

**INTEGRATED GM  
ASSESSMENT**  
ENVIRONMENT EVIDENCE BASE

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FINAL DRAFT

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# EXECUTIVE SUMMARY

This document sets out the environment component of the Integrated Greater Manchester Assessment. It has been designed to provide a high-quality evidence base to support the development of Greater Manchester's environment and low carbon priorities.

This report delivers a detailed analysis of strategic environmental issues, placing this analysis within a broader Greater Manchester strategic context. The evidence base focuses on those themes which are particularly relevant to Greater Manchester's strategic approach to the environment and climate change.

## GREATER MANCHESTER: ENVIRONMENT OVERVIEW

GM has an ambitious vision: to secure long-term sustainable growth and fulfil its economic potential, ensuring residents are able to contribute to and share in that prosperity. The environment impacts on many policy agendas and priorities that contribute to the delivery of this vision.

The deep dive sections in this chapter focus on Greater Manchester's action on climate change which is the primary focus for GM's environmental activity. The Greater Manchester Low Carbon Hub, a private sector led Board, has been established to oversee the implementation of the Greater Manchester Climate Change Strategy. The strategy has identified 5 themes and 2 cross-cutting issues to deliver the priorities discussed in this Chapter and they are:

- Buildings
- Energy
- Sustainable Consumption and Production
- Natural Capital
- Transport (covered in a separate IGMA Chapter)
- Low carbon sector growth and skills (cross cutting issues)

This chapter will also demonstrate how protection and enhancement of the environment supports many other policy agendas. In particular the environment and the themes considered within the deep dive sections of this chapter have a direct impact on:

- Jobs and economic growth
- Poverty (fuel, food)
- Infrastructure resilience
- Improving the housing stock
- Health
- Attracting and retaining workers

## **JOBS AND ECONOMIC GROWTH**

The cost of energy and resources directly affects the operating costs of business across GM, who are key for achieving sustainable growth. The Greater Manchester Business Survey conducted August – September 2012 shows that 87% of businesses reported that cost pressures on energy and materials are key issues. Significant cost savings are possible from resource efficiency. Efficiencies can reduce operational costs including materials input, processing and waste disposal costs. £23bn annual savings are possible in UK businesses through improved resource efficiency requiring no or little investment. The evidence is presented in the ***Transforming our Energy System*** and ***Increasing Sustainable Consumption and Production*** sections.

The transition to a low carbon economy also requires the public sector to become more energy efficient. The public sector also has the ability to delivery at scale with over 1.1 million housing units; over 900 schools; 23 Colleges; 5 Universities; 15 Hospitals and 91,000 businesses. Stimulating resource efficiency and climate change adaptation measures, across all sectors will create market demand for low carbon sector goods and services.

Recent research suggests that sales from Low Carbon Environmental Goods and Service (LCEGS) sector businesses in Greater Manchester (GM) are already in excess of £5bn p.a. and that the sector is expected to continue to grow by 4% per annum. Greater Manchester also has world leading university and research capabilities in low carbon built environment and electrical and mechanical engineering which are well placed to further innovate and test low carbon technology. Further evidence of the extent of the sector in GM and the skills issues are covered in the ***Economic Opportunity for a Low Carbon Economy section***

## **FUEL POVERTY AND IMPROVING THE HOUSING STOCK**

In difficult economic times for UK households, energy bill increases are pushing more homes into fuel poverty. The GM Poverty Commission Report published in January 2013 highlighted that the cost of energy is one of the three key factors causing poverty in GM: Fuel, Food and Finance. Action to retrofit the housing stock across Greater Manchester; to improve the energy efficiency and comfort for residents, will also reduce energy bills and energy consumption and in some instances improve the health and well being of residents. Evidence for activity is summarised in the ***Transforming our Buildings section***.

## **HEALTH**

Taking people out of fuel poverty has direct health benefits. Building on work completed by Bolton NHS, the GM Green Deal Business Case illustrated that for every 2000 households

supported out of fuel poverty the saving to the NHS alone, due to reduced winter morbidity and mortality, would be £1m per annum.

Protection and enhancement of Greater Manchester's natural environment or 'natural capital' can also contribute to improvements to resident's quality of life and health, and contribute to climate change adaptation. For example, poor air quality in Greater Manchester, which can be improved through increasing green infrastructure cover, is responsible for hundreds of early deaths and thousands of extra hospital admissions each year. Road traffic is now the major air pollutant.

## **INFRASTRUCTURE RESILIENCE**

Green Infrastructure can also contribute towards urban cooling, which could off-set the predicted rise in summer temperatures within the city. Climate change is likely to lead to higher impact rainfall and higher temperatures across GM. Understanding the impacts of these changes and the potential adaptation responses is essential for long-term risk and resilience planning for GM's infrastructure. Understanding climate change science and impacts is covered in the Background section and *Maximising the Value of Natural Capital* covers the evidence, understanding and activity for Greater Manchester's natural assets.

## **UNDERSTANDING CLIMATE CHANGE**

The Stern Review of the Economics of Climate Change was presented to Government in 2006 and concluded "the scientific evidence is overwhelming: climate change is a serious global threat, and it demands a global response". More positively it also concluded that the cost of action, around 1% of GDP was significantly less than inaction, about 5% of GDP. In 2008, Greater Manchester conducted a "Mini-Stern" for Manchester which assessed the economic impact of climate change on the Manchester City Region<sup>1</sup>. The analysis concluded that "without exploring opportunities and mitigating effectively, a 'failure to adapt' scenario suggests the City Region could lose an estimated £20billion by 2020." It is clear there is a need for both adaptation and mitigation.

## **ADAPTATION**

Climate change adaptation is responding to and managing the consequences of climate change. Climate change is likely to present a number of risks to GM both directly and indirectly. Direct impacts include the impacts of the likely changes to weather systems and the impact on infrastructure and services. Indirect impacts refer to impacts of climate change in other regions and how it might affect GM. For example, the impacts of climate change on

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<sup>1</sup> Mini-Stern for Manchester, Deloitte, August 2008 <http://manchesterismyplanet.com/strategy>

globally food production that may affect food supply to the UK and GM. It is possible the indirect impacts will be greater than the direct impacts but this is a gap in the evidence base and not, currently, fully understood.

Greater Manchester's direct threats from climate change are likely to be increased rainfall and the associated flood risks and the urban heat island affect which could make parts of the city dangerously hot at certain times of the year. Ongoing research into how to manage and respond to these impacts is ongoing, with leading research taking place within Greater Manchester's universities, and will continue to develop our understanding of potential responses.

## **MITIGATION**

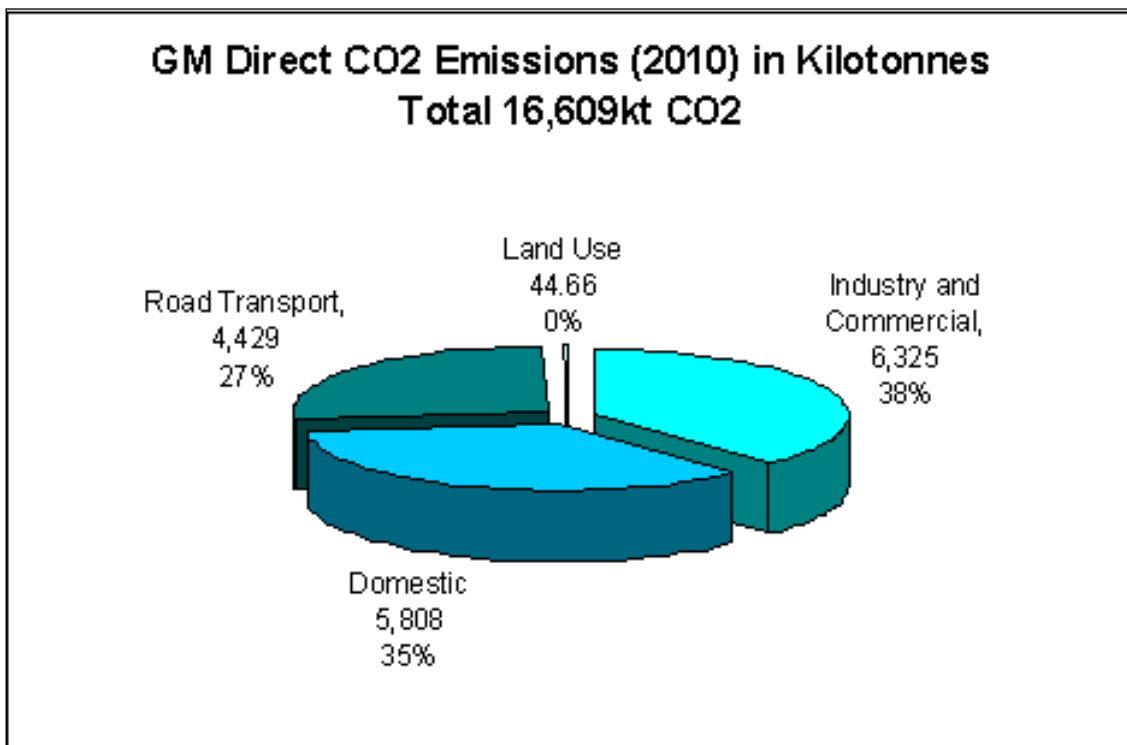
Climate change mitigation is reducing the causes of climate change: greenhouse gas emissions largely produced as a result of fossil fuel consumption. Mitigation will decrease GM's greenhouse gas emissions and in addition, reduce risks from energy price rises to both businesses and households. A GM-wide target of 48% CO<sub>2</sub> reduction by 2020 from a 1990 baseline was approved by the AGMA Executive/GMCA Board in July 2011. CO<sub>2</sub> is the largest contributor to Greenhouse gas (ghg) emissions. The latest available Government statistics for the GM local authority areas tell us that our annual emissions are already 22% lower than this 1990 baseline, almost half way towards the target. Continuing the trajectory towards a 48% target indicates that by 2015, we need to have reduced our emissions by 33% to 14,000 kt CO<sub>2</sub> *per anum*. This indicative, interim target is 2,600kt lower than our emissions in 2010. However business as usual is unlikely to meet the target as it becomes more difficult to implement savings.

Climate change emissions are currently measured from direct sources: transport; domestic buildings; industrial and commercial operations; and landuse. The graph below shows how each sector contributes to GM's direct emissions total.

## **TRANSPORT**

Transport is covered in a separate chapter of IGMA. It has direct relevance to the environment agenda because it is responsible for 27% of direct emissions and it is a significant contributor to poor air quality.

## GM direct emissions by sector 2005-2010



Source: DECC LA Carbon Emissions Estimates Full Data Set (published 2012)

To reach the 2015 interim target of a 2,600kt CO<sub>2</sub> reduction on 2010 levels it has been calculated each sector needs to reduce its emissions by the following, proportional amount:

- Road Transport: 695kt;
- Domestic: 912kt;
- Industrial and Commercial: 993kt.

The 'total carbon footprint' metric, which takes account of embodied carbon is being pioneered within GM. While the direct emissions footprint of GM is around 16.6m tonnes CO<sub>2</sub>, the consumption based carbon footprint is estimated at 41.2m tonnes CO<sub>2</sub>e. Until now, official place-based carbon metrics have taken a production-based approach, including only direct emissions and those resulting from electricity use. This has had policy implications, since what we measure tends to be what we manage. As a result, central, regional and local government have concentrated on carbon policies concerned almost solely with transport, household energy, energy generation and on-site business emissions. Consideration of indirect emissions is an emerging approach and potentially has considerably more scope to realise co-benefits than traditional forms of direct emissions management.

## **ECONOMIC OPPORTUNITY OF A LOW CARBON ECONOMY**

Adaptation and mitigation of climate change and other environmental impacts creates business opportunities for new and existing businesses in the “low carbon and environmental goods and services” (LCEGS) sector, contributing to the development of a low carbon economy.

The LCEGS sector describes a huge variety of markets and business activities. GM's greatest strength is the spread of activity across the range of low carbon and environmental markets which, given the relative immature nature of the industry, should enable GM to adapt and grow with the markets as they expand.

There are a number of large businesses based in GM who either have low carbon or environmental markets at the heart of their businesses, such as the Co-operative Bank and Siemens, or have diversified to successfully exploit the new market opportunities. For example the Peel Group, one of the Northwest's largest companies has established Peel Energy to develop renewable energy projects.

In addition, GM shows a comparative strength in numbers and expertise in the following sub-sectors: recycling, recovery and waste management; energy efficiency technology, building technologies and energy management; and renewable energy supply, particularly wind, biomass and PV.

## **TRANSFORMING OUR BUILDINGS**

Transformation of our buildings is vital to reduce emissions, improving the housing stock and reducing fuel poverty.

35% of GM's direct emissions arise from the Domestic sector which is entirely electricity, gas use and other fuel use. Across GM, there are 220,000 households living in fuel poverty and under-heated homes: equating to 19.8% of total households. In addition, 87% of the buildings currently standing will still be around in 2050 therefore retrofitting at scale is required.

A further 38% emissions arise from the Commercial/Industrial sector which includes buildings but also includes industrial installations, heat and power use, however it is not possible to say exactly what percentage arise from buildings alone. Due to the difficulty in collating the data from commercial buildings it is only possible to show the distribution of Display Energy Certificate (DEC) ratings amongst those public sector buildings with a DEC (buildings over 1000 sq meter). There is clearly an opportunity to save carbon and money from within the public sector estate.



## **TRANSFORMING OUR ENERGY SYSTEM**

The energy system supplies both heat and power (electricity). In GM the use of electricity, gas and other fuels account for 72% of direct emissions, 35% from the domestic sector and 37% from the commercial and industrial.

Along with ghg emissions reduction targets, the rising cost of energy and security of supply are the three main drivers for the use of renewable and low carbon energy generation. The rising and fluctuating cost of energy is also a consideration for both businesses and households. In 2010 GM spent over £5 billion on its gas and electricity bills.

To meet GM's CO<sub>2</sub> emissions reduction target it has been calculated, 3TWh of low carbon heat generation and 1TWh of low carbon electricity generation would need to be in place in GM by the early 2020s. This would mean increasing existing levels of wind, solar, hydro, thermal and biomass generation etc to around 20 times their current levels. This assumes that government will fully hit targets for offshore, nuclear, gas and other generation to sufficiently decarbonise large scale generation.

A study undertaken in 2010 identified the potential for 6,871MW of renewable energy installed capacity across GM. 79% from microgeneration (54% from heat pumps), 19% from community wind, 13% ground source heat pumps, 6% solar hot water heating, 6% PV, 1% municipal waste and 1% C&I waste.

The Decentralised and Zero Carbon Energy Planning Report prepared for AGMA in 2010 identified at least eight potential district heating schemes across GM using waste heat, gas or biomass CHP or geothermal wells. However these studies need to be developed and the renewable energy deployment opportunity needs to be better understood.

## **INCREASING SUSTAINABLE CONSUMPTION AND PRODCUTION**

Sustainable Consumption and Production (SCP) is a catch-all term for a number of inter-related issues concerning the production, use and disposal of natural resources. It covers both research into the causes of, and responses to, the issues.

A report published by Chatham House (2013) stated "The spectre of resource insecurity has come back with a vengeance. The world is undergoing a period of intensified resource stress, driven in part by the scale and speed of demand growth from emerging economies and a decade of tight commodity markets. Whether or not resources are actually running out, the outlook is one of supply disruptions, volatile prices, accelerated environmental degradation and rising political tension over resource access."

SCP covers a number of subjects including food; domestic consumption; transport; business supply chains; waste, water, public sector procurement, business resource efficiency, eco-

innovation and eco-design. Evidence for all subjects is presented within the SCP section; the highlights for food and business resource efficiency are summarised here.

## **FOOD**

The total carbon footprint (as presented in the Background section, Section 1 of this report) clearly shows a significant percentage (approx. 30%) of GM's emissions arise from food. Which might suggest food should therefore be prioritised for activity to help reduce emissions and meet the carbon reduction target. However the ease and practicality of a city wide response also needs to be considered.

Food is also an issue which inter-relates with a number of other policy areas not least, diet and health and local economic development. The interaction is complex, not well understood and can result in competing priorities. The evidence base is not available to help understand which actions help the environment, health and poverty and how they interact. For example, there is evidence to show that food bought locally benefits the local economy more; £1 spent in a local food outlet equals £1.76 to the local economy and only 36p if spent in a supermarket chain. What is not clear is if local, small scale production also reduces greenhouse gas emissions and / or generates positive health impacts. Food poverty was also recently identified as a serious issue across GM in the poverty commission report.

## **BUSINESS RESOURCE EFFICIENCY**

For a business, becoming more resource and energy efficient; using less raw materials and producing less waste saves money. Business resource efficiency enables a business to reduce operation costs and decrease operational risk through security of supply.

Businesses are still facing cost pressures from resource scarcity. As already stated, the Greater Manchester Business Survey conducted August – September 2012 shows that 87% of businesses reported cost pressures on energy and materials are key issues.

There are several estimates about how much can be saved in UK businesses from resources efficiency measures.

- DEFRA research highlights £23 billion of annual business savings available through improved resource and energy efficiency, requiring no/low investment, and £55 billion with a 2 year payback. The majority of the savings, £19bn are related to resource savings.
- DEFRA also estimates that 2% of business profits are lost each year through inefficient use of resources.

- DECC estimate that through socially cost-effective investment in energy efficiency the UK could be saving 196TWh in 2020, equivalent to 22 power stations.

This highlights how energy efficiency both avoids the cost of energy and, the scale of investment that would be required in infrastructure if the savings are not made.

Although there is plentiful evidence of the benefits of increased resource efficiency to business, there is still a disconnect between awareness and action due to the multiple market failures that operate in this area. As a result of this businesses are not taking advantage of the savings that can be made, restricting their opportunities for growth and negatively impacting on their resilience.

ENWORKS projects have identified £64 million of annual cost savings in 1500 GM businesses through resource efficiency, and supported the implementation of £18 million (29%) of these to date, leaving potential for £46 million of further annual savings in this small sample of companies alone. Looking at the overall business population in GM, ENWORKS projects have been funded to engage with less than 2% of this total, meaning there is still a large number of businesses that have will not have addressed this issue and still have significant potential to benefit.

## **MAXIMISING THE VALUE OF NATURAL CAPITAL**

The natural environment is our land, water and air; this includes many protected or valued assets such as our green infrastructure network, urban green space, waterways and reservoirs as well as the air we breathe, the water we drink, and the soil we build on. Natural capital is the stock of natural systems, or 'ecosystems', which yields a flow of valuable services into the future. These services include things such as fresh water, pollination, soil formation, as well as recreational opportunities. Natural capital underpins economic prosperity; yet where financial capital is relatively straight forward to measure, natural capital is much more difficult to quantify and evaluate.

The fact that it is difficult to attribute a value to environmental services leads to a position where greater emphasis is placed on the more measurable, economic indicators such as jobs or GVA growth than on natural capital. In this context, exploring innovative finance mechanisms (to stimulate a new natural-capital-inclusive economy) and encouraging the financial sector to account for the environment in its future investment and lending decisions (for example by publishing environmental profit and loss of organisations) is becoming increasingly important.

Collectively the evidence suggests a good understanding of the services that the natural environment provides in GM however the evidence is not currently well integrated and does

not exist at consistent spatial scales. There is an aspiration to develop the evidence base to become a more integrated baseline, allowing for the identification of critical data gaps and for more detailed, intelligent analysis.

There is not currently an agreed set of natural capital indicators in GM; there therefore an aspiration at a GM scale to develop a consistent set of indicators and for these to be integrated with economic and social (or quality of life) indicators.

# 1 BACKGROUND

- 1.1 Greater Manchester (GM) represents the largest functional economic area outside London. It has a population of 2.6 million people, at the heart of a travel to work area of 7 million people, and generates economic output of £46 billion each year. GM is a diverse conurbation with significant differences in productivity, connectivity and relative levels of wealth and deprivation; these present significant challenges in supporting continued sustainable economic growth.
- 1.2 However, GM remains a city of outstanding opportunity. The 2009 Manchester Independent Economic Review (MIER) concluded that GM was the best-placed conurbation outside London to increase its long-term growth rate, and therefore critical to raising overall economic growth in the North and the UK as a whole. Since the MIER was published, GM has delivered significant commercial developments, such as Airport City, MediaCityUK, Kingsway, and the Metrolink expansion, and continued to attract more new investment, in the context of a weak national economy.
- 1.3 GM has an ambitious vision: to secure long-term sustainable growth and fulfil its economic potential, ensuring that residents are able to contribute to and share in that prosperity. The Greater Manchester Strategy (GMS) published in 2009, and currently under review, sets out a series of priorities for action that build upon the findings of the MIER and are aimed at driving higher productivity, securing a better functioning labour market, reducing dependency on public services and generating the improved opportunities a stronger economy brings. A key part of this is identifying, and jointly investing in and tackling, the profound problems GM continues to face and which require collective focus on transformational actions, delivered collaboratively.
- 1.4 Because of its mature governance arrangements and track record of delivery, GM is working with government to simultaneously promote growth and reduce dependency through processes like the City Deal and Community Budget pilot, providing GM partners with a growing 'toolkit' to secure the shared objectives of securing sustainable economic growth and ensuring our residents benefit from and contribute to economic success.

- 1.5 However, it must be recognised though that the circumstances which partners are operating in have changed drastically over the past few years. The global economic downturn has created unprecedented and challenging economic conditions, making the delivery of GM's growth and reform objectives even more challenging. Our best estimates suggest that public sector spending has stayed the same between 2009 and 2012 at £21bn, with decreases in spend by local authorities, the police and others offset by increases in the costs of welfare benefits, and to a lesser extent, acute care. The cost of providing public services is becoming even more unsustainable, with greater proportions of funding spent on the costs of dependency rather than supporting growth.
- 1.6 Recent research from Newcastle City Council estimates that GM local authorities have experienced budget cuts ranging from £57 per head in Stockport up to £209 per head in Manchester, with reductions in Formula Grant alone for the GM authorities over the past two financial years totalling £273 million (18%), with further cuts to be announced later this year. Over the same period, GM Police's formula grant payment reduced by £57 million (11%) and GM Fire and Rescue's reduced by £9.3 million (12%). The community safety fund, previously paid to Councils and to be transferred to PCC's from 2013, has been cut by 60% from 2010/11 levels.
- 1.7 In this context, it is critical that the work we do, including on crime and policing, housing, the economy, environment, and health, is not done in silos, but is integrated so that spending and decisions in one area leverage and benefit those in others. The GM Combined Authority and Local Enterprise Partnership facilitate this, as will the Police and Crime Commissioner and Panel, the Health and Wellbeing Board, the GM Low Carbon Hub and Transport for Greater Manchester, amongst many others. The Integrated Greater Manchester Assessment (IGMA) is designed to bridge thematic areas by identifying shared opportunities, problems and issues so that partners' decisions are based on the strongest possible evidence.

*Structure and purpose of the Integrated Greater Manchester Assessment – Environment Evidence Base*

- 1.8 This document sets out the environment component of the IGMA and has been designed to provide a high-quality evidence base to support those themes and priorities which are i) particularly relevant to a Greater Manchester-level strategic dialogue, and ii) particularly dependent upon a multi-agency response in terms of environment.

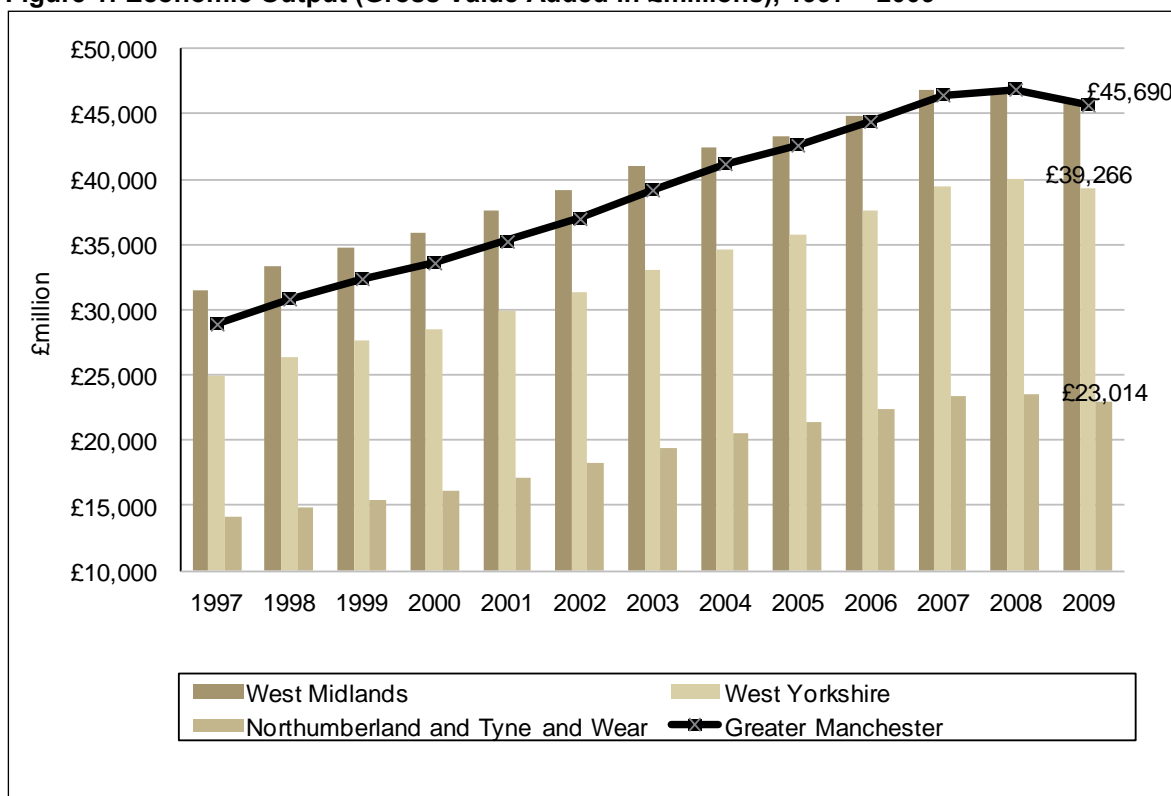
- 1.9 Section 2 frames the analysis within the broader strategic GM context, summarising the available intelligence to produce an analysis that sets out the key issues facing GM in a truly holistic way. Sections 3 to 8 identify the key environment issues facing partners across Greater Manchester.

## 2 GREATER MANCHESTER

### *Greater Manchester's Economy*

2.1 Greater Manchester is the UK's largest city in both population and economic terms after the capital, London. Following strong growth over the past decade, the conurbation generated just under £46bn of total GVA in 2009, almost a fifth of the total economic output of the North of England, punching above its weight in the North and North West, but not relative to London. Within the conurbation, GM South has been the only part of the UK to deliver growth rates matching those in London and the Greater Southeast over the past decade, with the North of the conurbation growing at a slower rate.

**Figure 1: Economic Output (Gross Value Added in £millions), 1997 – 2009**

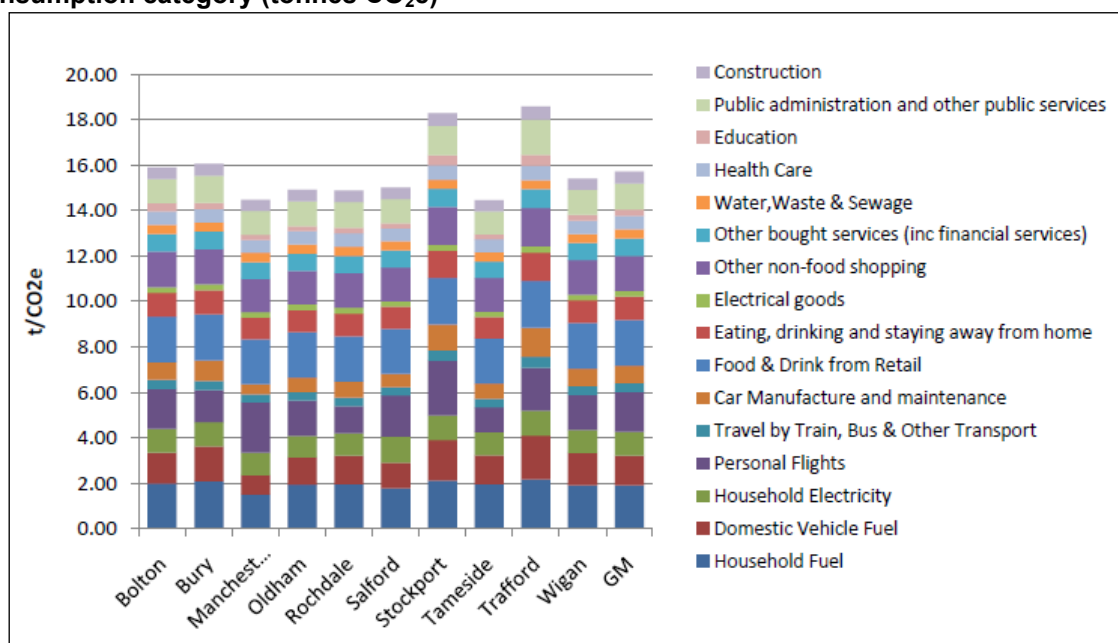


Source: ONS (2011) Regional, Sub-regional and Local Gross Value Added



- 2.2 Greater Manchester's employment growth over the past decade has been driven by the large-scale and rapid expansion of the service sector, particularly financial and professional services. This sector now accounts for a sixth of employment, a fifth of GVA and businesses, and contributed 40% toward employment growth in GM over the decade prior to the recession. Although smaller in size, GM has also developed its creative and digital industries to the stage where they represent the UK's biggest centre for the industries outside the Greater Southeast. This specialisation is forecast to increase over the coming decade as MediaCityUK and other assets develop. The size, strength and importance of GM's universities, colleges and providers mean that education is another key service specialism for the conurbation.
- 2.3 GM's industrial past means that it still retains strengths in manufacturing. Despite seeing a decline in employment in the sector over recent decades, it remains an important sector for GM, with an opportunity to focus on advanced manufacturing. In line with national trends, health and social care is the second largest employer in GM, and includes strong growth in high-value biotechnology and life sciences.
- 2.4 GM has a GM-wide target of 48% CO<sub>2</sub> reduction by 2020 from a 1990 baseline, approved by the AGMA Executive/GMCA Board in July 2011 to be achieved alongside the economic growth ambitions. This will require a reduction in overall emissions and the emissions per capita. The latest available Government statistics for the GM local authority areas tell us that our annual emissions are already 22% lower than this 1990 baseline, almost half way towards the target. The following graph (Figure 2) shows the per capita emissions for each LA district, which will need to reduce to meet the CO<sub>2</sub> reduction target.

**Figure 2: Average annual greenhouse gas footprint per resident by local authority area and consumption category (tonnes CO<sub>2</sub>e)**



Source: Primary research by Small World Consulting Ltd<sup>2</sup>

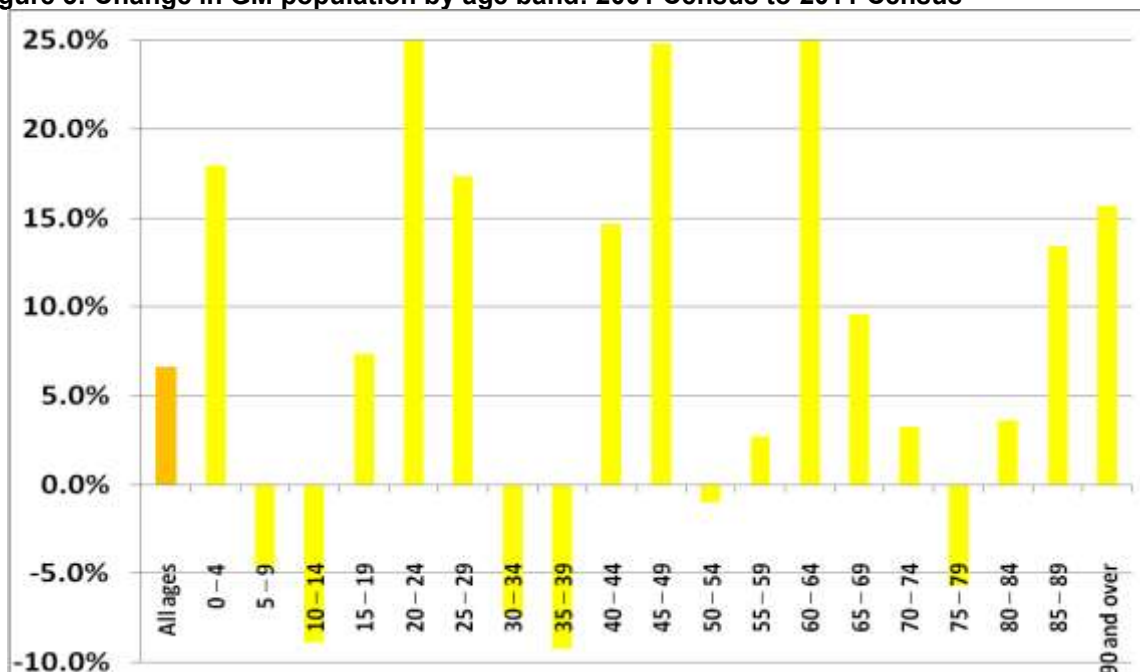
### Population growth and change

- 2.5 After declining throughout the 1980s and 90s, Greater Manchester now has a growing population. The first results of the 2011 Census reveal that the number of people living in the conurbation grew by 6.6% over the last decade. The strongest growth has been experienced in the regional centre, with the City of Manchester experiencing growth of 19% over the decade, the fastest growing of all core cities in England. Forecasts suggest that by 2014 GM will surpass its all time population peak, recorded in 1971.
- 2.6 Population growth is an inevitable result of GM's success in becoming an increasingly attractive place to live, study and work; however, it also brings its own challenges. Growth in GM's young population will place pressure on public services, most forcefully on the education system and the health service. Improved life expectancy will also increase the strain on the health service. Demand for more housing will likely result and, if not properly managed, could lead to an increase in community tensions.

<sup>2</sup> The Total Carbon Footprint of Greater Manchester: Estimates of the Greenhouse Gas Emissions from Consumption by Greater Manchester Residents and Industries, Small World Consulting, July 2011.

- 2.7 The demographic profile of GM is also fundamentally changing. The changes are occurring because of migration both from overseas and from other parts of the UK and from people in general living longer. In line with the overall ageing of the UK population the average age of a GM resident has increased slightly since 2001; in 2011 it was just under 38 years. Age profiles do differ between districts however, for example in the City of Manchester over half of the population is under 30, compared to 38% for England & Wales. Stockport has the oldest population within GM with 18% of residents aged over 65. The overall trend is an ageing population as a result of a number of factors, notably a bulge in the demographic, widely known as the baby boom generation, and improvements in treatments which will result in a dramatic aging of the overall population and a substantial increase in people surviving with long term conditions. Another, albeit smaller, baby boom occurred in the last decade.
- 2.8 Greater Manchester's growing and changing population structure has fundamental implications across a range of areas, providing opportunities to underpin economic growth, but also placing increasing demands on health, social care, policing and other public services as well as underpinning the continued need to invest in our transport network and secure a range of good quality housing to meet the needs of a changing population.

**Figure 3: Change in GM population by age band: 2001 Census to 2011 Census**



Source: Census (2001, 2011)

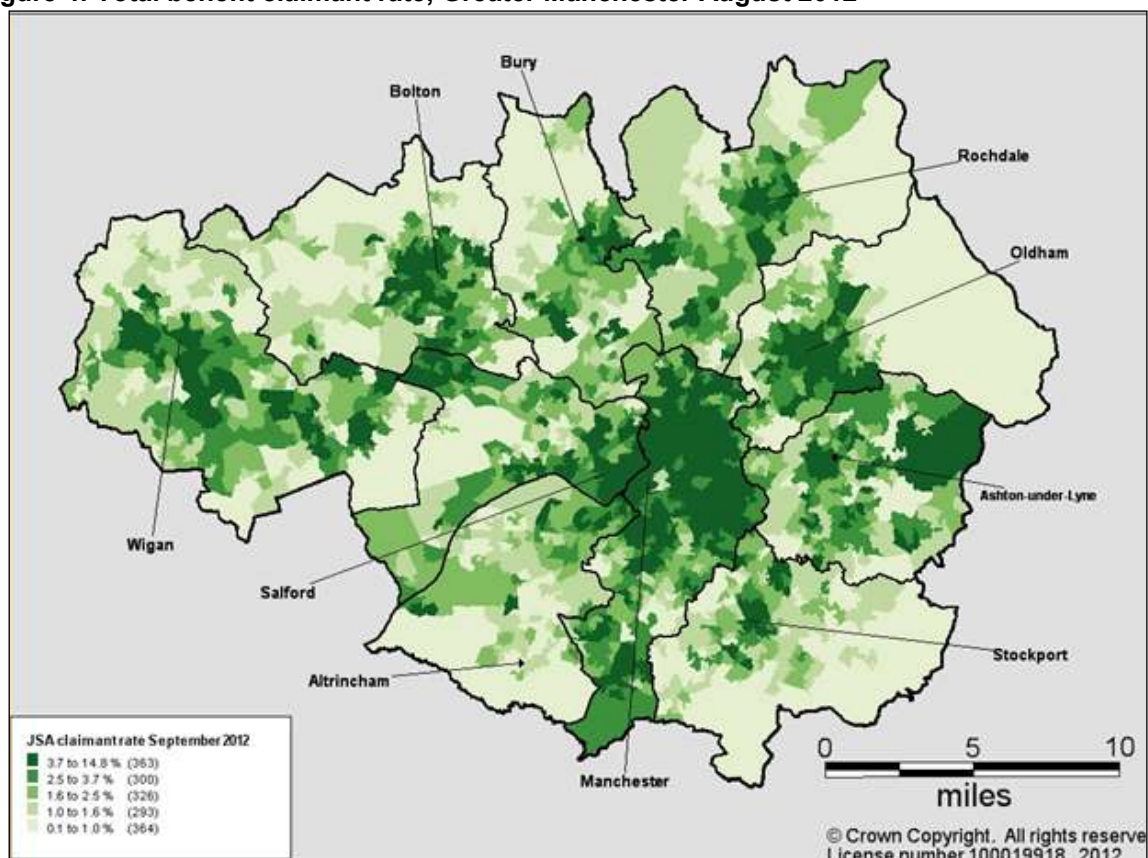
### **GM's recent economic performance**

- 2.9 While population growth remains strong, recent economic growth remains muted. An estimated 33,000 jobs were lost between 2008 and 2010, wiping £1bn from the conurbation's economic output, which has still not fully recovered. The latest business demography data (2010) reveals how challenging the economic climate has been since the recession, with business deaths surpassing births in both 2009 and 2010 – a trend repeated nationally. In 2010, there were 3,300 more business deaths than births across GM, a continuation of the trend seen in 2009 when deaths outnumbered births by 2,500.

### **Persistent unemployment and high levels of economic inactivity**

- 2.10 As a consequence of its extended period of economic restructuring, GM has a legacy of high unemployment and high levels of economic inactivity (those not employed but not looking for work, a significant proportion of which are long term sick). This structural challenge has more recently been exacerbated by the challenging economic circumstances. The number of unemployed residents has increased by 55.3% since 2008 to stand at 132,300, with youth and long-term unemployment rising most dramatically. However, unemployment figures are still dwarfed by levels of economic inactivity. Just under 350,000 GM residents are classed as economically inactive (excluding students), with over 150,000 claiming either Incapacity Benefit (IB) or its successor, Employment and Support Allowance (ESA).
- 2.11 The impact of economic inactivity is not felt equally across GM, with Manchester, Salford, Tameside and Rochdale suffering particularly high levels. More locally, benefit claimants are largely clustered in and around the central urban core and the main towns of Greater Manchester, with the lowest rates found in the affluent suburban areas and rural hinterland of the conurbation, as shown in Figure 4 below.

**Figure 4: Total benefit claimant rate, Greater Manchester August 2012**



Source: Department for Work and Pensions (2012)

2.12 The net result of these economic imbalances is that GM remains the location of some of the most deprived areas in the UK – 13% of the 5% most deprived neighbourhoods nationally are located in the conurbation – and, on average, the population is less healthy and life expectancy shorter than elsewhere in the country.

#### Forecast economic performance

2.13 Forecasts suggest that these challenging economic conditions are likely to continue. The number of jobs in GM is not expected to return to its pre-recession peak until 2017. The forecasts suggest a very different employment outlook for GM, with growth focused in business services, distribution and retail, personal services and health care. Traditionally key sectors such as manufacturing are forecast to decline but will still remain important for a number of areas of GM. The skills gaps this implies between the new jobs being created and unemployed residents' existing skills, coupled with continued population growth, means that unemployment is likely to remain at or around current elevated levels for the foreseeable future.

- 2.14 There are, however, some encouraging signs in regards to further growth in the long-term; GM is expected to return to the pre-recession peak (2007) of employment (1.31 million) in 2017, and 1.35 million people are forecast to be employed in the conurbation by 2022. The regional centre is predicted to consolidate its role as a centre for business growth of regional and national importance, but growth levels are expected to be inconsistent across GM, providing key challenges to partners to ensure the benefits of growth are felt across the conurbation.

#### **Planning for sustainable economic growth**

- 2.15 Greater Manchester's ten districts represent a coherent economic geography and, increasingly, we think and act as a one economic entity with a single labour market, high levels of connectivity and interdependent towns and cities. As with any large metropolitan area, different parts of Greater Manchester contribute to this functional geography in different ways and our strategy is focused on overcoming the barriers to growth and investment, increasing private and public sector productivity, creating jobs and sustainable communities.
- 2.16 The regional centre remains the focus for economic restructuring and growth, offering the largest office market outside London, with the connectivity and infrastructure to attract the skilled labour needed by key sectors from across Greater Manchester and beyond. The regional centre extends from the city centre of Manchester into Salford, and onto the adjacent development of Salford Quays/Trafford Wharfside – which has a mixed office, industrial and logistics offer, and includes MediaCityUK, with a focus on creative and digital industries. The regional centre also extends out along Oxford Road, where the Corridor Manchester comprises Europe's largest concentration of knowledge assets, including Universities, hospitals and Manchester Science Park. The regional centre provides employment for around 160,000 people and is the most employment intensive location in Greater Manchester.
- 2.17 In addition to the regional centre, there are a number of other key strategic locations across GM that have capacity to support further significant employment growth. Through demand-focused work initiated by GM's Business Leadership Council we have identified a number of investment priorities for physical development based upon maximising private sector employment and productivity. Such key locations include Airport City, Trafford Park, Kingsway, Cutacre, Carrington, Hollinwood, Port Salford and Media City.

- 2.18 Low carbon and environmental markets provide an opportunity for businesses to expand and diversify. The LCEGS sector is largely driven by legislation and regulation and is one of only a few growth markets in the current economic climate, still experiencing between 4 and 5% growth rates.
- 2.19 Investment in the conurbation's infrastructure remains critical to securing growth and for connecting our residents and businesses to growth. Critical infrastructure includes energy, water and waste, transport, digital communications and green. Infrastructure drives competitiveness and economic growth by increasing productivity, reducing costs and extending the reach of business. Different parts of GM experience different pressures on infrastructure with 'pinch points' often focused on economic priority areas such as the regional centre, town centres and major strategic transport and logistics hubs such as Manchester Airport.

#### **GM's changing housing market**

- 2.20 Adequate housing to meet the demands of a growing workforce and population is fundamental to ensuring the economy functions effectively. The past ten years have seen extraordinary changes in GM's housing market, with dramatic increases in population and decline in average household size. Such factors have led to significant increases in housing market demand. Meeting this demand now, when the market is less able and willing to respond, is a significant challenge. The latest Greater Manchester Forecasting Model (GMFM) suggests that GM needs to provide 8,643 new homes per year to 2032. The GMFM forecast is at the lower end of available estimates; for example by comparison the 2008 based CLG projections suggest an annual housing requirement of 9,800 households. Despite some uncertainty in the forecasts however, completion rates in GM have been falling consistently and annual completion figures were closer to 3,000 (2009/10-2011/12) than the required 10,000. In addition a large proportion of these completions have been affordable homes and therefore have been supported by public sector funding.

**Figure 5: Net and Affordable Housing Completions 2002/3 to 2011/12**



Source: GM districts

2.21 The owner-occupier market has suffered, particularly in terms of the level of sales, primarily due to the lack of mortgage availability, and specifically for first time buyers. In light of this, the demand for properties has seen a shift to the private rented market and this is reflected in increased levels of households renting across the sub-region as highlighted in the 2011 Census. Over the 10 years to 2011 there has been a rise of 62% in the number of households renting – this is 16% of households as opposed to 10% in 2001. Demand for social and affordable rent properties is also growing, for the same reasons. Housing providers - whether local authority arms length management organisations (ALMOs) or independent Registered Providers (RPs) play an increasingly important wider role in tackling deep-seated neighbourhood, skills and employment access issues for their residents. Overall, the social and affordable rented sector is larger in Greater Manchester than nationally - 22.9% compared to 17.6% in England, and higher still in Manchester and Salford (at 33.7% and 29.8% respectively).



2.22 The challenge to radically improve the conurbation's housing stock is significant. Developers have been finding it difficult to access finance and have become more risk averse. Buyers are similarly struggling to access the finance that they need therefore it will be critical to develop new mechanisms to invest in new and existing housing stock. While empty homes look to have declined in number from around 58,000 at the 2008 peak to 47,500 by 2011 in Greater Manchester (reducing faster than the national trend), they still represent a wasting asset and are often a contributor to deterioration of a street or neighbourhood. With the quality of Greater Manchester's private sector housing stock in any case relatively poor in terms of physical condition, age and size of homes, creating or accessing alternative sources of finance is a priority, to which Green Deal may prove a partial, though significant, solution.

### *Fuel Poverty*

2.23 With rising energy costs and incomes under pressure from the impacts of recession and from welfare reform, fuel poverty is expected to be a growing concern. A household is in fuel poverty if in order to maintain a satisfactory heating regime it needs to spend more than 10% of its income on all household fuel use, fuel poverty is an important and complex issue and one traditionally addressed and driven by Local Authority housing departments.

2.24 Across GM, there are 220,000 households living in fuel poverty and under-heated homes: equating to 19.8% of total households<sup>3</sup>. Taking people out of fuel poverty has direct benefits on public sector finance and resources. Building on work completed by Bolton NHS, the GM Green Deal Business Case illustrated that for every 2000 households supported out of fuel poverty the saving to the NHS alone, due to reduced winter morbidity and mortality, would be £1m per annum.

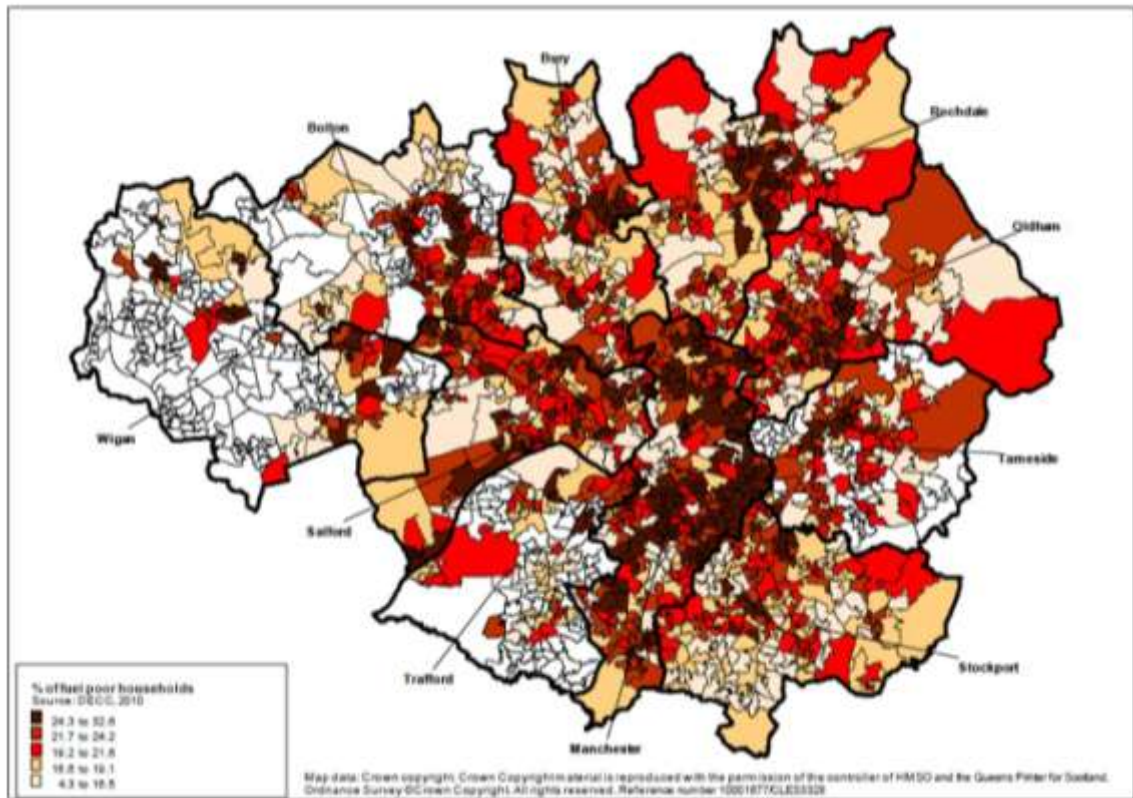
2.25 The GM Poverty Commission Report in January 2013 highlighted that the cost of energy is one of the 3 key factors causing poverty in GM: Fuel, Food and Finance. Action to improve to retrofit the housing stock across Greater Manchester, to improve the energy efficiency and comfort for residents will also reduce energy bills and energy consumption and in some instances improve the health and well being of residents.

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3 CLES, Greater Manchester Poverty Commission: Research Report (December 2012)

2.26 The extent and geography of fuel poverty is outlined below, across the sub-region, a total of 20% of households are classified as fuel poor, accounting for over 220,100 households. Hotspots of fuel poor households are found along the eastern edge of Manchester, throughout Salford and within the Central areas of Oldham, Rochdale and Bury.

**Figure 6: Geography of fuel poor households in Greater Manchester**



Source: Poverty Commission Report (2013)

2.27 Data from the Department of Energy and Climate Change shows that fuel poverty is most prevalent within households that are not owner occupied and in single person households. In Greater Manchester we are seeing growth in the private rental market and a decline in owner-occupation, this combined with forecast increases in single occupancy could have significant implications.

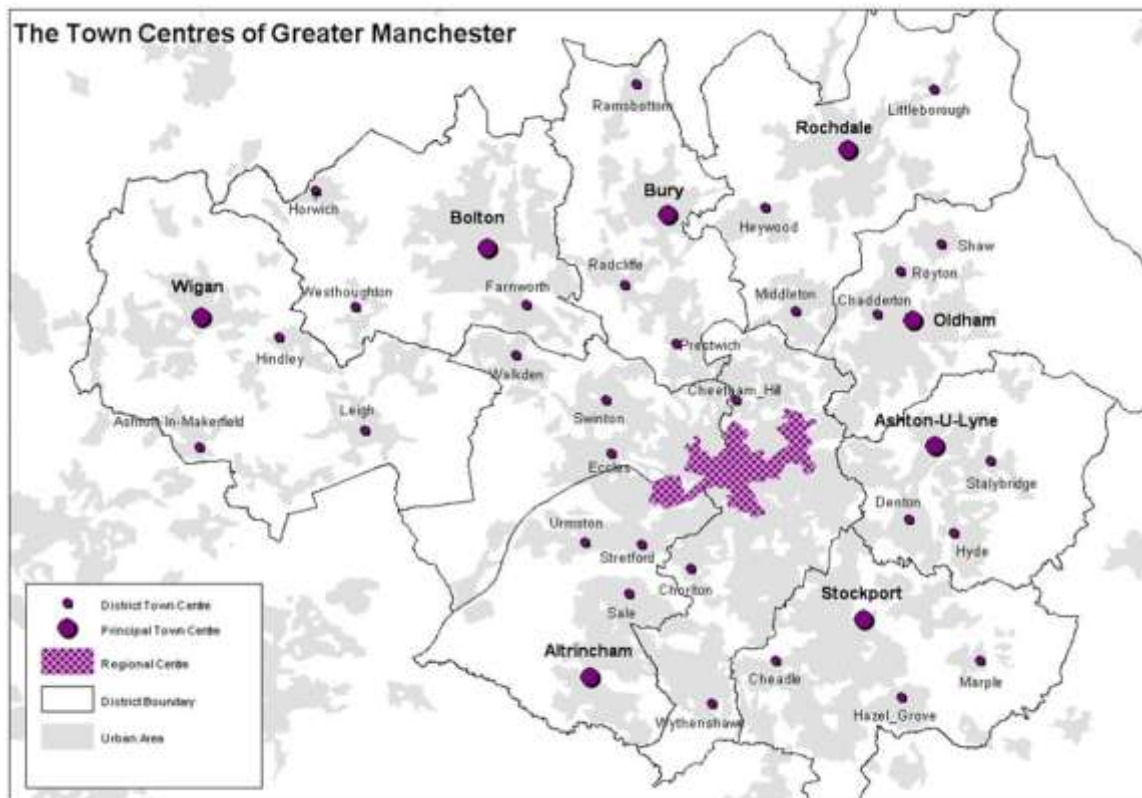
2.28 Fuel poverty is also an issue with clear connections to health and well being, as well as our low carbon ambitions. In terms of measurement excess winter deaths has been the measure most commonly used to assess fuel poverty. But this gives an incomplete picture of the effects of fuel poverty in both physical and economic terms. For example there are also proven links between fuel poverty and cardiovascular and respiratory diseases, physiological conditions and mental health. The Department of Health December 2009 fact sheet estimated that for the North West. The annual cost to the NHS of excess cold in homes was £117 million.

2.29 The measures taken to combat fuel poverty particularly focus around hardware components such as the installation of energy efficient home improvements. Although these measures contribute to the alleviation of fuel poverty they will not, in isolation, remove people from fuel poverty. More attention needs to be given to the effects of income loss, particularly in light of welfare reform as well as behavioural change such as through education and advice.

#### **A sustainable future for our town centres**

2.30 Greater Manchester has a network of eight principal town centres which are important centres of local employment in their own right as well as a focus for local pride and identity. It is estimated that GM's eight key town centres outside the regional centre employ some 122,000 people representing 17% of employment in the eight districts. They are the most accessible locations within Greater Manchester and have been the focus of significant investment, notably transport investment, in recent years. However, all eight town centres face significant challenges to their core role and functions.

**Figure 7: Greater Manchester's eight principal town centres**



2.31 The demand for our town centres as a location for retail, commercial, leisure and other uses is under constant competition – from other locations (principally out of centre sites) and other means of obtaining such goods and services (principally online shopping and e-commerce). The speed and scale of this change threatens the future of every town centre and undermines our current strategies for recovery. Between 2006 and 2011, e-commerce grew from 4% to 8% of the total retail market and is forecast to grow to 11% by 2016. Some analysts suggest that we are likely to see 30% fewer chain stores in town centres by 2020 and a reduction in demand for retail space of over 20% on the high street.

2.32 Work is now underway across GM to understand all of these issues in the round and develop a set of innovative, realistic and investable propositions that address the challenges and opportunities facing each of the eight principal town centres.

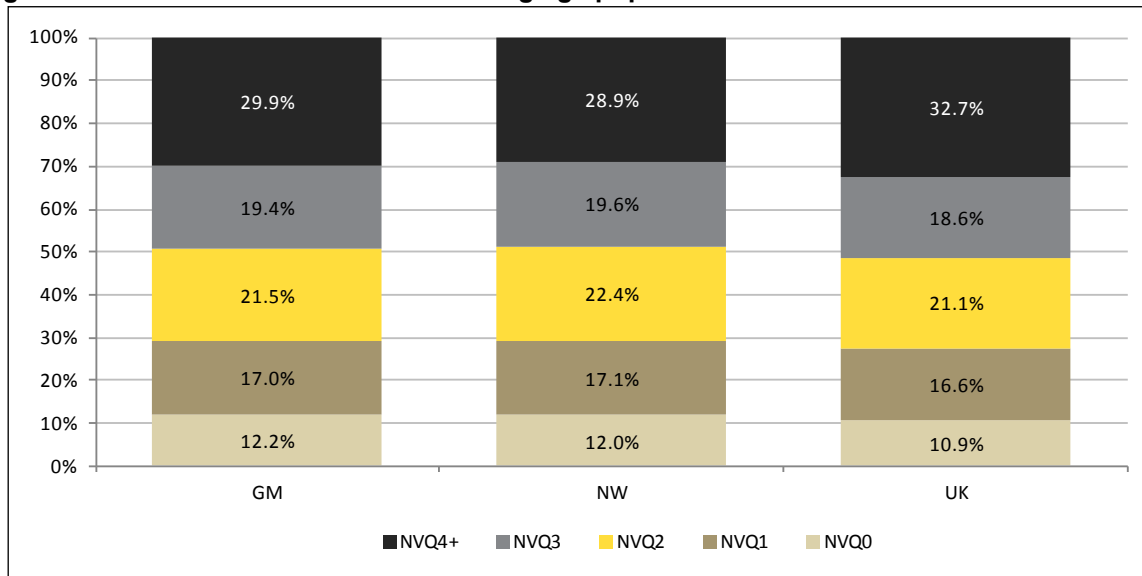
## Securing a transition to a low carbon economy

- 2.33 Greater Manchester is committed to securing a transition to a low carbon economy and has set itself ambitious targets to reduce CO<sub>2</sub> emissions by 48% by 2020 from a 1990 baseline. It is predicted that the emerging low carbon economy will grow both through increased demand for core low carbon goods as well as through a general shift towards a low carbon approach to all economic activity as places strive to reduce fossil fuel use. The Greater Manchester Business Survey conducted August – September 2012 found the top cost pressures for 87% of businesses is energy and resource prices. According to the Greater Manchester Mini-Stern, 4% of Greater Manchester’s employment is within energy intensive manufacturing.
- 2.34 Achieving a rapid transition to a low carbon economy could give GM a ‘first mover advantage’ as well as providing a critical underpinning to the challenges of reducing our own carbon emissions and developing resilience to climate change.
- 2.35 Adaptation and mitigation of climate change and other environmental impacts creates business opportunities for new and existing businesses. These businesses operate in the “low carbon and environmental goods and services” (LCEGS) sector and contribute to the development of a low carbon economy.
- 2.36 Currently there are 1,893 businesses employing 34,120 people supplying LCEGS products and services in GM and the market value is £4.2bn. This represents about 2% of the GM business base but the potential for future growth is huge.
- 2.37 The LCEGS sector describes a huge variety of markets and business activities. GM’s greatest strength is the spread of activity across the range of low carbon and environmental markets which, given the relative immature nature of the industry, should enable GM to adapt and grow with the markets as they expand.
- 2.38 The transition to a low carbon economy will help GM meet its ambitions on a number of other policy agendas for example:
- Infrastructure resilience
  - Improving the housing stock
  - Poverty (fuel, food)
  - Health
  - Attracting and retaining workers
  - Jobs and economic growth

### Skills and life chances

- 2.39 The MIER and the subsequent GM Growth Plan both place the highest priority on improving skills and ensuring these meet the needs of the economy, both to support the continued growth of the conurbation and for individual opportunity. Up-skilling of the labour force is vital for tackling economic inactivity and reducing growing worries regarding unemployment levels across all age bands.
- 2.40 Qualification achievement is the best proxy available for the skills levels of an individual or area. Figure 8 sets out how GM compares with regional and national comparators. While overall GM performs well against the regional average, it significantly lags behind the UK. Fewer Greater Manchester residents of working age are qualified to Level 4+ than the national average and more GM residents hold no qualifications. GM's weak skills profile is a key drag on its economic competitiveness and this lack of appropriate skills continues to limit individuals' chances to access economic opportunity.

**Figure 8: Qualification levels of GM working age population**



Source: Annual Population Survey (2011)

### Early years and school readiness

2.41 The MIER and GMS place particular priority on ensuring GM's children get the best start in life. Long term, school preparedness has been cited as the way to end the cycle of deprivation in the UK, with a greater concentration of effort in the early years to give children a better chance when they start school. A person's life chances are most heavily influenced by his/her early experiences. In GM 43% of children are assessed in reception class as 'not school ready' compared to 41% in England. In some parts of GM this rises to 48% (2011 figures) and in recent years GM has been on a downward trajectory. The current Early Years system costs around £300 million each year in GM but the costs of failure are far greater. It is estimated that:

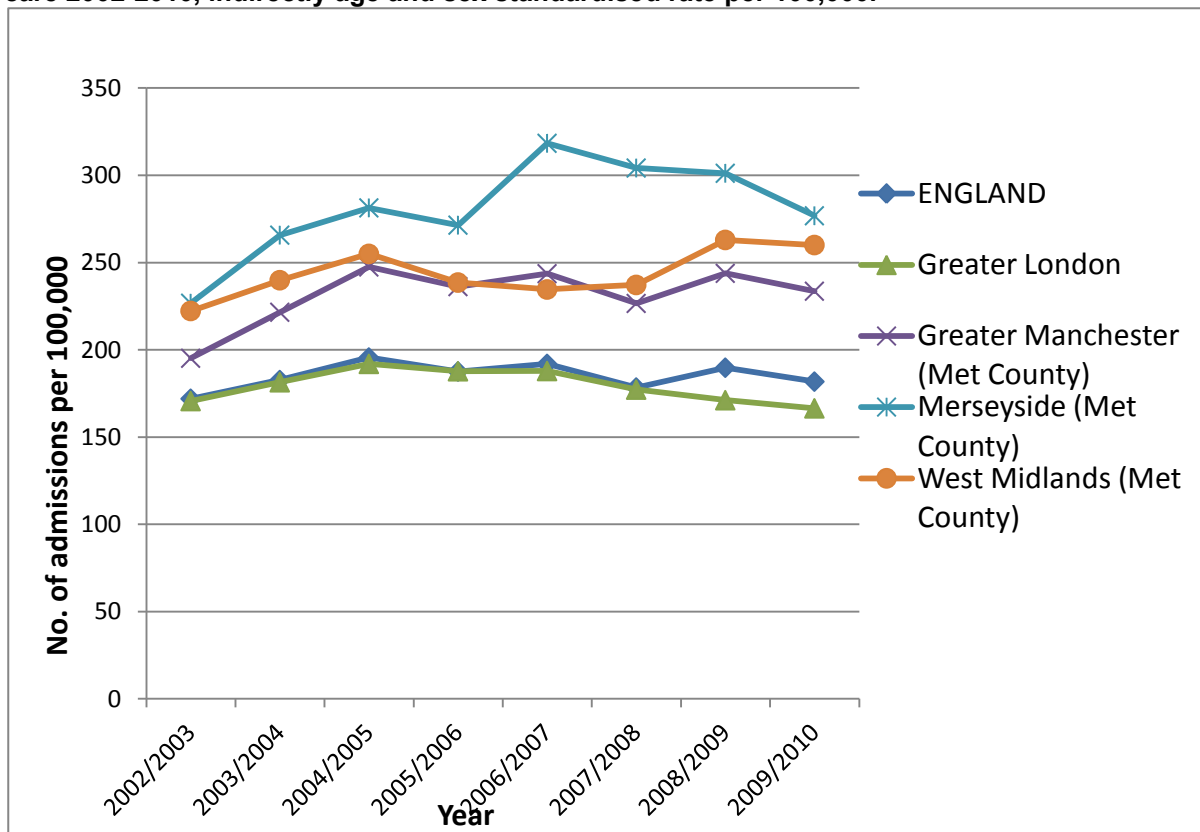
- £300 million each year is spent by health, schools and local authorities on services that could be reduced if risks to children's development were addressed earlier;
- £870 million each year is spent by the criminal justice system and evidence suggests up to 50% of all crime is attributable to people who had conduct problems in childhood and adolescence;
- £1.4bn p.a. is spent by the Exchequer on out-of-work benefits for GM residents, and a further £2.1bn p.a. on tax credits; and
- most importantly of all, are the costs of failure for individuals and families of GM's children failing to achieve their potential throughout their lives: economically, socially, and in terms of mental and physical health.

### *Securing long-term health and well-being*

2.42 Sustaining and improving the health and wellbeing of the GM population will have benefits in terms of economic growth and reducing dependencies on publicly funded services. There is untapped potential for public health services to reduce demand outside of health and social care spheres. Scaling up of effective public health interventions could secure a significant reduction in the use of public sector resources and secure both intermediate and longer term reductions in demand for high cost services.

2.43 Chronic conditions, diseases of long duration and generally slow progression, are ideally managed in primary care and normally will not require admission to emergency departments. However, sometimes chronic conditions can result in medical emergencies that need to be treated in A&E departments. When these emergencies result from inadequate management in primary care, an unnecessary strain is put both on patients and the healthcare system, as an A&E visit is significantly more expensive than a GP visit. Having to treat patients with chronic diseases in A&E means that fewer acute conditions and other emergencies can be treated and resources are diverted from other possible uses. Therefore it is desirable to minimise the number of A&E admissions for chronic condition that could be treated in primary care.

**Figure 9: Emergency hospital admissions: chronic conditions usually managed in primary care 2002-2010, indirectly age and sex standardised rate per 100,000.**



Source: NCHOD



- 2.44 However, there is an increasing trend nationwide for such admissions. Of the 4 areas studied, A&E admission rates for chronic diseases treatable in primary care between 2002 and 2010, have only decreased in the GL area (2.43% decrease). Additionally, GL had the lowest rate of such unnecessary admissions of all the compared cities, and was lower than the national average. The national average rate of admission for England showed a 5.70% increase over the 2002-2010 period. For GM, a sharp increase was seen from 2002 to 2005, the rate staying close to the 250 mark afterwards, ending the 2009/2010 cycle on a slightly decreasing trend. This placed GM significantly above the national average for A&E admissions of chronic diseases treatable in primary care, with an increase in admission rates of 19.7% between 2002 and 2010.
- 2.45 There has been a similar increase in admission to A&E of acute conditions which could have been treated in primary care. Over the same time period, A&E admission rates for acute conditions that could have been treated in primary care increased by 46.8% for GM, the highest increase in this type of admission of all 4 compared areas, and significantly higher than the national average of 21.11%. In the case of hospital admission rates for serious injuries, GM area comes second over the time period between 2002 and 2009, with an increase of 6.06% (from a starting point of 344 admissions per 100,000 population), second only to Merseyside (6.95%) and in contrast to the 0.47% decrease on a national level.
- 2.46 An analysis of the evidence highlights a number of key areas where collective action at the GM level could have a positive impact on health outcomes.
- **Early Years** - As set out in the Marmot Review, improving maternal and child health and wellbeing is a priority area for local, national and international public health. Emphasis is placed on early interventions so all children can have: “the best possible start in life. Social and emotional wellbeing is important in its own right, but it also provides the basis for future health and life chances”<sup>4</sup>.

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<sup>4</sup> NICE. NICE - Social and emotional wellbeing: early years. National Institute for Health and Clinical Excellence; 2012 Oct. Report No.: 40.

- **Cancer and cardio vascular disease** are the largest causes of death and disability in GM and how we make progress in the prevention, treatment and care of people with these conditions will largely determine how successful we are at improving population health. The excess of deaths from cancer in GM can largely be explained by past lifestyle factors which increase the risk of cancer occurring, particularly historic high levels of smoking. We also know that there is a link between deprivation and cancer deaths, with deaths from most cancers often higher in the poor.
- **Obesity** - a rise in obesity in Greater Manchester is a key issue. Many individuals who are overweight are fit and healthy and people should not be discriminated against because they are overweight. However, whilst there is variation in the health of individuals at the whole population level, increased weight is linked to an increased risk of ill health from, for example, heart disease, liver disease, some cancers, dementia and Type 2 diabetes.
- **Alcohol** - the significance of alcohol within society is widely recognized. Key findings from a series of bi-annual reports into alcohol in GM indicate that approximately a quarter of drinkers in GM are thought to drink to increasing risk levels and up to 8.8% drink to higher risk levels. Increased alcohol use has personal health impacts for individuals and places pressure on a range of public services. In the North West someone is admitted to hospital every four minutes because of alcohol and 2011 figures show that three of the ten worst performing districts nationally in terms of alcohol attributed hospital admissions are in Greater Manchester. A significant number of those claiming out of work benefits do so because of alcohol-related health problems and in August 2010 3,550 Incapacity Benefit claimants were claiming due to alcoholism.

- **Smoking** - Smoking is the leading risk factor that causes premature death and disability in GM. In the UK costs the NHS £1.5 billion a year. Smoking is responsible for about 5,000 deaths in GM alone each year. Within GM, it has been attributed as the risk factor most responsible for the inequality gap observed between the richest and poorest<sup>5,6</sup>. Smoking is associated with many different cancers, respiratory diseases (diseases of the airways), heart diseases, stomach and bowel diseases, infertility and erectile dysfunction, osteoporosis, cataracts and other eye diseases and diseases of the mouth, gums and throat<sup>7</sup>.
- **Mental health** is also a key issue for GM. The Royal College of Psychiatrists suggests that mental ill health is the largest single source of burden of disease in the UK. Mental illness is strongly associated with social deprivation, low income, unemployment, poor education, poorer physical health and increased vulnerability. One in four people will experience mental illness in their life time and approximately 11 million people of working age in the UK experience mental health problems and about 5.5 million have a common mental health disorder. There appears to be a lack of detailed evidence regarding the prevalence and impacts of mental ill health across GM but this is clearly an area which requires greater analysis.
- **Sexual Health** - improving sexual health is an important issue, in terms of health-gain, and reducing inequalities. Minimising costs to society and the health economy through reducing unplanned pregnancies, STIs, and the late diagnosis of HIV is a key objective. Poor sexual health can have a negative impact on people's lives, affecting their physical and mental health; unintended pregnancy has a life-changing impact on all individuals but especially teenagers, the termination of an unwanted pregnancy can have a lasting physical and psychological impact on the patient leading to further health problems in the future<sup>8</sup>, similarly although some STIs can be easily treated others require life-long management.

<sup>5</sup> Greater Manchester and Cheshire NHS Cancer Network. How can I avoid getting cancer: Smoking. 2010 May 5 [cited 2013 Mar 18]; Available from: URL: <http://www.gmccn.nhs.uk/CancerInfo/AboutCancer/HowcanIavoidgettingcancer/Smoking>

<sup>6</sup> NICE. Smoking cessation services. NICE; 2008 Feb. Report No.: 10.

<sup>7</sup> US Department of Health and Human Services. The health consequences of smoking: a report of the Surgeon General. Washington DC, USA; 2004.

<sup>8</sup> NHS Bury. Bury Sexual Health Strategy 2008-11. 2008.

### *The impact of welfare reform on people and places in GM*

- 2.47 Greater Manchester's partners continue to face key challenges to support the most vulnerable in our society, and to promote individual and community wellbeing and resilience. As we have seen above, GM continues to be characterised by inequalities between people and places that are doing well and those which are not. At the same time, major changes to welfare provision are currently being introduced throughout the UK by the Government in order to repair a fiscal situation resulting from the financial crisis and recession.
- 2.48 In 2010's Budget and Comprehensive Spending Review, approximately £18bn of welfare and pensions savings by the year 2014/15 were announced. A central change is the introduction of Universal Credit, a new, single benefit which replaces a number of out of work benefits and working tax credits. This will have a significant impact on Greater Manchester, which will also be amongst the first areas to test the new system. A further £10bn of cuts for two years from 2015-16 were signalled at Budget 2012 and the 2012 Autumn Statement set out an additional impact through capping benefits and tax credits by 1% per annum regardless of inflation.
- 2.49 Based on current claimant numbers it is estimated that there will be a net fall in the income of Greater Manchester's population of approximately £756m which will have wider economic effects and could cut as much as £1bn (2%) from the conurbation's economy. However, to aggregate these changes is to miss the particular difficulty which some individuals and families will face when one or more of these changes come into force, which could result in a strain on services which are already facing funding shortages.
- 2.50 It is clear that there will be an impact on both GM's economy as a whole and on particular families and individuals who will face financial difficulty as a result of the cumulative impact of the reforms. The impacts of welfare reform are likely to hit neighbourhoods where deprivation is focused and where public services are increasingly stretched most severely. Further analysis is required to understand the full impact of these changes on the resilience of our people and places.

### *Conclusions*

- 2.51 Greater Manchester has an ambitious vision to realise its evidenced economic potential and ensure long-term sustainable growth that our residents and businesses can benefit from and contribute to. An analysis of the evidence clearly demonstrates the scale of the opportunity – GM remains the country's largest economy outside of London with a growing population. However, it is also clear that the global downturn has presented real challenges to GM's people, businesses and public services.
- 2.52 The latest economic forecasts predict that the conurbation will return to growth, but not for some time, with economic conditions likely to remain challenging for the medium term. However, GM possesses significant assets, and efforts are focused on investing in these to help realise GM's economic potential.
- 2.53 It is clear, though, that the recession has had and will continue to have real consequences for GM, especially in terms of unemployment and worklessness, which combined with a legacy of low or poor skills and an aging population, presents challenges for partners operating in an increasingly financially constrained environment which will require a continued focus on cross agency, public service reform.

## 3 ENVIRONMENT OVERVIEW

- 3.1 GM has an ambitious vision: to secure long-term sustainable growth and fulfil its economic potential, ensuring that residents are able to contribute to and share in that prosperity.

### *Why is the environment important?*

- 3.2 The environment impacts on many policy agendas and priorities that contribute to the delivery of this vision. For example, the cost of energy and resources directly affects the operating costs of business across GM, who are key for achieving sustainable growth. The Greater Manchester Business Survey conducted August – September 2012 shows that 87% of businesses reported cost pressures on energy and materials are key issues. Significant cost savings are possible from resource efficiency. Efficiencies can reduce operational costs including materials input, processing and waste disposal costs. £23bn annual savings are possible in UK businesses through improved resource efficiency requiring no or little investment.
- 3.3 In difficult economic times for UK households, energy bill increases are pushing more homes into fuel poverty. The GM Poverty Commission Report published in January 2013 highlighted that the cost of energy is one of the three key factors causing poverty in GM: Fuel, Food and Finance. Action to retrofit the housing stock across Greater Manchester; to improve the energy efficiency and comfort for residents, will also reduce energy bills and energy consumption and in some instances improve the health and well being of residents.
- 3.4 The transition to a low carbon economy also requires the public sector to become more energy efficient. The public sector also has the ability to deliver at scale with over 1.1 million housing units; over 900 schools; 23 Colleges; 5 Universities; 15 Hospitals and 91,000 businesses.
- 3.5 Stimulating resource efficiency and climate change adaptation measures, across all sectors, will create market demand for low carbon sector goods and services.
- 3.6 The sales from Low Carbon Environmental Goods and Service (LCEGS) sector businesses in Greater Manchester (GM) are already in excess of £5bn p.a. and the sector is expected to continue to grow by 4% per annum. Greater Manchester also has world leading university and research capabilities in low carbon built environment and electrical and mechanical engineering which are well placed to further innovate and test low carbon technology.

- 3.7 Protection and enhancement of Greater Manchester's natural environment or 'natural capital' can also contribute to improvements to resident's quality of life and health, and contribute to climate change adaptation. For example, poor air quality in Greater Manchester, which can be improved through increasing green infrastructure cover, is responsible for hundreds of early deaths and thousands of extra hospital admissions each year. Road traffic is now the major air pollutant. Green Infrastructure can also contribute towards urban cooling, which could off-set the predicted rise in summer temperatures within the city.
- 3.8 Climate change is likely to lead to higher impact rainfall and higher temperatures across GM. Understanding the impacts of these changes and the potential adaptation responses is essential for long-term risk and resilience planning for GM's infrastructure.
- 3.9 This chapter will demonstrate how protection and enhancement of the environment supports many other policy agendas. In particular the environment and the themes considered within the deep dive sections of this chapter have a direct impact on:
- Jobs and economic growth
  - Infrastructure resilience
  - Poverty (fuel, food)
  - Improving the housing stock
  - Health
  - Attracting and retaining workers
- 3.10 The deep dive sections in this chapter focus on Greater Manchester's action on climate change which is the primary focus for GM's environmental activity. The Greater Manchester Low Carbon Hub, a private sector led Board, has been established to oversee the implementation of the Greater Manchester Climate Change Strategy. The strategy has identified 5 themes and 2 cross-cutting issues to deliver the priorities discussed in this Chapter and they are:
- Buildings
  - Energy
  - Sustainable Consumption and Production
  - Natural Capital
  - Transport (covered in a separate IGMA Chapter)

- Low carbon sector growth and skills (cross cutting issues)

*Evidence for effective response to climate change*

- 3.11 The Stern Review on the Economics of Climate Change was presented to the UK Government<sup>9</sup> in October 2006 by Sir Nicholas Stern who was Head of the Government Economic Service and advisor to the Government on the economics of climate change and development. This groundbreaking review, the first of its kind, identified greenhouse gas (ghg) emissions and the resultant climate change as one of the biggest environmental threats we are currently facing.
- 3.12 Stern also concluded “There is still time to avoid the worst impacts of climate change, if we take strong action now.”
- 3.13 The Stern Review was groundbreaking because it calculated the global cost of tackling climate change and the cost of inaction. Using results from the formal economic models developed as part of the research analysis, the Review estimates that if no action is taken the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever.
- 3.14 In contrast, the costs of action – reducing greenhouse gas emissions to avoid the worst of climate change can be limited to around 1% of global GDP each year. It is essential there is an international response to climate change but all action by individual countries, regions and cities is also vital.
- 3.15 The Stern Review called climate change the greatest market failure the world has ever seen and it interacts with other market imperfections. The Stern Review concluded there are three elements of policy required for an effective response:
- carbon pricing;
  - policy to support innovation and the deployment of low carbon technologies; and
  - action to remove barriers to energy efficiency and to inform, educate and persuade individuals about what they can do to respond to climate change.

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<sup>9</sup> Stern Review: The Economic of Climate Change, HM Treasury, (October 2006)



- 3.16 Greater Manchester therefore needs to both mitigate and adapt to climate change. This report sets out the evidence for Greater Manchester's mitigation response, to reduce CO<sub>2</sub> emissions in the "transforming our buildings" and "energy systems" sections (sections 5 and 6). The "increasing sustainable consumption and production" and "maximising the value of natural capital" sections include evidence for both adaptation and mitigation responses (sections 7 and 8). The first section, The "economic opportunity of a low carbon economy" describes the evidence for Greater Manchester low carbon and environmental (LCEGS) and how it could help support the economic development objectives of Greater Manchester. The remainder of the background section present a summary of the evidence for climate change impacts and responses.
- 3.17 There has been a large amount of scientific research undertaken into the causes, affects and responses to climate change. The key elements of the research relevant to Greater Manchester are presented here. In addition, Greater Manchester has a significant and growing body of GM specific research much of which has been undertaken in the city's Universities. The pertinent elements of that research are also presented here.

#### *Climate change and economics*

- 3.18 The Stern Review undertook independent research and collected witness statements to review the science and economics required to understand the challenges of climate change. The Stern Review concluded "the scientific evidence is now overwhelming: climate change is a serious global threat, and it demands an urgent global response."
- 3.19 In 2008, Greater Manchester conducted a "Mini-Stern" for Manchester which assessed the economic impact of climate change on the Manchester City Region<sup>10</sup>. The analysis concluded that "without exploring opportunities and mitigating effectively, a 'failure to adapt' scenario suggests the City Region could lose an estimated £20billion by 2020."

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<sup>10</sup> Mini-Stern for Manchester, Deloitte, August 2008 <http://manchesterismyplanet.com/strategy>

- 3.20 In January 2013 at the World Economic Forum in Davos Lord Stern updated his 2006 research. He has concluded that he under estimated the risks. The 2006 report pointed to a 75% chance that global temperatures would rise between two and three degrees above the long-term average; he now believes we are “on track for something like four”<sup>11</sup>.

### *Understanding greenhouse gas emissions*

- 3.21 The level of future climate change will depend on the level of greenhouse gas emissions within the atmosphere. The Inter-governmental panel on climate change’s (IPCC) lowest emissions scenario puts a best estimate of temperature increases by the end of this century at 1.8°C above the 1980–1999 baseline level, whilst the emissions scenario centred on the continued dominance of fossil fuel-based energy results in a best estimate of 4°C increase above this baseline<sup>12</sup>.
- 3.22 The Tyndall Centre for Climate Change Research at the University of Manchester undertakes research in climate change, particularly greenhouse gas emissions scenarios. The Tyndall Centre has investigated the impact of this research and has concluded the escalation in emissions is rapidly reducing options to stabilize global mean surface temperatures at less than 2°C above pre-industrial levels<sup>13</sup>. Further, the National Academy of the USA has demonstrated this is at a time when greenhouse gas emissions are accelerating the earth’s capacity to naturally absorb greenhouse gas emissions is declining<sup>14</sup>. Collectively, these studies, and others like them, suggest that the risk of (relatively) rapid and severe climate change is increasing.
- 3.23 If no action is taken to reduce emissions, the concentration of greenhouse gases in the atmosphere could reach double its pre-industrial level as early as 2035, virtually committing us to a global average temperature rise of over 2°C. In the longer term there would be a more than 50% chance that this temperature would exceed 5°C. This rise would be very dangerous indeed; it is equivalent to the change in average temperatures from the last ice age to today.

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11 As quoted in The Observer, 26<sup>th</sup> January 2013 <http://www.guardian.co.uk/environment/2013/jan/27/nicholas-stern-climate-change-davos>

12 (IPCC, 2007)

13 Beyond dangerous climate change: emission pathways for a new world". (Anderson K L, Bows A. 2011.) Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences. Vol. 369. pp 20-44.

14 Contributions to accelerating atmospheric CO<sub>2</sub> growth from economic activity, carbon intensity, and efficiency of natural sinks. (Canadell et al 2007) Proceedings of the National Academy of Sciences of the United States of America

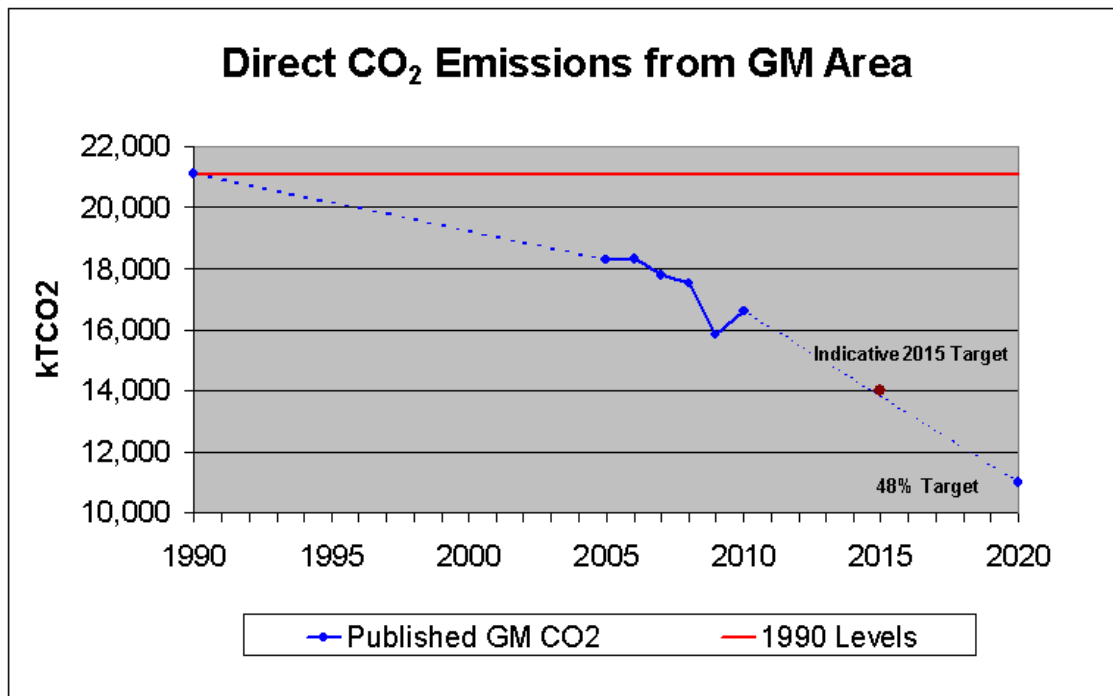
3.24 Greenhouse gas emissions can also be expressed in parts per million of CO<sub>2</sub> equivalent (ppmCO<sub>2</sub>e). The current level of greenhouse gases in the atmosphere is 430ppm CO<sub>2</sub>e and it is rising at more than 2ppm each year. To keep global climate change to less than 2°C, which is the internationally recognised goal, the levels of greenhouse gases need to be stabilised within the atmosphere between 450 and 550ppm CO<sub>2</sub>e. Stabilisation in this range would require annual emissions to be brought down to more than 80% below current levels by 2050.

**Greater Manchester emissions**

3.25 A GM-wide target of 48% CO<sub>2</sub> reduction by 2020 from a 1990 baseline was approved by the AGMA Executive/GMCA Board in July 2011. The latest available Government statistics for the GM local authority areas tell us that our annual emissions are already 22% lower than this 1990 baseline, almost half way towards the target. Continuing the trajectory towards a 48% target indicates that by 2015, we need to have reduced our emissions by 33% to 14,000 kt CO<sub>2</sub> *per anum*. This indicative, interim target is 2,600kt lower than our emissions in 2010.

3.26 The graph in Figure 10 below shows GM's direct emissions of CO<sub>2</sub> based on DECC statistics 2005-2010, back-cast to 1990, and forecast to GM's 2020 target.

**Figure 10: GM's direct CO<sub>2</sub> emissions**



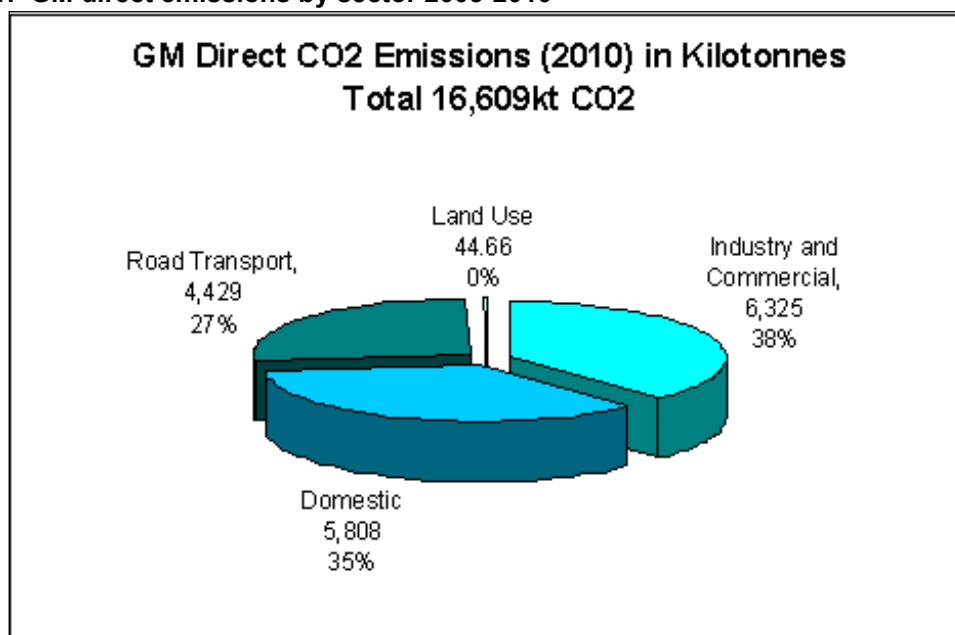
Source: DECC LA Carbon Emissions Estimates Full Data Set (published 2012)

3.27 Although the graph shows a general reducing trend consistent with the 2020 target, there was an apparent increase in emissions between 2009 and 2010. The downward trend in 2009/10 was largely due to the impact of the recession, however the Committee on Climate Change does not think there is an overall change in the underlying pace of emissions reduction<sup>15</sup>. The increase in emissions in 2010 following the reduction are mainly due to a rise in residential gas use as a result of an exceptionally cold winter, and increased fossil fuel electricity generation due to nuclear outages<sup>16</sup>.

3.28 While this trajectory suggests that GM will hit a 48% reduction target with a 'business as usual' approach, this is very unlikely to be the case. Emissions reductions will become progressively difficult to find, with the early easy wins already implemented.

3.29 Climate change emissions are currently measured from direct sources: transport; domestic buildings; industrial and commercial operations; and land use. Figure 11 below shows how each key theme contributes to GM's direct emissions total.

**Figure 11: GM direct emissions by sector 2005-2010**



Source: DECC LA Carbon Emissions Estimates Full Data Set (published 2012)

3.30 To reach the 2015 interim target of a 2,600kt CO<sub>2</sub> reduction on 2010 levels it has been calculated each sector needs to reduce its emissions by the following, proportional amount:

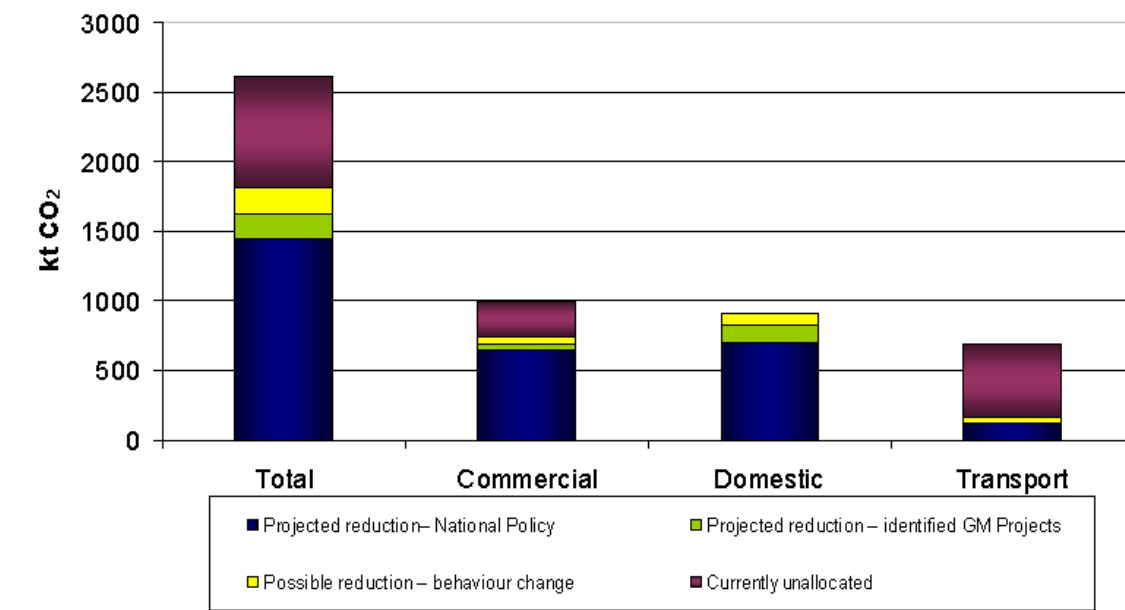
- Road Transport: 695kt
- Domestic: 912kt

15 [http://archive.theccc.org.uk/aws/Progress%202011/CCC\\_Progress%20Report\\_Exec\\_Summary\\_Intactive\\_1.pdf](http://archive.theccc.org.uk/aws/Progress%202011/CCC_Progress%20Report_Exec_Summary_Intactive_1.pdf)

16 <http://www.decc.gov.uk/assets/decc/11/stats/climate-change/4282-statistical-release-2010-uk-greenhouse-gas-emissi.pdf>

- Industrial and Commercial: 993kt
- 3.31 An indicative forecast of the savings required in each sector has been calculated using evidence from:
- DECC translations of their national strategy for climate change action The Carbon Plan to a GM scale. This takes into account the likely impact of national policy interventions in: grid decarbonisation; gas consumption; and road transport (engine efficiency standards and electric vehicles);
  - CO<sub>2</sub> savings expected from quantifiable actions contained within the GM Climate Change Strategy Implementation Plan;
  - Indicative estimates for additional savings that can be achieved from cultural/behaviour change measures.

**Figure 12: Possible source of GM emissions reduction by 2015**



	Projected reduction - National Policy kt CO <sub>2</sub>	Projected reduction - identified GM Projects, kt CO <sub>2</sub>	Possible reduction - behaviour change, kt CO <sub>2</sub>	Currently unallocated, kt CO <sub>2</sub>
Commercial	638	50	50	255
Domestic	701	120	91	0
Transport	115	0	40	541
TOTAL	1454	170	181	796

Source: GM Climate Change Implementation Plan

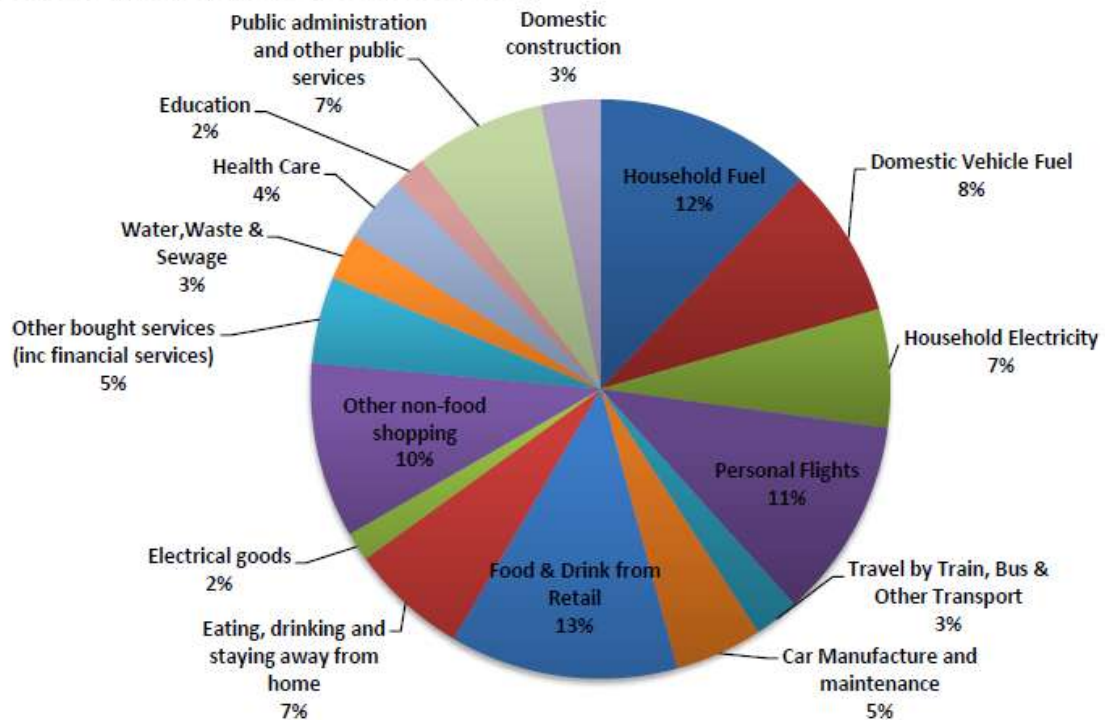
3.32 This approach to measure and report ghg emissions uses direct emissions and is in line with national reporting requirements, but Greater Manchester has also begun to pioneer a ‘total carbon footprint’ or ‘consumption metrics’ approach to measuring CO<sub>2</sub> emissions.

*Total carbon footprint*

3.33 The ‘total carbon footprint’ metrics take account of all the ‘embodied’ emissions involved with producing the goods and services used within GM, as well as those ‘direct’ emissions that arise directly from activities. The following chart shows that consideration of direct emissions misses a large % of the emissions that arise from activity taking place within GM.

**Figure 13: The greenhouse gas footprint of Greater Manchester residents broken down by consumption category (total 41.2 million tonnes CO<sub>2</sub>e)**

GM resident's footprint breaks down as follows:



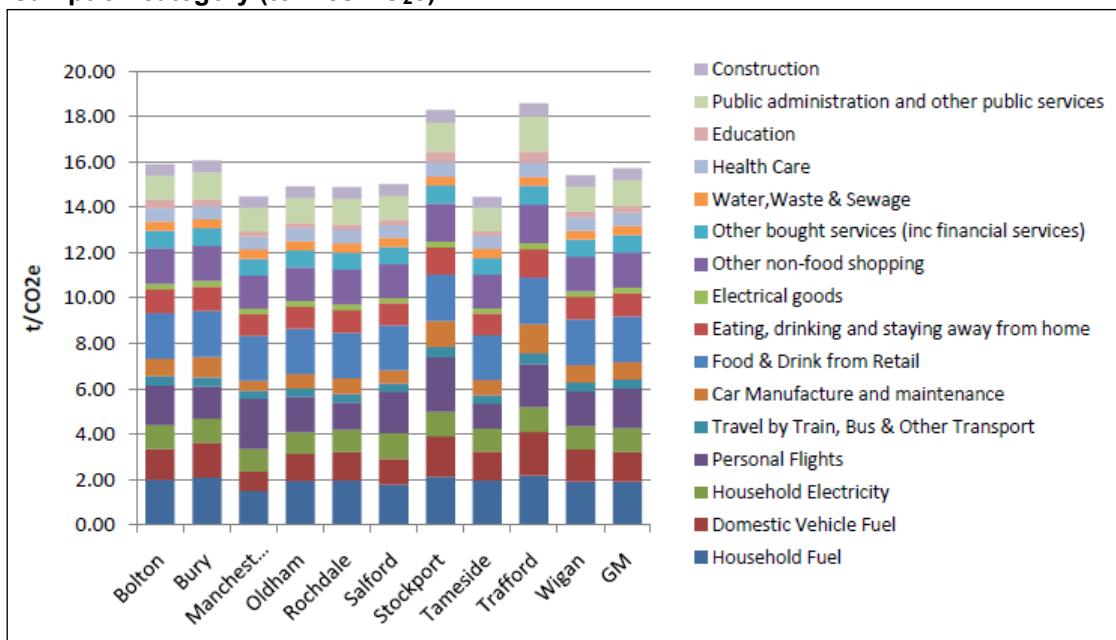
Source: Primary research by Small World Consulting Ltd<sup>17</sup>

- 3.34 While the direct emissions footprint of GM is around 16.6m tonnes CO<sub>2</sub>, the consumption based carbon footprint is estimated at 41.2m tonnes CO<sub>2</sub>e. Until now, official place-based carbon metrics have taken a production-based approach, including only direct emissions and those resulting from electricity use. This has had policy implications, since what we measure tends to be what we manage. As a result, central, regional and local government have concentrated on carbon policies concerned almost solely with transport, household energy, energy generation and on-site business emissions.
- 3.35 Relying entirely on the incomplete picture presented by production-based carbon metrics has been a major barrier to strategic approaches for developing low-carbon futures. The adoption of a consumption based metrics alongside production-based accounting opens up a wealth of both opportunity and challenge. Doing so is particularly important when seeking to understand and manage the impacts of lifestyles and of service economies, since in these cases, supply chain emissions often dwarf the direct emissions that would be included in an assessment of only direct emissions.

<sup>17</sup> The Total Carbon Footprint of Greater Manchester: Estimates of the Greenhouse Gas Emissions from Consumption by Greater Manchester Residents and Industries, Small World Consulting, July 2011.

3.36 Consideration of indirect emissions is an emerging approach and has considerably more scope to realise co-benefits than traditional forms of direct emissions management.

**Figure 14: Average annual greenhouse gas footprint per resident by local authority area and consumption category (tonnes CO<sub>2</sub>e)**



Source: Primary research by Small World Consulting Ltd<sup>18</sup>

### *Climate change adaptation*

3.37 Climate change is likely to present a number of risks to GM both directly and indirectly. Direct impacts include the impacts of the likely changes to weather systems and indirect impacts refer to impacts of climate change in other regions and how it might affect GM. For example, the impacts of climate change on globally food production that may affect food supply to the UK and GM. It is possible the indirect impacts will be greater than the direct impacts but this is a gap in the evidence base and not, currently, fully understood.

3.38 There is a growing body of evidence of the likely direct impacts of climate change. Greater Manchester has been particularly fortunate that, through the Eco-Cities initiative and a number of other research projects, it has a greater understanding of the likely direct impacts and a how to adapt than many other cities.

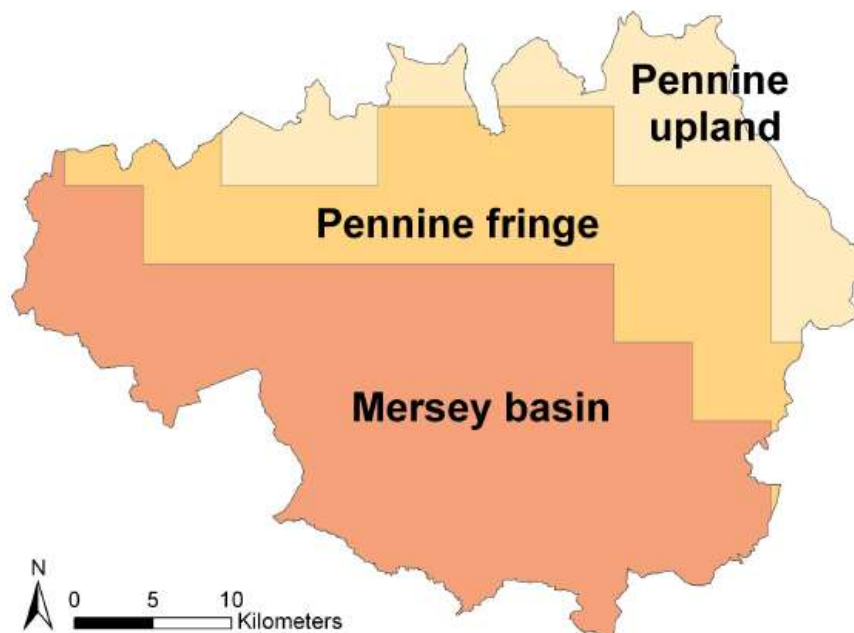
3.39 The research projects that have been undertaken in recent years and have contributed to our understanding include:

<sup>18</sup> The Total Carbon Footprint of Greater Manchester: Estimates of the Greenhouse Gas Emissions from Consumption by Greater Manchester Residents and Industries, Small World Consulting, July 2011.



- **Eco-cities**, an initiative led by the University of Manchester and funded by Bruntswood. The project focused on the response of urban areas to the impacts of climate change. Using scientific research, extensive stakeholder engagement and best practice examples of new programmes Eco-cities produced an “integrated climate change adaptation strategy” for GM.
  - **SCORCHIO** – Sustainable cities: options for responding to climate change impacts and outcomes. A University of Manchester project to develop tools for the analysis of adaptation options for urban areas with a particular emphasis on heat and human comfort in the built environment.
  - **GRaBS** – Green and blue space adaptation for urban areas and eco towns is an INTERREG IVC project with the aim of increasing the use of green and blue infrastructure for climate change adaptation.
- 3.40 The Eco-cities research developed our understand of future climate change projections for Greater Manchester. It has proposed three distinct climatic zones of Greater Manchester, shown in Figure 15.

**Figure 15: Three climate zones across Greater Manchester (Cavan 2011).**



Source: Cavan, 2011

- 3.41 Eco-cities developed probabilistic projections to provide details of the relative likelihood that a particular climate change outcome will be realised under a range of emission scenarios (e.g. a 3°C temperature rise by 2050 under a high emissions scenario).

- 3.42 Broadly speaking, the projections for Greater Manchester point towards warmer drier summers and warmer wetter winters. Therefore there is an increased risk of extreme events such as high temperatures and intense precipitation.
- 3.43 Intense precipitation is likely to lead to surface water flooding events increasing in frequency. Initial findings from the EcoCities project found that a range of critical infrastructure (including parts of the motorway network) and social infrastructure (including schools and emergency services buildings) are located within areas with an increased chance of flooding due to climate change. These assets support the effective functioning of Greater Manchester and if damaged or disrupted would bring significant negative socio-economic implications.
- 3.44 In addition to the rapid rise in greenhouse gas emissions over recent years and the implications of this for future climate change, another key area of research concerns the effects that climate change is having in the present day. For example, research reported in the journal *Nature* in 2011 demonstrated that the UK floods of 2000 (an event that resulted in £3.5 billion in insurance claims) were two to three times more likely to have occurred due to climate change<sup>19</sup>.
- 3.45 Further research is currently underway to “evidence and spatially prioritise climate change risk in Greater Manchester”. The aim of this research, funded by DEFRA and being undertaken by the University of Manchester is to inform the delivery of the GMS through enhanced understanding of the risks to delivery of the strategy from climate change. The outputs of this research will report during 2013 and will be incorporated into the IGMA refresh in 2014.
- 3.46 Greater Manchester’s heat island has been studied within the SCORCHIO project. This research found a current maximum heat island effect (the difference between urban and rural temperatures) of 8<sup>0</sup>C in summer and 10<sup>0</sup>C in winter<sup>20</sup>. As climate change raises temperatures across the conurbation over the coming decades, the heat island effect, will further exacerbate these temperature increases, especially in build up areas.
- 3.47 Currently, the temperature in Greater Manchester rarely breaches this threshold. The warmest day is between 25-27<sup>0</sup>C; and the warmest night varies between 15-18<sup>0</sup>C<sup>21</sup>. However, temperatures are projected to rise with climate change.

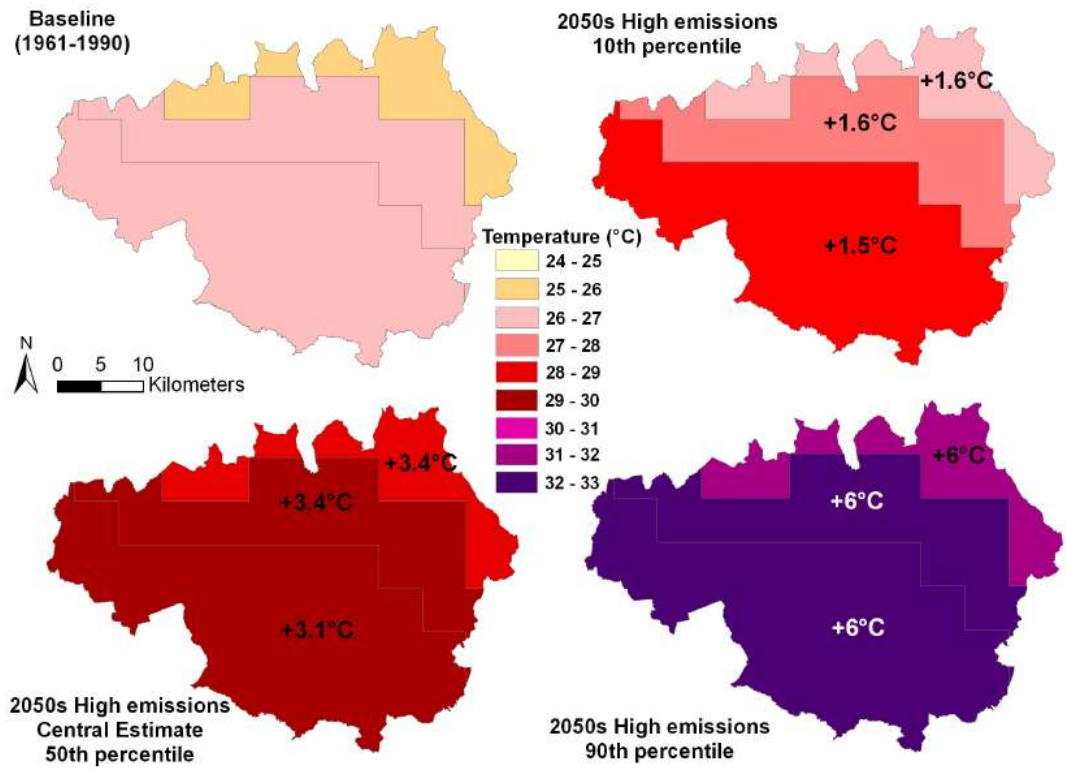
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19 Anthropogenic greenhouse gas contribution to flood risk in England and Wales in autumn 2000. (Pall et al 2011), *Nature*

20 <http://www.arcc-cn.org.uk/wp-content/Summaries/SCORCHIO-summary-final.pdf>

21(Cavan, 2011)

**Figure 16: Temperature of the warmest day of summer across Greater Manchester for the baseline and 2050s high emissions scenario**



Source: Cavan, 2011

## 4 ECONOMIC OPPORTUNITY OF A LOW CARBON ECONOMY

- 4.1 Adaptation and mitigation of climate change and other environmental impacts creates business opportunities for new and existing businesses. These businesses operate in the “low carbon and environmental goods and services” (LCEGS) sector and contribute to the development of a low carbon economy.
- 4.2 A low carbon economy also requires *all* businesses to improve their energy and resource use and reduce carbon intensity. The evidence for this activity, which also creates demand for LCEGS sector companies, is included in the “increasing sustainable consumption and production” section of this report.
- 4.3 The LCEGS sector is largely driven by legislation and regulation and is one of only a few growth markets in the current economic climate, still experiencing between 4 and 5% growth rates<sup>22</sup>. Work has been undertaken to try and quantify the scale of the opportunity and GM’s ability to respond and take advantage.
- 4.4 The “low carbon and environmental goods and services” (LCEGS) sector is a new and emerging industrial sector and it is not easily classified using the standard industrial classification (SIC) codes and is therefore difficult to identify and measure. SIC codes are only updated periodically and can’t keep pace with developments in the sector.
- 4.5 Despite the difficulty it is still important to measure the sector to monitor the impact of activities being undertaken to develop a response to environmental and climate change issues and to measure trends. A methodology for the classification and measurement of the low carbon and environmental sector has been developed and was pioneered in the Northwest. The method has since been adopted by central Government and is now the UK’s standard definition for the LCEGS sector.
- 4.6 The full name of the sector is the “low carbon and environmental goods and services” sector (LCEGS) this title for the sector evolved during 2009 from the previously used “environmental goods and services” name to reflect the growing number of low carbon technologies and services entering the market.

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<sup>22</sup> Low Carbon and Environmental Goods and Services (LCEGS), Report for 2009/10, BIS, (July 2011)

4.7 The definition is broken down into three main sections: traditional environmental goods and services; renewable energy technology; and emerging low carbon technology and services and within these three there are 24 sub sectors shown in the table below.

**Figure 17: showing the 24 headline sub-sectors of the LCEGS sector definition**

<b>Traditional Environmental Goods and Services</b>	<b>Renewable Energy Technology</b>	<b>Emerging Low Carbon Technology and Services</b>
Air Pollution	Hydro	Alternative Vehicle Fuel
Environmental Consultancy	Wave and tidal	Additional Energy Sources
Environmental Monitoring	Biomass	Carbon Capture and Storage
Marine Pollution Control	Wind	Carbon Finance
Noise and Vibration Control	Geothermal	Energy Management
Contaminated Land	Renewable Consulting	Building Technologies
Waste Management	Photovoltaic	
Water and Wastewater		
Recovery and Recycling		

4.8 The LCEGS sector is also commonly referred to as the “Green Economy”. In addition, the “Green Economy” term is also used to encompass both the sector and “green” activity such as resource efficiency activity within businesses, under one title. “Low Carbon” and “Green Economy” are used interchangeably and it is therefore important to be clear about what is meant when either term is used.

4.9 In January 2010 a report was produced for New Economy analysing the LCEGS sector in GM using 2008/9 data<sup>23</sup>. This is the most up to date research available and is therefore presented here however, research is underway at ENWORKS to update the figures and undertake further analysis of the LCEGS sector in GM.

4.10 Currently there are 1,893 businesses employing 39,557 people supplying LCEGS products and services in GM and the market value is £4.2bn.<sup>24</sup> This represents about 2% of the GM business base but the potential for future growth is great.

<sup>23</sup> Low Carbon and Environmental Goods and Services Sector: Analysis for Greater Manchester, A Report to New Economy from Innovas Solutions Ltd (January 2010)

<sup>24</sup> Low Carbon and Environmental Goods and Services Sector: Analysis for Greater Manchester, A Report to New Economy from Innovas Solutions Ltd (January 2010)

**Figure 18: The size of the LCEGS sector in GM (2008/9)<sup>25</sup>**

	<b>GM</b>	<b>NW</b>	<b>UK</b>
<b>Sales (£m)</b>	4,253	10,777	112,003
<b>Number of companies</b>	1,893	4,985	52,231
<b>Number of staff</b>	34,120	86,491	897,880

Source: Inovas (2008/9)

4.11 The GM proportion of the UK LCEGS sector is 3.7% which is almost exactly the same as the size of the whole GM economy compared to the UK (3.6%). Therefore, so far, the LCEGS in GM is performing on a par with expectations for the whole economy.

4.12 It also compares favourably in size with other GM priority sectors. As the table below shows the LCEGS sector is a similar size to other sectors highlighted as key to GM's economy.

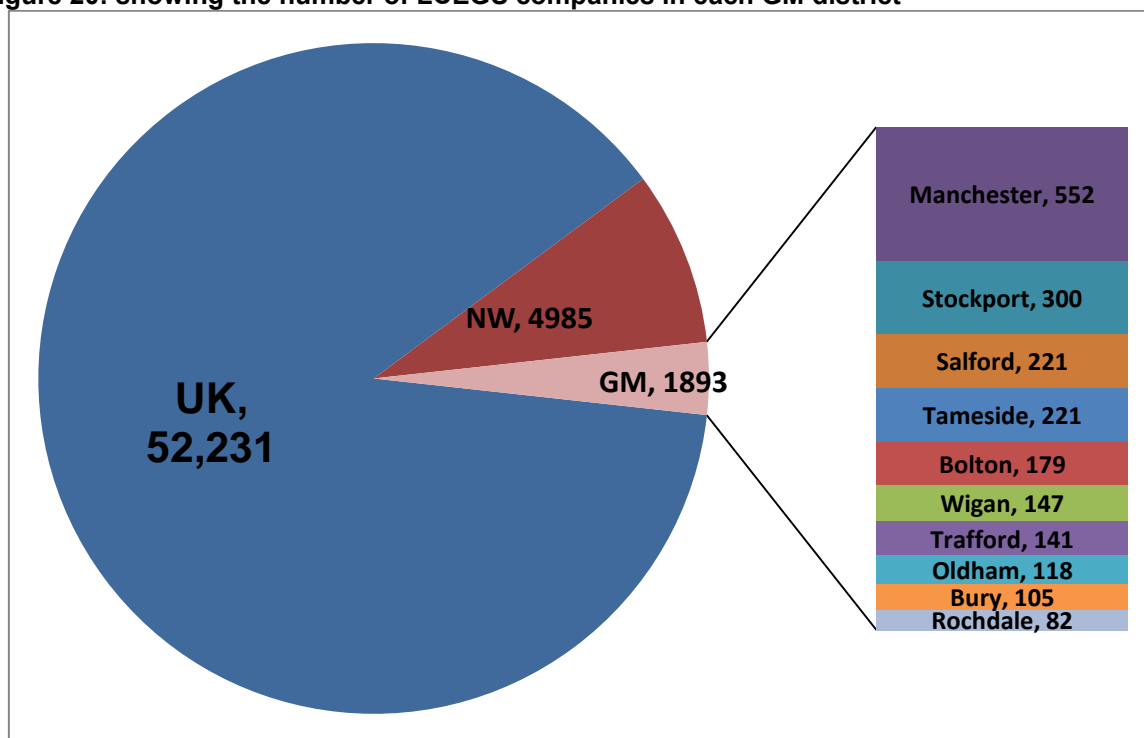
**Figure 19: Comparing LCEGS with Key Sectors in GM**

<b>Sector</b>	<b>Financial and Professional</b>	<b>Creative &amp; Digital</b>	<b>Health and Life Sciences</b>	<b>Sport</b>	<b>LCEGS</b>
<b>GVA generated annually</b>	£9.0bn	£2.7bn	£4.7bn	£0.5bn	£4.25bn market value
<b>Employees</b>	224,000	63,000	163,000	21,000	35,000
<b>Key Companies</b>	Co-op, RBS, BNY Mellon	MediaCity UK	Manchester Science Park, The Christie, UK Biobank	Adidas, Umbro, the Football Clubs	Co-op, Siemens, Ener g,

4.13 The number of companies is also distributed relatively evenly across the 10 districts in GM, reflecting their relative size as the following graph shows.

<sup>25</sup> Low Carbon and Environmental Goods and Services Sector: Analysis for Greater Manchester, A Report to New Economy from Inovas Solutions Ltd (January 2010)

**Figure 20: showing the number of LCEGS companies in each GM district**



Source: Envirolink

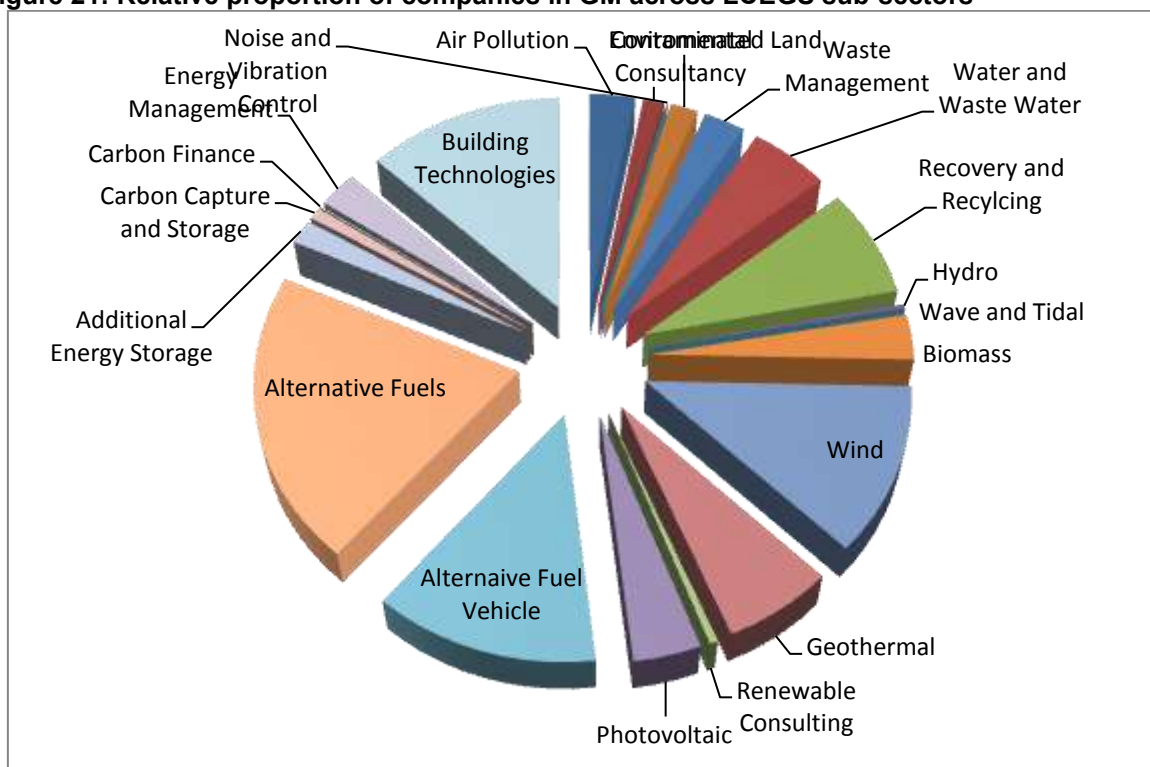
- 4.14 The LCEGS sector describes a huge variety of markets and business activities. GM's greatest strength is the spread of activity across the range of low carbon and environmental markets which, given the relative immature nature of the industry, should enable GM to adapt and grow with the markets as they expand.
- 4.15 In addition, GM has a strong academic base in fundamental subjects pertinent to a number of LCEGS sectors, such as electrical engineering along with several well regarded research institutes. For example:
- The Sustainable Consumption Institute;
  - The Tyndall Centre for Climate Change Research based at the University of Manchester; and
  - Research Institute for the Built and Human Environment at Salford.
- 4.16 There are a number of large businesses based in GM who either have low carbon and environmental markets at the heart of their businesses, such as the Co-operative Bank and Siemens, or have diversified to successfully exploit the new market opportunities. For example the Peel Group, one of the Northwest's largest companies has established Peel Energy to develop renewable energy projects.

4.17 In addition, GM shows a comparative strength in numbers and expertise in the following sub-sectors: recycling, recovery and waste management; energy efficiency technology, building technologies and energy management; and renewable energy supply, particularly wind, biomass and PV.

4.18 The pie chat below, Figure 21, shows large numbers of companies in both Alternative fuel vehicle and Alternative fuel categories. These categories feature well in all geographic areas because they represent fuel distribution sites as the following definitions show and therefore are not counted as a comparative strength.

4.19 However, it is not just about the volume of companies. There are also a significant number of companies developing innovative, niche technologies or services. These companies are likely to have high growth rates and might not be in one of the sectors well represented by volume of companies in GM. Never the less they still have the potential to make a significant economic impact, if nurtured to grow in GM.

**Figure 21: Relative proportion of companies in GM across LCEGS sub-sectors**



Alternative fuel vehicle: Main stream fuel for vehicles eg Compressed natural gas, Butanol, E85, other fuels such as hydrogen.

Alternative fuel: biodiesel, batteries and other fuels. The large presence in GM mainly demonstrates volumes of alternative fuel and biodiesel blends being sold through petrol forecourts.

Source: Innovas, 2010



## *Skills*

- 4.20 Transforming to a low carbon economy will require new skills for both the LCEGS sector and in the wider economy so all businesses sectors understand the risks and opportunities. The evidence presented here includes both the demand for LCEGS skills and the low carbon / environmental training required by the wider economy.
- 4.21 A skilled workforce is essential for business growth and a lack of the correct skills can act as a barrier to growth. A recent report produced for Wigan MBC<sup>26</sup> showed that just over 30% of employers anticipate that the transition to a low carbon economy will result in the creation of new job roles [both in the LCEGS sector and wider economy] over the next five years. In addition, to the realignment of existing roles, for example electricians becoming skilled in PV installation, new job roles are also anticipated to span the following:
- Suitably qualified trainers and providers in emerging technologies and processes;
  - Installers of renewable energy – particularly solar panels and ground source heat pumps;
  - Opportunities for energy assessors as the Green Deal and other accreditation systems are brought to market;
  - Testers of appliances/products – to ensure conformation to regulations in relation to low carbon agenda;
  - Manufacture of renewable energy and associated products e.g. batteries;
  - Environmental managers and officers;
  - Carbon emissions ‘specialists’ e.g. advice on conforming to new regulations and legislation an in managing the carbon footprint;
  - Energy efficiency advisors;
  - Energy assessors;
  - Skilled engineers for solar and wind energy;
  - Health and safety advisors;
  - Designers;
  - Research and development officers;
  - Product developers;

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<sup>26</sup> Research into Low Carbon Skills in Wigan, Final Report, Pye Tait Consulting (January 2012, Updated August 2012)

- Administration / clerical roles requiring specific knowledge of the low carbon agenda Eco-housing developers and salespeople;
  - Sustainability managers / sustainable development advisors; and
  - Carbon emission testers.
- 4.22 The Wigan report also mentioned that the skills required will vary across local authority areas depending on their existing economic base and sector characteristics. The research emphasised the [LCEGS] ‘sector’ is still evolving, with new technologies, products and occupations still emerging. Therefore not all employers possess a detailed understanding of the specific skills and knowledge needs and as such, not all are able to fully identify and quantify skills shortages.
- 4.23 However, shortages are already being experienced and have resulted in recruitment difficulties for employers. Much of the concern is related to traditional recruitment routes and occupations that need to adapt. The specific example quoted in the report is the availability in the workforce of apprentices. It is also vital that “traditional” occupations such as plumbers and electricians adapt and enhance their existing skill sets to be able to install and maintain new technologies.
- 4.24 A report by the University of Salford<sup>27</sup> noted that competition for suitably trained and experienced workers is one of the key issues that the LCEGS sector faces. Already, there is a shortage in the number of workers with skills related to science, technology, engineering and maths (the STEM subjects) and the LCEGS sector will be competing for these workers with industry as a whole.
- 4.25 Interviews with manufacturing companies highlighted concerns in relation to an ageing workforce and a clear need to engage with local schools and colleges to address career advice and recruitment needs. Many employers are struggling to fill vacancies in part because of a lack of ‘work ready’ young people. This is a common theme in the manufacturing sector and not just for LCEGS technologies, indicating employability skills are also in short supply, particularly among the 14-19 age group.
- 4.26 In GM there is a growing provision for both STEM disciplines and leadership and management discipline at the higher education level; some of these are pre-existing courses which incorporate low carbon or renewable energy technology skills and knowledge and some are new courses.

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<sup>27</sup> Integrated Workforce Renewal: Low Carbon Skills Provision in Greater Manchester (Feb 2011) [http://www.shusu.salford.ac.uk/page/iwr\\_low\\_carbon\\_skills](http://www.shusu.salford.ac.uk/page/iwr_low_carbon_skills)

- 4.27 The Wigan report also identified a number of employers offering a range of bespoke training to suit individual needs. However, the employers surveyed also noted that costs are the most significant barrier to training.
- 4.28 The study by Salford University contacted 18 out of 20 further education providers in GM in 2011 and found that all of those contacted either offered or were planning to offer (from September 2011) one or more courses or modules with a focus on low carbon skills for both the LCEGS and other business sectors in existing courses. However, most of the courses related to installation of renewable energy or other low carbon technologies e.g. rain water harvesting.
- 4.29 Examples of the type of courses on offer are listed below:
- University of Manchester
- Chemical Engineering with Environmental Technology MEng
  - Environment and Sustainable Technology MSc
  - Renewable Energy and CleanTech MSc
- Manchester Metropolitan University
- PgCert/PgDip/MSc and MSc (by Research) Environmental Management and Business
- University of Bolton
- Renewable Energy Systems and Technologies MSc
- University of Salford
- Environmental Management BSc
- 4.30 There are also courses provided across GM by further education establishments for LCEGS sector accreditations such as MCS (Microgeneration Certification Scheme) but the extent of the provision is unknown.
- 4.31 The Wigan report also noted a plethora of non-accredited, employer based training covering a wide range of subjects including understanding sustainable homes, waste management, energy management and sustainability in contracting, life cycle assessments and carbon foot printing courses. However the majority are aimed at training professionals, already in related occupations. As such it does not appear that this type of provision specifically includes ‘work ready’ skills despite the fact that many employers identify employee work readiness – particularly of younger people – to be lacking. Manufacturing and energy supply companies are offering the least amount of training in comparison with other sectors in the scope of the research.

- 4.32 The Wigan report researched barriers to employers within the LCEGS sector for accessing training provision; costs account for roughly half of all barriers reported by employers surveyed. Just over 15% of employers surveyed also noted that difficulties in gaining information about relevant training had been a barrier and just under 10% of employers considered training to be too time consuming.
- 4.33 The University of Salford noted the key issues for developing a LCEGS sector workforce is based on the need to up skill the current workforce and this has implications for the provision of training. The recommendations made by the report are that training provision should focus on updating current skills rather than developing new ones and training must be flexible to fit with employers needs.
- 4.34 The report recognises the reluctance of employers to invest in skills, particularly STEM skills, which could hinder the development of the sector. It was also noted there is confusion over 'green' terminology which is a barrier for investment in skills development.
- 4.35 The report concludes the LCEGS sector must adopt a funding and training infrastructure that will enable employers of all sizes to allow many of their technical workers to undertake courses that can be delivered flexibly to the employers' needs.

# 5 TRANSFORMING OUR BUILDINGS

## *Building 'Retrofit'*

- 5.1 Transformation of our buildings is vital to reduce emissions. 35% of GM's emissions arise from the Domestic sector which is entirely electricity, gas use and other fuel use. A further 38% emissions arise from the Commercial/Industrial sector which includes buildings but also includes industrial installations, heat and power use, however it is not possible to say exactly what percentage arise from buildings alone.
- 5.2 With this scale of emissions associated with our building stock, reducing emissions from buildings is critical if GM is to hit its overall carbon emissions reduction targets, in both the short and long term (87% of the buildings currently standing will still be around in 2050<sup>28</sup>).
- 5.3 Retrofitting at scale, provides opportunity not only to reduce emissions significantly but help reduce fuel poverty in domestic buildings and increased productivity for tenants and higher rent yields in the commercial sector.

## *Domestic buildings*

- 5.4 In difficult economic times for UK households, energy bill increases are pushing more homes into fuel poverty. The GM Poverty Commission Report in January 2013 highlighted that the cost of energy is one of the 3 key factors causing poverty in GM: Fuel, Food and Finance. This is supported by Save the Children report published in October 2012, *Child Poverty: it shouldn't happen here*<sup>29</sup>, which highlights Greater Manchester as having the highest levels of child poverty outside of London and identifies rising energy costs as a particular burden on low income families.
- 5.5 Across GM, there are 220,100 households living in fuel poverty and under-heated homes: equating to 20% of total households<sup>30</sup>. Taking people out of fuel poverty has direct benefits on public sector finance and resources. Building on work completed by Bolton NHS, the GM Green Deal Business Case illustrated that for every 2000 households supported out of fuel poverty the saving to the NHS alone, due to reduced winter morbidity and mortality, would be £1m per annum.

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28 Kelly (2008) Britain's Building Stock – A Carbon Challenge, DCLG.

[http://www.lcmp.eng.cam.ac.uk/wp-content/uploads/081012\\_kelly.pdf](http://www.lcmp.eng.cam.ac.uk/wp-content/uploads/081012_kelly.pdf)

29 It Shouldn't Happen Here, Save the Children, September 2012

[http://www.savethechildren.org.uk/sites/default/files/documents/child\\_poverty\\_2012.pdf](http://www.savethechildren.org.uk/sites/default/files/documents/child_poverty_2012.pdf)

30 CLES, Greater Manchester Poverty Commission: Research Report (December 2012)

- 5.6 New build properties, built in place of some of our oldest stock or as additional housing capacity, can play their role in improving domestic energy efficiency overall. It is estimated that there will be 9,200 new build domestic properties in GM by 2015. The energy efficiency of new build properties can, to some extent, be stipulated through building regulations and planning requirements.
- 5.7 However, 1.16m domestic households already exist in GM, many built before the introduction of modern building regulations. Of these, 80% are expected to still be in use in 2050. It is vital that these 973,000 existing houses undergo energy efficiency improvements, if 2050 carbon emission targets are to be met.
- 5.8 There is significant evidence to suggest how to approach improving energy efficiency within the housing stock. The GM Housing Retrofit Strategy<sup>31</sup> describes a “Fabric First” approach to energy efficiency improvements. Under this approach, retrofit of the building fabric is key. This will involve a move away from installation of stand alone energy efficiency measures such as loft insulation or energy efficiency lighting, towards a whole house approach. This is likely to result in the increased use of emerging technologies such as solid wall insulation. The GM Housing Retrofit Strategy estimates that ultimately 943,000 homes in GM will need solid wall insulation.
- 5.9 The Missing Quarter report concluded that change in behaviour can provide up to 25% more in energy reductions, over and above installation of measures<sup>32</sup>.

#### *Non-domestic buildings*

- 5.10 Commercial, industrial and public sector represents around 38% of all emissions within GM boundaries (this includes the public sector, industrial installations and is not limited to just buildings). Between 2005 and 2009 there was a decrease in industrial and commercial emissions of 17%, much of which is speculated to be attributed to a downturn in industry due to the recession, although there was a slight increase again in 2010 (11% reduction over the whole period).

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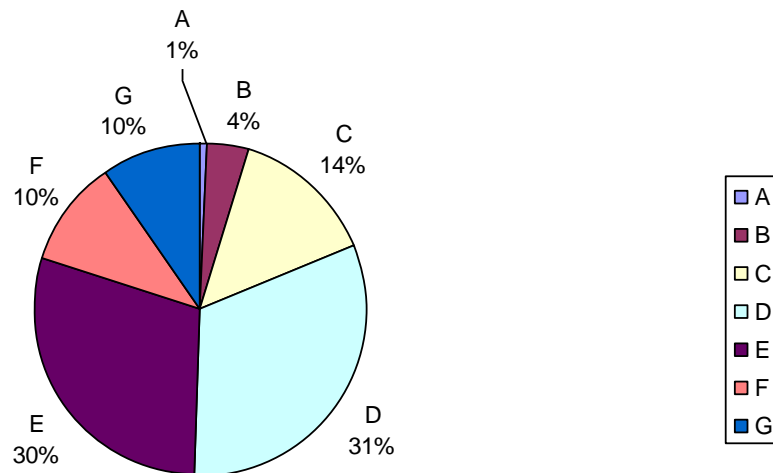
31 URBED (2012) GM Low Carbon Housing Retrofit Strategy

32 *The Missing Quarter*, Greater Manchester, LCEA Behaviour Change Retrofit Group, July 2011

- 5.11 The main methods of measuring non-domestic energy efficiency and consumption in buildings are Display Energy Certificates (DECs) and Energy Performance Certificates (EPCs). Currently, DECs and EPCs give approximate indicators of performance and there is no general publication of this data which means that all information is anecdotal but is the best measure of the performance of buildings within GM<sup>33</sup>.
- 5.12 Due to the difficulty in collating the data from commercial buildings it is only possible to show the distribution of DEC ratings amongst those public sector buildings with a DEC (buildings over 1000 sq meter) which in GM is as follows.

**Figure 22: DEC Rating by band in Greater Manchester public buildings**

**DEC Ratings in Greater Manchester**



- 5.13 Major public sector estates in GM include those owned by local authorities, education (primary, secondary, universities and other higher education), health sector, fire and police services, prison etc. This DEC register of GM buildings is dominated by the educational (schools, colleges and universities) sector, representing 66% of buildings overall. Poor performance in local authority owned buildings and schools is highlighted from the DEC register and identifies opportunity to improve the public sector estate.

<sup>33</sup> Manchester A Certain Future (MACF): Non-domestic Retrofit Paper, 2012

- 5.14 Authorities in GM each have a range of energy efficiency policy requirements for new developments and major refurbishments through their individual Core Strategies and other Planning policies, often with higher requirements than national regulations.<sup>34</sup> However there is still a long way to go to improve the energy efficiency of the public sector building stock across GM.
- 5.15 There is little evidence which shows the baseline performance or activity of the commercially owned buildings in GM.
- 5.16 It is important to the overall emissions reduction target for commercial buildings to reduce their emissions but, as yet, there is little evidence to show how best to accelerate activity in this area.

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<sup>34</sup> Manchester A Certain Future (MACF): Non-domestic Retrofit Paper, 2012



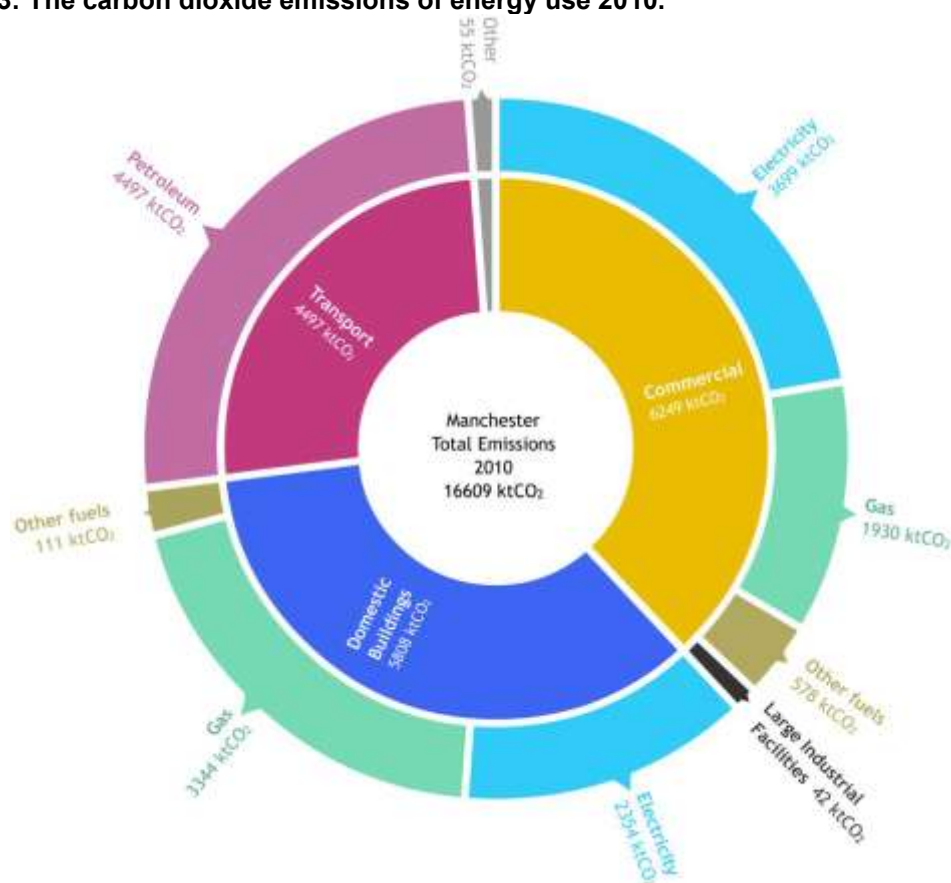
# 6 TRANSFORMING OUR ENERGY SYSTEM

6.1 The energy system supplies both heat and power (electricity). In GM the use of electricity, gas and other fuels account for 72% of emissions as the following diagram shows.

- 35% from the domestic sector
- 37% from the commercial and industrial

6.2 This section will demonstrate that along with CO<sub>2</sub> emissions reduction targets, the rising cost of energy and security of supply are the three main drivers for the use of renewable and low carbon energy generation.

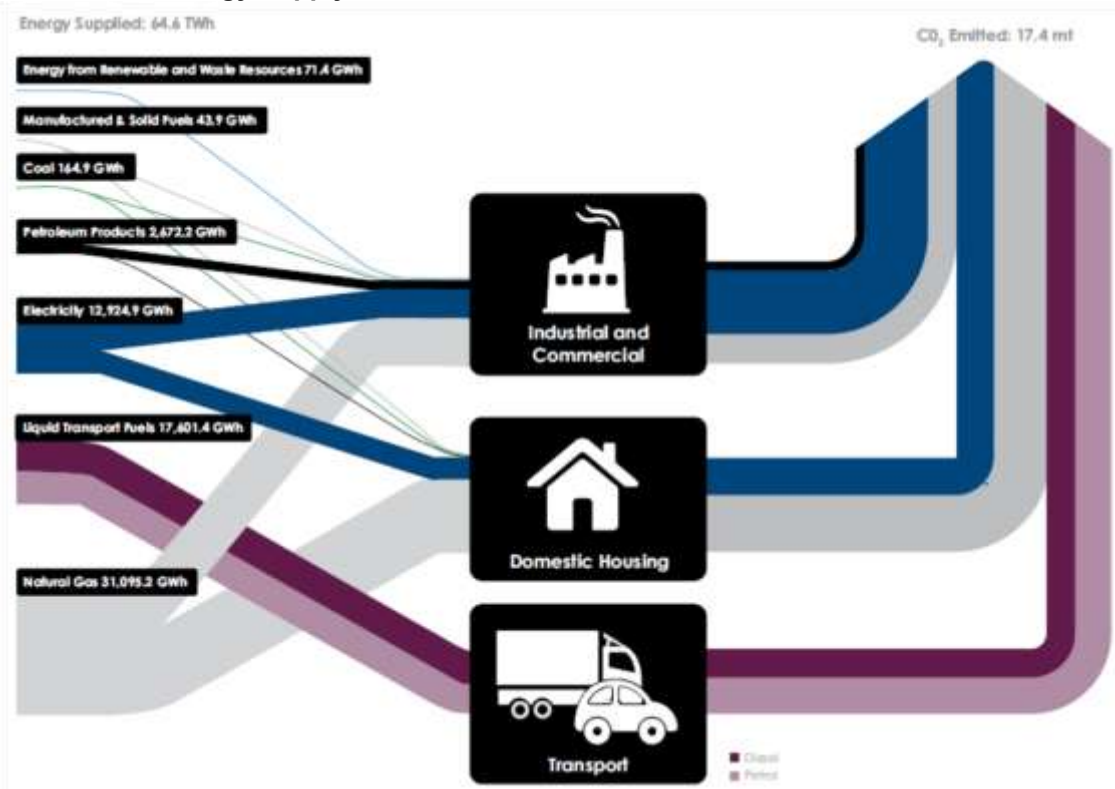
**Figure 23: The carbon dioxide emissions of energy use 2010.**



6.3 The domestic sector emits less CO<sub>2</sub> per unit of energy than the commercial and industrial sector primarily because the domestic sector is heavily reliant on the use of gas for space heating, domestic hot water and cooking, which is less energy intensive than electricity.

6.4 The following Sankey diagram shows the source of GM's energy in 2005 and the resultant CO<sub>2</sub> emissions and it is noticeable electricity used in the commercial and industrial sector creates a much larger proportion of emissions than of energy supply.

Figure 24: GM's Energy Supply and CO<sub>2</sub> Emissions in 2005<sup>35</sup>



Source: DECC Total and Final Energy Consumption at Regional and Local Authority Level (2005) / DEFRA GHG Conversion Factor Guidelines for Company Reporting (2009)

6.5 The carbon intensity of electricity generation goes some way to explain the focus on decarbonising electricity to meet carbon reduction targets. However it is also clear from both this section and the previous buildings section the use of heat also needs to be made more efficient and decarbonised to meet CO<sub>2</sub> emissions reduction targets.

6.6 The most recent detailed analysis of energy use was undertaken in 2011 using 2009 datasets. This identified that Greater Manchester used around:

- 25.8TWh of gas;
- 11.7TWh of electricity; and
- 20TWh of petroleum products.

<sup>35</sup> Connected: The Greater Manchester Energy Plan (2011)

- 6.7 Less than 1% of GM's energy consumption was met using other fuels, with these other fuels including solid fuel (this includes Manufactured Solid Fuel (MSF), coal and wood).
- 6.8 However, it also showed that between 2005 and 2009, gas and electricity use decreased by 17% and 9% respectively, with the commercial sector achieving the greatest efficiencies. Transport energy consumption remained static.

### *Cost of energy*

- 6.9 The cost of energy is also a consideration for both businesses and households. In 2010 GM spent over £5 billion on its gas and electricity bills<sup>36</sup>.
- 6.10 The Greater Manchester Business Survey conducted August – September 2012 found the top cost pressures for 87% of businesses is energy prices<sup>37</sup>. A report by government into the cases of SME business failures and insolvency during 2008 identified energy cost increases as a critical contributing factor in over half of cases and in its report back to Government during 2010-11<sup>38</sup>.
- 6.11 The price of electricity is expected to rise in the future and recent spikes in energy prices have shown how volatile energy prices can be. Increases in wholesale prices, carbon prices and the need to invest in new generation and upgrades to the UK's transmissions and distribution grid will all lead to more expensive electricity. Volatility in prices in itself can be a real issue for businesses with large energy costs making it very difficult to plan and manage energy spend.
- 6.12 Greater Manchester generally uses more energy per capita than the UK average – this is primarily due to high industrial and commercial activity levels as an economic and employment centre, rather than a presence of significant industrial energy users, or high energy use in homes. When normalised against economic performance, we generate more £ of GVA per unit of energy used than anywhere in the UK other than London, mainly due to our high proportion of commercial and retail businesses within the economy<sup>39</sup>.

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36 Connected: The Greater Manchester Energy Plan (2011)

37 Greater Manchester Business Survey (2012)

[http://neweconomymanchester.com/stories/1721-greater\\_manchester\\_business\\_survey](http://neweconomymanchester.com/stories/1721-greater_manchester_business_survey)

38 Connected: The Greater Manchester Energy Plan (2011)

39 Connected: The Greater Manchester Energy Plan (2011)

- 6.13 According to the Greater Manchester Mini-Stern, 4% of Greater Manchester's employment is within energy intensive manufacturing<sup>40</sup>. The textile sector is currently seeing a revival across GM, but is an energy intensive sector with a narrow productivity margin which would be threatened by energy prices increases.
- 6.14 Other key growth sectors for Greater Manchester including digital, communications, media and creative industries and advanced manufacturing are reliant on access to affordable, reliable energy.
- 6.15 In 2010 the average household spent over £1,100 on gas and electricity, an increase of 20% since 2007. In January 2013, prices indicate a likely annual household gas and electricity bills of over £1,300<sup>41</sup>. As already noted in the previous section fuel poverty is a significant issue in Greater Manchester.

### *Security of supply*

- 6.16 Security of supply is important because it can directly affect prices and the UK's ability to manage carbon emissions. The UK has been lucky with its abundant supply of natural gas and coal but now reserves are declining and the UK is importing increasing amounts of gas. In 2011 the UK imported more gas than it produced for the first time since 1967 and oil production levels fell to the lowest levels since 1970<sup>42</sup>. Therefore looking for alternative sources of energy is necessary to combat an overreliance on important fuel.
- 6.17 In addition, over the next decade over a quarter, about 20GW of the UK's generation capacity is scheduled to close. This is mainly larger, polluting fossil fuel power stations and nuclear power stations. These closures may have a positive impact on carbon emissions but will lead to a shortfall in the generation capacity required by the UK unless is replaced<sup>43</sup>.
- 6.18 GM is largely dependent on the national energy infrastructure for supply but increasing the amount of decentralised energy in GM would give greater control over cost, emissions and security of supply.

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40 Deloitte, Mini-Stern for Manchester: Assessing the economic impact of EU and UK climate change legislation on Manchester City Region and the North West (August 2008)

41 Connected: The Greater Manchester Energy Plan (2011)

42 <http://www.telegraph.co.uk/finance/newsbysector/energy/oilandgas/9173373/UK-gas-imports-outstrip-production-for-first-time-since-1967.html#>

43 Towards a low carbon pathway for the UK, Smith School of Enterprise and the Environment, University of Oxford (March 2012)

## Greater Manchester's energy infrastructure

- 6.19 To meet GM's CO<sub>2</sub> emissions reduction target it has been calculated, 3TWh of low carbon heat generation and 1TWh of low carbon electricity generation would need to be in place in GM by the early 2020s. This would mean increasing existing levels of wind, solar, hydro, thermal and biomass generation etc to around 20 times their current levels. This assumes that government will fully hit targets for offshore, nuclear, gas and other generation to sufficiently decarbonise large scale generation<sup>44</sup>.
- 6.20 The following table also shows that action on decentralised energy within GM is important to meet CO<sub>2</sub> reduction targets. The table, taken from the Sustainable Energy Action Plan<sup>45</sup> shows emissions reductions likely from national targets and how decentralised generation in GM could help ensure the CO<sub>2</sub> emission reduction targets are met.

**Figure 25: Likely Reductions in CO<sub>2</sub> Emissions 2020 / 2050<sup>46</sup>**

Action	Likely Reduction in CO <sub>2</sub> emissions by 2020 (%)	Likely reduction in CO <sub>2</sub> emissions by 2050 (%)
<b>National action</b>		
Contribution by renewables nationally (LCTP)	22.9	39.8
<b>Greater Manchester Action</b>		
Energy from biomass	0.3	1.2
Energy from waste	0.5	2.2
Wind	0.4	1.3
Hydro-electricity	0.02	0.04
Minewater Geothermal	0.1	0.7
Heat Networks - Manchester Town Hall	0.1	0.3
Heat Networks - sub regional x8 (Gas)	0.2	0.4
Heat Networks - sub regional x8 (Biomass)	0.7	1.3
Local heat networks x 34 (Gas)	0.2	0.5
Local heat networks x 34 (Biomass)	0.7	1.4

- 6.21 Possibly more importantly is the reduction and control of energy costs decentralised energy could bring to the public, private and domestic sectors in GM. The GM Energy plan recognises the potential to reduce cost and boost the economy by stimulating a new sector<sup>47</sup>. The Business Case for the AGMA / Green Investment Bank Joint Venture also recognises the importance of energy costs savings from decentralised energy and energy efficiency. Their proposed £300m investment programme of energy efficiency and heating projects could save GM a total energy cost saving in the region of £510 million at current prices<sup>48</sup>.

44 Connected: The Greater Manchester Energy Plan (2011)

45 Sustainable Energy Action Plan: A report to inform and help shape energy priorities in Greater Manchester (July 2010)

46 Sustainable Energy Action Plan: A report to inform and help shape energy priorities in Greater Manchester (July 2010)

47 Connected: The Greater Manchester Energy Plan (2011)

48 Joint Venture (AGMA and UK Green Investment Bank) Business Case (2012)

- 6.22 A study undertaken in 2010<sup>49</sup> identified the potential for 6,871MW of renewable energy installed capacity across GM; 79% from microgeneration (54% from heat pumps), 19% from community wind, 13% ground source heat pumps, 6% solar hot water heating, 6% PV, 1% municipal waste and 1% C&I waste.
- 6.23 The Decentralised and zero carbon energy planning report prepared for AGMA in 2010 identified at least 8 potential district heating schemes across GM using waste heat, gas or biomass CHP or geothermal wells.<sup>50</sup>
- 6.24 The potential for heat networks is being investigated further and feasibility studies on individual schemes and heat mapping will be undertaken during 2013.
- 6.25 Further mapping work to map the energy resources and renewable energy project opportunities are detailed within the GM Energy Plan.
- 6.26 Figure 26 below shows a possible trajectory for Greater Manchester's decarbonisation, which is set out in GM Energy Plan and follows the reduction scenario set out in the 2009 UK Low Carbon Transition Plan<sup>51</sup>.

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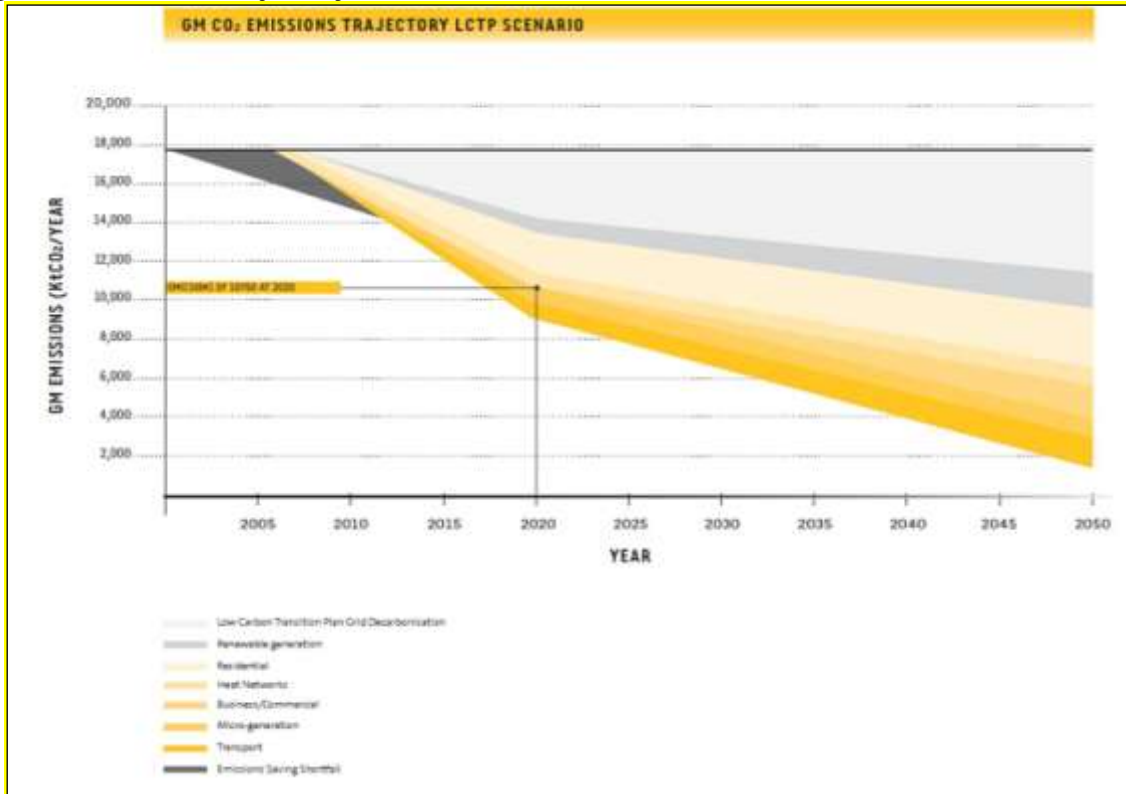
49 Northwest renewable energy and low carbon capacity and deployment, SQW for NWDA (August 2010)

50 Decentralised and zero carbon energy planning: a summary report, AGMA, (June 2010)

51 Connected: GM Energy Plan, Executive Summary (2011)

The UK Low Carbon Transition Plan: National Strategy for Climate and Energy (July 2009)  
<http://centralcontent.fco.gov.uk/central-content/campaigns/act-on-copenhagen/resources/en/pdf/DECC-Low-Carbon-Transition-Plan>

Figure 26: Possible Trajectory for Greater Manchester's Decarbonisation



Source: GM Energy Plan

# 7 INCREASING SUSTAINABLE CONSUMPTION AND PRODUCTION

## Definition

7.1 Sustainable Consumption and Production (SCP) is a catch-all term for a number of inter-related issues concerning the production, use and disposal of natural resources. It covers both research into the causes of, and responses to, the issues.

7.2 In GM the following definition for sustainable consumption and production (SCP) has been agreed:

‘Achieve a more productive, resource efficient, low carbon city region by 2020 through continuous economic and social progress that makes best use of resources to meet the needs and aspirations of Greater Manchester for a better quality of life’.

It gives both the opportunity to mitigate CO<sub>2</sub> emissions and create affective adaptation responses.

7.3 Underpinning the vision for 2020, there are five key themes:

1. Transforming resource use and consumption
2. Accelerating sustainable production
3. Maximising waste as a resource
4. A thriving low carbon and environmental goods and services sector
5. The public sector acting as an exemplar

7.4 To help clarify what is meant by the term, the following table highlights the main issues, their sub-components and where identified some solutions.

<b>Food</b>	Supply chains, especially cold supply chains; public sector procurement; where food originates and how it is supplied into GM; seasonality; scarcity and price issues; diet and waste.
<b>Domestic consumption</b>	Supply and demand side elements. <ul style="list-style-type: none"> <li>• Supply side there are two possible models, namely limit choice, so only lower impact products are sold, or provide a wider choice to consumers and look to help customer make informed choices.</li> <li>• Demand side, requires cultural and behavioural change possibly evolving to a more mend and repair approach to products. Running in parallel to this is a move from a product to a service economy where</li> </ul>



	goods are not owned but leased which supports easy upgrades, repairs and avoids built in obsolescence.
<b>Transport</b>	Includes leisure, commuting, and business travel/ logistics and is covered in the transport chapter of IGMA.
<b>Business supply chains</b>	Including resource scarcity, material flows and resilience to disruption. Resource mapping and resilience planning can help prepare businesses and their supply chains.
<b>Commercial and Industrial (C&amp;I) Waste</b>	This represents 83% of GM's waste arising, GMWDA have a Waste Plan which can be used to help define priorities and solutions. While GMWDA lead on municipal waste, C&I waste is collected by a range of providers from the private and third sectors and is therefore not included in the GMWDA plan and needs a separate solution. Possible issues include plastic reprocessing capacity and the ability for smaller waste producers to access cost effective recycling services in some parts of GM.
<b>Public sector procurement</b>	As an opportunity for stimulating change and to lead by example.
<b>Water resources</b>	Consumption, treatment and conservation of water resources.
<b>Business resource efficiency</b>	Companies using less energy/ material per unit of comparable production or service and maximising the value of any residual resources (waste streams). This includes behaviour change within businesses.
<b>Eco-innovation</b>	A sub-sDeveloping new ways of delivering existing or new function (products or services) into the market, often with new technology or materials.
<b>Eco-design</b>	This involves the design or redesign of goods and services to minimise their environmental impact over their lifetime. This can include using less materials (light weighting) material substitution, increasing recycled content, optimising packaging and design for disassembly

### *Why SCP is important*

- 7.5 A report published by Chatham House at the start of 2013 stated “The spectre of resource insecurity has come back with a vengeance”<sup>52</sup>. The world is undergoing a period of intensified resource stress, driven in part by the scale and speed of demand growth from emerging economies and a decade of tight commodity markets. Whether or not resources are actually running out, the outlook is one of supply disruptions, volatile prices, accelerated environmental degradation and rising political tension over resource access.
- 7.6 A significant amount of research has been undertaken in recent years to understand the impact of these global issues on Greater Manchester’s economy and this chapter presents a summary of the pertinent issues and highlights a number of gaps in understanding.

### *Food*

- 7.7 As the total carbon footprint (illustrated in Figure 10, Section 3) clearly shows a significant percentage (approx. 30%) of GM’s emissions arise from food. Which might suggest food should therefore be prioritised for activity to help reduce emissions and meet the carbon reduction target. However the ease and practicality of a city wide response also needs to be considered.
- 7.8 Food is also an issue which inter-relates with a number of other policy areas not least, diet and health and local economic development. The interaction is complex, not well understood and can result in competing priorities. The evidence base is not available to help understand which actions help the environment, health and poverty and how they interact. For example, there is evidence to show that food bought locally benefits the local economy more; £1 spent in a local food outlet equals £1.76 to the local economy and only 36p if spent in a supermarket chain<sup>53</sup>. What is not clear is if local, small scale production also reduces greenhouse gas emissions and / or generates positive health impacts?
- 7.9 The production of food is also responsible for other environmental impacts as well as greenhouse gas emissions such as habitat degradation, loss of wildlife and the impacts of using pesticides and fertilizer.

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52 Resources Futures, A Chatham House Report, December 2012  
<http://www.chathamhouse.org/publications/papers/view/187947>

53 New Economics Foundation (Nef) Buying Local Worth 400 per cent more (March 2005)  
<http://www.neweconomics.org/press-releases/buying-local-worth-400-cent-more>

- 7.10 There is a gap in the evidence base that needs to be addressed to demonstrate how carbon emissions from food can be reduced and how other environmental, health and welfare benefits can be achieved at the same time.

### *Domestic Waste*

- 7.11 Greater Manchester Waste Disposal Authority (GMWDA) is England's largest Waste Disposal Authority and is responsible for collection and disposal of municipal waste in all GM districts (apart from Wigan; Wigan is a Statutory Waste Disposal Authority in its own right). This amounts to 1.1 million tonnes of waste produced each year which is about 5% of National Municipal waste.
- 7.12 GMWDA has a waste management strategy<sup>54</sup> that includes an aspiration for Greater Manchester to become a 'zero waste' society; where all our resources are recycled or the energy is recovered, and nothing is wasted. A significant amount of work has been undertaken by the Waste Disposal Authority on waste prevention; the quantity of waste collected in Greater Manchester has fallen by 16% from 1.288 Kt (2007/8) to 1,085 kt (2011/12). This has been delivered by encouraging households to consume less through an expansive education programme, and designing waste collection systems to make householders more aware of the waste they produce.
- 7.13 GMWDA and Wigan WDA has produced a waste plan for 2012 – 2027 to guide the collection and disposal of municipal, commercial and industrial and hazardous waste across GM.<sup>55</sup>
- 7.14 Growth rates in municipal waste production are likely to stabilise, in line with recent data trends and the long-term target to reduce waste growth in the region by 0% by 2014. GMWDA want to reduce residual waste to 400kg per household by 2025 (equivalent to a 50% reduction across Greater Manchester against a 2008/09 baseline) through waste prevention, reuse and recycling.
- 7.15 GMWDA also want to meet the 50% recycling target across Greater Manchester by 2015, stretching to 60% by 2025, focusing on providing quality materials for closed loop recycling, and support the economy by providing access to secondary raw materials.

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<sup>54</sup> [http://www.gmwda.gov.uk/clientfiles/File/wms%20\(2\).pdf](http://www.gmwda.gov.uk/clientfiles/File/wms%20(2).pdf)

<sup>55</sup> <http://www.gmwastedpd.co.uk/>

- 7.16 In addition, GMWDA want to reduce the amount of residual waste land filled to the minimum that can be technically and economically achieved, using a combination of prevention, reuse, recycling and recovery with a target to achieve 90% diversion from landfill by 2015.

#### *Commercial and Industrial waste*

- 7.17 Commercial and industrial (C&I) waste can be disposed of at GMWDA waste disposal sites or collected by a private, licensed contractor. C&I is more varied than municipal waste and can require specialist recovery, recycling or disposal options.
- 7.18 There is currently no clear consensus around commercial waste trends; recent surveys including Defra's Commercial and Industrial Waste Survey 2010, and the North West Commercial and Industrial Waste Survey 2009 have drawn different conclusions in relation to Commercial Waste. The North West Survey indicated that commercial waste had risen since 2006, whilst the national survey carried out a year later indicated it had fallen. The North West Survey is more accurate and relevant to Greater Manchester, but was undertaken during 2008 so pre-dates the impacts of the recession. A consistent baseline and understanding of commercial and industrial waste trends is therefore a significant gap in our evidence base.
- 7.19 Despite this gap in the evidence relating to trends local surveys do indicate high levels of recycling in the commercial and industrial sectors in GM, but, have found that small businesses do not perform well. A recent survey undertaken by GM Manchester Chamber of Commerce found a lack of space and a lack of trusted suppliers as key barriers to recycling for Greater Manchester businesses.

#### *Business resource efficiency*

- 7.20 For a businesses, becoming more resource and energy efficient; using less raw materials and producing less waste saves money. Business resource efficiency enables a business to reduce operation costs and decrease operational risk through security of supply.
- 7.21 Businesses are still facing cost pressures from resource scarcity. The Greater Manchester Business Survey conducted August – September 2012 shows that 87% of businesses reported cost pressures on energy and materials are key issues.

- 7.22 There are several estimates about how much can be saved in UK businesses from resources efficiency measures. Defra research highlights £23 billion of annual business savings available through improved resource and energy efficiency, requiring no/low investment, and £55 billion with a 2 year payback<sup>56</sup> and the majority of the savings, £19bn are related to resource savings.
- 7.23 Conversely, DEFRA also estimates that 2% of business profits are lost each year through inefficient use of resources<sup>57</sup>. In addition, DECC estimate that through socially cost-effective investment in energy efficiency the UK could be saving 196Twh in 2020, equivalent to 22 power stations<sup>58</sup>. This highlights how energy efficiency both avoids cost of energy and, the investment that would be required in infrastructure if the savings are not made.
- 7.24 The NW has several significant industrial sectors such as food, chemicals and construction which make significant economic contributions to the region but that also have the potential to make significant environmental improvements particularly in energy, water and waste savings. The food supply chain, chemicals and construction industries together have the potential to save £13.4m in water costs, £63m in energy costs and £230m in waste costs.
- 7.25 Businesses in Greater Manchester have been able to access business resource efficiency advice from ENWORKS for the last 12 years and significant savings have been achieved. The independent evaluation of ENWORKS last project demonstrates the significance of resource efficiency interventions on the local economy: an investment of ~£9m over 3 years delivered net additional GVA of £178m. This represents a 1:20 return on investment to the public purse. This demonstrates the external benefits to the economy of delivering resource efficiency as well as the direct benefits to the business and indirect environmental benefits.
- 7.26 Although there is plentiful evidence of the benefits of increased resource efficiency to business, and a recognised business issue in terms of resource, there is still a disconnect between awareness and action due to the multiple market failures that operate in this area, the result of which is that businesses are not taking advantage of the savings that can be made, restricting their opportunities for growth and/or negatively impacting on their resilience.

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56 Defra 'The Further Benefits of Business Resource Efficiency' Oakdene Hollins, Final Report (March 2011)

57 Defra 'The Further Benefits of Business Resource Efficiency' Oakdene Hollins, Final Report (March 2011)

58 1 DECC: The Energy Efficiency Strategy: The Energy Efficiency Opportunity in the UK. (Nov 2012)

7.27 ENWORKS projects have identified £64 million of annual cost savings in 1500 GM businesses through resource efficiency, and supported the implementation of £18 million (29%) of these to date, leaving potential for £46 million of further annual savings in this small sample of companies alone. Looking at the overall business population in GM (93k), ENWORKS projects have been funded to engage with less than 2% of this total, meaning there is still a large number of businesses that have will not have addressed this issue and still have significant potential to benefit.

### *Eco-innovation and Eco-design*

7.28 An extension of resource efficiency within businesses, eco-innovation and eco-design are both a way of reducing resource use and therefore cost but can also produce new products for business expansion. As defined here, eco-innovation is a new way of delivering existing or new functions and eco-design involves the design or redesign of goods or services.

7.29 Whilst the evidence is clear that both can save businesses money and produce new goods and should therefore be included as part of resource efficiency advice it is difficult to quantify the potential for eco-design because it is largely related to new, and therefore not yet existing goods or services. This is a potential gap in the evidence base but is largely unknowable. Eco-innovation and eco-design can be bought about through incremental change but it could also arise through a technology shift such as that expected when practical uses for graphene are developed. Therefore whilst it is a gap in evidence it is unlikely to be a priority due to the difficulty in collating the information.

### *Water*

7.30 Water is a resource which could face supply issues as climate change takes impact, though not necessarily in GM. It is also a cost to businesses and households which can be minimised. Water is supplied and removed for treatment from businesses and households in GM by United Utilities and it is a regulated monopoly. The treatment of waste water is responsible for significant carbon emissions; the water industry as a whole currently accounts for five million tonnes of carbon dioxide emissions per year<sup>59</sup>, and the water sector is working to reduce them and other environmental impacts they have through the disposal of sewage sludge.

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<sup>59</sup> Environment Agency, A Low Carbon Water Industry by 2050 (December 2009)

- 7.31 Major water users in the region are households (domestic users), accounting for around half of the regional demand, power stations (around 19%) and businesses in the manufacturing sector – in particular industries in the chemicals sector.
- 7.32 The current rolling annual average leakage for UU is 462Ml/d and is the third highest leakage rate in country.
- 7.33 There is potential to reduce water and energy consumption by households across the NW through better metering. Metering is a proven way of reducing demand by 5% to 15% per metered household. However deployment rates are low and are only rising slowly, household water meter penetration in the Northwest is at 26% and is forecast to rise to 38% by 2015 and 60% by 2034/35.
- 7.34 Overall, the capacity of the region to supply water is considered to be sufficient to cope with current and predicted demand for the medium to long-term up to 2035, with planned resource support in particular for the Integrated Resource Zone (which GM is part of).
- 7.35 The Environment Agency has classified the region as one of 'Low' water stress (EA, 2007). The fact that there is a single provider across most of the region, UU, contributes to the flexibility to meet demand where and when it is needed and is highly regulated by Ofwat and EU directives.
- 7.36 The implementation of the Water Framework Directive is likely to have a potential cost impact on those industries using UU waste water treatment processes, as additional costs are passed on, as well as increased costs for firms monitoring their own water discharge points.

## 8 MAXIMISING THE VALUE OF OUR NATURAL CAPITAL

- 8.1 The natural environment is our land, water and air; this includes many protected or valued assets such as our green infrastructure network, urban green space, waterways and reservoirs as well as the air we breathe, the water we drink, and the soil we build on.
- 8.2 Natural capital is the stock of natural systems, or 'ecosystems', which yields a flow of valuable services into the future. These services include things such as fresh water, pollination, soil formation, as well as recreational opportunities.

### *Achieving a balance*

- 8.3 Natural capital underpins economic prosperity; a natural-capital-inclusive economy is a prerequisite for stimulating a sustainable economy, yet where financial capital is relatively straight forward to measure, natural capital is much more difficult to quantify or to put a value on.
- 8.4 Because it is difficult to attribute a value to environmental services this leads to a position where it is easier for decision makers, for example in consideration of development proposals, to place greater emphasis on the more measurable, economic indicators such as jobs or GVA growth than on natural capital. In this context exploring innovative finance mechanisms (to stimulate a new natural-capital-inclusive economy) and encouraging the financial sector to account for the environment in its future investment and lending decisions (for example by publishing environmental profit and loss of organisations) is becoming increasingly important.
- 8.5 GM recognises the vital link between economic capital, social capital and natural capital. All must be given emphasis and be fully integrated into a development strategy for a long-term sustainable future as this will enable GM to achieve a balance between economic success, quality of life and quality of environment. Despite this high level understanding however there is not currently an agreed set of natural capital indicators in GM; there therefore an aspiration at a GM scale to develop a consistent set of indicators and for these to be integrated with economic and social (or quality of life) indicators,



8.6 In the absence of a set of natural capital indicators, the remainder of this section draws on evidence available from a wide range of sources to summarise our baseline on the natural environment. Collectively this evidence suggests a good understanding of the services that the natural environment provides in GM however the evidence is not currently well integrated and does not exist at consistent spatial scales. There is an aspiration to develop the evidence base to become a more integrated baseline, allowing for the identification of critical data gaps and for more detailed, intelligent analysis.

### *Green Infrastructure (GI) in GM*

8.7 GM has many environmental assets including its network of river valleys, canals, wetlands and areas of landscape value; the role of this Green Infrastructure will become increasingly important. Green and blue infrastructure also play critical roles in addressing climate change, including both mitigation and adaptation, by sequestering CO<sub>2</sub> helping improve air quality, reducing peak summer time temperatures in cities (urban heat island) and managing and alleviating flood risk through sustainable urban drainage systems.

8.8 In Greater Manchester, green infrastructure consists of:

- open spaces (parks, woodlands, informal open spaces, nature reserves, lakes, historic sites and natural elements of built conservation areas, civic spaces and plazas, and accessible countryside)
- linkages (river corridors and canals, pathways, cycle routes and greenways)
- networks of “urban green” (the collective resource of private gardens, pocket parks, street trees, verges and green roofs)
- 2 National Parks (Peak District)
- 506 km<sup>2</sup>, or just under 40 per cent, of Greater Manchester is farmland, with the remaining 60 per cent (793 km<sup>2</sup>) representing the ‘urbanised’ area.

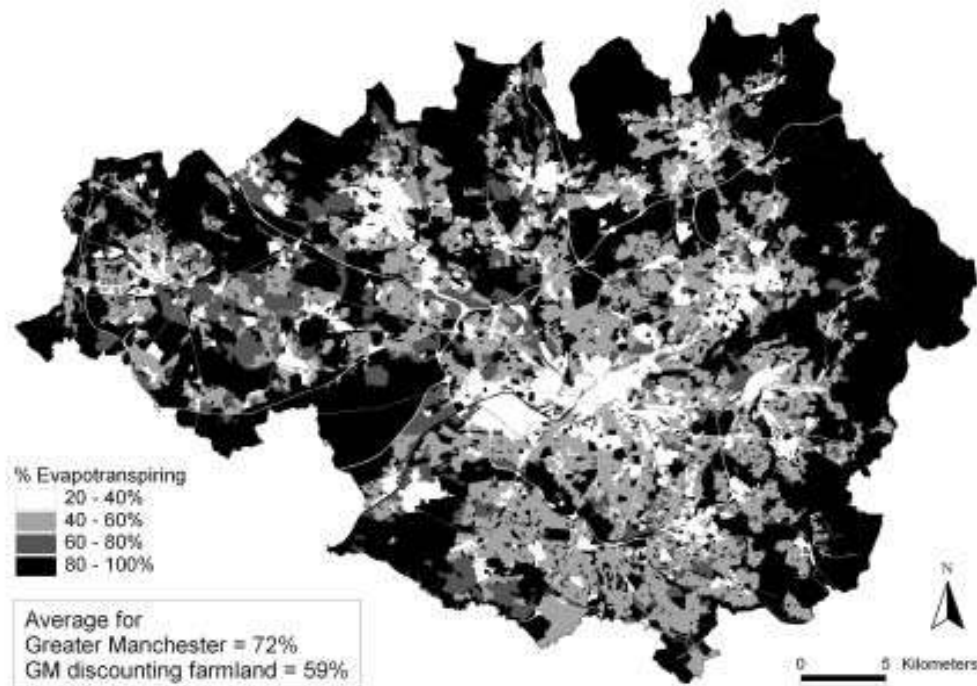
### *Tree cover*

8.9 There are approximately 8 to 10 million trees within GM, this accounts for 17% of the surface cover. There are 3.9 million individual tree canopies and 8600 ha of tree lines (woodlands or groups of trees). Trees play a vital role in climate change mitigation/adaptation as they:

- provide evaporative cooling and shading (Figure 27 as below), this can also reduce the formation of ozone in urban areas;

- provide opportunities for cold air drainage, air flows and improve air quality/noise exposure;
- reduce and alleviate surface water run off and flood risk;
- provide a framework for natural systems and functions that are ecologically fundamental to species and habitat viability, healthy soil, water and air;
- create creative greening approaches (such as street trees, green roofs, green facades).

**Figure 27: Proportion of evapotranspiring (i.e. vegetated & water) surfaces in GM**

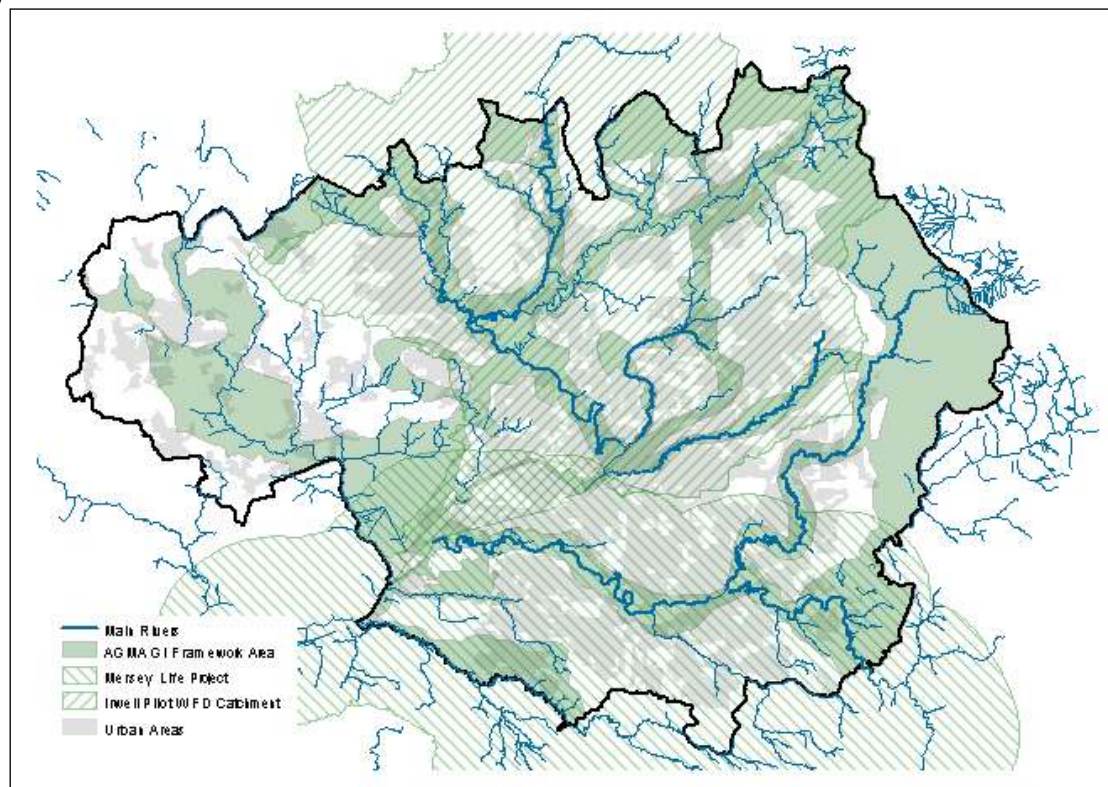


Source: Adapting Cities for Climate Change: The Role of the Green Infrastructure

### *Parks*

- 8.10 Parks provide critical green assets within GM and it is essential that these assets are protected particularly within the city and town centres and in areas with vulnerable populations. Parks also play a key role in encouraging air flow into urban areas, allowing species movement, managing and reducing soil erosion and creating tourism in high capacity landscapes.
- 8.11 The extent of GM's GI network is known and a significant amount of time and resource have been spent developing the GI Framework and Draft Action Plan. There are however a number of gaps in the evidence base including an understanding of the quality of GI assets at a GM spatial scale and the 'ecosystems services interaction' at a GM scale.

**Figure 28: Green Infrastructure Framework**



Source: GI Framework (2010)

***Waterways: Rivers, canals and lakes within GM***

8.12 The Ecological status of water bodies varies greatly within GM and good water quality is essential to promoting growth due to the recreational opportunities of blue infrastructure, improving the quality of key strategic areas and the key role that blue infrastructure plays in protecting and enhancing the health of the public, animals, plants and habitats. Figure 29 summarises the current status of water bodies within GM (water bodies can have poor ecological status due to a number of factors including water quality, barriers to fish migration etc). There are a number of failing water bodies within GM; in fact only a quarter of GM's waterways are of 'good' ecological status (as illustrated in Figure 29). However by 2015 82% of all water bodies within GM will be of moderate/good ecological status compared to just 72% in 2011 and by 2015 there will also only be 2.5% of bad status water courses within GM.

**Figure 29: Ecological status of water bodies in GM (2011)**

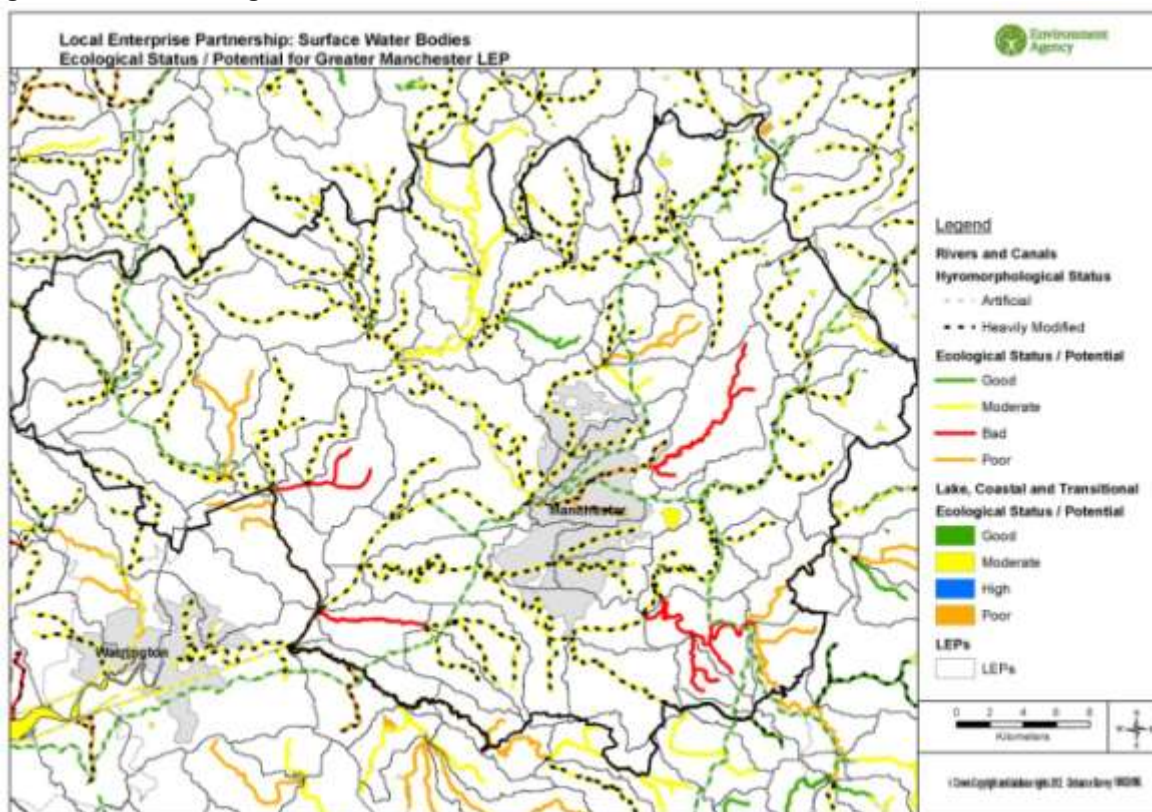
Eco Current	Greater Manchester
High	0
Good	25
Moderate	70
Poor	5

Bad	6
>= GESp	25
Total	100
% >= GESp	23.6%

Source: EA (2011)

8.13 Since the Industrial Revolution GM has been developed on a river basin flanked by the Pennine hills. Within GM there is a vast network of waterways comprising of rivers, canals and lakes, this equates to over 827km of linear networks which vary in water quality. This critical blue infrastructure plays a key role in biodiversity management, cooling of local areas, alleviating flood risk and providing a recreational resource for the local population. With the improvements in water quality there have also been a significant increase in recreational activities such as water sports and fishing.

Figure 30: WFD failing water bodies in GM

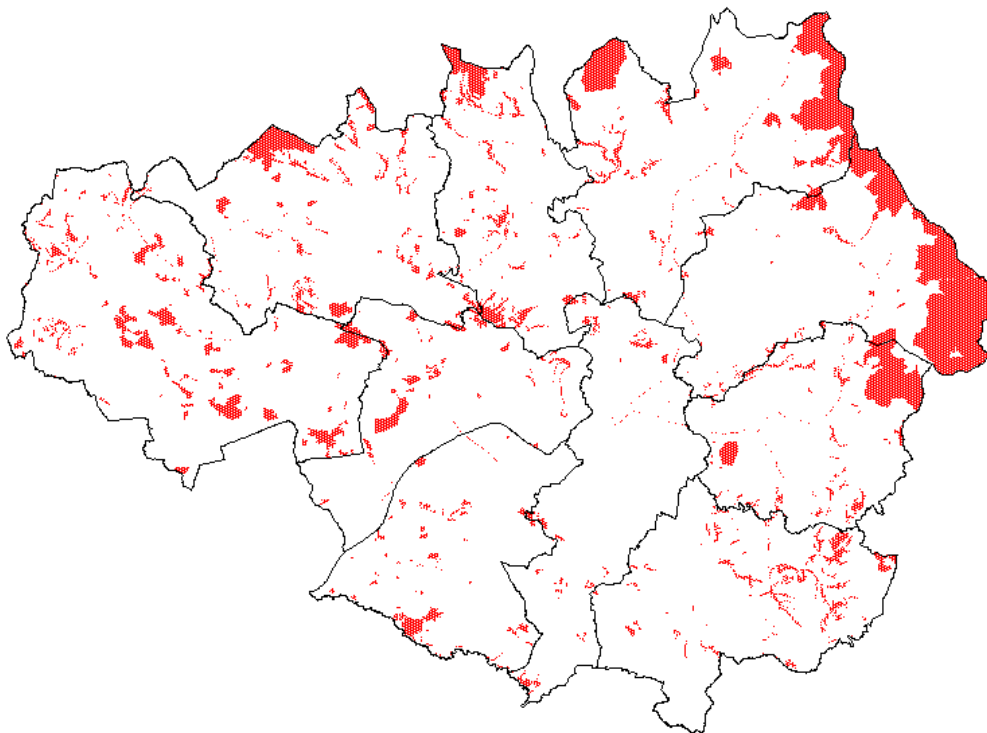


Source: EA (2011)

### *Ecological Value / Biodiversity*

- 8.14 Within the GM boundary there are European Special Areas of Conservation, a European Special Protection Area, large parts of the South Pennines form an Integrated Biodiversity Delivery Area, Sites of Special Scientific Interest (SSSIs), 535 Sites of Biological Importance (SBIs), 57 Local Nature Reserves and major river corridors including the Mersey and a wide range of public parks and private gardens. It is essential that these are maintained, not only for statutory requirements but to prevent future harmful development and to conserve and maintain habitat and species population. Climate change can also have an affect on the influx of non indigenous species within GM and can be a contributing factor to the spread of foreign disease/parasites which GM needs to become resilient to.
- 8.15 GM has many small and fragmented designated nature sites and the GM Biodiversity Action Plan identifies a list of habitats and species considered as priorities for nature conservation. This is underpinned by the ecological framework which has identified 5 broad Biodiversity Opportunity Areas. These are the natural areas, garden spaces, habitat mosaics, areas where locally specific actions will apply and species hotspots. Suggestion are put forward as to the best policy mechanisms to use to achieve effective habitat enhancement in each of the Opportunity Areas.

**Figure 31: Designated nature conservation sites in GM (upland blocks at the fringes)**



Source: An Ecological Framework for Manchester Report (2008)

### *Waste and Minerals*

- 8.16 Minerals underpin the infrastructure for growth and development through the adequate and steady supply of material to provide the infrastructure, buildings and goods that society, industry and energy require. The GM Minerals Plan aims to reduce our reliance on primary minerals (those dug out of the ground) through better use of recycled aggregates and secondary mineral products, such as fuel ash for building materials. It also identifies sites for extraction along with depots for transport and storage. It aims to support economic growth whilst protecting the amenity of local residents and safeguarding the environment. The GM Minerals Plan is still in production with adoption planned for Spring 2013.

### *Air Quality*

- 8.17 The physical environment can facilitate or deter a healthy lifestyle. The likelihood of people to walk, cycle or play in the open air is affected by the convenience, quality and safety of pedestrian and cycling routes and by the availability of local open space.
- 8.18 Poor air quality in Greater Manchester is responsible for hundreds of early deaths and thousands of extra hospital admissions each year. Road traffic is now the major air pollutant. On average air quality is bad on about 20 - 30 days a year in Greater Manchester, a very hot summer such as 2004 and 2006 would result in limits being exceeded on about 50 days. The number of days of poor air quality depend on the weather – as we begin to see an increase in hot, more pollutants will accumulate locally.
- 8.19 The conurbation of GM also has high levels of congestion in places which potentially threatens some of its locational advantages. The road infrastructure has resulted in major parts being designated an Air Quality Management Area, with the level of carbon dioxide emissions deriving from road transport being significantly above the national average. In GM the ten member authorities recognise that a joint approach to air quality management offers the most effective delivery strategy. The main 3 air pollutants within GM are CO<sub>2</sub>, nitrogen oxide and particulate matter (PM10).
- 8.20 GI plays a key role in improving air quality through absorbing significant quantities of gaseous pollutants such as SO<sub>2</sub>, NO<sub>x</sub> and ozone from the atmosphere and producing oxygen (through photosynthesis). There are statutory requirements for improving air quality as well as social, environmental and economic drivers.

### *GM Local Nature Partnership*

- 8.21 Recent developments have seen the formation of the GM Local Nature Partnership. This brings together key GM partners to coordinate and strengthen local action to protect and improve GM's natural environment. The group act as Ambassadors to champion the natural environment and help to collaborate and deliver key strategic priorities.