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# **POWERING GREATER MANCHESTER'S LOW CARBON FUTURE.**

## **EXECUTIVE SUMMARY.**

**CONNECTED:  
THE GREATER MANCHESTER  
ENERGY PLAN**



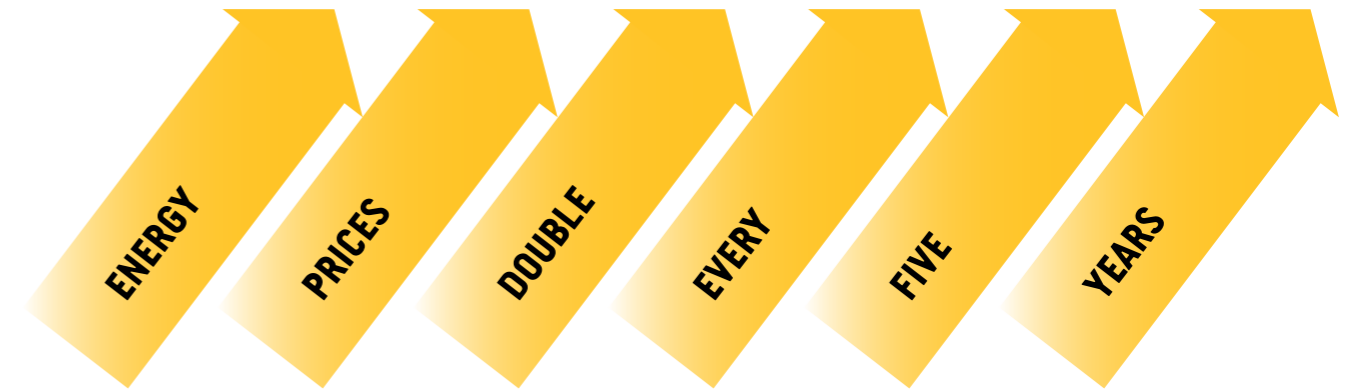
**GREATER MANCHESTER  
ENERGY GROUP**

## OVERVIEW

In the modern age, there is barely a moment of our lives where we are not wholly reliant on the generation and distribution of power. Since the Industrial revolution, access to power has defined modern existence in developed countries. Almost all of this power is drawn from increasingly expensive, finite, fossil fuel sources that result in carbon emissions and other social and environmental impacts.

As the 21st century gets into its stride, a new energy future is emerging. Climate change, volatile prices and the availability of fuel are pressing challenges right across the world. Greater Manchester needs a strategic plan in the face of this uncertain future. We need a strategy to keep the lights on and the economy working – and that's the purpose of this document.

This plan, **CONNECTED**, is our energy plan and it sets out the current situation, potential issues and proposed solutions for a more sustainable and secure energy future. It has been developed by the Greater Manchester Energy Group, a mix of public and private sector leaders who work together to support an affordable, low carbon energy future for Greater Manchester.



## CHANGING TIMES

The availability and price of energy has a significant impact on everyone's lives. Since the 1970s, the success of the National Grid and plentiful supplies of cheap UK gas have meant energy supplies have been affordable, and power outages have been minimal for the majority of the general public. However, as experienced during the Suez crisis, the oil shortages in the 70's, the fuel protests in 2000 and the Gloucestershire floods in 2007, even brief interruptions to availability can lead to significant disruption, civil emergencies and significant economic impacts.

Cities like Manchester led the first energy revolution, with local and municipal enterprises putting in place the building blocks of the UK's energy system. Since the 1970s, the success of the national grid and plentiful supplies of cheap UK gas have meant energy supplies have been affordable, and power outages have been minimal for the majority of the general public. In the second half of the 20th century, energy increasingly became a national concern, with national government setting the agenda, and following privatisation in the 80s and 90s, national companies delivering energy solutions. Now the transition to a low carbon economy means that for the first time in over half a century, the role of cities in identifying, financing and delivering energy infrastructure is vital. European and UK strategies for delivering a secure low carbon energy future place cities at the centre, and cannot be achieved without their leadership. This means Greater Manchester needs to act.

As the UK increasingly relies on imported or harder to extract fossil fuels, and with over a quarter of our generating plants needing to be renewed before the end of the decade, we simply can't afford to maintain our current system. In recent years, energy prices have been doubling every five years, and Greater Manchester's businesses and residents will be economically disadvantaged if an alternative approach is not delivered. We will fail to hit our targets on climate change, and we face a future with even greater levels of fuel poverty. Although we cannot wholly eradicate additional costs, the impact of such increases can be kept to a minimum if we act quickly.

Greater Manchester (GM) can prosper and protect its communities if it takes action on energy. If we reduce our energy consumption, adopt low carbon technologies, innovate in our use of the energy network and time our energy use to make best use of affordable, low carbon energy assets, these actions will deliver significant benefits. Early investment in low carbon, local energy demand reduction, management and generation solutions are the least expensive ways for us to meet our energy needs. In the longer term, equipping homes and businesses with the ability to store energy at times when supplies are abundant could also become an important feature of GM's energy system.

If Greater Manchester is to have a secure, low carbon energy system and strong low carbon economy then a combination of influencing, innovation, market development and practical projects will be needed to make better use of low carbon energy, reduce energy demand and diversify supplies. The energy market is highly complex, partitioned and regulated, and GM does not fully control its energy system. Achieving a low carbon, secure and affordable energy system in GM will require a concerted effort. No single player can act alone.

For the private sector, the challenge will be delivering long term investment. For the public sector, this is a test of multi-level governance; co-operation between European Institutions, national and local government to engage the private sector and deliver the right measures at the right level. Individuals, communities and businesses will need to act in enlightened self interest by investing in property and changing behaviour. The cultural challenge of this cannot be overstated.



## RISING TO THE CHALLENGE

The key challenges Greater Manchester needs to address are:

**Carbon emissions reduction and associated market drivers**, including an ambitious CO<sub>2</sub> emissions reduction target of 48% by 2020;

**Ageing and vulnerable distribution infrastructure**, which needs to adapt to new connection, management and two-way flow requirements;

**A drop in UK generation due** to the decommissioning of old nuclear, gas and fossil fuel power stations;

**The price, availability and impacts of fossil fuel extraction, distribution and use**; Increasing electricity demand associated with uptake of digital technologies, and, in the mid term, switching from fossil fuels to electricity for heat and transport;

To meet these challenges, Greater Manchester needs to:

**Change energy systems, use and behaviour** to capitalise on times when intermittent renewable supplies are abundant and network capacity is available;

**Identify opportunities and locations for new low carbon energy generation and distribution infrastructure**, aiming for GM to host 1TWh/year of electricity generation and 2-3TWH of heat generation by 2020, requiring a total investment of around £3.5 billion to achieve this;

**Harness the substantial economic opportunities arising from the changing ways in which Greater Manchester and the world will meet its future energy requirements**; and support partners in investing c£500 million+ to make our energy distribution networks fit for purpose in a low carbon economy; ;

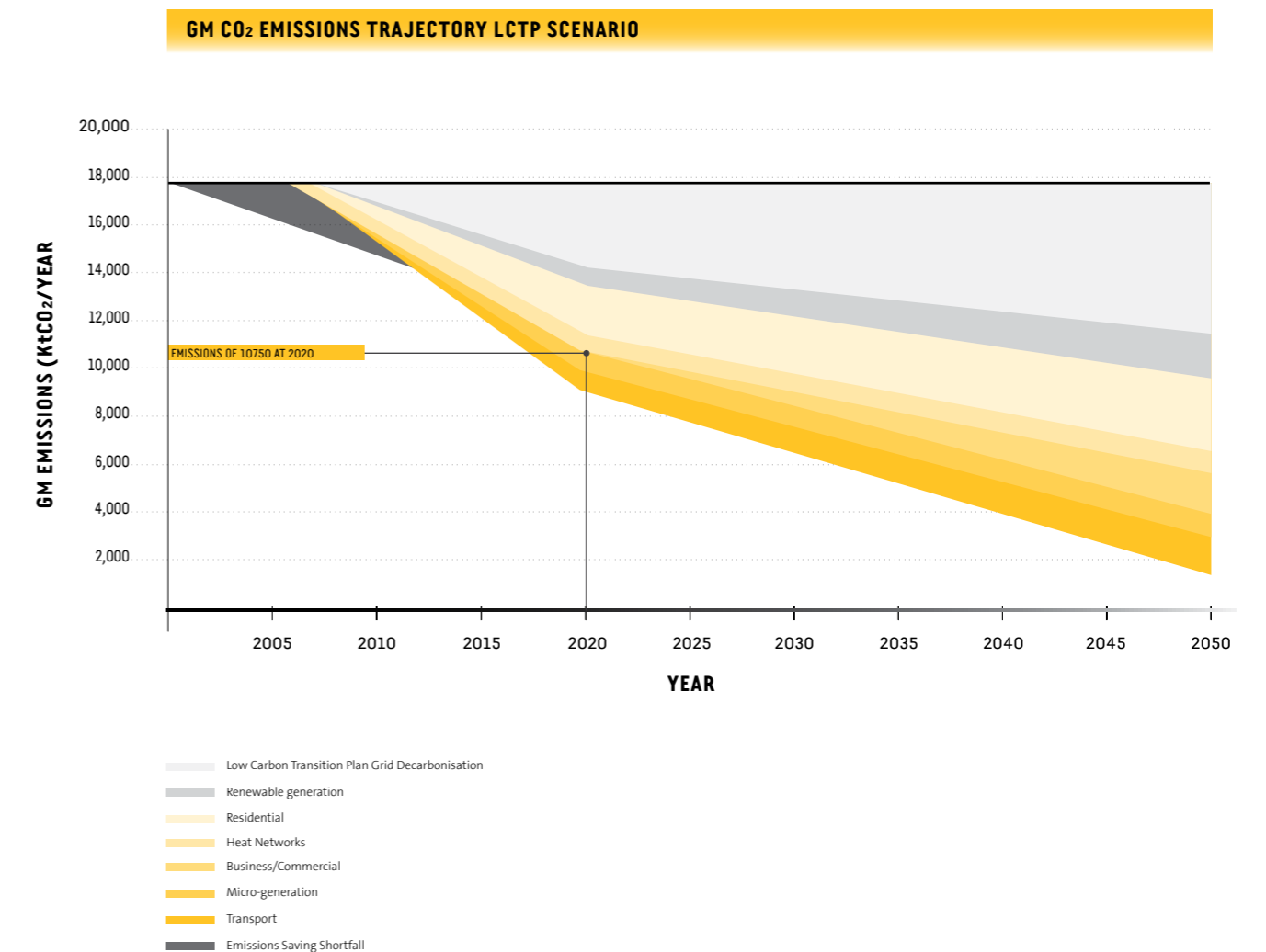
**Make sure we have the skills, expertise and knowledge** needed to deliver GM's future energy system;

**Recognising that the majority of investments and actions will need to be market and private sector driven**, to forge and maintain strong relationships and partnerships with key energy stakeholders, including the Greater Manchester Energy Group; and make sure that communities have a stake in their energy future;

**Capitalise on, and grow our substantial energy systems R&D and innovation capability.**

These challenges have a real impact on the economy and social wellbeing of Greater Manchester. If we get it right, the measures we take to deliver secure, low carbon energy supplies have the potential to strengthen the resilience of the system and stimulate sustainable economic growth while also lifting people out of fuel poverty. This can be achieved via reducing consumption, providing affordable supplies and creating employment opportunities. Although the actions needed to deliver this require significant investment and changes in lifestyles, the impact of pursuing business as usual would pose much greater challenges to the quality of life, solvency and economic performance of Greater Manchester's residents, organisations and businesses.

Figure 1.  
The graph below shows a possible trajectory for Greater Manchester's decarbonisation, following the reduction scenario set out in the 2009 UK Low Carbon Transition Plan.





## GM'S VITAL STATISTICS

In 2009, GM used 25.8 TWh of gas and 11.7 TWh of electricity. Around 20 TWh of petroleum products was used for transport activities. Since 2005, gas and electricity use have decreased by 17% and 9% respectively, with the commercial sector achieving the most significant efficiencies. Transport fuel consumption has remained fairly static. Despite a decrease in our energy use over the same period, in 2010 the average household spent over £1,100 on gas and electricity, an increase of 20% since 2007. Similar price increases in the commercial and industrial sector have had a significant impact on company profitability.

In total, GM spent over £5 billion on its gas and electricity bills during 2010. In 2005, our direct CO<sub>2</sub> emissions were a little over 18 million tonnes, decreasing by 13.5% to just under 16 million tonnes by 2009. This is slightly less than the national trend over the same period. Within this trend, GM's commercial and transport emissions have decreased more slowly, correlating with a relatively strong economic performance. Domestic emissions have decreased noticeably more than the national trend, particularly in the last few years, and this could reflect an early impact of GM's strategic focus and action on domestic retrofit.

Greater Manchester generally uses more energy per capita than the UK average – this is primarily due to our high 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.

GM's highest profile renewable energy generation schemes include the Scout Moor Windfarm, Co-op Group Solar Tower, Barton Locks and other innovative hydro projects, and a number of waste water treatment, solar and landfill schemes. Four groundbreaking anaerobic digestion plants and a combined heat and power scheme will use Greater Manchester's waste to produce 8MW of energy, 83MW electricity and 5MW heat. Uptake of decentralised and building integrated renewable energy generation is increasing, and new hydro, geothermal, wind and biomass generation opportunities are being actively pursued. Many authorities within Greater Manchester were early adopters of renewable energy criteria in their Planning Framework, and this is resulting in building integrated renewable energy schemes across the domestic, commercial and industrial property estate.

## STRONG FOUNDATIONS

Greater Manchester has a relatively small amount of large scale energy generation infrastructure and does not host a major energy supply company. However, it has a higher than average proportion of energy sector companies, a track record of network innovation and higher than average energy sector employment and growth. Our universities host energy research programmes in excess of £100 million in value. These are the foundations on which Greater Manchester needs to build its interventions if it is to realise the benefits of a rapid transformation to a low carbon economy.

At international, national and local level, there is a significant gap between the levels of investment, innovation and transformation we know will be needed to meet climate change and energy security challenges, and the existing and planned actions already in place.

HOUSEHOLD ENERGY COSTS 2007 = £880

HOUSEHOLD ENERGY COSTS 2010 = £1100

20% INCREASE

## AND SO... THE ENERGY PLAN

Greater Manchester needs to consider and plan for a number of different future scenarios. There are a large number of critical actions that need to be undertaken now if our businesses and residents are not to be disadvantaged from the radical transformation that our energy system will undergo.

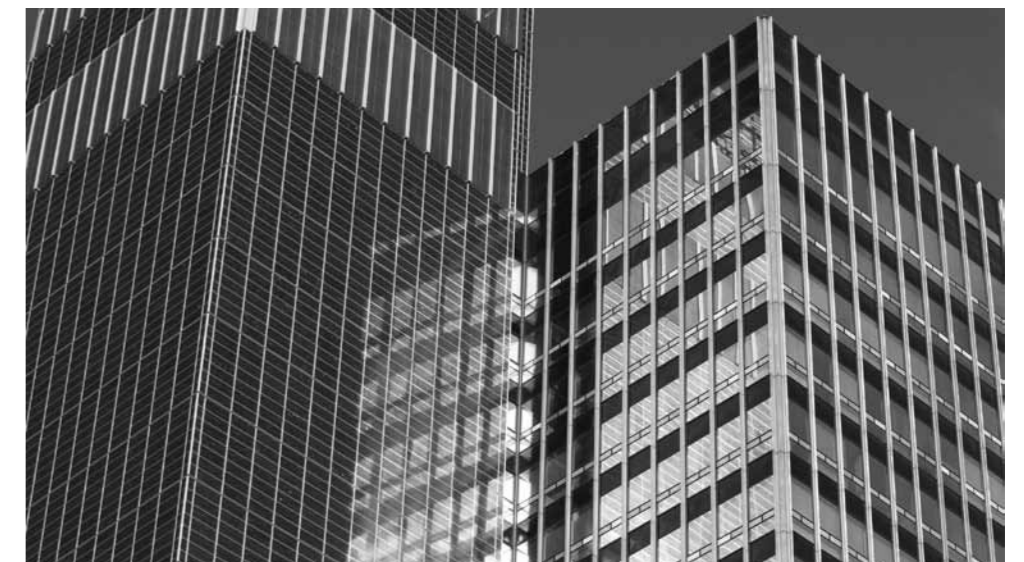
There is a significant inter-relationship between this plan and the Greater Manchester Climate Change Strategy. This plan aims to progress the energy challenges identified in the Strategy, and will form a key bridge between the Strategy and its implementation.

The detailed programme of activities being undertaken to deliver the Energy Plan will be included in the Climate Change Strategy Implementation Plan.

**CONNECTED** provides a strategic overview of the market, legislative and policy context, including the key drivers and challenges affecting the energy system. It identifies the actions and opportunities already in place within Greater Manchester to address these, and recommends the steps needed to address the gap between targets and actions in a way which aims to strengthen Greater Manchester's economic, social and environmental performance. It aims to establish the strategic issues and challenges facing the energy system between now and 2020, and to support Greater Manchester in addressing them. To date, information on GM's energy system has been scattered across a number of different reports, plans and initiatives, most notably the Sustainable Energy Action Plan and Decentralised Energy Plan. **CONNECTED** aims to draw together the key evidence and issues from this work into a single, accessible location suitable for general policy and decision-makers across Greater Manchester. It also aims to provide key stakeholders, including government, other cities and key businesses with an understanding of Greater Manchester's perspective.

In particular the energy efficiency of our building stock will be central to our energy future, and essential in the delivery of our climate change and energy goals. In early 2010 Greater Manchester was designated as a Low Carbon Economic Area for the Built Environment and a special purpose LCEA Board has been put in place to drive forward progress in retrofitting Greater Manchester's building stock for a low carbon future. This work is summarised in the Energy Plan, and further information on this detailed building level activity will be presented elsewhere as part of the Climate Change Strategy and Implementation Plan, and soon to be published Greater Manchester Housing Retrofit Strategy.

**CONNECTED** focuses specifically on strategic energy issues, and on the 'beyond doorstep' challenges and actions relating to generation, distribution, use, markets, networks and prices that will deliver a robust energy system.



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## KEY OUTCOMES BY 2020

If Greater Manchester is to succeed in achieving its social and economic objectives, we will need to invest in our energy infrastructure at a scale equivalent to its previous investments in transport and regenerating the built environment. The development of a long term, stable investment platform and robust energy skills base to deploy a mix of high volume, small scale energy schemes, network innovations and large energy projects are therefore top priorities. In addition to the radical transformation of the energy network, shift away from fossil fuels in transport and low carbon retrofit of our buildings, opportunities to locate around 1TWh of new electricity generation and 3TWh of heat generation will need to be found.

**As already identified in the GM Climate Change Strategy, key energy outcomes by 2020 will be:**

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<b>Invest</b>	<p><b>To have created market conditions which promote low and zero carbon energy generation and distribution</b> opportunities across Greater Manchester, including local renewable power stations, leading and facilitating the development of local heating, cooling and smart grid networks and integrating microgeneration opportunities into our new building development standards and retrofitting programmes;</p> <p><b>Continued support and investment</b> in UK renewable and low carbon energy generation via our energy procurement strategies; and</p> <p><b>Work to increase the size, economic and jobs contributions</b> of Greater Manchester's energy sector.</p>
<b>Inspire</b>	<p><b>For users to understand that the cost and carbon impact of their energy use is linked to their patterns of consumption</b>, and have access to support systems and schemes to help both reduce demand, and balance capacity, demand, carbon and cost – we have the opportunity to demonstrate national leadership in this area.</p> <p><b>To provide communities with the ability to shape and own a stake in their own energy future</b></p>
<b>Plan</b>	<p><b>To have strengthened our understanding</b> and ensured that existing and planned energy infrastructure is secure, resilient to the impacts of climate change, changes in energy use and the connection of local low carbon supplies, and to have integrated energy security issues into our planning for civil contingencies; and</p> <p><b>To have developed an understanding of the need to decarbonise the energy supply</b> at community and household level, ensuring that the benefits of both reducing emissions and ensuring a secure and affordable future energy supply are applied in the planning of energy infrastructure at neighbourhood level.</p>
<b>Innovate</b>	<p><b>To be early adopters</b> of smartgrids, smart technologies and energy storage, improving the efficiency of our energy system;</p> <p><b>To have created market opportunities</b> for the £100 million of energy research being undertaken by Greater Manchester's universities; and</p> <p><b>To have integrated the development of new heating and cooling networks</b> and the establishment of locally generated power networks with the development of major retrofitting programmes and role out of smart technologies in order that networks can expand as heat demand from retrofitted property decreases.</p>

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**To achieve these outcomes Greater Manchester will:**

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<b>Invest</b>	<p><b>Deliver a co-ordinated approach</b> to actively supporting the development and delivery of local energy generation and network projects, focussing initially on a discrete number of schemes across renewables, distribution, smart grids, pricing, charging and storage that demonstrate technologies and commercially viable investment models for further development;</p> <p><b>Deliver a low carbon investment framework</b> that provides and recycles access to cost effective capital for low carbon projects; and</p> <p><b>Maximise the take-up of international, national and local financial instruments</b> including securing a robust local share of grants, low cost finance, including feed in tariffs, energy levies and the Green Deal.</p>
<b>Inspire</b>	<p><b>Deliver a co-ordinated communications programme</b>, promoting energy training and 'carbon literacy', making energy use and carbon emissions publicly 'visible', including a rapid and accelerating roll out of smart meter and energy information technologies to encourage informed use of energy; and</p> <p><b>Influence the development of energy programmes</b> to ensure that training and supply chain support are integrated into their development.</p>
<b>Plan</b>	<p><b>Deliver a spatial strategy and policy instruments</b> which optimise collaboration between District Core Strategies, the National Planning Framework and local opportunities, and create a robust, transparent and supportive framework which engages communities, particularly around the need to balance large and small scale generation and secure locations for energy infrastructure with local interests and amenity concerns;</p> <p><b>Influence existing and new energy generation and distribution companies</b> to ensure they have effective strategies for resilience, adaptation and the upgrading of networks, and the connection of low carbon technologies; and</p> <p><b>Make sure that core issues</b> such as fuel poverty, energy security, infrastructure costs and achieving market competitive advantage cut across the full range of Greater Manchester's programmes and interventions.</p>
<b>Work together</b>	<p><b>Enable the right market conditions to be developed</b> to promote investment and action in Greater Manchester via the Energy Group's governance and partnership arrangements which promote strong working relationships with key energy organisations.</p>

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## ENERGY PLAN REPORTS

This overview is supported by a number of issue specific reports which aim to address the desired outcomes and actions above. Their purpose is to equip senior decision-makers across Greater Manchester with a core understanding of energy opportunities and challenges and to enable key actors to take a stake in the delivery of a low carbon, affordable energy future. Together, they comprise Greater Manchester's Energy Plan. The reports include:

<b>Greater Manchester: Our Energy Use</b>	An insightful guide to our consumption using current methodologies and an indication of our future footprint. What might we expect to use in the future? How do we reduce the amount we use, and make better use of available supplies?
<b>Greater Manchester: Our Energy infrastructure</b>	A guide to how it works, where it is and what kind of shape it's in, plus more on how we need to enhance it, including 1-2 page overviews and actions on: Electricity generation; Distribution (including smart networks and storage); Heat
<b>The Energy Market</b>	The 'big six' suppliers and the key players across the energy system. How they operate, and the implications of this market's future for Greater Manchester, including key challenges such as price, energy security, climate change and fuel poverty.
<b>Low Carbon Goods and Services sector</b>	An update and refresher briefing around our market presence and strengths in low carbon goods and services, and the actions needed to sustain its growth.
<b>Sixth Wave Innovation</b>	Briefing on the future of low carbon and clean technologies and how we unlock opportunities to ride a 'sixth wave' of global innovation, including Greater Manchester's substantial R&D base.
<b>The Regulatory and Policy Framework</b>	A briefing on the rapidly changing world of regulation in Europe and the UK, with new Government guidance emerging and reviews of existing mechanisms (e.g. FiT). Suggestions on the position we need to adopt to shape the framework.
<b>Low Carbon Investment</b>	The critical question examined. How do you fund a low carbon revolution? What are the payback periods and mechanisms? What impact will the carbon price have? How will GM mobilise investment?
<b>Working Together</b>	The governance and delivery arrangements for how GM will work together, and who does what.
<b>Action Plan</b>	This Plan forms part of the Environment Commission Work programme, and will be expanded upon in the Climate Change Implementation Plan.

## CONNECTED ONLINE: VISIT [WWW.GMEPONLINE.COM](http://WWW.GMEPONLINE.COM)

The reports will be available online as part of a website which also provides access to a range of knowledge assets which were produced by partners during the course of the Plan's development.

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Connected sets out the current situation, potential issues and proposed solutions for a more sustainable and secure energy future. It has been developed by the Greater Manchester Energy Group, a mix of public and private sector leaders who work together to support an affordable, low carbon energy future for Greater Manchester.

**FOR MORE INFORMATION:**  
[WWW.GMEPONLINE.CO.UK](http://WWW.GMEPONLINE.CO.UK)  
 For further information about AGMA and its activities visit [www.agma.gov.uk](http://www.agma.gov.uk)  
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 Decarbonising the city is funded by CLASP,  
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