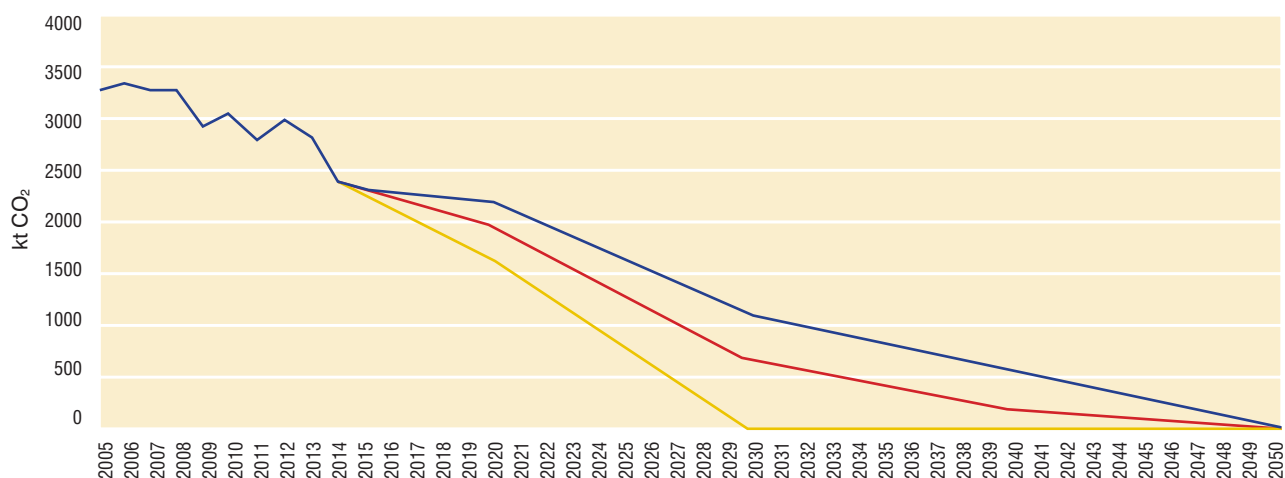
and using the expertise of the Manchester CO₂ Monitoring Group⁷.

The following is a summary of the Group’s work to date. It is subject to further development as international and UK policy develops. However, it is important that we include it at this stage to help us begin to understand the scale of the challenge, and to enable us to start to deliver the actions that we know will be needed, irrespective of the final scenario and carbon budget for Manchester. It has been informed by UK Government analysis for meeting the UK Climate Change Act targets, and analysis undertaken by Carbon Brief to understand the remaining global carbon budgets under a range of scenarios⁸. Each scenario includes the likelihood of achieving a 1.5 or 2°C target. This is a commonly adopted practice for climate change scenarios, recognising there is significant uncertainty and complexity in accurately predicting long-term outcomes.

The following indicative Manchester budgets, pathways and CO₂ reduction targets have been developed for three potential scenarios; the budgets are for the period from 2017 to 2050, and the CO₂ reduction targets are based on a 2005 baseline:

Scenario	Carbon budget (Mt CO ₂)	% CO ₂ reduction from 2005			
		2020	2030	2040	2050
Scenario 1 – 50% chance of limiting global average temperature increase to 2°C	37	34%	68%	85%	100%
Scenario 2 – 66% chance of limiting global average temperature increase to 2°C	28	41%	80%	95%	100%
Scenario 3 – 33% chance of limiting global average temperature increase to 1.5°C	17	50%	100%	100%	100%

Pathways to 2050



⁶ Relevant Our Manchester commitment: by 2025 be on a path to being a zero carbon city by 2050

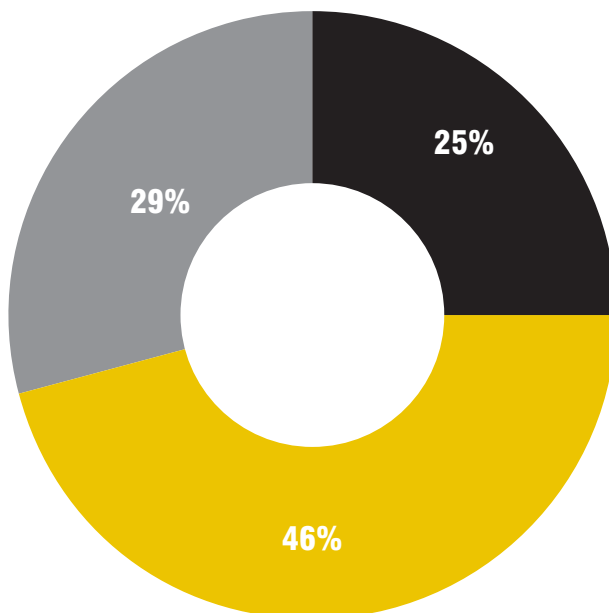
⁷ Dr Ali Abbas, Dr Seb Carney, Dr Rachel Dunk, James Harries, Dan Walker

⁸ <https://www.carbonbrief.org/analysis-only-five-years-left-before-one-point-five-c-budget-is-blown>

Further work by the Manchester CO₂ Monitoring Group is planned for 2017 in order to develop five-year carbon budgets for each scenario, and to adopt the Global Protocol for Community-scale Greenhouse Gas Emissions (GPC)⁹.

The work to date on carbon budgets is based on Scope 1 and 2 emissions. These emissions come mainly from the energy and fuel used for buildings and transport:

In addition to Scope 1 and 2 emissions, Manchester's activities also give rise to Scope 3 emissions. These emissions come mainly from waste management, travel beyond the city's boundaries, and the production and transportation of food, products and services from outside Manchester, for consumption and use in the city. Scope 3 emissions are not currently included in the work on carbon budgets, but some of these sources will be included when we adopt the GPC protocol. In the meantime, this strategy already sets out the need for work that will help to reduce our Scope 3 emissions, particularly the 'Resources and Waste' and 'Food' actions in Section 4. This builds on the work undertaken in relation to the 'Sustainable Consumption and Production' section of the city's previous climate change strategy.



Manchester's Scope 1 and 2 CO₂ emissions (2015 estimated)

- Business (1,169 ktCO₂)
- Domestic (724 ktCO₂)
- Transport (639 ktCO₂)

Our 'zero carbon' objective is that:

'Manchester will adopt and stay within a scientifically robust carbon budget that is consistent with the Paris Agreement to limit global average temperature increases to well below 2°C, ultimately resulting in Manchester becoming a zero carbon city by 2050. Manchester's carbon budget, pathway and timescales for becoming zero carbon will be kept under ongoing review and be subject to revision, to ensure that the city plays its full role as part of the Paris Agreement.'

It is hoped that the development of carbon budgets for Manchester will help to inform the development of the Greater Manchester Climate Change Strategy for 2020+. And that hopefully it will also help inform potential work by GMCA to agree a Greater Manchester carbon budget with UK Government, on the basis that, with the right devolved powers and funding, the city-region can deliver local action that makes a measurable contribution towards achieving UK CO₂ targets.

⁹ <http://www.ghgprotocol.org/city-accounting>

3.2.5 Culture Change ¹⁰

In the original *Manchester: A Certain Future*, the strategy set out two headline objectives; 'CO₂ reduction' and 'low carbon culture change'. The latter objective – unusual in a climate change strategy at that time – was included because, even in 2009, it was clear that without changing our city's culture, we would find it hard to bring about the level of action needed to meet our 2020 targets, much less the even deeper reductions in carbon emissions that we knew would be necessary beyond 2020.

The question is sometimes posed whether low carbon culture change initiatives should be focussed on 'behaviour change' activities focussed on citizens, to directly try to influence their behaviour, or on low carbon 'skills training' in schools, colleges and the workplace to encourage the development of products and services that offer a low carbon alternative to the norm. Based on the experience of the last six years, the answer is clearly "both". And that this approach to changing culture should be delivered simultaneously. Widespread culture change will generate the drive and commitment for solutions to climate change i.e. the citywide commitment to deliver this strategy. In turn this will create the demand for low carbon goods and services that are needed to deliver these solutions. By equipping our students and workers with the knowledge and skills required to develop these products and services, we can then go on to ensure that Manchester residents are best-placed to secure employment in our growing low carbon economy.

We need all our citizens to have 'an awareness of the carbon dioxide costs and impacts of everyday activities, and the ability and motivation to reduce emissions, on an individual, community and organisational basis'. This is the formal definition of Carbon Literacy – a concept and approach developed in Manchester and now spreading internationally. It is this awareness, ability and motivation that is the foundation of a low carbon culture. Rather than a series of isolated initiatives, it has been Manchester's aim to develop this culture through working where people live, work and study, in a host of linked initiatives. These vary from formal teaching and certification schemes, to the many informal citizen green schemes, to the formal business networks and initiatives that have been established in the last six years.

Work by our city's universities and academic institutions has reported that it is not possible to readily measure 'culture', much less it's even more rarefied relative 'low carbon culture'. However, progress can be gauged by monitoring the trend in proxy measurements that we would expect to change over time as a result of the awareness, ability and motivation defined above. As a city we will continue to develop our carbon literacy and monitor these trends over time.

Our objective for 'culture change' is that from 2017:

'Climate-positive and climate resilient decision-making and behaviours will become progressively incentivised and embedded within the lifestyles and business operations of the city, helping lead to practical actions that reduce the city's CO₂ emissions and increase our climate resilience'.

¹⁰ Relevant Our Manchester commitment: continue to encourage the growth of a low carbon culture



4. OUR COLLECTIVE ACTION

4.1 INTRODUCTION

This section provides an overview of the areas where action is needed in order to achieve our vision and objectives. It is split into ‘enabling actions’ and ‘thematic actions’. For each area, details of the specific strategic actions that need to be delivered within a given five-year period will be set out in the strategy’s latest implementation plan. The areas set out below and the actions in the Implementation Plan for 2017-22 have been developed to incorporate those areas that Manchester stakeholders identified as priorities for action from the public consultation on the draft strategy:

Transport – 44%
(see section 4.3.3)

Education and engagement – 14.8%
(see section 4.2.1)

Waste and recycling – 11.3%
(see section 4.3.4)

Green spaces – 9.4%
(see section 4.3.6)

Energy efficiency and generation – 8.4%
(see section 4.3.2)

Buildings – 4.7%
(see section 4.3.1)

Businesses and economy – 3.8%
(see sections 4.2.3, 4.2.4 and 4.2.5)

In combination with the strategic actions set out in implementation plans, all stakeholders in the city will also have a role to play, embedding action on climate change as part of their everyday lives and business operations. See section 4.5 on ‘action by all stakeholders’.

In addition to concerted action within Manchester, supportive GMCA and UK Government policies will be required to enable us to fully achieve our objectives. The Implementation Plan for 2017-22 sets out actions for working with both parties.

4.2 ENABLING ACTIONS - CREATING THE RIGHT CONDITIONS FOR ACTION

In order to encourage, empower and incentivise organisations and individuals to take the level of action required to meet our objectives, we need to create the right framework of policies, societal values and culture. This strategy forms a key component of this local policy framework and will need to work in concert with our other key city strategies in order to attract and reward stakeholders for working towards our shared vision.

4.2.1 Education and engagement¹¹

To underpin and enable us to achieve the ambitious objectives set out in this strategy, Manchester’s residents, businesses and public sector organisations will all need to develop an understanding of climate change and the action they can take as part of their everyday lives and business operations. Over time this understanding will be a core part of the city’s culture, perhaps becoming as recognisable and well known as the city’s sporting, music and cultural heritage.

The result will be a city where all individuals and organisations are taking action, and sharing in the benefits that will come as a result. Climate positive decisions will become instinctive, built on long-term and sustained education programmes and campaigns, and an underlying knowledge that becoming a zero carbon, climate resilient city is key to happy, healthy, fulfilled lives for our residents, and success for our businesses in a decarbonised global economy.

Manchester has a rich history of contributing to the national and international landscape and now offers a huge variety of culture and sport that is enjoyed by visitors from across the city, the UK and overseas. Intelligently embedding positive climate change messages as part of the activities of these sectors presents an opportunity to reach an already significant and growing number of people. It will form a key part of our activities to enable the culture change we need to see in Manchester and cities around the world.

¹¹ Relevant Our Manchester commitment: continue to encourage the growth of a low carbon culture

4.2.2 Investing in our young people^{12, 13}

The business leaders, investors and politicians of 2050 are at school, college and university in Manchester today. The knowledge, skills and global outlook they develop will be key to their own success and the planet's. Embedding an understanding of climate change in their studies to be teachers, doctors, engineers, accountants, architects, nurses, right across the spectrum of job opportunities, will ensure that they can succeed in shaping a world they want to be part of.

Greater Manchester's low carbon and environmental goods and services sector currently employs approximately 37,000 people. To maximise its role in improving the prosperity of Manchester residents, we need to ensure that our residents and students have the full spectrum of knowledge and skills the sector requires. A key to success will be matching the demand for low carbon and climate resilience expertise with skilled, business-ready employees. The city's schools, colleges and universities already play a significant role here, developing carbon literate citizens that can help drive Manchester's transition to a zero carbon, climate resilient economy, and ensuring that our young people have the skills to secure rewarding, well-paid work.

4.2.3 Innovation, attracting investment and business growth¹⁴

The low carbon and environmental goods and services sector is valued at £3.4 trillion globally and £5.4 billion in Greater Manchester. As this market continues to mature and grow rapidly, it provides a significant opportunity for Manchester businesses to prosper. Work by the Manchester Growth Company will be key to ensure that Manchester businesses – small, medium and large – can take advantage of this growth, from local, UK and overseas markets.

Whilst many of the solutions we need to be zero carbon have already been created, innovation by the city's businesses and universities will help to reduce their costs and increase the efficiency, speed and convenience of rollout, both locally and to a global market. In addition, new technological solutions and substantial innovation will also still be required; a need and opportunity that our businesses and universities are well-placed to respond to.

Although successful in securing funding from a range of sources, the capacity of the city's organisations to innovate is still limited by their current levels of resources and the opportunities or 'spaces' to innovate on this subject. Current Government and European policy typically pitches cities against each other to compete for innovation-based funding. The 2015 'Internet of Things' call for projects, for example, whilst ultimately resulting in £10m for Manchester's CityVerve project, also left 33 other UK cities without funding to take forward their ambitions. In order to unlock the potential for Manchester and other UK cities to develop the solutions we need, and which can be exported globally, we need to ensure we have the right level of resources and the 'spaces' to innovate.

We also need to ensure that investors are drawn to the city by the ecosystem of creative industries, willing public and private sector partners and a mix of innovative new solutions for them to back, borne out of the right 'spaces' for innovation to flourish.

4.2.4 Enabling and incentivising institutional investment

We have already seen the first phase of business-led low carbon solutions coming forward as part of investments by a number of the city's major institutions. For example, new low carbon energy systems have been installed in the last five years at Manchester City's Football Academy, Manchester Metropolitan University's Birley Field Campus, and as part of the Town Hall and Central Library transformation, with further schemes still planned. These investments were driven by institutional commitments in organisations that are now being rewarded with reduced energy bills and reputational benefits.

Other organisations will need to be encouraged and incentivised to bring forward schemes that replicate this good practice. In some sectors, businesses will require new financial levers and investment to enable this to happen. For example, commercial landlords will need to be supported to ensure they can invest in solutions that will deliver a bottom-line benefit to their organisation at the same time as reducing carbon emissions, including measures that are currently being driven by the Government's Minimum Energy Efficiency Standards legislation. In the city's heritage buildings solutions are needed to break through the policy and funding barriers that are currently preventing technically viable solutions from being delivered.

¹² Relevant Our Manchester commitment: connect higher education institutions with businesses in the city to give graduates a clear route to quality employment or support for an innovative idea

¹³ Relevant Our Manchester commitment: respond to student expectations for sustainable development to be included in studies and institutional practice, building on progress already achieved through the Eco Schools programme and the commitments of our colleges and universities.

¹⁴ Relevant Our Manchester commitment: support the growth of established and emerging business sectors

4.2.5 Supporting our businesses ¹⁵

As set out in the 'sustainable economy and jobs' section above, all businesses in Manchester stand to benefit from action on climate change. Organisations that cut their CO₂ emissions through reducing their energy use and using renewable energy will also save money. Enabling staff to work from home and understanding how flooding, high temperatures and extreme weather can affect supply chains will help ensure businesses are prepared when the impacts of climate change are felt, in Manchester and beyond.

All 19,000 businesses in Manchester, large and small will need to go on this journey to become low carbon, climate resilient organisations. As well as contributing to the city's climate change objectives this will also help them to maximise profits and minimise risks. In many cases businesses will choose to go on this journey using their own in-house expertise. In other cases businesses will need support, drawing on initiatives such as Manchester Growth Company's Green Growth programme, the Carbon Literacy Project's Carbon Literate Organisation scheme, and others that will need to develop in the coming years.

4.2.6 Spatial planning, development and infrastructure investment

The city's developer partners will continue to have a major role to play over the coming decades, working in partnership with Manchester City Council to bring forward significant levels of housing and commercial development. Properly planned, this scale of development will contribute towards this strategy's objectives, and help to avoid 'locking in' high carbon and climate-vulnerable developments and land use patterns for the long-term.

With sufficient density, new public and active transport routes will become viable, renewable energy projects will become commercially and technically viable, and business cases for investing in areas of currently underused and low quality greenspace will be able to come forward. New development served by such infrastructure will become a significant part of the appeal for existing and new domestic and commercial occupants.

To enable this, Manchester City Council will need to respond to the views expressed during the public consultation on this strategy, and more widely by the UK development industry, by setting clear, long-term standards and land use plans for new developments. Current Government planning policy does not encourage this approach. However, as we are already starting to see in other cities, Manchester will need to be bold in its use of local planning powers,

to ensure we make use of it as a tool for delivering the objectives the city believes in. Being able to do this will be a test for the Government and its implementation of devolution policy in practice. A critically important and immediate first step is to ensure that the Greater Manchester Spatial Framework is consistent with the objectives set out in this document. To that end Manchester Climate Change Agency will continue to actively contribute towards the Framework's development.

In recognition of the climate change benefits of our approach to spatial planning, development, and infrastructure investment, Manchester will become recognised as a beacon of sustainable design¹⁶.

4.2.7 Joined-up public services ¹⁷

Joining-up services and shifting from a responsive to a preventative, early-intervention approach means that public bodies will be able to deliver better outcomes for Manchester residents at the same time as reducing overall spending. Building capacity within our communities as part of this work will enable residents to take charge of their lives, ensuring sustainable changes can be achieved over the long-term.

Joined-up action to deliver health and climate change outcomes represents one of the areas of major opportunity in Manchester. Improving the energy performance of the city's homes will help to reduce the numbers of people living in fuel poverty as well as domestic carbon emissions. Increasing the quality and accessibility of green space and local food growing will encourage healthier lifestyles and help to reduce flood risk and heat stress caused by climate change. The strategic partnership between the city's health and social care providers, third sector organisations, and Manchester Climate Change Agency that was established in 2016 – the Green and Healthy Manchester Partnership – will provide a key mechanism for this work.

By linking to the Greater Manchester health and social care devolution package and Health Innovation Manchester, the intention will be to pilot approaches in Manchester that can be rolled-out across the city-region, as well as enable best practice from the other nine districts to be replicated here. It will also be possible to begin to rebalance the focus from London-centric health research and innovation and help to create a system whose strengths are based on country-wide activities and not simply one part of it. There is significant potential for Manchester's contribution to this rebalancing to be through focussing some of our efforts on the links between health and climate change. Doing so would build well on a number of research activities already underway

¹⁵ Relevant Our Manchester commitment: improve the resource efficiency, carbon and environmental performance of all business sectors

¹⁶ Relevant Our Manchester commitment: we will be a beacon of sustainable design

¹⁷ Relevant Our Manchester commitment: radically improve health outcomes, integrating health and social care, and supporting people to make healthier choices, so that people have the right care at the right place at the right time

at the University of Manchester and Manchester Metropolitan University.

Other areas of join-up will also be needed, including linking employment opportunities to the volunteering schemes run by the city's universities and third sector organisations. Across all areas, work will need to be underpinned by the latest research and data to ensure that more joined-up approaches are being identified and are delivering better social, environmental and economic outcomes than the current system. The Greater Manchester Connect initiative to enable data sharing and analysis will play a key role here.

4.2.8 Resident-led solutions and the voluntary and community sector ¹⁸

Manchester's people are our greatest asset. Those who have lived here their whole lives as well as those who have made Manchester their newly adopted home, our residents are proud and passionate about the city and making it the best place it can be. We already see this enthusiasm translating into a broad and diverse mix of inspiring resident-led activities. Community food growing, health walks, clubs for sharing energy saving tips, biodiversity walks, and community clean-ups are among the activities already underway.

To create the Manchester we want, we need to see these initiatives spread even further, to every corner of the city. Enabling this to happen will require many things. Key to it will be a change in mindset about an individual's role in their local community and the shift from direct service delivery from public and third sector organisations to building capacity for locally-led change. The result will be empowered, inspired and confident communities that are taking charge of their own futures. Our residents will become healthier, happier, more skilled, more productive and more prosperous on the route to becoming a zero carbon, climate resilient city.

4.2.9 Digital technologies and data ¹⁹

Informing people's everyday lifestyle choices, right through to major investment and service delivery decisions with real-time data and digital technology will help to ensure that the right climate conscious decisions are being made.

This will build on work to date through Manchester's smart cities programme, including the Triangulum and CityVerve projects in the Corridor, which are using digital technologies to improve the energy performance of existing buildings and reduce the number of transport journeys.

4.2.10 Working with the Greater Manchester Combined Authority, UK Government and devolution

Achieving the level of physical and transformation outlined in this strategy will require major programmes of work, a number of which will be best delivered or only possible by working with GMCA and other Greater Manchester partners. In some areas this will require funding and powers from Government and its agencies, and which will need to be agreed as part of ongoing devolution agreements.

UK cities make a significant and increasing contribution to UK CO₂ emissions – the eight English 'Core Cities' (the eight largest cities outside of London) and their wider city-regions, for example, are already responsible for one-quarter of the country's CO₂ emissions. Notwithstanding that these cities are more carbon efficient than other areas, giving rise to lower CO₂ per head of population than other areas, they are not yet able to 'decouple' their economic and population growth from increases in CO₂ emissions.

These cities, therefore need to be empowered and enabled to contribute simultaneously towards UK economic targets and those on climate change. As with previous rounds of devolution Manchester can play a strong role here, providing leadership and collaborating with other UK cities to secure powers and funding that enable low carbon, climate resilient city growth to be achieved.

A significant part of this devolution will be in making better use of money that is already controlled by Government or spent under the direct influence of the policy and legislative framework that Government puts in place. For example, £300m of utility taxes are raised annually in Greater Manchester, with us currently having little or no influence on how these funds are spent. The Energy Company Obligation (ECO) that was placed on large energy suppliers has similarly raised large sums of funding to date, from expenditure within Greater Manchester, but again has not been able to be directed locally to ensure the achievement of cost-effective outcomes.

From the outset, the delivery of this strategy will be underpinned by work to secure the devolved powers and funding that are needed to bring about the levels of physical and culture transformation required. This will include work to consider if and how a reciprocal relationship could be established between the Greater Manchester Combined Authority and Government; one that enables and incentivises the achievement of jointly agreed local climate change targets, and in turn makes a measurable contribution towards meeting national targets.

¹⁸ *Relevant Our Manchester commitment: continue to work with the voluntary and community sector to find new ways of reaching those communities that remain untouched by Manchester's success, creating resilient and vibrant communities of people*

¹⁹ *Relevant Our Manchester commitments: harness the potential of technology to improve the city's liveability, sustainability and connectivity; use digital technology to transform the way we use energy in order to help reduce energy bills and carbon emissions.*

4.3 THEMATIC ACTIONS

This section sets out the six thematic areas where action will be taken. At this stage, prior to setting a specific carbon budget for Manchester, it is subject to change, particularly as international climate change policy continues to develop. It does, however, provide a high-level overview of the actions that are required, with further details provided in the Implementation Plan for 2017-22.

4.3.1 Buildings

Existing buildings will be retrofitted to minimise their energy requirements and, to meet their remaining, minimised energy requirements, to install renewable energy technologies, including solar panels and heat pumps. In domestic buildings, particular priority will be given to vulnerable residents and those living in fuel poverty²⁰. Retrofit will also ensure that properties are resistant to flooding and extreme rainfall, and to higher summer temperatures and heat waves. Extra care will be taken to protect vulnerable occupants in particular, such as those in hospitals, schools, and care homes.

Retrofit at the rate and scale required in the domestic sector will involve coordinated action by Manchester City Council, Greater Manchester Combined Authority, housing providers, and other local partners with the skills, expertise and funding required to enable this level of activity to be delivered. We will need to mobilise funding that is currently underutilised by Government, its agencies and the Big Six energy companies. The forthcoming update to the Energy Company Obligation (ECO) scheme represents the biggest opportunity in the short-term.

In non-domestic buildings, owner-occupiers, landlords and tenants will need to find ways to invest in energy efficiency and on-site renewable energy technologies that deliver a direct financial return, reputational benefits and which responds to the expectations of their customers and supply chains.

Gas for heating will be replaced either with biogas or hydrogen, or by converting to the use of electric heating systems that can be powered by zero carbon electricity supplies.

The standards that our developer partners build to will increase over time, driven by local demand and policy, reaching net zero carbon by the early 2020s²¹. This shift will ensure that we don't create assets with low long-term value which have high carbon and running costs and climate vulnerability 'locked in' to

their design. By developing policies collaboratively with developers and other built environment professionals, this transition will be able to be managed so that supply chains and expertise can be built up over time, and that zero carbon buildings are commercially viable for the developers constructing them. Local businesses, colleges and universities will play a key role in helping to develop these skills as well as supporting the development of innovative new construction products and technologies.

4.3.2 Energy

By taking much greater influence, control and ownership of the city's energy system, the city's residents and businesses will be supplied with 100% clean energy by 2050²². This will include renewable electricity generated within Manchester, and renewable electricity generated outside our boundaries and imported into the city via a local energy company, or similar organisation(s). However, we don't want to simply replace one centrally controlled energy system with another. We want to see a much more diverse energy landscape where multiple stakeholders, from large organisations to individual residents, are all actively involved.

Local residents will play their part in this democratization of energy through investment in community energy schemes and co-operative purchasing clubs. Greater Manchester Community Renewables, which launched its first share issue in 2016, Carbon Co-op and many others like them will be helping to generate low and zero carbon energy. As well as benefitting their members and local communities financially, such schemes provide a much more efficient way of generating and distributing energy than from centralised power stations many miles away.

Gas will be replaced by biogas and hydrogen, including for the city's district heating network, which will begin developing in 2017. Our existing energy infrastructure will be adapted, and new infrastructure designed so that it can withstand extreme rainfall and high temperatures.

Fundamental to this shift will be securing the levels of funding required. Part of this will be through mobilising local funding that is already accessible but not currently fully utilised for low and zero carbon energy projects. However, a substantial part of this work will be focussed on making better use of money that is already collected but not used by Government, its agencies or private businesses to deliver the level of benefits possible. This particularly relates to funding raised through Government taxes and levies.

²⁰ Our Mcr: 'Tackle fuel poverty by improving the energy-efficiency of our existing homes, building new homes to the highest standards, and locally generating increasing levels of affordable, low and zero-carbon energy.'

²¹ Relevant Our Manchester commitment: Build well designed, energy-efficient, sustainable and affordable homes to rent and buy

²² Relevant Our Manchester commitment: Be a 100% clean energy city by 2050

As Government brings forward new and updated financial instruments to support low carbon schemes, we will need to ensure that Manchester City Council, the GMCA and the city's partners can play an active role in deciding on where, when and how Government-backed programmes are implemented on-the-ground.

Innovative new technologies and solutions will be developed by the city's universities and businesses, and will be funded and delivered by local partners with a long-term interest in secure, affordable supplies of energy for the city. Building on the expertise at the University of Manchester's Manchester Energy research centre and within other partners, battery storage is one of the areas where world-class research and commercial exploitation will help to reap significant economic rewards for the city and enable us to better utilise renewable energy from intermittent sources such as wind turbines.

4.3.3 Transport

The way we move around the city – and even the need to move – will be transformed on the way to 2050. Digital communication technologies, new working arrangements, and well-planned and located new developments will reduce the need to travel. Safe, green routes for walking, running and cycling, incorporating good signage, will become an integral part of the city, making it easy to move around by foot and bike²³. Manchester's canals, 'Green Corridor', Fallowfield Loop and other existing routes will see further major improvements, combined with the creation of new routes to create an integrated network that will make active travel an everyday part of life in Manchester.

A reliable, affordable, and integrated public transport system will be the mode of choice for those not travelling on foot or bike²⁴. Private journeys will be via hydrogen or electric vehicles, in many cases using shared cars from neighbourhood car-sharing schemes, reducing the need for and expense of personal car ownership.

Manchester Airport will continue to be a major hub for incoming and outgoing movements of people and goods, at the heart of the Northern Powerhouse. Emissions will be managed as part of an international aviation emissions scheme, to be developed within the framework of the Paris Agreement. In the meantime, the city and wider aviation industry will continue to benefit from world-class expertise

at Manchester Metropolitan University's Centre for Aviation Transport and the Environment, including through planned work to look at options for preparing Manchester Airport and the city for the introduction of an international agreement on aviation emissions.

Our existing and new transport infrastructure will be designed to ensure it can withstand high rainfall and temperatures, to prevent the disruption that could otherwise come from flooding and heat stress. Trams and buses will be designed to ensure that passengers can travel in comfort during periods of high temperatures.

4.3.4 Resources and waste

Notwithstanding increases in recycling rates in recent years, significant volumes of products and material still have no identified use at the end of their lives, resulting in high costs for waste management and landfill. Shifting to a zero waste, 'circular economy' by 2050 will see us break this cycle, taking materials currently destined for landfill and repurposing and recycling them into new products for commercial sale. In addition to the cost savings and environmental benefits, a new circular model provides opportunities for new businesses in the redesign of existing products and the repurposing, recycling and reselling of used materials. Certain materials will require new processes to enable them to be used in a new form, setting out a role for materials science research and innovation by the universities.

In addition, shifting our patterns of consumption will help to reduce the generation of waste in the first place, moving increasingly to become a city where cultural, sporting and recreational activities are at the heart of productive and fulfilled lives. The products that we do need to buy will be from sustainable sources, fixable, and able to be repurposed and recycled into new products and materials at the end of their lives²⁵. Where materials are left with no viable use, they will likely become used as fuel for the generation of energy, provided emissions are captured and make no net contribution to the city's zero carbon footprint.

By making the most of materials already within Manchester we will be less susceptible when climate change affects the parts of our supply chains that exist in other parts of the UK and around the world.

²³ Relevant Our Manchester commitment: Increase the proportion of cycling and walking journeys and provide improved infrastructure and signing; Encourage walking, cycling and public transport use, and continue to invest in the infrastructure this requires

²⁴ Relevant Our Manchester commitment: Have an integrated, smart and affordable transport system

²⁵ Relevant Our Manchester commitment: Recycle more of our waste

4.3.5 Food

Shortening our food supply chains wherever possible and maximising the amount of locally produced, seasonal food, with only sustainable levels of meat consumption, will bring significant health benefits, business opportunities and jobs to Manchester, at the same time as reducing the city and the world's carbon footprint.

For food that continues to be produced outside of Manchester's boundaries, we will develop an increasing understanding of its impacts, to help drive further long-term changes in food-buying habits, and to enable us to work with and influence those who supply our food, to ensure it has minimal negative environmental impacts.

Growing food that thrives in Manchester and the north west, on a community and commercial basis, will also help us to establish supplies of food that are as secure as possible in a changing climate, particularly when we take account of the changes we expect to see. As well as developing an increased understanding of the CO₂ emissions associated with food produced outside of Manchester, we will also have an understanding of its vulnerability to a changing climate, enabling us to adapt our food-buying habits and minimise potential disruption to consumers and suppliers of food.

Building on its work to date, the Manchester Food Board and its partners have a key role to play in maximising the sustainability of the city's food system, working with and seeking to positively change the practices of consumers and suppliers large and small.

4.3.6 Green spaces and waterways ²⁶

Manchester's green spaces and waterways provide myriad benefits to the city's communities, economy and wildlife. Manchester has committed to ensure that these benefits are realised throughout the city by embedding high quality green and blue spaces at the heart of all communities. The approach to achieving this is set out in the Manchester Green and Blue Infrastructure Strategy 2015-25, available from: **www.manchester.gov.uk**.

Whilst recognising there is a broader suite of benefits that they provide, this climate change strategy focuses particularly on how green spaces and waterways contribute to the strategy's climate change objectives.

Sequestration of carbon, particularly by trees, will make a direct contribution to Manchester's CO₂ reduction targets. Further benefits will come from using green and blue infrastructure to shade and insulate buildings, reducing the need for mechanical cooling and heating. It will also contribute indirectly by creating attractive transport routes for walkers, runners and cyclists.

Integrating green and blue spaces to our built environment, particularly in the city centre and other areas that are densely developed, is key to managing increased levels of rainfall and high temperatures that we have already started to experience. Parks and other areas of designated urban greenspace, green roofs, urban allotments, canals, community food growing, and other approaches will become an increasingly recognisable part of the city's landscape. Combined with parks across the city, Local Nature Reserves, Sites of Biological Importance, and other designated areas of greenspaces, being green will be a key part of becoming a climate resilient city.

²⁶ Relevant Our Manchester commitment: Improve the quality of parks, green spaces, rivers and canals, and incorporate more into new developments where appropriate.

4.4 5-YEAR IMPLEMENTATION PLANS AND CARBON BUDGETS

Five-year implementation plans will be produced, setting out the actions that will be delivered in relation to each of the areas described above. They will cover both the activities that will contribute directly to achieving our objectives during that period, as well as the preparatory and enabling work that will lead to practical action and progress in following five-year periods.

As set out above, the actions of all organisations and individuals in the city are key to the strategy's successful delivery. However, the breadth and depth of action to be delivered is vast and it would not be realistic or helpful to try to capture all activities that will need to take place within any five-year period. To provide a tool that can practically drive forward the delivery of the strategy, implementation plans will therefore cover the strategic activities that will be delivered by the city's key partners. This will include activities designed to encourage, support and enable all city stakeholders to contribute to the strategy's delivery.

Five-year carbon budgets will also be published alongside future implementation plans. They will be aligned with the timescales for UK carbon budgets, to enable us to calculate what contribution we are making towards achieving UK carbon reduction targets. The strategy's first implementation plan will cover the period 2017-22. The first carbon budget will cover the period 2018-22.

4.5 ACTION BY ALL STAKEHOLDERS

In combination with supportive and enabling policies and programmes by GMCA and UK Government, the action of all stakeholders in Manchester is critical to the successful implementation of this strategy. There are already many examples of action by the public sector, private businesses and local residents that have contributed towards delivering Manchester's first climate change strategy, during 2010-16. From switching to renewable energy suppliers, growing healthy food with neighbours, to major investments in low carbon buildings and cycle routes, all action is part of Manchester's collective efforts and the cumulative impact that has been achieved to date.

Manchester has a number of existing programmes that can support individuals and organisations to take action on climate change, at home, at work, at school and college, and at university. Further information is available from:

www.manchesterclimate.com/getinvolved.

5. GOVERNANCE

Ultimately, the successful implementation of this strategy is the responsibility of all residents, businesses, public and third sector organisations in the city. However, a critical part of this devolved, collective approach to climate change action is that it is overseen, championed, coordinated and enabled by a robust, transparent and accountable governance structure.

Our Manchester Forum

Working on behalf of the city, the Our Manchester Forum has responsibility for high-level oversight of the city's climate change commitments, as part of its role in overseeing the full suite of commitments in the *Our Manchester* strategy.

Manchester Climate Change Agency

Manchester Climate Change Agency is responsible for focusing specifically on *Our Manchester's* climate change commitments. The Agency's role is to oversee, champion, coordinate and facilitate the delivery of this strategy. It does this by working with partners on four headline areas of activity:

- 1) Policy-making and political commitment
 - a) Supporting and facilitating the development of local policy and political commitments that will support the implementation of this strategy
 - b) Facilitating further development of this strategy and accompanying implementation plans
- 2) Engaging Stakeholders
 - a) Sign-posting to existing and developing new stakeholder-specific education and support programmes
 - b) Running annual engagement programmes and campaigns, building on Manchester Climate Lab in 2016

- 3) Monitoring and Reporting Progress
 - a) Publishing annual progress reports
 - b) Publishing ongoing news at www.manchesterclimate.com
- 4) Initiating New Projects and Funding Bids – bringing together partners to respond to needs and opportunities that will contribute towards delivering this strategy and its latest implementation plan, building on the £10m of new projects and funding bids that were developed in the Agency's first twelve-months, 2015-16.

Partnerships, groups and networks

Fundamental to the success of this strategy is that action is delivered in every corner of the city. Notwithstanding the significant reach of the Our Manchester Forum and Manchester Climate Change Agency, there will still be limits to the reach of each organisation and its members, and their capacity to support and initiate new activities. Existing partnerships, groups and networks already play a key role in scaling-up action on climate change in Manchester. These existing bodies and the many new ones yet to be created will have essential roles in making sure that all stakeholder groups play their part in the delivery of this strategy.

Leadership

Across all sectors and all communities, leaders will need to inspire and help drive action. Political leadership will be an important but not the only type of leadership we will need to see. Recognising that different stakeholder groups respond best to the actions and views of their peers and competitors, business leaders, community leaders, faith leaders, leaders in education, and many others will all have a role in building a citywide movement for action on climate change.

6. FUNDING

The major physical and cultural transformations that lie ahead of us require action in every community and sector of the city. Given this breadth and depth of action, it wouldn't be possible to establish a central 'climate change fund' to support the strategy's delivery. Funding will therefore need to come from a range of different sources.

In some cases this will be existing funding that can be redirected and better spent in order to deliver a fund's original objectives, as well as the city's climate change objectives. For example, through the use of funding for health and social care, for preventative interventions that avoid health issues developing in the first place, at the same time as reducing CO₂ emissions or improving resilience to climate change.

In other instances, there will be a need for 'new' funding, including that which is secured through competitive processes and through establishing new mechanisms for investment.

The following sets out an initial outline list of funding options. It is based on those identified in the Greater Manchester Climate Change Strategy, recognising that there will be occasions where funding bids and programmes will be GM-wide:

Private sector

- Manchester-based companies' investment in existing buildings and infrastructure
- Private investment by national and international companies, including for new developments

Individuals and communities

- Personal finances
- Charitable trusts
- Big Lottery Fund
- Revenue generated from community energy projects

Public sector

- Ongoing and increasing access to levies and taxes e.g. ECO funding for domestic retrofit
- UK research and innovation funding, including from Research Councils and Innovate UK
- Local authority revenue and investment funding
- Devolved health and social care funding
- EU funding, including for projects that are currently live and those where applications have been submitted in 2016
- European Regional Development Funding

7. MEASURING AND REPORTING PROGRESS

The following is an initial set of key performance indicators (KPIs) for measuring progress against the strategy's objectives and key areas of activity. They are aligned with those used for monitoring progress against the Greater Manchester Climate Change Strategy 2011-20 to help us understand our contribution to city-region targets. The KPIs will be further developed in 2017, as an early action in the Implementation Plan for 2017-22.

Primary KPIs:

Sustainable economy and jobs
CO ₂ /£m GVA
Number of employees in the low carbon and environmental goods and services (LCEGS) sector
Value of sales in the LCEGS sector
Annual rate of growth of the LCEGS sector
Healthy communities
% of households in fuel poverty
Index of cycle use
Resilience to climate change
Number of properties in flood warning areas
Zero carbon
% reduction in total CO ₂ emissions, from 2005 levels
Culture change
% of residents certified as Carbon Literate
% of organisations committed to a climate change, environmental or resource efficiency initiative e.g. Carbon Literate Organisation, Green Growth, ISO14001
% of Manchester schools as Eco Schools

Secondary KPIs:

Buildings
% reduction in domestic CO ₂ emissions, from 2005 levels
% reduction in commercial and industrial CO ₂ emissions, from 2005 levels
Energy
Total number of renewable energy installations registered for Feed-in Tariff
Total generating capacity of renewable energy installations registered for Feed-in Tariff
Transport
% reduction in transport CO ₂ emissions, from 2005 levels
% of journeys by walking, cycling and public transport
% of journeys to the city centre by walking, cycling and public transport
Resources and waste
Amount of residual waste generated per household, per year
% of domestic waste recycled or composted
Food
To be developed
Green spaces and waterways
Number of trees planted per year
% of Manchester covered by tree canopy

ANNUAL REPORT

Manchester Climate Change Agency will publish an annual report that sets out the city's progress against the strategy's objectives, progress in the delivery of the latest implementation plan, and areas where new activities are needed to ensure we remain on track to meet our objectives. Reports will be available from:

www.manchesterclimate.com

Headlines from this annual report will also be included in the annual 'State of the City' report, which is produced on behalf of the city by Manchester City Council, to report on progress against *Our Manchester*. The report will be available from:

www.manchester.gov.uk

ONGOING REPORTS AND NEWS

Ongoing reports and news stories will be published at:

www.manchesterclimate.com

8. UPDATING OUR STRATEGY

As set out in previous sections, this first version of Manchester's Climate Change Strategy 2017-50 is being published at a time when ongoing developments in international policy and science makes it difficult to set clear commitments and plans for Manchester. However, to wait for these developments to unfold and provide us with the clarity we ultimately need would be to fail in our duty to respond to the urgent challenge and opportunity in front of us.

This strategy has therefore taken the latest information we have available and used it to develop our first step towards Manchester becoming a zero carbon, climate resilient city. Actions set out in the Implementation Plan 2017-22 will help us to define our next steps, for the period 2023-27, at the same time as taking practical action across all the areas set out in Section 4.

This version of the strategy has therefore been written with a view to being refreshed prior to the development of the Implementation Plan for 2023-27. The intention is that this refresh will include a carbon budget for Manchester, which is consistent with the Paris Agreement, and which includes a pathway and timescale for expending this budget.

9. FURTHER INFORMATION

The latest information on climate change action in Manchester and what you can do to get involved is available from:

www.manchesterclimate.com

To get in touch with Manchester Climate Change Agency email:

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