



Adapting to climate change— a Greater Manchester policy perspective

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EcoCities is a joint initiative between the School of Environment and Development at the University of Manchester and commercial property company Bruntwood. The project looks at the impacts of climate change and at how we can adapt our cities and urban areas to the challenges and potential opportunities that a changing climate presents.

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Summary

This EcoCities working paper maps out the policy landscape on climate change adaptation, focusing particularly on its implications for progress on adaptation in Greater Manchester. Although policy frameworks can rapidly shift, this review offers a snapshot into key pieces of legislation and their implementation as it stands at the beginning of 2012. The paper begins at supra-national level before concentrating on national policy and then strategies influencing the growth and development of Greater Manchester. The conclusion draws together the major implications of the review of adaptation policy, and considers how this may define the scope of partnership working towards ensuring that Manchester is a 'well-adapted' city.

1 Introduction

Adapting to climate change will require responses that address the discord between the current form and function of urban areas and the risks and potential opportunities posed by present and potential future climate. The impacts of weather and climate are clearly seen where their associated extreme events, such as flooding and heat waves, and/or incremental long-term changes exceed the capacity of urban areas to cope with the resulting hazards. Forward looking plans with a clear vision of how to respond to the implications of climate change are needed. These should address both the direct weather and climate impacts and the possible secondary impacts of these changes locally and globally. This position is summed up by the Royal Commission on Environmental Pollution, who stated, in the context of climate change adaptation, that: 'anticipatory or forward planning rather than simple reaction is essential' (RCEP 2010: 1). As the Stern Report indicates (Stern 2006), planned adaptation will be much more cost effective than retrofitting and developing emergency measures. Also, planned adaptation will reduce the likelihood of 'mal-adaptations': inappropriate development on floodplains or actions that compromise mitigation efforts such as mechanical cooling. The Stern Review (2006) into the economic implications of climate change concluded that Government had a role to play in providing policy guidelines and the economic and institutional support to assist adaptation.

Policy frameworks support the development of adaptation responses. Given the diverse and interconnected nature of climate change impacts, these should be targeted across a range of sectors and spatial scales in a way that considers their interdependencies. Supportive adaptation policies, and resulting targeted strategies and actions, can equip cities and urban areas for changing climate patterns, which looks set to influence their future growth and competitiveness. However, much existing policy effort is targeted at mitigation; that is the reduction of the greenhouse gas emissions that are principally responsible for observed and projected future changes in climate (ASC 2010: 6; RCEP 2010: 1). Adaptation remains the poor relation in policy terms, yet there is some evidence of increasing adaptation activity within policy communities, stimulated in part by the recognition of the unavoidable impacts of climate change. Existing policy structures also exhibit links to the adaptation agendas, although responding to the changing climate may not have been central to their development.

This report synthesises current climate change adaptation policy that set the framework for Greater Manchester activity in this agenda. The policy review covers a range of legislation and regulation relating to climate change adaptation, from the supra-national to conurbation level. Particular attention is paid to policies relevant to the development and use of land, since it is through spatial planning and development control systems that climate change policies

can readily be enacted (Blanco and Alberti 2009, Davoudi et al 2010). The report is not exhaustive, particularly at the supra-national level, with greater attention paid to the UK and Greater Manchester scales. Moreover, the policy landscape can shift rapidly, as it has done during the course of the EcoCities project (which began in 2008). A policy review such as this is therefore only a snapshot of the current picture. Nevertheless it is valuable to develop a better understanding of the current status of adaptation policy in order to identify opportunities to build upon, and to highlight potential gaps and weaknesses (particularly at the local level) that if addressed would bolster the position of decision makers looking to develop and implement adaptation responses.

This report begins with an overview of supra-national adaptation policy, focussing on the United Nations Framework Convention on Climate Change, the European Climate Change Programme and European Directives that impact to adaptation. High level commitment at the global and EU scales is building behind adaptation, with associated programmes and initiatives emerging. It is also apparent that, in the form of EU Directives, current policy structures exist that, if implemented effectively by EU member states, offer significant potential to advance adaptation goals.

Midway through the EcoCities project, a UK general election resulted in a change of government. Combined with a fiscal crisis and a reorientation of government policy towards deregulation and deficit reduction, the national policy framework has substantially changed and, at present, the implications for climate change adaptation are uncertain. However, the Climate Change Act (2008) survives as the key piece of statutory legislation. The summary of national policy begins with its influence on the work of key UK government departments. It then covers the remits of specific departments before focussing on changes in policy and planning frameworks that may impact on climate change adaptation, particularly for local authorities. The implications of recent national level governance changes for regional level activity on climate change adaptation, particularly the loss of Regional Development Agencies (RDAs), are also explored.

The report then turns to Greater Manchester, the key focus of the EcoCities project. It is significant that the Greater Manchester Strategy, the overarching document guiding the future growth and development of the conurbation, highlights adaptation. Other relevant ongoing strategy initiatives include the Greater Manchester Spatial Framework and the Greater Manchester Climate Change Strategy, each of which emphasises the role that adaptation has to play in the future growth and development of Greater Manchester. These strategy frameworks provide a basis to take forward adaptation responses, and demonstrate support for this agenda amongst local decision makers.

Despite the hollowing out of legislation, regulation and guidance at national and regional scales, Greater Manchester has been able to embed the adaptation agenda within key strategic policy document. The key challenge is now to translate high level strategic goals into practice. The reduction in national and regional level support makes this more difficult, but the potential benefits to Greater Manchester, competing with cities on the European and global stage, are significant. In an era where climate change impacts look set to influence the growth and development prospects of urban areas, a competitive advantage is to be gained by those that respond most efficiently and effectively to the challenge.

2 Supra-national scale: high level policy support

2.1 The United Nations Framework Convention on Climate Change

The [United Nations Framework Convention on Climate Change](#) (the Convention) stems from the United Nations Conference on Environment and Development (the Earth Summit) of 1992. The Convention was originally focused on stabilising and reducing greenhouse gas emissions, although it has steadily expanded and now includes a prominent adaptation element. It is the key international treaty relating to climate change, and has resulted amongst other things in the development of the Kyoto Protocol.

At the Convention's first Conference of the Parties (COP) annual meeting (Berlin, 1995), the topic of adaptation was institutionalised via the agreement of a three-stage approach to adaptation, essentially involving the planning and implementation of adaptation measures. As a result of action taken within the Convention, there now exist several funding mechanisms (administered by the Global Environment Facility) to support adaptation action on the ground, principally in developing countries (Institute of Development Studies 2006).

The [Bali Action Plan](#), passed by the Convention in 2008, highlights adaptation as one of the five key building blocks on which effective future responses to climate change must be developed. The plan notes that there are four key areas of concern for moving forward with the adaptation agenda. These are:

1. Improving national planning for adaptation.
2. Enhancing financial and technical support.
3. Improved knowledge sharing.
4. Strengthened institutional arrangements.

The Cancun Agreements, the outcomes of COP 16 published in 2011, goes further and calls for enhanced action on adaptation, particularly in developing countries which are most vulnerable to climate change impacts, stating that:

Adaptation must be addressed with the same priority as mitigation and requires appropriate institutional arrangements to enhance adaptation action and support (UNFCCC 2011: 3).

The resulting [Cancun Adaptation Framework](#) aims to enhance adaptation action at national and sub-national levels. Due to the supra-national nature of the

Convention, direct links to Greater Manchester are limited. However, the Convention does represent the bedrock of international efforts concerning climate change, and in this respect is vital to future collaborations to enhance adaptation policy and practice. The Convention remains the key process through which international agreement can be secured on climate change issues. Consequently, as adaptation continues to rise up the political agenda, it provides the best vehicle to develop coordinated global strategies to address climate change impacts. Increased adaptation activity in this arena over recent years in the form of communications and actions within the Convention demonstrate that this is now taking place.

2.2 The European Climate Change Programme

The first European Climate Change initiatives started in 1991, and related directly to reducing CO² emissions and increasing energy efficiency. Since then, with the increasing scientific consensus around climate change and the adoption of international agreements such as the UN Framework Convention on Climate Change and the Kyoto Protocol, the EU has taken more direct action to further climate change policies in its member states. Launched in 2000, with the ongoing second phase beginning in 2005, the [Climate Change Programme](#) focused on this challenge, particularly on implementing the Kyoto Protocol. The Climate Change Programme is the central plank of EU climate change policy, and is a key element of the supra-national framework overarching work on climate change impacts and adaptation at the UK scale.

In recognition of the inevitability of some degree of climate change impacts and the need to respond to them, the Climate Change Programme includes a working group on impacts and adaptation. This group coordinates activities in this field, and played a key role in the development of a White Paper, [Adapting to climate change: towards a European framework for action](#). An overview of the White Paper is given in 2.2.1 below.

2.2.1 Adapting to climate change: towards a European Framework for Action

Adopted by the Commission of the European Communities in 2009, the stated objective of the White Paper is: ...'to improve the EU's resilience to deal with climate change' (Commission of the European Communities 2009: 7). It notes that this is necessary in order to respond to the impacts of climate change in areas including food, health, transport and ecosystems. The economic case for adaptation is also outlined, echoing the findings of the Stern review (Stern 2006). The White Paper begins with the premise that:

Adaptation is already taking place but in a piecemeal manner. A more strategic approach is needed to ensure that timely and effective adaptation measures are taken, ensuring coherency across different sectors and levels of governance. (Commission of the European Communities 2009: 3)

The White Paper aims to stimulate further work on the development of an integrated and coordinated approach to adaptation across the EU. The White paper recognised that although adaptation responses are being developed at national, regional and local levels across the EU, coordination is nevertheless needed, for example where climate change impacts cross national boundaries and where sectors are affected that operate beyond the nation state level, such as agriculture and energy. It is acknowledged that EU level strategy and guidance can also help to spread best practice.

Stemming from the White Paper, phase one of the EU's Adaptation Framework (2009-2012) aims to build capacity to develop an EU-wide adaptation strategy in phase two (beginning in 2013). Phase 1 is guided by four 'pillars of action':

1. Developing the knowledge base
2. Integrating adaptation into EU policies
3. Employing a combination of policy instruments to ensure effective delivery of adaptation
4. Stepping up international cooperation on adaptation

The White Paper, and the Adaptation Framework that it establishes, demonstrates EU level commitment to the adaptation agenda. It also aims to stimulate, support and resource a more coordinated approach to adaptation in order to: ...provide a sustainable and sound economic basis for future generations (Commission of the European Communities 2009: 16).

2.3 European Directives

The EU Adaptation White Paper and Adaptation Framework were developed in direct response to emerging evidence of climate change. There are additional pieces of EU legislation that offer opportunities to embed adaptation responses into emerging plans programmes and projects. These exist in the form of 'Directives.' Directives are legislative acts that require EU member states to achieve defined outcomes within prescribed timescales, although they often offer member states considerable flexibility as to how the outcomes are achieved, although legislative changes will generally be necessary.

Although most existing EU Directives were not developed with adaptation as a key driver, they do nevertheless constitute important elements of the existing supra-national policy framework on climate change adaptation. It is also significant that they are already embedded into policy making and practice, and therefore do not need the same level of investment of resources and capacity building to begin to deliver adaptation benefits that new initiatives would do. There follows an overview of four EU Directives that display clear links to the adaptation agenda and offer opportunities, backed by legislative weight, to develop and implement strategic and project based adaptation responses in EU member states.

2.3.1 The Water Framework Directive

Adopted in 2000, the [Water Framework Directive](#) (WFD) is the most significant piece of EU legislation relating to the water environment, and sets the context for much of member states policy on water management. It integrates a range of water-related directives, which have now been repealed. The aim of the WFD is to protect and prevent further deterioration of water by achieving 'good water status', which is defined by the WFD and includes qualitative and quantitative element, in all European coastal, surface water and groundwater bodies by 2027. River Basin Management Plans (RBMPs) are the key delivery mechanism of the Directive and contain strategies for meeting good water status within river basins.

Climate change adaptation in urban areas has much to do with the management of water resources in the context of flooding, water supply and demand, and water quality. Climate change will significantly influence water quality, for example through increasing pollutant concentrations in water bodies during periods of low flow. It will also impact on water quantity issues through, for example, increasing demand for groundwater resources and irrigation capacity. The WFD does not make specific reference to climate change. However, there are strong implicit links to the adaptation agenda within the legislation. These concern developing responses within RBMPs to address the effects of climate change that threaten the achievement of the goals of the WFD. Further, the WFD also incorporates the aim of helping to mitigate flood and drought impacts. As coastal waters are covered by the Directive, climate change induced sea level rise is also relevant to the WFD. Ultimately, to meet the requirements of the directive, RBMPs must consider future climate change impacts. The overarching framework that the WFD provides for organisations such as environmental authorities, local planning authorities and utilities companies should be seen as an important element of coordinating their response to climate change impacts. Also, as the WFD is familiar to planners and other environmental managers, it provides an accessible route into the adaptation debate around the water environment.

2.3.2 The Floods Directive

Adopted in 2007, the [Floods Directive](#) provides a framework for the assessment and management of flood risk, and applies to all inland and coastal waters across Europe. The Directive aims to reduce the negative impacts associated with flooding on human health, the environment, cultural heritage and economic activity. It has a number of core requirements leading to the production of flood risk management plans (by the end of 2015) for areas identified as being at risk of flooding. These include identifying areas potentially at risk of significant flooding and preparing flood hazard and flood risk maps. Coordinated action within shared river basins is required. In England and Wales, as is the case with the WFD, DEFRA is responsible for transposing the Floods Directive into UK law and the Environment Agency is responsible for the implementation of the Directive.

Climate change projections indicate that in Greater Manchester changing rainfall patterns, particularly increasing winter precipitation and extreme rainfall events, could contribute to an increased risk of flooding ([Cavan 2011](#)). Reacting to changing patterns of flood risk is a key element of adapting to climate change. The Directive recognises and responds to this risk at an EU scale through requiring an assessment of potential future flood risk accounting for land use change, and of the impacts of climate change within areas identified as currently being at risk. It also notes that when reviewing and updating flood risk management plans, the likely impacts of climate change should be considered. Although flooding is the core focus of the Directive, there are indirect links to other adaptation themes, for example the impact of contaminated flood water on water quality in urban water courses.

In many ways, climate change adaptation lies at the heart of the Floods Directive, and it is clear that it goes significantly beyond the WFD in this respect. The omission of reference to climate change within the WFD, which now forms a key element of the Floods Directive, is reflective of the increasing attention to this issue amongst policy makers. However, it is expected that the Floods Directive and the WFD will be aligned in terms of their implementation in practice, and the development of flood risk management plans and RBMPs should ideally therefore be integrated. The Floods Directive provides an important overarching framework for activity on flood risk management, and places climate change adaptation firmly within the scope of high level EU policy.

2.3.3 The Environmental Impact Assessment Directive

[Environmental Impact Assessment](#) (EIA) is the process of assessing the potential environmental impacts of projects prior to their implementation. The aim of the EIA Directive (adopted in 1985) is to integrate environmental considerations into

project decision making and, where possible, to help mitigate the potential environmental consequences of projects in a preventative manner. There is no statutory duty on the part of developers to accept recommendations arising from the EIA process. However, EIA does help to ensure that project decisions are taken in light of their potential environmental effects. Projects requiring mandatory EIA include a wide range of large scale developments such as energy generation and supply infrastructure, chemical installations, various transport developments, and large groundwater abstraction initiatives. A screening process is used by competent authorities to determine whether projects not falling within specified mandatory categories, yet are likely to have significant environmental effects, should be subjected to EIA.

The EU White Paper promotes the use of EIA for identifying and recommending responses to the climate impacts linked to new projects. The White Paper therefore recognises that EIA has the potential to integrate climate change adaptation into development planning. However, the EIA Directive does not make direct reference to climate change adaptation. It does, nevertheless, require the direct and indirect effects of projects on climatic factors to be considered. The assessment of interrelationships between factors included within the scope of the Directive, for example climatic factors, water and soil must also be considered. Seen in this way, the Directive can be interpreted as having strong links to adaptation themes. It is also significant that the Directive requires the cumulative environmental impacts of projects to be addressed. Issues such as increasing flood risk and the depletion of groundwater resource are the result of many individual development decisions. EIA, which is preventative in nature, provides the scope to reduce the incidence of cumulative climate change impacts such as these. Further, there is scope within statutory stages of the EIA process, particularly assessing project alternatives and proposing recommendations to address negative environmental consequences stemming from the project, to incorporate climate change adaptation responses into project planning. EIA offers the potential to make developments more resilient to climate change impacts through influencing issues such as their location and design at an early stage in their planning.

2.3.4 The Strategic Environmental Assessment Directive

The [Strategic Environmental Assessment](#) (SEA) Directive, adopted in 2001, requires an assessment of plans and programmes likely to have significant environmental effects against a defined set of environmental criteria. The aims of the Directive are to protect the environment, to integrate environmental considerations into the preparation of plans and programmes and to increase the transparency of strategic decision making. Plans and programmes covered by the Directive include those setting a framework for future development consent of projects, and those relating to a range of sectors including agriculture, energy, forestry, spatial planning, transport, waste management and water

management. In the UK, Sustainability Appraisal (SA) has evolved to meet the requirements of the SEA Directive. SA goes beyond SEA to include a broader range of social and economic factors in the assessment of plans and programmes.

The aim of SEA is to provide decision-makers and affected stakeholders with timely and relevant information on the environmental impacts of a plan or programme in order to, as part of its ongoing development, make it more environmentally sound. The SEA Directive links to a range of environmental issues. 'Climatic factors' is included within the SEA Directive's list of criteria for assessing plans and programmes against, therefore linking it to climate change adaptation. Reference is also made to water and soil, which links to the impacts of climate change on water quality/quantity and ground conditions. The Directive also mentions that the impact of plans and programmes on health should be assessed, which connects to high temperatures in urban areas. Consideration of the interrelationships between criteria is also required, which broadens the scope of the legislation in climate change adaptation terms. The interrelationships between climate and issues including health, soil and water are fundamental to the adaptation agenda. The Directive also notes the need to consider long-term, synergistic and secondary impacts of plans and programmes on environmental issues, which again chimes with the climate change adaptation agenda.

The SEA Directive has a potentially strong role to play in climate change adaptation. The legislation covers the preparation of a wide range of plans and programmes that link closely to the generation of climate change impacts and the development of responses to these impacts. The EU White Paper on climate change adaptation acknowledges this, stating that SEA should be used to help assess the climate change impacts of plans and programmes. However, SEA is ultimately a decision aiding tool, as is EIA. Although the process of undertaking a SEA, for example during the preparation of a spatial plan, can raise awareness of the impacts of that plan in terms of reducing or exacerbating climate change risk, decision makers must act on the results of the assessment in order to secure any adaptation benefits. Nevertheless, working alongside EIA, SEA provides a powerful tool for assessing the potential environmental impacts of plans and strategies and the projects that they influence. This offers the opportunity for the development a tiered approach to impact assessment in the context of the effects of climate change, which could lead to an enhancement of adaptive capacity across a wide range of sectors.

This introduction to the supra-national policy frameworks influencing climate change adaptation demonstrates that there is commitment to the agenda at global and EU levels. The following section considers the picture from the national level.

3 National scale: emerging central-local relations

Recent policy analyses point to a 'hollowing-out' of the state where the regulatory and welfare regimes of central government have successively been 'rolled-back' (Rhodes 1994). The resurgence of local and regional level governance, which actively engages stakeholders in civil society and businesses, has moved in to fill the policy gap. New spaces to develop partnerships and collaborative policy-making have arisen, often without due democratic accountability (Skelcher 2000; Haughton et al 2010). Coupled with an increasingly interdependent global economy and international commitments, central government's domestic role has become, in rhetoric at least, one of a facilitator and coordinator of action.

This decentralisation, focused on an efficient allocation of resources and a strong emphasis on supporting local and regional action, has been the favoured approach to climate change adaptation at national level in the UK (DEFRA 2010). For climate change adaptation, the role of the UK government is conceived as providing the policy framework to encourage adaptation. Achieving this entails removing any barriers, providing a robust evidence base and leading by example through embedding climate change adaptation within its internal decision-making structures and activities (NAO 2009: 5; DEFRA 2010). Moreover, the UK government's role extends to certain infrastructure networks and public utilities which need to be regulated at national level given their interdependencies in the system as a whole and their operations across regional boundaries.

The *Climate Change Act* (2008) remains the most considerable piece of national legislation providing a framework for adaptation action. Although it principally responds to internationally agreed carbon emission targets, it incorporates adaptation requirements that have since set the tone across UK government departments, non-departmental organisations and their relationship with local authorities. It remains the key piece of legislation even since the election of a Coalition Government in May 2010, since when numerous pieces of legislation have recently made it to the statute books or remain subject to consultation. This policy review at national level is, therefore, highly selective. It takes the *Climate Change Act* (2008) as a starting point and explores its implications for adaptation policies in key sectors, especially those with impacts on the development and use of land such as national infrastructure. It looks at the work of the main government departments charged with effecting climate change adaptation, before focussing on the possible adaptation effects of planning legislation as enshrined in the *Localism Act* (2011) and the *Draft National Planning Policy Framework* (DCLG 2011).

3.1 Climate Change Act (2008)

Part four of the [Climate Change Act \(2008\)](#) specifically deals with adaptation and outlines three main requirements of the UK Government. Firstly, a Climate Change Risk Assessment (CCRA) needed to be completed within three years, and at the time of writing its publication is imminent. Following on from this, a national adaptation plan will be formulated. Secondly, the *Climate Change Act (2008)* led to the establishment of the Committee on Climate Change (CCC), an independent body dealing with reducing carbon emissions and meeting carbon targets. As part of this, the impartial 'Adaptation Sub-Committee' was formed to input into the methodology of the CCRA, monitor progress and scrutinise further legislation on climate change adaptation. Thirdly, the *Climate Change Act (2008)* provided Department for the Environment, Food and Rural Affairs (DEFRA) with powers to oblige organisations with specific national functions, such as the provision of transport networks and water utilities, to report on their progress towards adapting their organisations to meet the climate change challenge. Each adaptation requirement is discussed in the subsequent sections.

3.1.1 Climate Change Risk Assessment (CCRA)

Due for publication at the end of January 2012, the CCRA draws together evidence and analysis to:

- 1) inform the government's understanding of the risks and opportunities afforded by climate change, where risk is a consideration of the likelihood of an impact and the magnitude of its consequences.
- 2) compare the risks posed by a changing climate with other pressures on the Government.
- 3) prioritise adaptation policy.
- 4) assess the costs and benefits of adaptation actions (the Adaptation Economic Assessment).

This will be the first in a series of quinquennial risk assessments. The first report uses existing evidence and covers key climate risks for 11 priority sectors as well as exploring the interdependencies between them. The sectors are: agriculture; flood and coastal management; water; marine and fisheries; forestry; biodiversity; business; built environment; transport; energy; and health.

3.1.2 Adaption sub-committee (ASC)

The ASC advises the UK government on preparing the country for the changing climate. Its main role has been to advise on the methodology of the CCRA, to comment on the risks and opportunities afforded by climate change and to scrutinise progress towards 'preparedness' for climate change. Thus far, the ASC have prepared two national level progress reports (ASC 2010; ASC 2011) as well as specific reports for the devolved administrations.

Unlike the mitigation agenda, with set targets to be achieved on future carbon emissions, the uncertain and undefined nature of the outcome of adaptation responses makes them much harder to monitor. The ASC has identified a series of indicators and questions to assess preparedness for changing climatic conditions. The 'adaptation ladder' clearly outlines the role of policy as removing barriers and encouraging adaptation.

The ASC has identified land-use planning; emergency planning; managing natural resources; providing infrastructure; and designing and renovating buildings as the five priority areas to manage the changing climate (ASC 2010). To date, they consider the UK to be coping with the current climate but, critically, that strategic decision-making is not fully incorporating risks. Land-use planning and water resources are identified as particular challenges. For example, every one of the nine local authorities that ARUP surveyed for the ASC report had increased building footprint in areas at risk of pluvial flooding, with four local authorities increasing it above the average for development across the entire locality. For eight out of nine of the local authorities, overall building footprint increased in areas at risk of river flooding although at the same proportion in the case studies as a whole. (ARUP 2011: 53; ASC 2011: 9).

3.1.3 Adaptation reporting powers

DEFRA coordinates the Government's adaptation strategy, while the Department of Energy and Climate Change (DECC) has led on mitigation. The *Climate Change Act* (2008) permitted DEFRA to require strategically important organisations responsible for public utilities and critical infrastructure to report to Government on how they are assessing and addressing the risks and opportunities that climate change poses to the delivery of their services. This 'Adaptation Reporting Power' makes it statutory for 91 key public bodies and utilities to report their plans between 2010 and 2011. Along with voluntary submissions, over 100 organisations have reported from sectors including water, energy, transport, the regulators and other public bodies. These reports will be synthesised and, along with the CCRA, form the basis of the future National Adaptation Plan.

3.2 Departmental Adaptation Plans and Programmes

All sixteen of the major government departments have produced climate change departmental adaptation plans (DAPs) that have since been updated following the General Election (see section 3.2.5). This review focuses on those bodies responsible for a large part of climate change adaptation strategies and cross-Government programmes, particularly those inaugurated by DEFRA, DCLG and the Environment Agency.

3.2.1 Adapting to Climate Change Programme (DEFRA)

To co-ordinate work on climate change adaptation across the public sector, the Adapting to Climate Change (ACC) Programme began in 2008. DEFRA acts as central co-ordinator for the Programme with a large team dedicated to climate change adaptation. The Programme is in two phases. Phase 1, from 2008-2011, has laid the groundwork necessary to implement Phase 2 that will see the development of a statutory National Adaptation Programme, as required by the *Climate Change Act* (2008). The objectives of Phase 1 were:

- 1) develop a more robust and comprehensive evidence base about the impacts and consequences of climate change on the UK;
- 2) raise awareness of the need to take action now and help others to take action;
- 3) measure success and take steps to ensure effective delivery; and
- 4) work across Government at the national, regional and local level to embed adaptation into Government policies, programme and systems (Capstick 2010).

Meeting these objectives has involved developing a close working relationship with the UK Climate Impacts Programme (UKCIP) to reach out to stakeholders and deliver relevant evidence and user-friendly tools to assist adaptation.

3.2.2 UKCIP

[UKCIP](#) began in 1997 as a bottom-up organisation that involved stakeholders in research on climate impacts on natural resources. In 2005, UKCIP's remit was expanded to encompass adaptation and engage local authorities and the business sector in this agenda. Until September 2011, it received the majority of funding from DEFRA and worked closely with this department. The Environment Agency has recently taken over this aspect of UKCIP's work. Although there is some uncertainty over how the relationship will unfold and the level of future funding available, it is clear that UKCIP has led to admirable achievements in

providing adaptation information widely and transparently and in creating stakeholder networks (UKCIP 2011: 76).

A further element of the ACC programme has seen the development of reports on key sectors, in particular with reference buildings and infrastructure.

3.2.3 Climate-resilient infrastructure

In 2009, the Cabinet Office launched the Critical Infrastructure Resilience Programme (CIRP), led by the Civil Contingencies Secretariat. The aim of this cross-sector programme was to improve the resilience of critical infrastructure and essential services to severe disruption from natural hazards. By 2011, the Cabinet Office issued its consultation document: *Keeping the Country Running: Natural Hazards and Infrastructure* (Cabinet Office 2011). This complements the *National Infrastructure Plan* (HM Treasury and Infrastructure UK2011), in which climate change was identified as one of the five long-term challenges for infrastructure. Moreover, this plan means that decisions on large infrastructure projects will be taken in Parliament. Subsequently, the ACC commissioned several reports from academic and professional bodies under the climate resilient infrastructure programme. The reports were produced in response to calls from infrastructure owners, investors and insurers for a Government vision and policy on adapting infrastructure to climate change. They included *Climate resilient infrastructure: preparing for a changing climate* (RAE 2011), which outlined the challenges to the transport, energy, water and ICT infrastructure sectors in adapting to climate change and sets out the action that need to be taken. Providers of the country's infrastructure services have to better account for climate risks in their plans, investments and operations. Given the importance afforded to large infrastructure in maintaining the economy and even stimulating it, this will be a key area of Government-led action on climate change adaptation.

The Government has a stated aim on making green, climate-resilient infrastructure a key priority (HM Government 2011: 7). In most cases, their approach will set the framework for market-based responses rather than direct intervention by raising awareness amongst those in senior positions in national infrastructure companies and ensuring that investors and insurers are aware of climate change risks develop appropriate responses to those risks. The Government also notes that that both new and existing infrastructure will need to become more resilient to underpin the transition to a green economy. The Government cite the example of United Utilities building a new pipeline between Merseyside and Bury to ensure adequate water supplies for the north west given anticipated water shortages in the Lake District sources due to climate change (HM Government 2011: 52). The Green Investment Bank will support this process through leveraging investment in priority infrastructure areas, receiving

£3 billion over the next three years for this purpose (HM Treasury and Infrastructure UK: 8).

3.2.4 Building Regulations

The building regulations are codes that set the standards for the design and construction of new developments and, in some cases, retrofits. DCLG periodically reviews the building regulations, with the next batch due for review and implementation by April 2013. DCLG are concerned with over-complexity; the aim of the review will be to iron out inconsistencies, such as the implications of a trend towards air-tight structures encouraged by energy efficiency codes on climate change adaptation where ventilation may be key. Certainly, the next review of Part L (conservation of fuel and power), will consider overheating in buildings. Moreover, 'the Department is committed to ensuring that wherever possible future changes to the Building Regulations seek to incorporate consideration of designing buildings for not only the existing, but also the future climate too' (DCLG 2010: 15).

3.2.5 Sustainability Appraisal

In England and Wales, sustainability appraisal (SA) is an assessment process applied during the preparation of plans and programmes in order to identify their potential environmental, economic and social effects. The results of the appraisal process can be used to strengthen the content of plans and programmes in terms of their contribution to sustainable development. SA's are required to conform to the requirements of the EU SEA Directive. As such, the process offers the potential to incorporate the consideration of climate change impacts during the preparation of certain plans and programmes, notably spatial plans. SA provides an example, as do building regulations codes, of an existing process currently embedded in planning practice that can progress the development of adaptation responses. SA remains a requirement under the current plan making system, although the coalition government are currently determining whether this will carry forward as part of the new planning framework and the preparation of neighbourhood plans (see sections 3.3.2 – 3.3.3).

3.2.6 Greening Government Commitments

In February 2011, DEFRA announced the 'Greening Government Commitments'. Here, the UK government is working towards sustainable development through adopting climate aware policies and procurement strategies for its own estate. Although these predominantly focus on mitigation strategies such as reducing waste and greenhouse gas emissions, government departments are required to be transparent and open about the steps taken to adapt crown estate property and land to climate change. Under the previous government, sixteen key departments published their departmental adaptation plans (DAPs). The DAPs identify policies and priorities in relation to climate change adaptation,

particularly in the development of staff skills and assessing risk. Short progress reports and updates of the DAPS were subsequently published in May 2011 and are intended to 'explain the importance of climate change adaptation to the Government's policy programme and the Green Economy' (DEFRA 2011c)

3.2.7 The Civil Contingencies Act

The [Civil Contingencies Act \(2004\)](#) deals with risk and resilience in the UK to reduce their effects on UK citizens. It evolved in response to a new range of threats including terrorism, climate change and animal/human pandemics. The Act requires the establishment of 'Local Resilience Forums' (based around police force boundaries and involving key stakeholders with a role in emergency planning). These forums must produce a 'Community Risk Register' to outline the nature, likelihood, impact and response to risks identified for a particular locality. The Act also gives the government emergency powers in the event of occurrences such as those outlined above.

The Act defines an emergency in such a way that it includes events that threaten serious risk to human welfare (impacts on human life, property and infrastructure) or the environment (contamination of land, air and water, impacts on plant or animal life). Responsible authorities must prepare plans to respond to such events. Weather and climate related emergencies that fall within the remit of the Act include storms, flooding, gales, snow, high and low temperatures and water shortages. Climate change is projected to increase the frequency and severity of these emergencies. Further, climate change and related impacts link to a range of other potential emergencies outlined by the government, including those concerning human health, animal and plant diseases, and structural failure in the built environment. So, even though climate change is not specifically mentioned in the Act, it clearly has the potential to be a central factor in many of the emergencies that the Act responds to. The Act is currently under review.

3.2.8 Flood and Water Management Act (2010)

Following severe flooding in the UK in 2007, the Government commissioned Sir Michael Pitt to review Britain's capabilities in the event of severe floods (Pitt 2008). Part of the remit was to take the ideas on climate change as set out in the Stern Review and translate them into practical actions. The Pitt Review envisioned a strong role for central Government, noting that:

...direction must come from Government. It is difficult for any single organisation, even those as large as the major infrastructure companies, to interpret the volume and complexity of the technical data involved. Even if they can, the choices any individual firm makes will not always reflect the true costs and benefits to society as a whole. So the Government should

drive adaptation forward, facilitating and regulating the pace of change (Pitt 2008: xi).

DEFRA is the government department responsible for legislation of flood risk, with the Environment Agency the body for delivering action. However, the recent [Flood and Water Management Act](#) (2010) has devolved power further to local authorities, clarifying responsibilities and facilitating more effective partnership working (NAO 2011). Specific consequences of this Act are:

- 1) making the Environment Agency the responsible body nationally for the strategic overview of flood and coastal erosion risk management from all sources of flood risk;
- 2) placing new responsibilities on the 152 upper-tier local authorities (unitary and county councils) to strategically manage and coordinate local flood risk from groundwater, surface water run-off and ordinary watercourses (watercourses other than main rivers and reservoirs). These local flood authorities must produce a strategy for managing local flood risk;
- 3) placing a duty on defined flood risk management authorities to cooperate;
- 4) the requirement of bodies responsible for managing risk, such as local authorities, to act consistently within the framework of local and national flood risk strategies;
- 5) requiring arrangements to be put in place to enable local authority scrutiny of flood risk management activity (NAO 2011: 14).

3.2.9 The Natural Choice

The first natural environment white paper for 20 years, [The Natural Choice: securing the value of nature](#) (HM Government 2011b) sets out a vision in which 'the Government wants this to be the first generation to leave the natural environment of England in a better state than it inherited' (HM Government 2011b: 3).. The prevailing central government narrative of reform, underscored by the NPPF's promotion of economic development, is viewed with scepticism by those engaged in environmental protection for example, the National Trust amongst many others (Reynolds 2011: 5). Partly to ameliorate these concerns, *The Natural Choice* announced the formation of Local Nature Partnerships (LNPs) supported by a £1 million start-up fund. The Association of Greater Manchester Authorities (AGMA) have been one of the 22 successful recipients in the first round of LNP funding (DEFRA 2011d).

Even more relevant for urban areas, *The Natural Choice* contains a commitment to create a Green Infrastructure Partnership. This is designed to support the development of green infrastructure (GI) in England and contains a commitment

to consider how green infrastructure can provide resilience to climate change. Expertise across civil society, professional bodies, local authorities, developers, planners and social housing enterprises, amongst others will be brought together. Communities, particularly in towns and cities, will be assisted in making more innovative use of existing grey infrastructure – such as creating rooftop gardens, small community gardens or living walls. What form this assistance will take has not been detailed.

Initially running for two years, the aims of the Green Infrastructure Partnership are to:

- 1) look at the condition of green infrastructure across England and how it meets communities' needs;
- 2) investigate the scope for improvements, and look at the barriers to green infrastructure in existing areas to meet future challenges such as climate change;
- 3) consider how local communities, planners and decision-makers can best be supported in designing and developing green infrastructure;
- 4) demonstrate the social, economic and environmental benefits that well designed green infrastructure can provide; and
- 5) help people to quantify the costs and benefits of investing in green infrastructure and make the case for new projects (DEFRA 2011e).

3.3 Changing central-local government relationships

3.3.1 NI 188: Planning to adapt to climate change

Previous local government reforms resulted in the development of a new series of national outcomes and associated national indicators (NIs) against which the performance of local authorities is to be assessed. Contained within a national framework of 198 indicators was NI188, which related to 'planning to adapt to climate change', and required local authorities who selected this as one of their priority indicators to report on their progress towards developing climate change adaptation plans. Measuring tangible adaptation outcomes was not possible in the same way as other elements of the indicator set, so NI 188 was developed a process indicator. Assessment took place on a 5 point scale stretching from a baseline of recognising adaptation issues up to implementation, monitoring and continuous review of a local adaptation action plan. The aim of this indicator was to, at the very least, encourage local authorities to think about climate change impacts and the development of suitable adaptation plans.

Following the General Election in May 2010, the new coalition believed monitoring by central government in this fashion imposed an unnecessary layer of bureaucracy on local authorities who, in any case, would be having their budgets substantially cut in a time of fiscal crisis. The National Indicator set and its monitoring through Local Area Agreements was abandoned. DEFRA highlights that it largely fulfilled the aim of raising awareness, in which case local authorities should be freed up to implement adaptation strategies for their identified priority impacts and locations. Although DEFRA still uses NI 188 guidelines to encourage local authorities to undertake voluntary self-assessments (DEFRA 2011b), the loss of this mechanism removes a level of accountability for local authorities to take adaptation action.

3.3.2 The Localism Act

The Coalition agreement, formulated in May 2010, stated the intentions of the new Government to usher in new legislation based on the Conservative Party's vision for *Open Source Planning* (The Conservative Party 2010). The [Localism Act](#), passed by Royal Assent in November 2011, transfers powers from central government down to local level. As a consequence, Regional Spatial Strategies, and the Regional Development Agencies (RDAs) that oversaw them, have been abolished and power decentralised down to neighbourhoods and local communities who now have the opportunity to form their own neighbourhood plans to guide local land use and development.

RDAs were non-departmental public bodies funded by central government to deliver its objectives at regional level. Whilst not democratically accountable, the RDAs effectively co-ordinated data and expertise in a strategic manner across traditional spatial planning boundaries being particularly effective at engaging with local businesses (House of Commons 2010: 175). They were key bodies in encouraging local authorities, businesses and other organisations to tackle climate change (Kazmierczak 2012). In the north west of England, the document [Rising to the challenge: a climate change action plan for England's Northwest](#) (NWDA/GONW/NWRA/EA 2006) stated that climate change is a 'make or break' issue for the region, and outlined a vision to work towards a 'well adapted' region by 2020. Although it was left for other agencies and authorities to deliver adaptation actions, the Action Plan and associated regional programmes and initiatives did progress the adaptation agenda in the region. However, with the emphasis now firmly on localism and neighbourhood solutions, the RDAs have been replaced by Local Economic Partnerships (LEPS), which have limited central government funding and virtually no environmental capabilities. The government has worked to address this latter criticism through the recent announcement of Local Nature Partnerships (LNPs) (see section 3.2.9 above).

It is believed that much of the RDA functions are transferred to national level (HM Government 2010b: 45). Meanwhile, DEFRA grant funding has provided £405,000 of support to 9 independent [climate change partnerships](#) (CCP) across England to maintain some continuity while regional governance arrangements are in flux. The CCPs are now responsible for local input into the CCRA and have facilitated workshops with key local players (DEFRA 2011b). The adaptation reporting powers contained within the *Climate Change Act* (2008) also mandate some adaptation activity at sub-regional and regional scales. For example, in the north west of England, utilities companies including United Utilities and Electricity Northwest are required to assess and report on climate change risks, opportunities and adaptation responses.

3.3.3 The National Planning Policy Framework

Currently in its draft stages and expected to become law in 2012, the [National Planning Policy Framework](#) (DCLG 2011) is framed in the spirit of the Localism Act and has proved to be a particularly thorny piece of legislation for the current UK government and has significant implications for climate change adaptation.

Prior to the NPPF, climate change adaptation in England was addressed through a series of Planning Policy Statements (PPS) and specific guidance. DCLG's supplementary PPS on planning and climate change, issued in 2007, considered adaptation alongside mitigation. These legislative and policy arrangements for addressing climate change through the planning system were considered by the Royal Commission on Environmental Pollution to be 'fragmented and convoluted' although with emergent frameworks of potential value (RCEP 2010: 46). In 2010, DCLG revised the PPS1 supplement on planning and climate change to consolidate it with PPS22 on renewable energy. PPS20 on coastal planning was replaced with an updated supplement to PPS25 on development and flood risk. The RCEP also noted other underlying problems; particularly in the training and professional capacity of planners to fully consider adaptation when taking development decisions.

The NPPF has sought to simplify planning guidance into a short document. The vision is to devolve power from central government to local communities. For climate change, the assumption is that risks are so inherently uncertain and the impacts locally specific, that responses should be locally generated (DEFRA 2011). With regard to planning for climate change, flooding and coastal change (detailed under the section 'Planning for Places') (DCLG 2011: 42 – 5) the draft NPPF states that when determining planning applications, Local Planning Authorities should apply the 'presumption in favour of sustainable development'. This presumption is the 'golden thread' running through the NPPF although the only guidance at present remains that: 'all plans should be based upon and contain the presumption in favour of sustainable development as their starting

point, with clear policies that will guide how the presumption will be applied locally' (DCLG 2011: 4).

It should be noted that climate change mitigation and adaptation are stated as a strategic priority under the NPPF. Therefore, planning for climate change has a more national direction than other areas. For example, the Government's zero carbon policy must be reflected in 'any local requirement for a building's sustainability' (DCLG 2011: 42). Local plans will also need to be supported by strategic flood risk assessments (DCLG 2011: 44). Indeed, familiar flood risk and coastal protection policies and tests remain necessary even for small-scale developments.

Significantly, the NPPF maintains that sustainability credentials in developments may overcome risks. Green infrastructure is regarded as a panacea to development: section 154 states that any new developments should be planned to avoid increasing vulnerability to climate change impacts and 'care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure' (DCLG 2011: 43).

3.3.4 Responses to the Localism Act

Even though many organisations welcome the simplification of the planning system and a move towards democratic accountability at local level, both the Localism Act and the NPPF have elicited strong objections. These particularly focus on the 'presumption in favour of sustainable development' which is believed to be ill-defined and, therefore, open to interpretation and the threat of untrammelled economic development.

Some are worried about the changing institutional arrangements. Hugh Ellis, chief planner at the TCPA, thinks that the general trend towards no national or regional regulation is a step backwards, particularly in the context of climate change. He notes that we are 'now alone amongst advanced European nations in having no national or regional spatial plan for our development' (Ellis 2011: 3) Therefore, issues with long time-horizons, such as climate change, are without the necessary structures and planning frameworks to take such a long-term view.

Leading professional organisations, such as the RTPI, lobbied for the inclusion of certain qualifications to the approved Localism Act that Labour Party MPs successfully tabled as amendments. These include a 'duty to cooperate' whereby local planning authorities (and county councils that are not local planning

authorities) are required to cooperate in relation to planning for sustainable development. This duty ensures that serious consideration will be given to working together on joint plans where there is a need for cooperation. Moreover, neighbourhood plans have a 'duty to consult' to which the Government will provide regulations that will require neighbourhood planning to specify arrangements for consultation before a neighbourhood development plan or order is submitted. Furthermore, these neighbourhood plans will be subject to local referendum before being adopted.

Think tanks, such as the Green Alliance, consider that nothing in the Localism Act is necessarily a barrier to successful climate change action (Green Alliance 2011). On the positive side, they highlight opportunities linked to the formation of new partnerships, for example through LEPs, which may be conducive to initiating action. More worrying is the lack of money and resources to be diverted into sustaining partnerships and developing neighbourhood plans. Further, action on climate change adaptation will be based on political will and volunteerism. This could mean that central government will be forced to intervene in the future. If those in an LEP, or communities formulating a neighbourhood plan, are not convinced of the need to address climate change let alone recognising a collective responsibility: 'as long as opting out is possible, climate change will not be tackled with the consistency and level of ambition that is needed if national targets are to be met' (Green Alliance 2011: 41).

3.3.5 LRAP and LAAP

In order to support local authority adoption of NI 188, the Local and Regional Adaptation Partnership (LRAP) Board was set up in April 2008 to provide guidance and advice. Working at local and regional level, it aimed to facilitate action on climate change adaptation at a local and regional level, by highlighting best practice, enhancing skills, providing toolkits and encouraging joint working between local and regional agencies. In June 2011, it was relaunched as the Local Adaptation Advisory Panel (LAAP). This will run for two years and will work with the ACC programme, receiving limited funding from DEFRA. The LAAP objectives include to:

- 1) directly influence the work of the HM Government Adapting to Climate Change Programme and its delivery bodies including the development of the National Adaptation Programme and the provision of evidence and interpretation tools.
- 2) help HM Government to devise 'local government friendly' climate change adaptation policy and programmes.
- 3) act as a forum for dialogue between local government, its partners and central Government and its arms length/delivery bodies on local climate

change adaptation work, with a particular focus on priority themes determined by the group (DEFRA 2011f).

Given the focus on voluntarism, reduced role for central state in almost all matters excepting the national infrastructure, it is at local authority level that action on climate change adaptation will be effected. Greater Manchester provides an interesting and evolving example of action on climate change at this level, and evolving conurbation scale governance structures with links to adaptation are discussed in the following section.

4 Greater Manchester scale: strengthening local policy

Greater Manchester has been the key focus of much of the work undertaken within the EcoCities project. There follows an interpretation of relevant overarching policy, strategy and guidance documents developed at this scale, focussing on their links to climate change impacts and adaptation responses.

4.1 The Manchester Multi-Area Agreement

The primary focus of the [Manchester Multi-Area Agreement](#) (MAA), signed by the Association of Greater Manchester Authorities (AGMA) and Central Government in July 2008, is on enhancing economic growth and development within Greater Manchester through encouraging cross-boundary working between local authorities. This goal is to improve the quality of life of residents and working towards safe, strong and prosperous communities. The MAA is based around a series of proposals or 'building blocks' targeted at improving economic performance. Issues concerning productivity, skills and employment are addressed, although the MAA goes further to incorporate factors impacting on economic growth, including climate change and the quality of critical infrastructure.

It is stated that: 'Manchester wants to change the way it works as a city to improve the wealth and well-being of its people' (AGMA and Manchester Enterprises 2008: 5). The MAA outlines a number of factors that could inhibit the promotion of economic growth that the strategy strives for. One of these is stated as: 'climate change and the changing market conditions that it presents' (AGMA and Manchester Enterprises 2008: 10). The MAA does emphasise that sustainable economic growth and addressing climate change are strongly linked, although this is particularly in respect of the opportunities that the low carbon economy presents for growth and employment. Nevertheless, several of the building blocks of the MAA will be influenced by future climate change impacts. These include enhancing inward investment and ensuring that critical infrastructure (transport, utilities) can sustain economic growth. The threats that a changing climate and associated impacts may bring to the economy (for example through impacts on transport or water related critical infrastructure) are stressed within the MAA. In response to this threat, it is noted that infrastructure will be commissioned that can provide for economic growth whilst also encouraging climate change adaptation.

4.2 Prosperity for all: the Greater Manchester strategy

The [Greater Manchester Strategy](#) (GMS) establishes a shared vision and series of 11 strategic priorities for a range of diverse partners working across different sectors and spatial scales within the conurbation. The GMS was approved by AGMA in 2009 and outlines a strategic direction for Greater Manchester up to 2020. It provides a common framework for the development of plans and programmes in areas such as transport and housing. The importance of adaptation to climate change is highlighted within the Greater Manchester Strategy. The Strategy notes that:

A timely shift to a low carbon economy and the challenge of adapting to a rapidly changing climate both offer opportunities to the city region. Conversely, failure to cut emissions and adapt to climate change will fundamentally undermine our economic viability and success....Adapting to a changing climate and boosting our resilience is also integral to our future success (AGMA 2009: 43).

Recognition of the need to adapt to climate change impacts within what is the overarching strategic document guiding the growth and development of Greater Manchester to 2020, emphasises that responding to the changing climate is seen as an important exercise locally. The GMS sets out a range of objectives, some of which refer to delivering on adaptation issues. These include:

- Apply cross cutting sustainability principles to procurement, transport, spatial planning and investment activities, and prioritise the retrofit of existing domestic and commercial stock to underpin the transition to a low carbon economy, which is resilient to a changing climate.
- Develop a robust understanding of critical infrastructure, strengthen accountabilities and improve the security of supplies and by investing in measures to make it fit for purpose for a low carbon, resilient and growing economy.
- An across-the-board improvement in the development and management of the city region's public realm, including design quality, its contribution to the visitor experience, cultural and heritage interpretation, signage and wayfaring and sustainability, particularly in the face of climate change and the urban heat island effect. This should be accompanied by a programme to increase green infrastructure and urban tree cover (AGMA 2009: 44-56).

The GMS makes a clear statement that future economic prosperity and improving levels of quality of life in Greater Manchester depends, in part, on adapting to the changing climate. A series of Greater Manchester scale strategies, assessments and guidance documents, some complete and others currently in development, provide a supporting framework for decision makers and stakeholders to progress towards this goal. These are introduced below.

4.3 The Greater Manchester Spatial Framework

The [Greater Manchester Spatial Framework](#) (GMSF) is currently being prepared by the AGMA Planning and Housing Commission, and will underpin the delivery of the GMS. In effect, the GMSF will be the spatial expression of the GMS, providing a framework to guide the location of development and investment in Greater Manchester. A series of 'topic papers' have been developed to inform GMSF preparation, and provide an overview of its scope and focus. There is reference to climate change adaptation issues within these topic papers, indicating that this agenda will feature within the GMSF.

A topic paper produced on the infrastructure dimensions of the GMSF provides the fullest insight into the adaptation dimensions of the framework. This document notes that there is a need to develop a better understanding of the implications of climate change for the long-term viability of infrastructure, and that lack of a long-term approach to infrastructure maintenance and provision could make climate change adaptation more difficult. It is stated that: 'providing high-quality development that is economically and environmentally sustainable in the face of existing risk and climate change is a significant challenge' (AGMA 2010a: 10). Strengthening flood risk management is noted as a key adaptation response in this respect, as is green infrastructure provision. The topic paper states that new skills are needed to understand the impact of climate change more clearly. It is also noted that further Greater Manchester scale collaborative work will be necessary over the coming years in the fields of water supply, waste water and drainage, flood risk management and green infrastructure, all of which exhibit climate change adaptation links.

An initial set of spatial principles to embed within the GMSF have been proposed, which in terms of climate change adaptation include:

- To use sustainable drainage systems (SuDS) to deal with surface water management and attenuation on or adjacent to development, without the need for public sewer connection;

- To ensure that cross cutting opportunities to deliver a range of priorities such as flood risk management, addressing climate change impacts and reducing carbon, low carbon energy, promoting tourism and recreation, increasing health and well being and increasing biodiversity are supported and delivered;
- To ensure that the opportunities for and potential of urban green networks and small scale interventions to deliver strategic green infrastructure functions are fully captured and maximised;
- Where green space is limited, to maximise use of green roofs, as an integral component of a SuDS system, to provide additional cooling, thermal performance, biodiversity, air quality and public health benefits;
- To direct the most vulnerable development and critical infrastructure to areas of least flood risk to reduce the need for additional infrastructure.’ (AGMA 2010a: 13-4)

Although the final version of the GMSF has yet to be signed off, it appears that spatial principles relating to adapting to climate change impacts will be included. The spatial principles outlined above demonstrate that climate change impacts, including flooding and the urban heat island effect, are recognised as challenges that Greater Manchester must address in order to achieve its full potential.

4.4 The Greater Manchester Climate Change Strategy

The [Greater Manchester Climate Change Strategy](#) (GMCCS) was completed and approved by AGMA in 2011, and is intended to support the delivery of the climate change aspirations of the GMS. AGMA’s Environment Commission is responsible for leading the implementation of the GMCCS. The strategy provides a strategic framework to embed climate change within plans and programmes developed at the conurbation and district level. These include the Greater Manchester Energy and Local Transport Plans and the Spatial Framework, and spatial plans and climate change strategies prepared at the district level. The GMCCS is also intended to support climate change planning and action undertaken by other organisations within the public and private sector. The GMCCS sets out actions to be taken within different sectors to deliver on four overarching objectives. One of these relates to adaptation, and states that: ‘We will be prepared for and actively adapting to a rapidly changing climate’ (AGMA 2011: 18). Adding substance to this overarching objective, two indicators are set out to track Greater Manchester’s adaptation progress. These are:

- The extent, quality and productivity of green spaces and tree cover;
- The number and quality of resilience plans and adaptation strategies (AGMA 2011: 22).

The adaptation element of the GMCCS acknowledges the science of climate change, and highlights some of the key associated impacts faced by Greater Manchester, including those originating in other parts of the world. The adaptation objective, alongside the other three objectives that form the backbone of the strategy, are translated into a series of actions across five interconnected themes; buildings, energy, transport, green spaces and sustainable consumption. Enhancing resilience to climate change impacts through implementing adaptation responses features within the buildings and transport themes. Green spaces are identified as a key adaptation response.

The GMCCS aims to position Greater Manchester as a leading city in the transition to a low carbon economy, and also one where adaptation to climate change impacts is a prominent feature of strategy and action. The benefits of doing so for economic prosperity, and in terms of securing competitive advantage for the conurbation, are at the forefront of the drivers behind the GMCCS. AGMA cross-boundary governance arrangements spanning the sectors and agendas underlying the strategy are in place to support future climate change strategy development and action.

4.5 The Greater Manchester Strategic Flood Risk Assessment

From the outset, the [Greater Manchester Strategic Flood Risk Assessment](#) (SFRA), approved by AGMA in 2008, recognises the need for adaptation to climate change, noting, for example: 'sewer and surface water flooding are likely to become more frequent and widespread under urbanisation and climate change scenarios' (Scott Wilson 2008: Ch1.8). General policies suggested within the SFRA are based on catchment flood management plans (CFMPs) and the recently repealed PPS25. For example, relating to CFMPs, it is noted that authorities should: 'Take further action to sustain the current scale of flood risk into the future (responding to the potential increases in flood risk from urban development, land use change, and climate change)' (Scott Wilson 2008: Ch 4.2.1).

In terms of specific actions, it is noted that local authorities should develop approaches to incorporate flood proofing measures to respond to increases in future flood risk such as raising finished floor levels in new development designs, and/or creating compensatory flood storage basins. Joint working between local authorities is also promoted. The SFRA proposes a range of objectives to meet the goal of reducing flood risk which include creating accurate flood risk maps, developing surface water management plans and promoting the use of sustainable drainage systems (SuDS). Progress has been made in these areas,

including the development of the hybrid Trafford-Salford-Manchester SFRA (JBA Consulting 2011).

Although the Greater Manchester SFRA does not carry the weight of a statutory document, it does provide important targeted guidance and local insights into one of the key climate change risks facing Greater Manchester.

4.6 Towards a Green Infrastructure Framework for Greater Manchester

The document [*Towards a Green Infrastructure Framework for Greater Manchester*](#), developed by The Environmental Partnership (TEP) TEP for AGMA and Natural England in 2008, focuses on developing responses to climate change impacts using green infrastructure (GI), and explores the feasibility of developing a Greater Manchester GI framework. It notes that: 'there is an economic and social need to futureproof our urban areas against the effects of extremes of heat, rainfall and occasional drought...' (TEP 2008: 14). GI is proposed as a response to this challenge via the role it can play in flood risk management and climate change adaptation. For example, it is noted that GI can be used to 'manage storm flows and free up water storage capacity in existing infrastructure to reduce risk of damage to urban property, particularly in the City centre and vulnerable urban regeneration areas' (TEP: 13). The cooling and shading capacity of GI is also noted.

A number of priorities are given for a GI framework for Greater Manchester. Several link to adaptation. These are:

- to sustain and increase canopy cover and urban greenery in town centres, high density residential areas and in areas subject to urban regeneration and densification;
- ensure doorstep access to significant greenspaces and waterways and ensure such places are well managed;
- create and maintain corridors and/or 'stepping-stones' of greenspaces, especially south to north and lowland to upland;
- promote good land and soil management in landscapes of distinctiveness, particularly where these are important for carbon storage e.g. the Mosslands and the Pennine fringes;
- increase woodland cover, particularly on derelict and brownfield land where soils have little value for food growing and usually have little existing carbon storage.

- protect most efficient and irreplaceable soil-based carbon sinks e.g. deep peat soil (TEP 2008: 41).

In terms of a way forward TEP gives clear recommendations that AGMA: 'promotes a framework for GI as an early action to influence spatial and infrastructure planning across the whole city region. This should be formalised into a city regional strategy with delivery arrangements once the overall extent and timescale of growth is clear' (TEP 2008: 24). The Framework document is intended to enhance awareness and capacity across a wide range of Greater Manchester stakeholders of GI as a key element of spatial policy. Working in a similar way to the SFRA, the GI Framework document enhances the knowledge base at the Greater Manchester scale to develop and implement adaptation responses. Work is currently ongoing by the AGMA Planning and Housing Commission to take forward work undertaken by TEP to develop a Greater Manchester Green Infrastructure Action Plan, which will help to coordinate GI investment and activity across the conurbation.

5 Climate change adaptation policy: a Greater Manchester perspective

Coordinated institutional frameworks tasked with supporting, developing and implementing adaptation policies and strategies are an important element of reducing climate change risk. The Royal Commission on Environmental Pollution (RCEP), within their report *Adapting Institutions to Climate Change*, note that institutions must recognise that vulnerability to climate change will increase over the coming decades, and that they should address this challenge proactively and systematically following a flexible and iterative approach (RCEP 2010: 95). They go on to state that: 'The key message is that building adaptive capacity needs to be embedded as part of the routine business of institutions' and that: '...organisations will need to ensure that their policies and programmes address, and reduce, vulnerability to climate change, and exploit opportunities to increase resilience' (RCEP 2010: 95 - 6).

This review demonstrates both strengths and weaknesses in the current framework of policies overarching and guiding the development of adaptation responses in Greater Manchester. At the supra-national level, the European Adaptation Framework and a series of relevant EU Directives present opportunities to stakeholders working to embed adaptation more firmly within policy and practice at national, regional and local scales. Existing processes such as EIA and SEA, and actions taken to meet the goals of the Water Framework and Floods Directives, should be seen as important elements of the adaptation response.

In the UK, the economic downturn and the change in central government has shifted the national policy landscape considerably since 2010. While there is a broad high level framework in place that can encourage climate change adaptation, this is largely based on voluntary action and is not backed up by guidance to support responses at the local level. Other elements of UK policy are harder to remove and will provide a significant legislative incentive to adapt, such as the building regulations. Moreover, the Government's 'hands-off' strategy and rhetoric does not apply to infrastructure and utilities that cross spatial boundaries and are regarded as public goods. Here further legislation and, crucially, funding paths will be needed to ensure the implementation of adaptation responses.

However, the process of deregulation that is ongoing in the UK, particularly in the realms of planning and development control, is removing legislation and regulation that had previously supported the development of adaptation responses. Recent changes creates a gap in strategic planning above the district

level, which does not benefit the development of responses to climate change risks such as flooding. It is hard to imagine that climate change adaptation will be at the forefront of the minds of neighbourhood planners who, in a time of limited funding, may prioritise other more immediate goals such as spending on health and education. Indeed, research by the think tank, the Green Alliance, highlights that as a result of the changing legislative context, 37% of local authorities indicated that they will de-prioritise climate change with a further 28% narrowing their ambitions in this area. However, around 35%, including Manchester City Council, have more progressive aims and remain firmly attached to commitments on climate change action for both adaptation and mitigation (Green Alliance 2011: 15).

Although there appears to have been a loss of strategic policy and guidance on adaptation in the UK, key Greater Manchester governance frameworks are increasingly acknowledging that adaptation is an important issue for the conurbation to address in plotting a more sustainable course of growth and development. Reference to adaptation within influential documents such as the *GMS* sends out a clear signal to individuals and organisations responsible for guiding Greater Manchester's growth and development; responding to the impacts of climate change must be part of the process of realising goals linked to advancing economic prosperity and encouraging sustainable communities. Sitting under the *GMS*, the *GMCCS* and the forthcoming *GMSF* offer detailed and targeted support and direction to the process of adapting Greater Manchester to the changing climate. These strategies are strong building blocks around which adaptation responses can be developed at finer spatial scales and across a wide range of sectors.

Greater Manchester also benefits from a system of governance that allows for integrated cross-conurbation initiatives. *AGMA*, which represents the 10 local authorities located in Greater Manchester, is one of the key executive bodies with an influence over planning and decision making. *AGMA*'s governance arrangements are based around seven commissions tasked with taking forward key cross-cutting priorities. The commissions address issues including transport, economic development, planning and housing and the environment. In 2011, Greater Manchester gained the statutory Greater Manchester Combined Authority (*GMCA*), which is responsible for coordinating issues across the conurbation including economic development, job creation, housing and transport activities. 2011 also saw the creation of the [Greater Manchester Local Enterprise Partnership](#) (*LEP*). The *LEP*, which is a partnership between private sector organisations, the education sector and local authorities, has a remit to remove barriers to and promote long-term sustainable economic growth. The *LEP* is responsible for delivering the *GMS*. Working together the *LEP*, *GMCA* and *AGMA* are well placed to develop adaptation responses at a strategic scale across

Greater Manchester. However, as adaptation at the local scale is now largely a voluntary activity, progress will ultimately depend on whether there is the political will to drive forward this agenda at the conurbation scale. There is nothing in the LEPs per se that requires climate change adaptation, with its goals largely based around delivering on economic growth. AGMA, with their environment commission and the GMCCS, has a more formal adaptation remit and it will be interesting to see the extent to which the economic and environmental agendas cohere as the implementation of the GMS proceeds.

Nevertheless, the combination of conurbation scale governance structures, and the inclusion of adaptation within the strategy documents that these bodies are responsible for implementing, puts Greater Manchester in a relatively strong position to progress the adaptation locally. There exists an opportunity to embed adaptation responses within conurbation wide strategies guiding agendas such as energy, housing and transport. The development of overarching adaptation strategies at this scale suits the mobilisation of responses to challenges posed by a changing climate, many of which, such as flooding and heat stress, do not respect administrative boundaries and are influenced instead by bio-physical forces. The challenge is to capture this adaptation opportunity at the strategic level, align it more closely to the delivery of economic goals, and then work to embed the agenda more comprehensively into practice.

Adaptation to climate change is in many respects a local issue. Impacts differ spatially, often at a fine scale. This is due to a large variety of interrelated factors, for example soil type, which in this case affects issues including the ability of soil to retain moisture and support vegetation under lower precipitation conditions and the extent to which excess rainwater percolates into soils therefore lessening flood risk. Similarly, urban density can influence natural runoff patterns at a fine scale through the existence (or lack of) of hard surfaces such as roads and car parks. As a result of both of these factors (and others including rainfall distribution), we see that in Greater Manchester patterns of surface water flood risk are spatially diverse ([Kazmierczak and Kenny 2011](#)). Ideally, adaptation policy needs to recognise these issues and create an environment that enables locally appropriate responses to be taken by responsible authorities. There are broad adaptation principles contained within high level policy and guidance such as the GMS and GMCCS, but the question is how to effectively translate these aspirations down to the activities of agencies and authorities responsible for taking action on the ground.

One of the most significant challenges in delivering this agenda locally concerns the implications of the financial crisis and the resulting austerity measures facing the public sector. A stakeholder network analysis undertaken within the EcoCities project (Kazmierczak 2011) identified organisations that are central to

communication and collaboration on climate change adaptation in Greater Manchester. The NWDA, Environment Agency and local authorities were identified as particularly significant in this respect. These organisations have suffered as a result of recent economic and political change. Indeed, the NWDA, previously a key player at the strategic level, no longer exists. The Environment Agency will now assume a stronger role as the government's delivery body for advice on climate change adaptation to businesses and local authorities, a remit that was previously UKCIP's. Although they are receiving some additional funding to do so, as an organisation the Environment Agency's budget has been cut by 10% over the current spending period (2011 – 2015) compared to previous periods. The National Audit Office estimates that it will need to find an additional £20 million of funding to protect against flooding due to climate change and improve ageing flood defences (National Audit Office 2010). In addition, capacity within local authorities across Greater Manchester is being eroded due to job losses and funding cut backs. In the private sector also, a focus on cost saving could threaten the inclusion of adaptation measures in new developments.

The LEP proposal to government explicitly recognises this emerging challenge; although Greater Manchester has a policy framework that supports adaptation, progress could be constrained to a certain degree by funding shortages. The proposal document notes that the GMSF will focus in issues including steps to: '...future proof our communities against climate change, within the context of reducing public sector resources' (AGMA 2010b: 24). In effect, local authorities will be asked to do more, but with less funding. Further, loss of personnel capacity and removal of national legislation and policy guidance puts local authorities in a weaker position to deliver adaptation responses. The outcomes of the deregulatory processes nationally, and the loss of the regional tier of governance which included a Climate Change Action Plan for the north west of England, has been to open up a strategic policy guidance and support vacuum between the local and EU scales. This is particularly the case for local planning authorities, which given the local nature of climate change impacts and the significance of spatial planning as an adaptation response, is a worrying development. As noted by the RCEP, local stakeholders and decision makers benefit from higher level policy support:

...it is important that local actors can operate within EU, national and regional strategic policy and regulatory frameworks which take account of the need for, and indeed encourage and co-ordinate, action aimed at adaptation (RCEP 2010: 34).

Returning to the recommendations of the Pitt Review on flooding, the UK government is not acting to: 'drive adaptation forward, facilitating and regulating the pace of change' (Pitt 2008: xi). Despite this lack of strategic

policy, Greater Manchester has shown that it can make progress on adaptation through acting locally. The Localism Bill and the transfer of responsibilities from central to local governments does, in theory, offer Greater Manchester authorities an opportunity, working under the strategic guidance of bodies including AGMA, to advance locally relevant adaptation responses. In order to do so, executive bodies in Greater Manchester will need to recognise and provide solutions to challenges linked to funding, personnel capacity and the availability of strategic guidance for local level adaptation action.

6 Conclusion. The value of supporting adaptation policy locally: enhancing economic and civic competitiveness

Cities and their hinterlands are the engines of economies, whilst also being centres of learning and cultural exchange. Cities, and the competition between them, are key forces for the coming decades. Dobbs et al (2011: 1) note that the top 100 cities ranked by contribution to global GDP growth will generate around 35% of global GDP growth to 2025. They also note that 'middleweight' cities (with populations between 150,000 and 10 million) will be a significant force, gaining GDP share over the coming decade from 'megacities' (which have populations above 10 million). Further, cities are projected to see a population growth rate at 1.6 times the global average (Dobbs et al 2011).

Greater Manchester is positioning itself to compete against Europe's other leading cities in a world where civic power may become an increasingly significant driver of change. This forward looking challenge-focused perspective is reflected in the vision set out in the GMS:

By 2020, the Manchester city region will have pioneered a new model for sustainable economic growth based around a more connected, talented and greener city region where the prosperity secured is enjoyed by the many and not the few (AGMA 2009: 5).

Due to their high concentrations of people and property, risks to cities are magnified. Making towns and cities more sustainable and resilient to the range of environmental, economic and social challenges that they will face over the coming decades is a key policy issue. Adaptation to a changing climate is one aspect of such a holistic response to fitting cities for the 21st Century.

There are potential benefits to be gained by those cities that react effectively to the challenge. The World Economic Forum now places climate change at the top of their Global Risk Barometer, which ranks risks from terrorism to asset price collapse according to their perceived likelihood of occurrence over the next 10 years and their perceived impact in monetary terms (World Economic Forum 2011). If we have reached a situation where the World Economic Forum, a group of the most powerful leaders of business and industry, acknowledges the high level of risk associated with climate change, the topic looks set to influence decision making more strongly over the coming years. In an era of multiple and interacting climate risks, the 'first movers' in the field of adaptation could expect to achieve a boost to their competitiveness relative to other urban areas by instigating adaptation policies and strategies that demonstrate that they are developing a proactive climate change response. It is here that adaptation links

to economic competitiveness and the creation of economic opportunities. Private sector investment decision, including where businesses choose to locate, are influenced in part by perceived levels of risk and uncertainty regarding a particular location. Adaptation policies and strategies can help to reduce perceived risk, and consequently may increase demand for space by residents and businesses in urban areas that actively pursue adaptation responses.

Potential growth and employment opportunities also stem from moving the adaptation agenda forward. Much attention is now being placed on 'green growth' and the low carbon economy. It is possible that in a city such as Manchester, adaptation is at least an equal and perhaps even better prospect for jobs and growth than mitigation (the reduction of greenhouse gas emissions). This is because a good proportion of the technology required for reducing carbon emissions will be imported from beyond the city, whereas it is possible to envisage more local markets for activities linked to adaptation such as building retrofit and urban design. This could be bolstered by the realisation on the part of property owners and businesses that they will need to take the initiative to adapt and enhance their own resilience to climate change, ideally supported by a framework of guidance and actions plans. The level of redesign of the urban fabric needed to increase the resilience of towns and cities to the scale of projected climate change would doubtless be associated with significant levels of investment and job creation. Although many of these may be at the lower end of the skills spectrum, there will also be important opportunities in professional sectors such as environmental consultancy and urban planning and design.

Looking beyond economic competitiveness and growth potential, adaptation connects with many of the key challenges facing urban areas in the 21st Century: from social justice through reducing climate risk to vulnerable groups, to enhancing quality of life in cities via the enhancement of green spaces. It is about creating healthy and agreeable places where people want to live. Progress with adaptation will invariably mean progress in other policy areas. Adaptation should ideally be integrated alongside other relevant issues and concerns within policies and strategies that promote the long term growth and development of cities in a holistic and multifaceted way. The existence of appropriate adaptation policy frameworks, and the delivery of their aspirations, is key step to encouraging the realisation of such opportunities.

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