

AGMA

**Greater Manchester
Energy Group**

Shaping Partnership
Energy Priorities



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Energy Priorities

Supporting the
Development of a
Greater Manchester
Energy Group

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Ove Arup & Partners Ltd
St James's Buildings, Oxford Street, Manchester, M1 6EL
Tel +44 161 228 2331 Fax +44 161 0
www.arup.com

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Greater Manchester Energy Group Governance Structure

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Summary of Actions

1 Executive Summary

This report has been prepared for AGMA's Environment Commission by Arup to stimulate dialogue on shaping priorities for the newly formed Greater Manchester Energy Group (GM Energy Group).

Building an integrated response to climate change, growth aspirations and energy security is one of the most pressing challenges of our time. Rising to the challenge requires multi-disciplinary working across local authority boundaries, but with an understanding of local organisations, priorities and context. Therefore, Greater Manchester (GM) is considered the most appropriate level to coordinate a response. GM is well placed to respond to these challenges with a long history of working across local authority boundaries, a significant existing low carbon economy, world leading university and research capabilities, the Low Carbon Economic Area (built environment) designation and the City Region pilot initiative. Consequently, it is recognised that a GM Energy Group that works across AGMA Authorities and thematic Commissions is the most effective way of addressing energy issues in an effective, integrated fashion.

If GM can develop an efficient, low carbon energy system this will support economic growth and pave the way for GM to be recognised internationally as an innovative City, second only to London in the UK for economic success and sustainable development. On the other hand, an energy system that cannot rise to these challenges could constrain future growth, worsen the affordability of energy and social divisions, and damage the competitiveness of the economy.

It is recognised that the wide remit of the GM Energy Group, coupled with the capacity limitations of local authorities and other partners, necessitates that clear priority actions are identified from the multitude of possible actions. In particular, priority actions are required that will drive real change, innovation and 'quick wins'. However, it is also important that any actions should not be detrimental to any longer term initiatives or solutions. This document uses existing baseline expertise, emerging GM case studies and experience, local authority information and Arup experience working in GM to recommend actions that will achieve these objectives.

The following eight actions are recommended as the priority actions for the new GM Energy Group:

- 1) Build a partnership of energy stakeholders;
- 2) Identify strategic priorities for energy planning at the GM level involving the energy sector and partners to guide future energy infrastructure investment decisions. These priorities could be taken forward in a Sustainable Energy Action Plan;
- 3) Develop an appropriate strategic framework to enable the deployment of innovative energy (heat and power) distribution systems;
- 4) Identify the skills, capacity and resources needed to deliver the GM Energy Group's priorities and develop working arrangements to take them forwards;
- 5) Develop and support the implementation of energy infrastructure and system related components of the Low Carbon Economic Area (built environment) work stream;
- 6) Identify effective solutions to encourage behavioural change in energy use including effective communication to communities and businesses;
- 7) Develop and secure funding to pilot Smart Grid technology in GM; and
- 8) Provide a voice for GM in the development of UK energy policy.

A full list of actions is provided in Section 5 of this report, with a table summarising actions and indicative timescales provided in Appendix 2. It is recognised that AGMA cannot and should not deliver these priorities alone, but can most effectively do so in collaboration

with organisations and bodies at the national and local scale. Further, the aims of the GM Energy Group should be delivered in co-ordination with measures to reduce non-energy carbon emissions and the delivery of other forms of infrastructure (e.g. water and communications).

2 Introduction

2.1 Who is the Association of Greater Manchester Authorities?

The Association of Greater Manchester Authorities (AGMA) consists of the ten local authorities with other key public and private sector partners that make up the Greater Manchester City Region (GM).

Figure 1: AGMA Local Authorities



GM is one of the two pilot statutory city regions in the UK. The aim of the pilot is to see how groups of local authorities with additional freedoms and flexibilities can drive economic growth and contribute to sustainable development. AGMA have adopted a new constitution to reflect GM's ambitions and provided a legal framework to manage strategic development and financial resources delegated from the national and regional levels. To co-ordinate strategic GM programmes, AGMA's seven commissions are:

- Planning and Housing
- The New Economy
- Improvement and Efficiency
- Health
- Environment
- Public Protection
- Transport

2.2 What is AGMA's Approach to Energy?

The City Region Pilot Agreement between AGMA and government directly references the importance of energy and the intention to establish a GM Energy Group¹ to develop a robust city-regional approach to the challenges of maintaining security of supply, delivering carbon emission reductions and maximising local economic advantage. The Environment Commission is leading this cross-commission piece of work on behalf of AGMA and shaping GM's approach to energy systems and infrastructure.

2.3 Developing the GM Energy Group: Interim Arrangements

Preparation work is being carried out to establish the GM Energy Group alongside the progression of a number of energy related projects. Current resources do not allow for the delivery of large scale energy projects across GM, therefore, the Energy Group will be

¹ A summary of the GM Energy Group Governance can be found in Appendix A.

tasked with identifying and securing the necessary resources to deliver low carbon energy infrastructure and systems.

The GM Energy Group will include the chair (Elected representative) and a representative from the Environment Commission. A representative of Electricity North West has been invited to act as Vice Chair and representatives from other key organisations and other Commissions will also form part of the GM Energy Group. A series of face to face meetings are in progress with the suggested GM Energy Group members. The GM Energy Group will be launched at a small event in early February 2010 followed by its inaugural meeting a short time later. This document has been prepared in advance of this launch.

The Environment Commission Strategy Team will support the GM Energy Group, assisted by a cross functional team of local authority and other specialists. This network has already met on three occasions and is due to meet again in early February 2010. In addition to this, AGMA hope to secure some policy and organisational support as part of ongoing discussions with the NWDA regarding the GM Energy Group's sub regional role. It is expected that the GM Energy Group, once established, will be responsible for determining and securing its capacity and resource needs in order to deliver on key programmes.

It is anticipated that the development of delivery arrangements for the Low Carbon Economic Area (built environment) will secure project management, delivery and capital funding capacity to progress energy objectives relating to the energy performance of the built environment, and a bid to European Regional Development Fund is being made on that basis. The Energy Savings Trust has provided project coordination and delivery capacity to GM in a short term seconded basis to assist in the development of the bid.

2.4 This Document

This document provides an overview of the context in which the GM Energy Group will operate and the energy challenges and emerging priorities GM faces. The aim of the document is to stimulate dialogue and assist the emerging GM Energy Group in identifying strategic priorities on which collective action is required.

The document builds upon numerous studies, policies and initiatives at the national, regional, sub-regional and local levels. The recommendations particularly draw upon²:

- The Climate Change Act 2008 national targets for carbon reduction;
- UK Low Carbon Transition Plan recommendations on how targets will be met;
- The White Paper, Meeting the Energy Challenge 2007 which sets out some of the major energy challenges facing the UK; and
- Manchester Independent Economic Review
- Decentralised and Zero Carbon Energy Planning;
- Draft Energy Savings Trust Low Carbon Cities report;
- The GM Strategy;
- Manchester Mini-Stern and subsequent economic analysis by INNOVAS;
- Draft documents prepared for the Low Carbon Economic Area submission;
- Draft documents prepared as a result of the recent Low Carbon roadshows; and
- Numerous other initiatives on Smart Grids, electric cars, and energy reduction.

² References are provided in Appendix C.

3 Greater Manchester's Energy System

3.1 Introduction

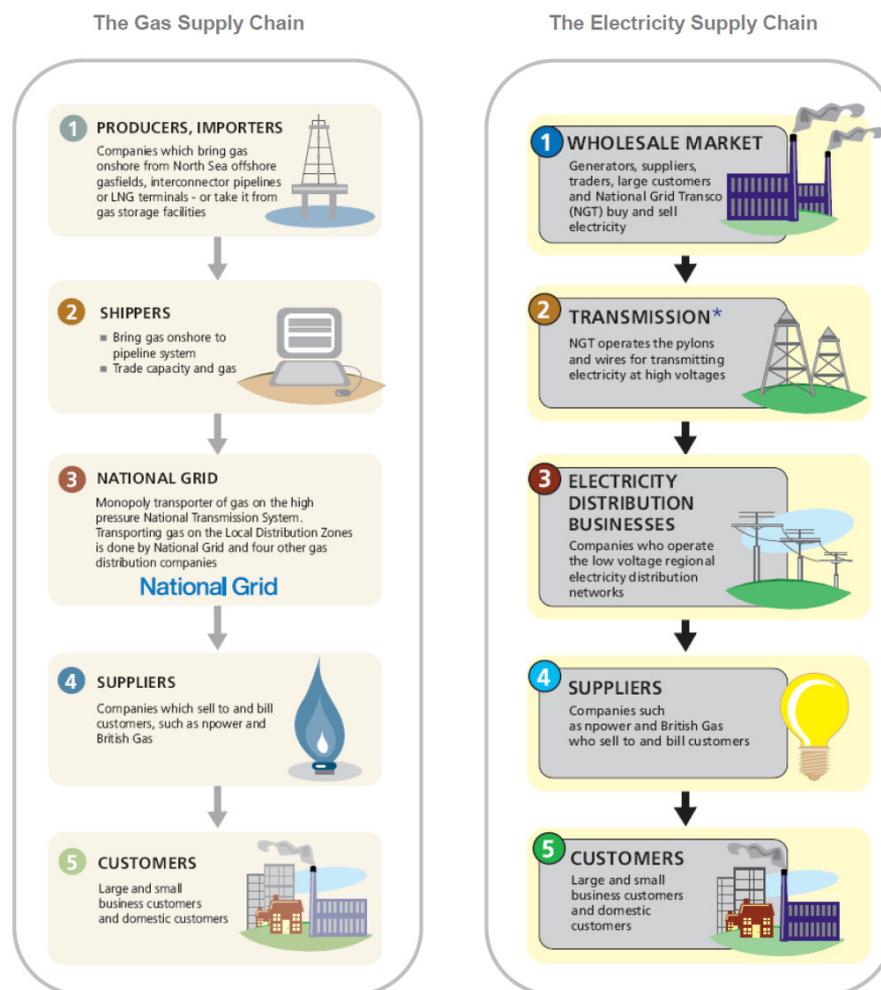
To effectively manage the reduction of CO₂ emissions, it is important to understand the energy system in terms of the fuels used for heating, cooling, power generation, transport and industrial processes. Energy is essential to the functioning of our cities. We use it to move ourselves and our goods, to heat and illuminate our buildings and to operate our appliances and machines. In the UK the ultimate source of most of the energy we use is fossil fuels deposited millions of years ago. We extract it as coal, gas and oil and burn it in thermal power stations to generate electricity, take it directly into our houses to burn as gas and heating oil, or burn it as petrol and diesel in our cars and lorries.

3.2 Energy Market in the UK

3.2.1 Gas and Electricity

Over the last 20-30 years the UK's gas and electricity markets have undergone a process of deregulation and privatisation. The energy consumer typically only deals with energy supply companies, with supply chains sitting behind these companies. Ofgem regulates both the gas and electricity markets.

Figure 2: Gas and Electricity Market Supply Chains³



Sources: Securing Britain's Gas Supply (Ofgem 26.06.07)

Securing Britain's Electricity Supply (Ofgem 13.06.05)

³ The licence holder for the Electricity Distribution business covering GM is Electricity North West. They contract many of the tasks to operate the network to United Utilities who formally owned this licence.

3.2.2 Petroleum based fuels

The energy market for transport fuels is more complex. There are nine companies that make up the UK Petroleum Industry Association (UKPIA) which undertake refining in the UK. These produce a range of transport fuels and wider petrochemical products which are then sold on an open market to a wide range of companies which sell direct to consumers.

The UK is becoming increasingly dependent on imports of both crude oil and key petroleum products, such as diesel and aviation fuel. In 2008, 66% of the UK's crude oil imports were sourced from Norway, with the majority of the remaining imports sourced from Russia, Algeria and Venezuela, and less than 1% from the Middle East (source DECC).

3.2.3 Heat

In some parts of Greater Manchester, particularly around 1960's social housing, there are heat networks. These operate with a central boiler generating steam or hot water which is then piped around the area. Each property has a connection to this network, and usually has a heat exchanger in their house that using the heat from the network to heat water in their house for a central heating system or for domestic hot water. Systems of this vintage have a poor reputation, mainly due to experience of poor reliability. However in other northern European cities, and some UK cities, heat distribution systems are used highly successfully.

3.2.4 Renewable Energy

There has been some limited uptake of renewable energy technologies within GM (Scout Moor wind farm, solar panels etc). These currently form a very small part of GM's energy mix and the steps needed to transfer to renewable energy generation sources need to be a prime area of focus for the GM Energy Group.

3.3 Energy Networks

3.3.1 Electricity

The UK Electricity Grid is operated as a common grid, with generators supplying to the grid in response to demand. The current UK electricity generation is heavily geared toward fossil fuels with typically over 70% of generation from coal and gas fired power stations. The balance is made up from nuclear and renewables, plus some imports from France.

The UK government objective is to move to a decarbonised grid with a target that by 2050, 80% of all UK energy generation does not cause carbon emissions. It is intended that this will be achieved by a mix of nuclear, renewables, and fossil power stations with carbon capture and storage.

A fundamental feature of electricity distribution is that electricity storage is very difficult to achieve economically. This means that generation has to respond almost instantaneously to demand.

Consumers buy electricity from Suppliers. They in turn buy from Generators, pay National Grid to transmit it to Greater Manchester at high voltage, and pay Electricity North West the electricity Distribution Network Operator (DNO) in the North West. ENW reduce the voltage at substations and convey it through the local electricity network to the consumer. In general it is the location and capacity of substations which determines the availability of electricity to energy users.

3.3.2 Gas

The UK gas supplies are still largely sourced from off shore platforms and supplied to terminals on the coast. Facilities are being developed for piped connections to European gas networks, and for the receipt of Liquefied gas imports from the rest of the world. National Grid own and operate a regulated nationwide High Pressure gas distribution network, from which the main connection to the Greater Manchester area is in Partington.

From there the gas is distributed to consumers through a network of Intermediate High, Medium and Low pressure gas mains. Changes in gas pressure occur at gas governors. In Greater Manchester the local gas DNO is also National Grid, but this is not the case for much of the rest of the UK where the local gas network has been sold to other companies.

A key issue in the trunk network is the provision of storage. At present the UK has only capacity for limited storage, and efforts are being made to develop more gas storage, to allow the UK to cope better in the event of very high demand and/or the loss of a major supply source. In the North West the Cheshire salt works are seen as a large potential gas storage area. The issue of national gas storage should not be confused with the local gas storage in gasometers. These balance the local supply network across the day between peak and off peak.



3.3.3 Petroleum Products

Petroleum products are supplied in a broadly unregulated market. The supply network is normally reliant on road transport of the product to the retailer (petrol stations) or the consumer (heating oil).

There are two major nodes of this distribution network that are critical for Greater Manchester. The Shell Stanlow Complex at Ellesmere Port has a refining capacity of 12 million tonnes, producing a range of products including petrol, diesel, jet fuel and fuel oil. In Trafford Park, the Manchester Fuel Terminal is fed by the Mainline Pipeline which runs up the UK from Milford Haven. It is the regional centre of the fuel distribution networks for Esso and other main fuel retailers.

A few major consumers have pipeline supplies, for example Manchester Airport.

3.3.4 Heat

Heat network play a very small role in Greater Manchester at present, largely focussed about 1960's social housing. However there is currently considerable interest in developing a new heat network, particularly along the Oxford Road Corridor. Heat utilisation is important. Heat is a bi-product of fossil fuel based electricity generation, which is often wasted, thereby significantly reducing the fuels useful energy yield.

3.3.5 Solid Fuel

In recent years Solid Fuel has played a very small role in energy supplies for Greater Manchester, with road based delivery of coal and wood. However the drive for low carbon fuels has driven a growth in the use of biomass (solid fuel derived from plants). Biomass is normally delivered by road, and like Petroleum products are in a largely unregulated market. Whilst most UK biomass has been derived from UK forestry and other planting, the growth in demand is starting to generate a requirement for imported biomass. For example, two new secondary schools in Oldham have their heating derived from biomass fuel.

The sustainability agenda has also driven the use of waste solid fuel for energy. This has included the incineration of solid waste from sewage treatment works, and that of municipal and commercial solid waste.

3.4 Energy Use in Greater Manchester

In Greater Manchester in 2005 we consumed some 63.2 terawatt hours (TWh) of energy to meet our demand for heating and cooling, power generation, transport (excluding aviation) and industrial processes. In 2005, these inputs to our energy system resulted in emissions of 17.1 megatonnes carbon dioxide (MtCO₂). This is show in graphical form in Figure 3.

Greater Manchester's 'energy balance' and resultant CO₂ emissions show that:

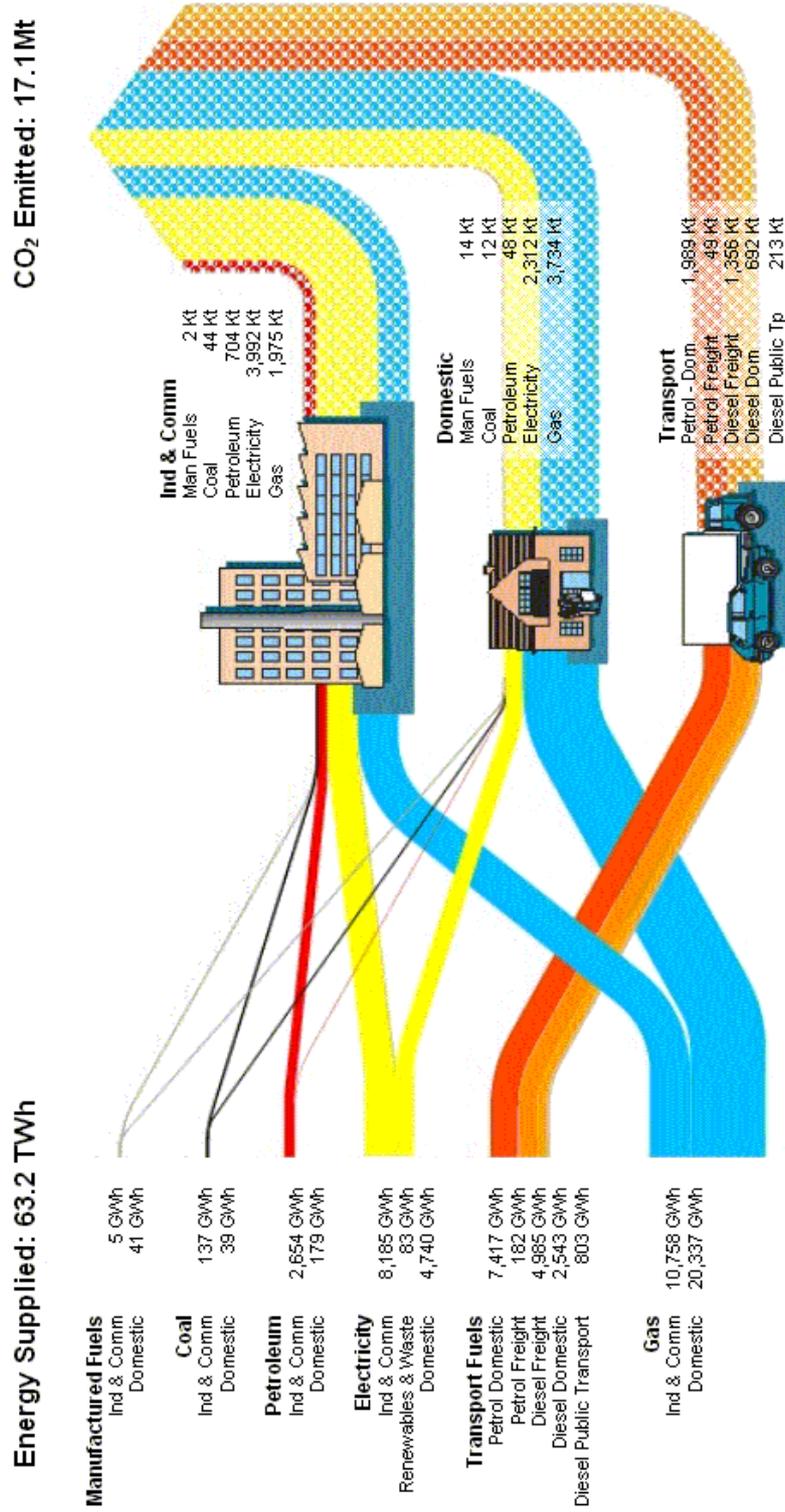
- Gas is the largest fuel source consumed with transport fuels as the second largest;
- The fuel mix and methods for generating electricity are more carbon intensive than gas for heating / cooling;
- The domestic sector is the largest consumer of energy at 40% (excluding transport);
- The Industrial and Commercial sector consumes around 35% of energy (excluding transport); and
- Transport (all sectors) accounts for 25% of energy consumed.

The fuel mix for electricity generation and supply shows that:

- The UK is currently heavily reliant on fossil fuels with gas supplying 37.7% of electricity and coal supplying 35.8%; and
- In 2005, the fuel mix and methods for generation consumed 1,257,290 GWh of energy, which supplied 365,067 GWh of electricity (29% of energy consumed in generation) and resulted in an overall heat loss of 897,222 GWh (71% of energy consumed in generation).

Figure 3: GM Energy Balance

Greater Manchester's Energy Balance, 2005
Energy Supply and CO₂ Emissions



Sources:
 DECC Total & Final Energy Consumption at Regional and Local Authority Level, 2005
 DEFRA Company Guidelines to DEFRA / DECC GHG's Conversion Factors for Company Reporting

4 Drivers for Systemic Change to Greater Manchester's Energy System

4.1 Introduction

The strategic aim for Greater Manchester is to reshape the energy system and infrastructure to enable the development of a low carbon economy for Greater Manchester, by ensuring that GM's energy system:

- Can achieve significant emission reduction targets;
- Can support GM's growth aspirations; and
- Provides a secure supply of energy, now and in the future.

Each of these challenges is explored in more detail below.

4.2 Reducing Emissions

4.2.1 Policies and Legislation

The drivers for Greater Manchester (GM) to reduce its greenhouse gas emissions and develop a low carbon economy are numerous and compelling. International and national policy and legislative drivers commit the UK to reducing emissions. In particular, the UK Climate Change Act requires that the UK reduce our CO₂ emissions by 80% by 2050 (over 1990 baseline). Interim 'carbon budgets' have been set to ensure the UK meets the 2050 target, including a target for a 34% reduction by 2020. On a shorter timescale, the UK Government's Energy White Paper aimed to reduce CO₂ emissions by 10% on the 1990 baseline by 2010. Further targets focus on methods for emission reduction, rather than the reduction itself. For example targets have been set for the UK to: derive 15% of its energy from renewable sources by 2020⁴; achieve a 29% reduction in emissions from homes by 2020; and generate 40% of the UK's electricity using low carbon sources by 2020⁵.

The GM Strategy has responded to the national drivers, setting out the vision and priorities to deliver rapid transformation to a low carbon economy and setting a target for AGMA to reduce emissions by 30-40% by 2020. It is recognised that energy is not the only source of carbon emissions, but given its major role the GM Energy Group will have a significant role to play in the delivery of GM targets.

GM has also recently been designated a Low Carbon Economic Area for the Built Environment, committing GM to action to reduce carbon emissions in this sector. AGMA has also put in place joint-administrative arrangements to co-ordinate a city-regional approach to tackling climate change under a climate change agency. GM has established a single Energy Savings Trust Advice Centre and undertaken a city-region wide Distributed and Renewable Energy Generation Study to support objectives and actions.

4.2.2 Economic Drivers

There are also strong economic drivers for GM to make a transition to a low carbon economy. The Mini-Stern for Manchester⁶ analysed the impact of legislation on a low carbon economy and demonstrated that up to £20billion may be lost to the economy up to 2020 if Greater Manchester fails to respond effectively to the new and emerging legislative framework. National market incentives through the Carbon Reduction Commitment Energy Efficiency scheme will mean that large organisations will be taxed on their use of energy generated using fossil fuels from April 2010. Where companies successfully reduce energy use, or increase the amount of energy they use generated by renewable sources, they will lower their costs. Consequently, these companies will be more competitive than companies

⁴ EC, 'EC Directive on Renewable Energy'

⁵ 2009, 'Low Carbon Transition Plan'

⁶ Deloitte, 2008, 'Mini Stern for Manchester'.

who do not. Therefore, to remain competitive, Greater Manchester must find a way to reduce energy use and increase generation by low carbon and renewable energy sources.

Further, publications such as the Green New Deal report⁷ emphasises that the economic opportunities for the UK associated with low carbon development. Shifting to green energy will produce new jobs and create more pound-for-pound investment. For example, analysis shows that the Low Carbon Economic Area for the Built Environment designation alone could deliver up to £650m additional Gross Value Added and support 34,800 jobs. Businesses who act now to develop low carbon solutions may be able to export these ideas to other areas of the UK and potentially abroad. Therefore, development of low carbon opportunities can support economic growth, whereby inaction could stagnate it. Much work is currently underway to harness this potential and the GM Energy Group will have a key role to play.

Finally, it should be noted that there is a risk that measures to reduce carbon emissions either intentionally, or unintentionally result in increased fuel costs. Whilst fiscal measures can be an effective method of instigating behavioural change, the GM Energy Group should also be aware of the need to minimise fuel poverty. In other words, there is a need to ensure that small businesses and poorer sections of society are not put in financial difficulty by their inability to cope with rising energy costs and have access to affordable energy.

4.2.3 Social, Psychological and Cultural Drivers

Behaviour of individuals, businesses and communities can be a large driver, or obstacle to working towards a low carbon economy. For example, the 40:40:20 rule⁸ expresses the theory that 40% of car journeys can be eliminated without a need for action to be taken to replace them. In other words, the trips can be eliminated or replaced by walking/ cycling. Even without considering the remainder of trips, this shows that behaviour can have a very large influence on transport emissions. Therefore, actions that aim to change transport behaviour in Greater Manchester can assist in achievement of a low carbon economy.

Similarly, there is some evidence that social and cultural factors could begin to drive forward low carbon developments. Energy Performance Certificates and Code for Sustainable Homes ratings are beginning to inform home buyers about the energy performance of their home. At present, the schemes are relatively new and therefore it is unclear whether this has or will begin to influence buyer behaviour and consequently drive up the energy performance of homes. However, it is conceivable that in the future there will be a social driver for low higher energy efficiency standards informed by these standards. These social drivers could similarly influence consumer behaviour in other products such as cars.

Therefore, there is clearly an opportunity to support a low carbon economy through instigating programmes to encourage cultural and behavioural change and education and training should be a component of any approach to ensure proposals are successful in supporting a low carbon economy.

Overall, the challenge for the GM Energy Group is to support the development of GM's energy infrastructure and shape energy use in way that enables GM to meet its carbon reduction targets and maximise the economic and social benefits of doing so.

4.3 Energy System to Support Growth Aspirations

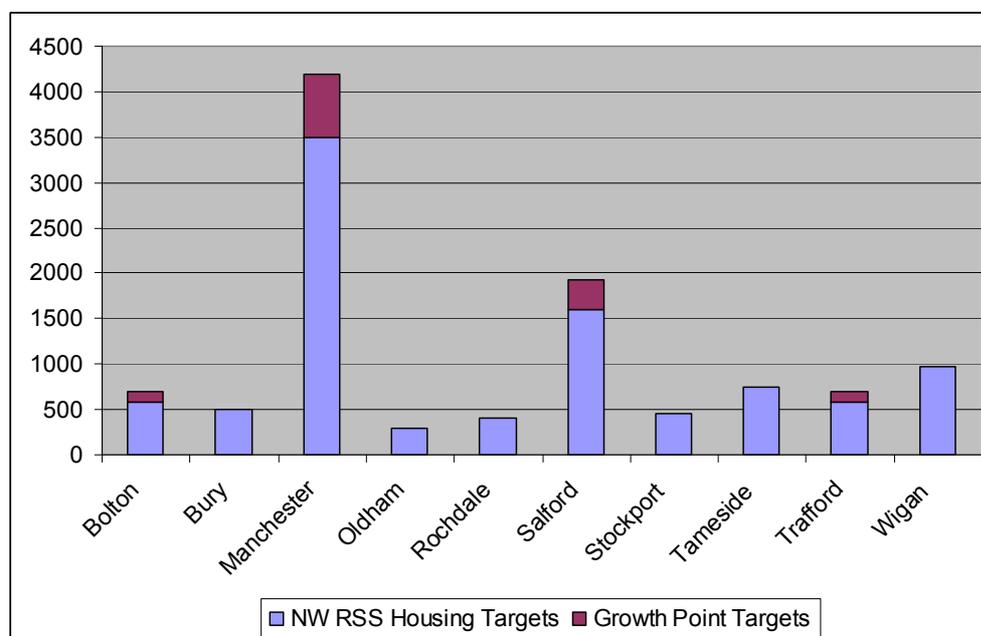
Greater Manchester has aspirations for population/ housing growth and economic growth. The energy infrastructure and supply will need to be sufficient to facilitate this growth. In 2008 Greater Manchester was selected as a Housing Growth Point, with the local

⁷ New Economics Foundation, 2008, 'A Green New Deal'.

⁸ The 40:40:20 rule was cited by Lynn Sloman, 2006, 'Car Sick'. The rule argues that 40% of car trips made by the average person could have been made by bike, foot or public transport without any changes to existing infrastructure; 40% could be made using public transport if options were improved and 20% have to be made by car. The latter category could include carrying heavy goods or transporting an elderly relative.

authorities of Bolton, Manchester, Salford and Trafford committed to delivering growth rates of 20% above the levels containing the North West Regional Spatial Strategy. The remaining 6 AGMA Authorities have committed to delivering their RSS figures, which in themselves engender housing growth. Figure 4 shows the net average number of houses that would need to be built annually up to 2021 to meet North West Regional Spatial Strategy (NWRSS) and Growth Point targets.

Figure 4: Annual Average Housing Provision (Net of Clearance Replacement) in GM



The GM Strategy also aims to drive sustainable economic growth and states that to achieve sustainable economic growth:

'It is crucial that the city region has the infrastructure to sustain its housing and low carbon growth objectives. Of particular importance is the supply of energy, both large scale and decentralised.'

It is important that GM's energy infrastructure has the capacity to support economic growth. In some cases, this may require the updating of old energy infrastructure and the installation of new infrastructure. For example, if electric cars are to become a realistic alternative, infrastructure will need to be provided for people to charge their cars. However, it does not necessarily follow that economic growth will require continuous increases in the capacity of energy networks. Alternative solutions can be mechanisms to make better use of existing infrastructure through spreading the demand for energy more evenly over time or reducing demand through behavioural change or increasing energy efficiency. Alternative solutions will be necessary alongside any improvements in infrastructure because, as discussed above, a failure to cut carbon emissions will fundamentally undermine the GM's economic viability and success.

The challenge for GM is to ensure that GM has the infrastructure required to support population and economic growth, whilst ensuring that in doing so, they are supporting aspirations for a low carbon economy.

4.4 Security of Supply

Energy plays a crucial role in GM's economy and maintaining social well-being, therefore it is important that GM has access to a secure energy supply. Dependence on one source of energy, or energy from locations where the UK has no political control can be less secure than an energy supply generated using a variety of domestic technologies. For example, the following can reduce the security of energy supplies:

- National policies to retain energy in the production country
- Political instability in a production country
- Peak oil and diminishing resources
- Natural disasters affecting extraction or distribution of fuels
- Closure of existing power stations (e.g. nuclear)
- Reduced energy generation (e.g. wind turbines affected by strong winds)

The challenge for the GM Energy Group is to increase the security of GM's energy supply sources through measures such as increasing use of local fuel sources and decentralised energy generation.

Most failures in supply to date have, however, not been as a result of failure in the energy source. They have derived from failures in the distribution network. This runs from small scale power cuts due to a fault on a local substation to major interruptions to British Telecom services in Central Manchester caused by the tunnel fire in the 1990s. Looking overseas, the US has on a least two occasions experience loss of electricity supplies over a number of states caused by a combination of high demand and equipment failure.

For the regulated electricity and gas markets, the responsibility for ensuring reliability of supplies rests with the regulator Ofgem, who in turn set standards for the DNOs. However the success of a city relies on its infrastructure and the reliability of that infrastructure should be a matter of concern to the city.

Customers also cannot get energy supplies if they are unaffordable. The issue of reliability of supply is therefore also influenced by the issues of fuel poverty. Measures to reduce demand and also increase the affordability of energy are thus of great importance.

5 Rising to the Challenge

5.1 Introduction

The UK's Low Carbon Transition Plan aims to deliver emission cuts of 18% on 2008 levels by 2020, by measures such as

- Getting 40% of our electricity from low carbon sources by 2020;
- Making homes greener;
- Ensuring the most vulnerable are supported;
- Developing a low carbon supply chain;
- Cutting emission from transport; and
- Producing a vision for a Smart Grid.



The measures above can be met both through a physical improvement in the infrastructure and building fabric and changing the behaviour of people living in GM. For example, emissions from transport can be cut through improving cycle lanes to make it a safe, attractive option over driving, or through publicity campaigns aimed at persuading people of the health and cost benefits of cycling. The Energy Group should be focused equally on changing behaviour so that less energy is required and improving infrastructure to lower carbon emissions from the energy that is generated.

Analysis has suggested a large number of solutions that GM can implement to rise to the energy challenges outlined above, in line with the national priorities in the Low Carbon Transition Plan. This analysis focused on examination of national policies and priorities and the extensive GM evidence discussed in this document. The priorities are also based on discussions with AGMA Commissioners and Arup specialists who have worked on infrastructure and climate change projects in GM. The main priorities and actions are set out in the remainder of this chapter. These areas for action do not attempt to provide a comprehensive solution to all the energy issues, but help distil some suggested priority areas for the GM Energy Group to focus on in the first five years of operation to ensure early action and real change. A table summarising and prioritising actions is presented in Appendix B.

5.2 Partnership Working with Utilities Companies and New Delivery Vehicles

A major issue at the moment is that there is little partnership working between local authorities and utility companies. Consequently, there is little scenario planning to meet future energy infrastructure needs. This means that utility companies do not necessarily plan for the infrastructure needs of developments set out in Unitary Development Plans or Local Development Frameworks and it is difficult to implement GM wide infrastructure planning. Additionally, utilities companies often look around 5 years into the future and do not engage in long-term planning. This presents a problem for the development of Core Strategies and Unitary Development Plans which often look 20 years into the future. A further difficulty is that some utilities planning information is not currently in the public domain, which reduces the availability of information about the plans of utilities companies. Finally, there are many issues associated with delivering new energy infrastructure, primarily revolving around the initial capital costs of new infrastructure and the risks associated with new technologies.

Tackling these issues is likely to involve a combination of increased engagement with utilities companies on the provision of energy infrastructure and the development of new

delivery vehicles where existing structures do not adequately support the provision of energy infrastructure befitting the UK's second city.

Actions

- 1) Build a high level, city wide partnership of energy stakeholders;
- 2) Draw up an engagement agreement with utilities companies setting out how and when local authorities and utilities companies will engage to enable strategic energy planning; and
- 3) Support the identification of options for the creation of new energy delivery models, such as ESCos, where they can contribute to GM's objectives.

5.3 Energy Generation and Transmission

The following section sets out potential actions on energy generation and transmission. These actions are recommended by Arup as priorities for the GM Energy Group based on feasibility, costs and recommendations in previous studies. It is recognised that many other schemes will be progressed in GM and these should also be supported in the capacity building and energy strategy components of GM Energy Group's role. However, the following suggests three pilot schemes that could deliver early, significant wins for the GM Energy Group.

5.3.1 Development of Heat Networks

Currently, the development of decentralised heat networks tends to be a relatively cost effective way of reducing carbon emissions through energy use. Research suggests that areas with a demand above 3,000 kW/km² could provide returns on investment of 6% or above⁹, and consequently could be the focus for the development of heat networks. In GM, 55% of thermal demand is from areas with this level of thermal demand, supporting a roll out of domestic sector thermal programme. It is suggested that supporting the development of heat networks should be a main priority for the GM Energy Group. In this regard, it is recognised that some local authorities and areas have begun looking at opportunities for heat networks for example, the Oxford Road Corridor. One important role for the GM Energy Group will be to support existing work and help disseminate lessons learnt to the rest of GM.

Actions

- 4) Develop an appropriate strategic framework to enable the deployment of innovative heat distribution systems
- 5) Support for Corridor Manchester plans for a heat network through assisting in engagement with stakeholders and potentially developing delivery and funding vehicles;
- 6) Develop an accessible GM heat demand map to identify priority areas for heat networks;
- 7) Identify potential heat suppliers such as industries and potential Energy from Waste plants; and
- 8) Identify two pilot heat network projects and support the development of business plans to support the schemes, including a focus on delivery and potential use of local authority buildings to provide 'anchor loads'.

5.3.2 Smart Grids and Smart Consumers

Currently, energy use for both commercial and domestic uses is characterised by peak loads, whereby a large demand for energy comes at particular times on particular days.

⁹ Draft Heat and Energy Saving Strategy, 2009

The classic example is a peak demand for energy when people put the kettle on during the break in Coronation Street.

Smart Grids are grids that deliver electricity from suppliers to consumers using two-way digital technology to control appliances at consumers' homes to save energy and reliability. Smart Grids can also provide real-time information to energy users using Smart Meters.

These meters can assist in behavioural change by alerting consumers to the appliances and actions that use a lot of energy. For example, a Smart Meter can be used to demonstrate the benefits of turning appliances off at the wall in terms of energy (and cost) savings. Therefore, Smart Grids can help develop a more efficient energy network that may be able to cope better with economic and population growth, whilst working towards low carbon targets through reducing energy use.

Smart Grids are specifically identified as a key action in the UK Low Carbon Transition Plan, and in December 2009, the Government issued "Smarter Grids: The Opportunity" which sets out its proposals for the development of Smart Grids.

Actions

- 9) Develop and secure funding to pilot Smart Grid technology in Greater Manchester through appropriate initiatives including Corridor Manchester¹⁰, Plugged in Places¹¹, Co-op Quarter etc.
- 10) Disseminating learning from the pilot scheme throughout GM and drawing up a plan of how to roll out Smart Grids in other areas if appropriate.

5.3.3 Micro-Generation Areas¹²

GM has a history of developing innovative micro-generation schemes, including the largest photovoltaic retrofit in the UK at the CIS tower. The introduction of Permitted Development Rights and funding mechanisms for micro-generation has increased the feasibility and viability of some technologies. However, currently the initial capital outlay, long payback periods and uncertainty over technologies means that retrofitting micro-generation technologies has not begun to take off on a large scale. Support is required to tackle these challenges and make micro-generation a realistic option. The creation of a micro-generation area could help make options viable through economies of scale and demonstrate the viability of technologies to other areas of GM.

Actions

- 11) Assess the viability of establishing a micro-generation area in GM to pilot a large scale micro-generation retrofitting programme;
- 12) Identify an area of GM and supporting actions to support micro-generation. This could also potentially include identifying a suitable manufacturer in the GM to minimise transport costs and maximise local economic benefits.

5.4 Transport

Greenhouse gas emissions from transport represent 21% of the total UK domestic emissions¹³. Recent research¹⁴ suggests that to reduce GM's emissions by 80% by 2050, significant changes would need to be made to the GM transport systems. This could involve 40% of car journeys switching to electric cars, presumably powered by sustainable

¹⁰ Corridor Manchester is the corridor running from St Peter's Square to Whitworth Park in Manchester incorporating a large proportion of the MMU and Manchester University buildings.

¹¹ Plugged in Places was an initiative launched in November 2009 aiming to create a critical mass of infrastructure in 3-6 lead cities or regions in the UK to support the early market for electric vehicles.

¹² Micro-generation areas were recommended as a potential delivery mechanism in Urbed, 2009, 'Decentralised and Zero Carbon Energy Planning'.

¹³ Low Carbon Transport: A Greener Future, DfT, 2009

¹⁴ Draft EST Low Carbon Cities: Manchester, Commission for the New Economy, 2009

electricity, 15% eliminated by changing driver behaviour and 25% due to improved vehicle efficiency. Recent efforts to introduce the congestion charge in GM were unpopular with residents and there is a need for a concerted effort to develop a cohesive GM approach to reducing emissions from transport.

AGMA are currently developing a low-carbon transport prospectus for GM, with the GM Energy Group supporting the emerging energy aspects e.g. charging points for electric vehicles.

Actions

- 13) Support the Integrated Transport Authority and Environment Commission in shaping the low-carbon transport agenda;
- 14) Helping to shape the energy elements of emerging low-carbon transport objectives;
- 15) Managing the implementation of energy aspects of transport infrastructure.

5.5 Buildings

In total, 45% of GM's emissions are from existing built environment¹⁵. Therefore, there is a large potential for reduction in GM's carbon emissions through initiatives that aim to reduce emissions from buildings. GM has a strong track record in regeneration and world leading university and research capabilities in the built environment, particularly along the Oxford Road Corridor. These factors have contributed to GM being named as the first Local Carbon Economic Area (built environment). Further, ensuring that new and existing buildings are energy efficient is important to minimise fuel poverty. The challenge for the GM Energy Group and its partners is to draw upon the opportunities provided by GM's experience, designation and research expertise to develop innovative schemes to reduce carbon emissions from buildings and minimise fuel poverty.

The Delivery Plan for the Low Carbon Economic Area has the following four areas of focus.

- Finance: Development of bespoke sustainable financial frameworks;
- Skills: Development of bespoke sustainable financial frameworks;
- Supply: Above national average productivity and growth rates within the low carbon industries across GM; and
- Research: Establishment of low carbon research programme for low carbon 'retrofit' products.

The Environment Commission will be responsible for taking forward the Delivery Plan to meet the aims of the LCEA. It is envisaged that energy strategy and technology issues relating to the LCEA will be dealt with by the GM Energy Group, whilst LCEA programme delivery will be dealt with by the Environment Commission. A particular role for the GM Energy Group will be to support the implementation of energy infrastructure and system related components of the Low Carbon Economic Area (built environment) work stream.

As the Energy Group works across AGMA commissions¹⁶, the GM Energy Group will be able to draw upon the knowledge and skills of the other AGMA Commissions relevant to delivery such as the Planning and Housing Commission, whilst being led by the Environment Commission.

¹⁵ Arup, 2009.

¹⁶ Although the GM Energy Group is led by the Environment Commission, it will involve representatives from other AGMA Commissions.

Actions

Develop and support the implementation of energy infrastructure and system related components of the Low Carbon Economic Area (built environment) work stream. These actions could include any or all of the below:

- 16) Support the exploitation of opportunities to implement cavity wall insulation and loft insulation for early wins on minimising energy use and fuel poverty;
- 17) Ensure information sharing to enable GM to build on experience of Housing Market Renewal programmes in Oldham/ Rochdale and Manchester/ Salford to implement residential retrofit programmes;
- 18) Continue discussions between AGMA Environment Commission and interested banks on funding for retrofitting buildings; and
- 19) Stimulate debate on how to deal with capital intensive building solutions that may not currently be economically viable to implement. For example, solid wall insulation is capital intensive and does not generally yield sufficient cost savings to overcome the significant initial outlay. Therefore, discussion is needed on how to support these interventions. Actions could include continuing conversations with the Homes and Communities Agency on this subject.

5.6 Energy Strategy and Planning

Effective management of the transition to a low carbon economy requires a coherent, evidence-based and prioritised action plan, together with a monitoring and performance framework to track progress. Work has commenced to develop a Sustainable Energy Action Plan (SEAP) or 'Energy Plan' for Greater Manchester under the EU PEPSE¹⁷ project, which forms part of the Environment Commission's work programme. In addition the Environment Commission is developing a complementary monitoring and performance framework. The development of the SEAP for Greater Manchester will present the GM Energy Group with an opportunity for further development and embedding of sustainable energy management within the businesses processes of partner organisations.

Complementary to this is the identified need for a Spatial Energy Plan to interpret city-regional targets in terms of development and infrastructure needs. This recognises the critical role of the land use planning system in maximising opportunities and minimising constraints to achieve the physical re-tooling of the energy system and built environment at the scale required.

The Decentralised and Zero Carbon Energy Study undertaken on behalf of the Planning and Housing Commission highlights that energy issues and networks cross local authority boundaries and there are significant advantages associated with planning at a GM scale. For example, development of consistent planning requirements provides a level playing field in negotiations with developers. Similarly, there are also economies of scale associated with carrying out studies and research at a GM level.

GM has been working towards a coherent GM approach to energy, particularly to reduce carbon emissions and mitigate climate change. For example, GM has commissioned a number of baseline studies (e.g. Mini-Stern for Manchester) and has set up a Climate Change Agency. It is clear that energy issues and networks cross local authority boundaries and there are significant advantages associated with planning at a GM level. For example, inconsistent planning requirements can mean developers can play local authorities off against one another by threatening to build in an adjacent authority if requirements are not relaxed. Similarly, there are also economies of scale associated with

¹⁷ PEPSE stands for "Partnership Energy Planning as a tool for realising European Sustainable Energy Communities", and is a project to support the emergence of European sustainable energy communities. PEPSE aims to achieve its goals through local community planning for the efficient supply, distribution, use of renewable energy sources and management of energy demand.

carrying out studies and research at the GM level. This said, actions were selected carefully to ensure planning can remain locally specific and studies can reflect local priorities.

Finally, to support the development of GM actions, the GM Energy Group will need to liaise with national Government on arrangements for GM governance and funding to support the actions set out in this document. Further, actions at the GM level would need to complement and, where possible, influence national energy policy. The GM Energy Group will have a role in liaising between GM and national Government on these issues, providing a voice for GM.

Actions

- 20) Develop a Sustainable Energy Action Plan for GM;
- 21) Development of a uniform approach to low-carbon metrics through dialogue with local authorities;
- 22) Consider if it is appropriate to allocate land for low carbon infrastructure, or more general energy network requirements such as substations, and set out an agreed definition of 'appropriate development' in the Greenbelt. Work with the Planning and Housing Commission to ensure that appropriate arrangements are put in place to provide the necessary land, and development control frameworks, to ensure the energy network requirements are met.
- 23) Engage with local authorities to identify opportunities for policy convergence including:
 - connecting buildings to district heat networks or ensure there is an ability to do so in the future where heat networks are planned;
 - requiring new developments to develop on-site low carbon or renewable energy solutions and/ or require funds towards 'allowable solutions' in GM;
 - setting carbon reduction targets for GM and considering whether targets for local authorities are appropriate; and
 - producing energy and carbon budget statements setting out how they meet requirements.
- 24) Provide a voice for GM in the development of UK energy policy.

5.7 Capacity Building

Policies and regulations (e.g. Planning Policy Statement 1 Supplement), require that local government plays a significant and increasing role in energy issues, but local authorities' capacity to fulfil these obligations is not always adequate. The new and emerging legislative framework identifies responsibilities ranging across strategy development, performance management, intervention planning and execution, area wide compliance with government targets or legislation and emergency response. A historic transfer of responsibilities to government agencies and private sector utilities has been reversed, without an associated reintegration of skilled capacity. Similarly, many of the primary objectives and major projects GM depends on pose significant energy challenges and cannot be delivered without a body such as the GM Energy Group shaping the way forward.

This highlights both the need to pool resources and take a collaborative approach at GM level and the importance of a network delivery model to harness the expertise of public and private sector partners when executing new responsibilities, rather than compete with the private sector for the same small talent pools. Recent work by the AGMA Environment Commission has sought to develop an overview of current energy expertise held within different AGMA local authorities. It is clear from this that many skills are present in one local authority but not others. These skills are not necessarily shared across boundaries and local authorities could benefit significantly from sharing and pooling expertise and resources on energy.

Actions

- 25) Identify the skills, capacity and resources needed to deliver the GM Energy Group's priorities and develop working arrangements in order to take them forwards;
- 26) Develop proposals for new working arrangements to meet skills and capacity gaps;
- 27) Identify effective solutions to encourage behavioural change in energy use including effective communication to communities and businesses;

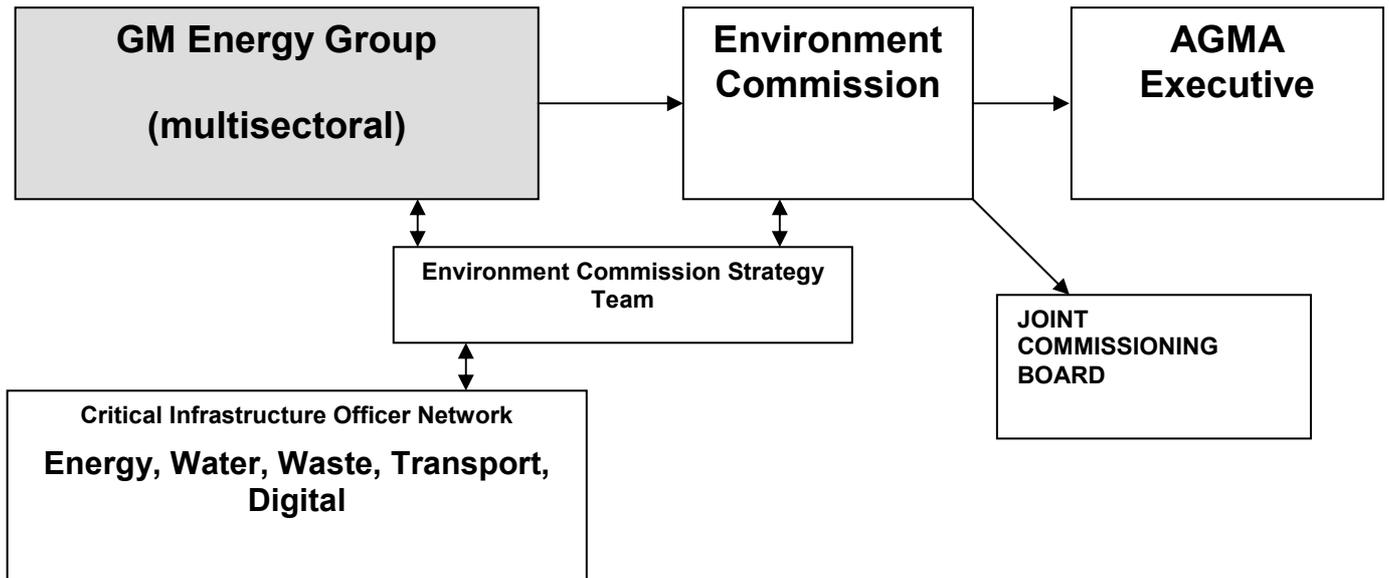
Appendix A

**Greater Manchester
Energy Group
Governance Structure**

A1 Greater Manchester Energy Group Governance and Support Arrangements

The GM Energy Group is a cross Commission senior level body, which feeds in to AGMA Executive via the Environment Commission. It may also be appropriate for certain matters to be tabled with the Joint Commissioning Board.

The Group is supported by the Environment Commission Strategy Team, who are assisted in doing so by a cross disciplinary network of senior officers established to support work on a wide range of critical infrastructure priorities. The diagram below illustrates the organisational structure.



Appendix B

Summary of Actions

B1 Summary of Actions Table

Based on the findings of this report and the supporting research the table below sets out an initial list of potential actions for the Greater Manchester Energy Group to consider and prioritise. Recognising the limited capacity available to the Group it is anticipated that a small number of the actions suggested below may be the focus for an initial work programme.

No.	Action	Time Frame	Status
1	Build a high level partnership of energy stakeholders	2010	Recommendation
2	Draw up an engagement agreement with utilities companies	2010	Recommendation
3	Support ESCo development where appropriate.	2010-2011	Recommendation
4	Develop an appropriate strategic framework to enable the deployment of innovative heat distribution systems	2010-2015	Recommendation
5, 6, 7 and 8	Support existing work on heat networks and help disseminate lessons learnt to the rest of GM. Including identification of two pilot projects in 2010	2010	Recommendation
9	Develop and secure funding to pilot Smart Grid technology in Greater Manchester	2010	Recommendation
10	Draw up plan of how to roll out Smart Grids after pilot and disseminate learning	2012	Recommendation
11	Assess viability of a GM micro-generation area	2010	Recommendation
12	Identify a pilot micro-generation area of GM and actions to support the scheme	2010-2015	Recommendation
13	Support the Integrated Transport Authority and Environment Commission in shaping the low-carbon transport agenda	2010	Recommendation
14	Helping to shape the energy elements of emerging low-carbon transport objectives	2010	Recommendation
15	Managing the implementation of energy aspects of transport infrastructure	2010-11	Recommendation
16, 17, 18 and 19	Develop a delivery plan to tackle decarbonisation of building stock and decentralisation of energy supply. To include: <ul style="list-style-type: none"> Exploit opportunities for cavity wall insulation and loft insulation Support implementation of residential retrofit programmes Continue discussions between AGMA Environment Commission and interested banks on funding for retrofitting buildings Stimulate debate on how to deal with capital intensive and non profitable building solutions such as solid wall insulation. This could include supporting existing conversations with the HCA on this subject 	2010 2010-2015 2010 2010-2015 2010-2011	Plans commenced Commenced Commenced Commenced Recommendation
20, 21, 22, 23	Develop a Sustainable Energy Action Plan to guide energy planning in local authorities, including, amongst other factors: <ul style="list-style-type: none"> Considering a uniform approach to low-carbon metrics Identify opportunities for policy convergence Developing a heat demand map Identifying potential heat suppliers Consider whether it is appropriate to allocate land for energy infrastructure 	2010-12	Framework commenced
22	Consider if it is appropriate to allocate land for low carbon infrastructure	2010	Recommendation
24	Provide a voice for GM in the development of UK energy policy	2010 onwards	Recommendation
25	Identify the skills, capacity and resources needed to deliver the GM Energy Group's priorities and develop working arrangements in order to take them forwards	2010	Commenced

No.	Action	Time Frame	Status
26	Develop proposals for new working arrangements to meet skills and capacity gaps	2010-2011	Recommendation
27	Identify effective solutions to encourage behavioural change in energy use including effective communication to communities and businesses	2010-2011	Recommendation

